THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

Metropolitan
Climate Action Plan

*Draft Program
Environmental
Impact Report*

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The Metropolitan Water District of Southern California

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Acronyms and Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
AB	Assembly Bill
APCD	Air Pollution Control Districts
AQIA	Air Quality Impact Analysis
AQMP	Air Quality Management Plan
AVAQMD	Antelope Valley Air Quality Management District
AWTP	Advanced water treatment plant
BAAQMD	Bay Area Air Quality Management District
BESS	Battery energy storage systems
BMPs	Best Management Practices
°C	Degrees Celsius
CAAQS	California Ambient Air Quality Standards
CAISO	California Independent System Operator
CalEEMod	California Emissions Estimator Model
CAL FIRE	California Department of Forestry and Fire Protection
Cal OSHA	California Occupational Safety and Health Administration
CAP	Climate Action Plan
CARB	California Air Resources Board
CBC	California Building Code
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
CO_2e	Carbon Dioxide Equivalent
CO	Carbon Monoxide
CRA	Colorado River Aqueduct
CRHR	California Register of Historical Resources
cy	Cubic Yards
dB	Decibels

DNL	Day-Night Average Level
DOF	California Department of Finance
DPM	Diesel exhaust particulate matter
EIR	Environmental Impact Report
EMFAC2017	EMissions FACtor 2017
°F	Degree Fahrenheit
FHSZ	Fire Hazard Severity Zones
FHWA	Federal Highway Administration
FMP	Fisheries Management Plans
FTA	Federal Transit Administration
GHG	Greenhouse Gas
GWP	Global Warming Potentials
HABS	Historic American Building Survey
HCP	Habitat Conservation Plan
HMMP	Habitat Mitigation and Monitoring Plan
hp	Horsepower
Hz	Hertz
ICAPCD	Imperial County Air Pollution Control District
IPCC	Intergovernmental Panel on Climate Change
ITP	Incidental Take Permit
LED	Light Emitting Diode
LEED	Leadership in Energy Efficiency and Design
L_{eq}	Equivalent Noise Level
LRA	Local Responsibility Areas
LSAT	Land-Surface Air Temperature
LSTs	Localized Significance Thresholds
MBTA	Migratory Bird Treaty Act
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
Metropolitan	The Metropolitan Water District of Southern California
MT	Metric tons
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NCCP	Natural Community Conservation Plan
NMFS	National Marine Fisheries Service
NO_x	Nitrogen oxides

NOAA	National Oceanic and Atmospheric Administration
NOP	Notice of Preparation
NPPA	Native Plant Protection Act
NRHP	National Register of Historic Places
OEHHA	California Office of Environmental Health Hazard Assessment
OSHA	Occupational Safety and Health Administration
PEIR	Program Environmental Impact Report
PM	Particulate Matter
ppm	Part Per Million
PPV	Peak Particle Velocity
PQS	Professional Qualifications Standards
PRC	Public Resources Code
RCNM	Roadway Construction Noise Model
RCRA	Resource Conservation and Recovery Act
RMS	Root Mean Squared
RRWP	Regional Recycled Water Program
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SCCAB	South Central Coast Air Basin
SCE	Southern California Edison
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SFBAAB	San Francisco Bay Area Air Basin
SGIP	Self-Generation Incentive Program
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SOI	Secretary of the Interior
SRA	Source Receptor Area
SRA	State Responsibility Area
SSAB	Salton Sea Air Basin
SWP	State Water Project
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TACs	Toxic Air Contaminants

USC	United States Code
U.S. DOT	United States Department of Transportation
VCAPCD	Ventura County Air Pollution Control District
VdB	Vibration Decibels
VMT	Vehicle Miles Travelled
VOCs	Volatile Organic Compounds
WTP	Water Treatment Plant
YLHEP	Yorba Linda Hydroelectric Power Plant
ZEV/EV	Zero-Emissions Vehicle/Electric Vehicle

Executive Summary

This document is a draft Program Environmental Impact Report (PEIR) analyzing the potential environmental effects of The Metropolitan Water District of Southern California's (Metropolitan) proposed Climate Action Plan (CAP or proposed program). This section summarizes the characteristics of the proposed program, the environmental impacts and mitigation measures associated with implementation of the proposed program, and alternatives to the proposed program considered in this draft PEIR.

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ES.2 Program Summary

Climate Action Planning

In response to mounting urgency surrounding global climate change and mandated emissions reductions, entities in California and around the world have developed CAPs. While the content of such plans varies depending on the specific emissions reduction objectives of the lead agency, CAPs generally include a baseline inventory of greenhouse gas (GHG) emissions, a forecast of future GHG emissions, a GHG reduction goal consistent with applicable reduction targets, and a series of policies, measures, or actions intended to achieve the reduction goal.

As Metropolitan's service population has grown, continued and increasing efforts to reduce the environmental and economic impact of Southern California's water supply have contributed to Metropolitan's resiliency and opportunities for neutralizing its carbon footprint. Metropolitan furthers this commitment to sustainability and efficiency by proposing to adopt a CAP to establish an emissions reduction target and describe in detail reduction activities and policies Metropolitan may implement to achieve its reduction targets over time.

Plan Area

The proposed CAP includes GHG emissions reduction measures for Metropolitan's construction, operation, and maintenance activities. It is anticipated that most reduction measures would be implemented throughout a six-county Southern California region comprising Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. These counties include all of Metropolitan's service area and most of its infrastructure facilities. The proposed CAP may also involve implementation of GHG emissions reduction measures or programs at Metropolitan land holdings in Imperial County, specifically within the Palo Verde Valley; as well as Bacon Island, Bouldin Island, Holland Tract, and Webb Tract in the Sacramento-San Joaquin Delta region (San Joaquin County and Contra Costa counties).

While environmental emissions influence climate change at a global scale, the analysis in this PEIR focuses on potential impacts associated with implementation of the proposed CAP in California, and more specifically, the Plan Area, consistent with the requirements and applicability of CEQA.

Program Components

Emissions Inventory

The proposed CAP contains an inventory of Metropolitan's GHG emissions from 1990 to 2020 Due to the geographically disparate nature of Metropolitan's operations, emissions reported in the inventory are based on activities over which Metropolitan has direct operational control. The inventory delineates emissions by Scope, as defined in the Local Governments for Sustainability reporting frameworks and detailed below. The emissions inventory reports Metropolitan's GHG emissions in metric tons of carbon dioxide equivalent or CO_2e.

- **Scope 1 Emissions**. Scope 1 emissions are those associated with direct emissions from sources owned or controlled by Metropolitan. This includes emissions from direct fuel combustion, including natural gas, propane, welding gasses, and gasoline and diesel used to power Metropolitan's vehicle fleet.
- **Scope 2 Emissions**. Scope 2 emissions are those associated with indirect emissions associated with the consumption of Metropolitan's purchased electricity use. Specifically, emissions generated at power plants that supply electricity for Metropolitan operations. Metropolitan purchases electricity from power generated from within California and from outside of California in the southwestern United States, which includes electricity generated from hydropower at the Hoover Dam. Scope 2 emissions also include transmission and distribution losses that occur as electricity is delivered to Metropolitan facilities.
- **Scope 3 Emissions**. Scope 3 emissions are other indirect emissions that occur as a result of Metropolitan's operations, including emissions associated with waste generation, water consumption and wastewater generation from Metropolitan-owned buildings, employee commutes, and construction activities.

The proposed CAP also includes an emissions forecast through 2045 to account for potential changes in hydrology, climate, climate and air quality regulations, population growth, operations, and future construction projects that may affect Metropolitan's emissions in the future. Furthermore, the emissions forecast allows for comparison between forecasted GHG emissions and reduction targets to understand the reductions necessary to achieve Metropolitan's GHG reduction goals.

Reduction Target

The proposed CAP establishes a GHG reduction target aligned with applicable state GHG reduction policies. The CAP considers various reduction levels, target methodologies, and tracking mechanisms to quantify and measure progress toward GHG emissions reductions. Ultimately, a linear per capita target or "Linear Reduction to Carbon Neutral by 2045 – Per Capita Target" with a Carbon Budget tracking mechanism, described in greater detail in Chapter 2, *Project Description*, was utilized.

GHG Reduction Measures

In order to achieve the proposed CAP's emissions reduction target, GHG emissions reduction measures would need to be implemented. The CAP includes 39 proposed GHG emissions reduction measures that, if implemented, could help Metropolitan reduce its Scope 1, Scope 2, and Scope 3 emissions. Reduction measures for each Scope are grouped into nine strategies that could be employed at Metropolitan's various facility types during facility maintenance activities and future expansion and construction activities, as well as policies and projects to explore new technologies and practices to conserve resources. The reduction measures do not include actions taken by Metropolitan to date that have resulted in GHG emissions reductions, such as Metropolitan's early adoption of hybrid-electric vehicles for its operational fleet and Leadership in Energy Efficiency and Design (LEED) certification for several of its facilities. However, the measures may build or expand upon these past actions. Most measures within the nine categories are either administrative (e.g., studies, investigations) in nature or involve replacement of existing infrastructure with newer, more efficient infrastructure at the same location and, therefore, would not have physical impacts to the environment. Measures with the potential to result in physical impacts to the environment are described in detail in Chapter 2, *Project Description*.

ES.3 Alternatives

This draft PEIR examines alternatives to the proposed program in Chapter 7, *Alternatives*. Section 15126.6(a) of the *State CEQA Guidelines* states that an EIR shall describe "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project," as well as provide an evaluation of "the comparative merits of the alternatives." Under Section 15126.6(a), an EIR does not need to consider alternatives that are not feasible, nor need it address every conceivable alternative to the project. As discussed in greater detail in Chapter 7, *Alternatives*, several alternatives were considered but rejected, including alternative locations and alternative methods, as these alternatives would not be feasible, accomplish the basic objectives of the proposed program, or substantially lessen environmental effects.

This draft PEIR considers a No Program Alternative to determine whether environmental impacts would be similar to, less than, or greater than those of the proposed CAP. The No Program Alternative, as well as all alternatives considered but rejected, are described in greater detail in Chapter 7, *Alternatives*.

ES.4 Areas of Known Controversy

Section 15123(b)(2) of the *State CEQA Guidelines* requires that an EIR identify areas of controversy which are known to the lead agency, including issues raised by other agencies and the public. Areas of controversy associated with the proposed program are made known through comments received during the Notice of Preparation (NOP) process, as well as input solicited during public scoping meetings and an understanding of the community issues in the study area.

The comments on the NOP for the draft PEIR for the proposed CAP generally expressed concern over the following issues: alternatives analysis and impacts to biological species and jurisdictional habitats (California Department of Fish and Wildlife [CDFW]), air quality impacts from construction or operation of projects implemented under the proposed program (San Joaquin Valley Unified Air Pollution Control District [SJVAPCD], Mojave Desert Air Quality Management District [MDAQMD], South Coast Air Quality Management District [SCAQMD], and Ventura County Air

Pollution Control District [VCAPCD]), impacts to tribal cultural resources (Native American Heritage Commission [NAHC]), and watershed management (Ventura County Public Works). Appendix A contains a copy of the NOP and the comment letters received during the NOP scoping period.

ES.5 Issues to be Resolved

*State CEQA Guideline*s Section 15123(b)(3) requires that an EIR contain a discussion of issues to be resolved, including the choice among alternatives and whether or how to mitigate significant effects. Issues to be resolved for the proposed CAP include:

- How to address impacts from individual projects under the proposed CAP given that specific details for implementation of all GHG emissions reduction measures are not sufficient to prepare a project-level analysis at this time; and
- How best to implement programmatic mitigation measures identified in this draft PEIR at the project-level to reduce potential environmental impacts associated with implementation of the proposed CAP to the degree feasible.

ES.6 Summary of Impacts and Mitigation Measures

Table 1 includes a brief description of the identified environmental impacts associated with each threshold analyzed in detail in the draft PEIR, proposed mitigation measures, and the level of significance after mitigation.

This document is a PEIR. Section 15168(a) of the *State CEQA Guidelines* states that:

> A Program EIR is an EIR which may be prepared on a series of actions that can be characterized as one large project and are related either: (1) geographically; (2) as logical parts in a chain of contemplated actions; (3) in connection with issuance of rules, regulations, plans, or other general criteria, to govern the conduct of a continuing program; or (4) as individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways.

As a programmatic document, this draft PEIR presents a regional assessment of the impacts of the proposed CAP prepared by Metropolitan. Analysis of site-specific impacts of individual projects is not the focus of a PEIR. Many specific projects are not currently defined at a level that would allow for such an analysis. The appropriate level of project-specific environmental analysis of individual projects would be undertaken, as necessary, by Metropolitan prior to each project being considered for approval. This draft PEIR serves as a first-tier CEQA document that will support second-tier CEQA documents for individual projects to be implemented under the proposed CAP.

This draft PEIR evaluates potential impacts against existing conditions, which are generally conditions existing at the time of the release of the NOP (June 23 to July 22, 2020). Mitigation identified in this draft PEIR, as listed in Table 1, shall be implemented by Metropolitan for individual CAP projects under its jurisdiction, as applicable and necessary. Project-specific environmental documents may adjust these mitigation measures as necessary to respond to site-specific conditions at the time of implementation.

As summarized in Table 1, this draft PEIR identifies significant and unavoidable impacts in the resource categories of air quality, cultural resources, and noise. Significant and unavoidable impacts identified in this draft PEIR are a result of the potential for construction activities associated with individual projects to exceed air quality emissions thresholds, impact historical or archaeological resources, or exceed noise or vibration thresholds. Because construction specifics such as project footprint, construction schedules, and equipment usage are not known at this time, such impacts are presumed to be significant and unavoidable. However, such impacts may be reduced once individual project details are known and project-level analysis occurs. All other potentially significant impacts identified would be reduced to less than significant levels with the implementation of mitigation measures.

Table 1 Summary of Environmental Impacts, Mitigation Measures and Impacts After Mitigation

Impact	Mitigation Measure(s)	Significance After Mitigation
Air Quality		
Impact AQ-A. Implementation of the individual projects proposed under the CAP would potentially conflict with or obstruct implementation of the applicable air quality plan due to construction emissions. This impact would be potentially significant.	**MM AQ-1 Construction Air Quality Assessment** For individual projects to be implemented under the CAP that involve construction activities with an intensity (i.e., size, schedule, equipment, demolition, import/export of soil, architectural coating) greater than the sample program activity, an air quality assessment shall be prepared to evaluate construction emissions in light of the applicable air district thresholds. **MM AQ-2 Implement Emission Reduction Measures** If construction emissions would exceed any of the applicable thresholds, emission reduction measures shall be implemented to reduce emissions below the thresholds. Measures may include, but would not be limited to: • All construction equipment shall be equipped with Tier 4 certified engines or CARB-certified Level 3 diesel particulate filters. All diesel particulate filters shall be kept in working order and maintained in operable condition according to manufacturer's specifications, as applicable. • Construction equipment with lower horsepower ratings shall be utilized, as applicable and practicable. • Ultra-low-sulfur diesel fuel shall be used for stationary construction equipment, as applicable. • Low-emission on-site stationary equipment shall be used, as applicable. • Alternatively-fueled construction equipment (e.g., renewable diesel, natural gas, electric) shall be utilized instead of diesel-fueled construction equipment, as applicable. • The schedule for soil import and/or export shall be extended to reduce the number of daily haul truck trips, as applicable. • The schedule for the coating/painting phase shall be extended to reduce the square footage coated/painted each day, as applicable. • Architectural coatings with a VOC content of less than 250 grams per liter shall be utilized.	Significant and unavoidable.
Impact AQ-B. Construction impacts related to criteria air pollutant emissions resulting from implementation of individual projects proposed under the CAP would be potentially significant.	**MM AQ-1** and **MM AQ-2**.	Significant and unavoidable.
Impact AQ-C. Neither construction nor operation of individual projects proposed under the CAP would expose sensitive receptors to substantial pollutant concentrations. This impact would be less than significant.	This impact would be less than significant. No mitigation is required.	Less than significant. No mitigation required.

Impact	Mitigation Measure(s)	Significance After Mitigation
Impact AQ-D. Neither construction nor operation of individual projects implemented under the proposed CAP would result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. This impact would be less than significant.	This impact would be less than significant. No mitigation is required.	Less than significant. No mitigation required.
Biological Resources		
Impact BIO-A. Implementation of individual projects under the proposed CAP would potentially have a substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or other special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. This impact would be potentially significant.	**MM BIO-1 Special Status Plant Species Surveys** If completion of the project-specific biological resources assessment determines that special status plant species have potential to occur on site, surveys for special status plants shall be completed prior to any vegetation removal, grubbing, or other construction activity of each program activity (including staging and mobilization). The surveys shall be floristic in nature and shall be seasonally timed to coincide with the target species identified in the program activity-specific biological resources assessment. All plant surveys shall be conducted by a qualified biologist no more than one year prior to project implementation (annual grassland habitats may require yearly surveys). Surveys shall be conducted in accordance with current protocols established by the CDFW, USFWS and the local jurisdictions if said protocols exist. If special status plant species are identified, Mitigation Measure BIO-2 shall apply. **MM BIO-2 Special Status Plant Species Avoidance, Minimization, and Mitigation** If state- or federally-listed special status and/or CRPR 1 and 2 plant species are identified during the project-specific biological assessment, the activity shall be re-designed to avoid impacting these plant species to the maximum extent feasible. If CRPR 3 and 4 species are found, the biologist shall evaluate if they meet criteria to be considered special status, and if so, the same process as identified for CRPR 1 and 2 species shall apply. If special status plant species cannot be avoided and would be impacted by a program activity implemented under the proposed CAP, all impacts shall be mitigated at an appropriate ratio (minimum ratio of 1:1) to fully offset program activity impacts, as determined by a qualified biologist for each species. A restoration plan shall be prepared and implemented, as applicable. **MM BIO-3 Endangered/Threatened Animal Species Habitat Assessment and Protocol Surveys** If the results of the project-specific biological resources assessment determine suitable habitat may be present for any federally and/or state endangered or threatened animal species, habitat assessments and/or protocol surveys shall be completed in accordance with CDFW and/or USFWS/NMFS protocols prior to construction. Alternatively, in lieu of conducting protocol surveys, Metropolitan may choose to assume presence within the activity footprint and proceed with implementing appropriate avoidance measures, consultation, and permitting, as applicable.	Less than significant with mitigation incorporated.

Impact	Mitigation Measure(s)	Significance After Mitigation
	If the target species are detected during protocol surveys, or protocol surveys are not conducted and presence is assumed based on suitable habitat, Mitigation Measure BIO-4 shall apply. **MM BIO-4 Endangered/Threatened Animal Species Avoidance and Mitigation** If habitat is occupied or presumed occupied by federal and/or state-listed species and would be impacted by program activities, the program activity shall be redesigned in coordination with a qualified biologist to avoid impacting occupied/presumed occupied habitat to the maximum extent feasible. If occupied or presumed occupied habitat cannot be avoided, Metropolitan shall consult with USFWS, NMFS, and/or CDFW in order to determine the appropriate course of action, which may include a Biological Opinion (BO) or HCP/ITP issued by the USFWS/NMFS (relevant to federally listed species) and/or the ITP issued by the CDFW (relevant to state listed species). If occupied or presumed occupied habitat cannot be avoided, compensatory mitigation shall be provided (minimum ratio of 1:1) to fully offset impacts to habitat prior to the construction. Compensatory mitigation may be provided through purchase of mitigation bank credits, in-lieu fee, or permittee-responsible habitat restoration/establishment/enhancement/preservation. Compensatory mitigation may be combined/nested with special status plant species and sensitive natural community restoration, where applicable. Temporary impact areas shall be restored to similar pre-project conditions. If on and/or off-site habitat restoration/conservation is identified, a Habitat Mitigation and Monitoring Plan (HMMP) shall be prepared to ensure the success of compensatory mitigation sites. The HMMP shall identify long-term site management needs, routine monitoring techniques, and performance standards for determining that the conservation site has met the necessary criteria to function as a suitable mitigation site. **MM BIO-5 Endangered/Threatened Species Avoidance and Minimization During Construction** The following measures shall be applied to aquatic and terrestrial species, where appropriate. Metropolitan shall select from these measures as appropriate depending on site conditions, the species with potential for occurrence, and the results of the project-specific biological resources assessment (Mitigation Measure BIO-1). Pre-construction surveys for federal and/or state listed species with potential to occur shall be conducted where suitable habitat is present by a qualified biologist not more than 72 hours prior to the start of construction activities. The survey area shall include the proposed disturbance area and all proposed ingress/egress routes, plus a species-specific buffer. If any life stage of federal and/or state listed species is found within the survey area, the appropriate measures in the BO or HCP/ITP issued by the USFWS/NMFS (relevant to federally listed species) and/or the ITP issued by the CDFW (relevant to state listed species) shall be implemented; or if such guidance is not in place for the activity, the qualified biologist shall recommend an appropriate course of action, which may include consultation with USFWS, NMFS, and/or CDFW.	

Impact	Mitigation Measure(s)	Significance After Mitigation
	• The activity limits of disturbance shall be flagged. Areas of special biological concern within or adjacent to the limits of disturbance shall have Environmental Sensitive Area fencing installed between said area and the limits of disturbance. • All activities occurring within or adjacent to sensitive habitats that may support federally and/or state endangered/threatened species shall have a qualified biologist present during all initial ground disturbing/vegetation clearing activities. Once initial ground disturbing/vegetation clearing activities have been completed, the biologist shall conduct pre-activity clearance surveys, as needed to ensure protection of endangered/threatened species. • If pumps are used for dewatering activities, all intakes shall be completely screened with wire mesh not larger than five millimeters to prevent animals from entering the pump system. • If at any time during construction of the program activity an endangered/threatened species enters the construction site or otherwise may be impacted by the program activity, all program activities shall cease. At that point, a qualified biologist shall recommend an appropriate course of action, which may include consultation with USFWS, NMFS, and/or CDFW. Alternatively, the appropriate measures shall be implemented in accordance with the BO or HCP/ITP issued by the USFWS (relevant to federal listed species) and/or the ITP issued by the CDFW (relevant to state listed species) and work can then continue as guided by those documents and the agencies, as appropriate. • All trenches, pipes, culverts or similar structures shall be inspected for animals prior to burying, capping, moving, or filling. • Upon completion of the program activity, a qualified biologist shall prepare a final compliance report documenting all compliance activities implemented for the activity, including the pre-construction survey results. **MM BIO-6 Non-Listed Special Status Animal Species Avoidance and Minimization** Depending on the species identified in the project-specific biological resource assessment , the following applicable measures shall be implemented to reduce the potential for impacts to non-listed special status animal species: • Pre-construction clearance surveys shall be conducted by a qualified biologist within 14 days prior to the start of construction (including staging and mobilization). The surveys shall cover the entire disturbance footprint plus a minimum 100-foot buffer and shall identify all special status animal species that may occur on-site. The qualified biologist shall make recommendations for avoidance of non-listed special status species, such as through the use of exclusion fencing, buffer zones, etc. • A qualified biologist shall be present during all initial ground disturbing activities, including vegetation removal, to recover special status animal species encountered during construction activities.	

Impact	Mitigation Measure(s)	Significance After Mitigation
	• Upon completion of the program activity, a qualified biologist shall prepare a final compliance report documenting all compliance activities implemented for the program activity, including the pre-construction survey results. • If special status bat species may be present and impacted by the program activity, within 30 days of the start of construction a qualified biologist shall conduct presence/absence surveys for special status bats where suitable roosting habitat is present. Surveys shall be conducted using acoustic detectors and by searching tree cavities, crevices and other areas where bats may roost. If active bat roosts or colonies are present, the biologist shall evaluate the type of roost to determine the next step. o If a maternity colony is present, all construction activities shall be postponed within a 250-foot buffer around the maternity colony until it is determined by a qualified biologist that the young have dispersed. Once it has been determined that the roost is clear of bats, the roost shall be removed immediately. o If a roost is determined by a qualified biologist to be used by a large number of bats (large hibernaculum), alternative roosts, such as bat boxes if appropriate for the species, shall be designed and installed near the program activity site. The number and size of alternative roosts installed will depend on the size of the hibernaculum and shall be determined by a qualified biologist. o If other active roosts are located, exclusion devices shall be installed such as valves, sheeting or flap-style one-way devices that allow bats to exit but not re-enter roosts to discourage bats from occupying the site.	
Impact BIO-B. Individual projects implemented under the proposed CAP could result in significant impacts to riparian habitats wetlands and/or sensitive natural communities. This impact would be potentially significant. **Impact BIO-C.** Individual projects implemented under the proposed CAP may result in significant impacts to state or federally protected wetlands. This impact would be potentially significant.	**MM BIO-7 Jurisdictional Delineation and Impact Avoidance** If the results of Mitigation Measure BIO-1 indicate program activities implemented under the proposed CAP would impact wetlands, drainages, riparian habitats, or other areas that may fall under the jurisdiction of the CDFW, USACE, and/or RWQCB, a qualified biologist shall complete a jurisdictional delineation. The jurisdictional delineation shall determine the extent of the jurisdiction for each of these agencies within the program activity site and shall be conducted in accordance with the requirement set forth by each agency. The results shall be provided in a jurisdictional delineation report submitted to Metropolitan, USACE, RWQCB, and CDFW, as appropriate, for review and approval. The program activity shall be designed to avoid or minimize impacts to jurisdictional areas to the maximum extent feasible. **MM BIO-8 Wetlands, Drainages and Riparian Habitat Restoration** If impacts to jurisdictional drainages, wetlands, riparian habitat, and sensitive vegetation communities cannot be avoided, impacts shall be mitigated at an appropriate ratio to fully offset project-specific impacts (minimum ratio of 1:1). Where feasible, temporarily impacted areas shall be restored to pre-project conditions. An HMMP shall be developed by a qualified biologist and submitted to the agency overseeing the program activity for approval. Alternatively, mitigation shall be accomplished through purchase of credits from an approved mitigation bank or in-lieu fee program.	Less than significant with mitigation incorporated.

Impact	Mitigation Measure(s)	Significance After Mitigation
	MM BIO-9 Sensitive Natural Community Avoidance and Mitigation If the results of Mitigation Measure BIO-1 indicate program activities implemented under the proposed CAP would impact sensitive natural communities, impacts shall be avoided through final program activity design modifications. If Metropolitan determines sensitive communities cannot be avoided, impacts shall be mitigated on-site or off-site at an appropriate ratio to fully offset program activity impacts (minimum ratio of 1:1). Temporarily impacted areas shall be restored to pre-project conditions. An HMMP shall be developed by a qualified biologist and submitted to the agency overseeing the program activity for approval.	
Impact BIO-D. Neither construction nor operation of individual projects implemented under the proposed CAP would interfere with movement of native resident or migratory fish or wildlife species or established wildlife corridors. This impact would be less than significant.	This impact would be less than significant. No mitigation is required.	Less than significant. No mitigation required.
Impact BIO-E. Neither construction nor operation of individual projects implemented under the proposed CAP would impact protected trees and, as such, would not conflict with local policies or ordinances protecting biological resources. This impact would be less than significant.	This impact would be less than significant. No mitigation is required.	Less than significant. No mitigation required.
Impact BIO-F. Individual projects implemented under the proposed CAP would not conflict with a Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan area. This impact would be less than significant.	This impact would be less than significant. No mitigation is required.	Less than significant. No mitigation required.
Cultural Resources		
Impact CUL-A. Individual projects implemented under the proposed CAP would have the potential to cause a substantial adverse change in the significant of a historical resource. This impact would be potentially significant.	**MM CUL-1(a) Built Environment Investigation** A historic resources evaluation shall be prepared for any future proposed project facilitated by the CAP involving a property which includes buildings, structures, objects, landscape/site plans, or other features that are 45 years of age or older. The evaluation shall be prepared by a qualified architectural historian or historian who meets the Secretary of the Interior’s (SOI) Professional Qualifications Standards (PQS) in architectural history or history. The qualified architectural historian or historian shall conduct an evaluation in accordance with the guidelines and best practices promulgated by the State Office of Historic Preservation to identify any potential historical resources within the proposed	Significant and unavoidable

Impact	Mitigation Measure(s)	Significance After Mitigation
	project area. The evaluation of the potential resource within its historic context shall be documented. All evaluated properties shall be documented on Department of Parks and Recreation Series 523 Forms. If a property is identified as an eligible historical resource under CEQA, Mitigation Measure CUL-1(b) shall be implemented. **MM CUL-1(b) Built Environment Documentation Program** If eligible built environment historical resources are identified for a future proposed project implemented under the CAP, efforts shall be made to the extent feasible to ensure that impacts are avoided. If avoidance is not possible, a Built Environment Documentation Program shall be implemented. Measures may include but are not limited to, compliance with the Secretary of the Interior's Standards for Treatment of Historic Properties and documentation of the historical resource in the form of a Historic American Building Survey (HABS)- report or HABS-Like report. The HABS or HABS-Like report shall comply with the Secretary of the Interior's Standards for Architectural and Engineering Documentation and shall generally follow the HABS Level III requirements, including digital photographic recordation, detailed historic narrative report, and compilation of historic research. Application of mitigation shall generally be overseen by a qualified architectural historian or historic architect meeting the PQS, unless unnecessary in the circumstances (e.g., preservation in place). **MM CUL-3 Previously Unidentified Resources Encountered During Construction** In the event that any potentially significant cultural resources are unexpectedly encountered during construction, work will be immediately halted and the discovery shall be protected in place. A 50-foot buffer around the exposed resource shall be established until a qualified cultural resources specialist evaluates the discovery. If the qualified cultural resources specialist determines that the discovery represents a potentially significant cultural resource, including a potential historical resource, additional investigations may be required to mitigate adverse impacts from project implementation. This additional work may include avoidance, testing, and evaluation or data recovery excavation. Work shall be prohibited in the restricted area until Metropolitan provides written authorization.	
Impact CUL-B. Individual projects implemented under the proposed CAP may cause a substantial adverse change in the significance of an archaeological resource. This impact would be potentially significant.	**MM CUL-2(a) Phase 1 Archaeological Resource Investigation** If archaeological resources are identified during project-specific analysis that may be adversely affected by any future proposed project implemented under the CAP, Metropolitan shall retain a qualified archaeologist meeting the Secretary of the Interior standards in archaeology to complete a Phase 1 cultural resources assessment of the site. A Phase 1 cultural resources assessment will include an archaeological pedestrian survey of the site, if feasible, and sufficient background archival research to determine whether subsurface prehistoric or historic remains may be present. Archival research should include a current records search from the appropriate California Historical Resources Information System information center and a Sacred Lands File search conducted with the Native American Heritage Commission. A Phase 1 report or results documentation shall be submitted to Metropolitan prior to any ground disturbing activities. Recommendations contained therein shall be implemented throughout all ground disturbance activities.	Significant and unavoidable.

Impact	Mitigation Measure(s)	Significance After Mitigation
	MM CUL-2(b) Extended Phase 1 Investigation For any projects proposed within 100 feet of a known archaeological site and/or in areas identified as sensitive by the Phase 1 study, an Extended Phase 1 (XPI) study shall be conducted to determine the presence/absence and extent of archaeological resources on the project site. XPI testing should comprise a series of shovel test pits and/or hand augured units and/or mechanical trenching intended to establish the horizontal and vertical boundaries of archaeological site(s) on the project site. No archaeological resources would be collected during the XPI Investigation. If an archaeological site is identified, Mitigation Measure CUL-2(c) or CUL-2(d) shall be implemented. **MM CUL-2(c) Avoidance of Archaeological Resources** Identified prehistoric or historic archaeological resources shall be avoided and preserved in place, where feasible. Where avoidance and preservation in place is not feasible, additional measures shall be applied as identified in Mitigation Measure CUL-2(d) through CUL-2(g). **MM CUL-2(d) Phase 2 Archaeological Resources Investigation and Evaluation** Where preservation is not feasible, each resource shall be evaluated for significance and eligibility for listing in the CRHR through a Phase 2 archaeological resource evaluation. A Phase 2 evaluation shall include any necessary archival research to identify significant historical associations as well as mapping of surface artifacts, collection of functionally or temporally diagnostic tools and debris, and excavation of a sample of the cultural deposit to characterize the nature of the sites, define the artifact and feature contents, determine horizontal boundaries and depth below surface, and retrieve representative samples of artifacts and other remains. A final Phase 2 Testing and Evaluation report shall be submitted to Metropolitan prior to any ground disturbing activities. Recommendations contained therein shall be implemented throughout all ground disturbance activities. **MM CUL-2(e) Phase 3 Archaeological Data Recovery Program** If an archaeological resource meets the CRHR eligibility and cannot be avoided, Metropolitan shall implement a Phase 3 Archaeological Data Recovery Program, conducted to exhaust the data potential of significant archaeological sites. The Phase 3 Archaeological Data Recovery Program shall follow a research design prepared by a qualified archaeologist meeting the SOI PQS standards for archaeology and approved by Metropolitan in advance of Phase 3 fieldwork and excavations. The Phase 3 Data Recovery research design will use appropriate archaeological field and laboratory methods consistent with the California Office of Historic Preservation Planning Bulletin 5 (1991), Guidelines for Archaeological Research Design, or the latest edition thereof. The final Phase 3 Data Recovery report shall be submitted to Metropolitan prior to and any ground disturbing activities. Recommendations contained therein shall be incorporated into project design and implemented throughout all ground disturbance activities. **MM CUL-2(f) Processing and Curation of Archaeological Materials** Archaeological materials collected from the sites during the implementation of Mitigation Measures CUL-2(d) through CUL-2(e) shall be processed and analyzed in the laboratory according to standard archaeological procedures. The age of the materials shall be	

Impact	Mitigation Measure(s)	Significance After Mitigation
	determined using radiocarbon dating and/or other appropriate procedures; lithic artifacts, faunal remains, and other cultural materials shall be identified and analyzed according to current professional standards. The significance of the sites shall be evaluated according to the criteria of the CRHR. The results of the investigations shall be presented in a technical report following the standards of the California Office of Historic Preservation publication "Archaeological Resource Management Reports: Recommended Content and Format (1990 or latest edition)". Upon completion of the work, all artifacts, other cultural remains, records, photographs, and other documentation shall be curated an appropriate established curation facility based on the location of the fieldwork and/or repatriated to local Native Americans as appropriate. All fieldwork, analysis, report production, and curation shall be fully funded by Metropolitan. **MM CUL-2(g) Cultural Resources Monitoring** If recommended by Phase 1 (Mitigation Measure CUL-2(a)), XPI (Mitigation Measure CUL-2(b)), Phase 2 (Mitigation Measure CUL-2(d)), or Phase 3 (Mitigation Measure CUL-2(e)) studies, Metropolitan shall retain a qualified archaeologist to monitor project-related, ground-disturbing activities. **MM CUL-3**	
Impact CUL-C. Individual projects implemented under the proposed CAP would be required to comply with all applicable regulations pertaining to the discovery of human remains. This impact would be less than significant.	This impact would be less than significant. No mitigation is required.	Less than significant. No mitigation required.
Noise		
Impact NOI-A. Individual projects implemented under the proposed CAP may result in generation of a substantial temporary or permanent increase in ambient noise levels. This impact would be potentially significant.	**MM NOI-1 Locate Excavation Sites Away from Noise-Sensitive Receivers, Where Feasible** Construction staging and activities shall be located in areas as far as practicable from sensitive receivers or in areas where receivers can be shielded from construction noise. **MM NOI-2(a) Conduct Project-Level Noise Studies for Construction Activities Where Noise-Sensitive Receivers are Present** Project-level construction noise studies shall be conducted for project activities that would exceed the screening criteria for a less-than-significant impact, as summarized in Table 30 and Table 32 of the draft PEIR. Such noise studies shall identify the existing ambient noise levels, characterize the nearest sensitive receivers, estimate the noise levels receivers will experience during construction of individual projects, compare estimated noise levels to the local jurisdiction's noise limits or to the construction noise criteria in the FTA (2018) *Transit Noise and Vibration Impact Assessment Manual* for those that do not have quantitative construction noise level limits, outline any measures that may be used to reduce noise levels, and determine the amount of noise reduction that would occur with	Significant and unavoidable

Impact	Mitigation Measure(s)	Significance After Mitigation
	implementation of these measures. If the project-level noise study concludes that noise reduction measures are required, Mitigation Measure NOI-2(b) shall be implemented. **MM-NOI-2(b) Implement Noise Reduction Measures** If the results of the noise study determine noise reduction measures are required, noise reduction measures shall be implemented. Construction noise reduction measures may include, but would not be limited to, the use of mufflers, sound blankets/barriers, and/or enclosures and scheduling construction activities to minimize simultaneous operation of noise-producing equipment. Construction noise measures shall be implemented to reduce noise levels to FTA (2018) construction noise criteria, as feasible. If the individual project would be constructed concurrently with development projects located within a 0.5-mile radius of the individual project location, the noise study shall also consider the cumulative impact of construction noise on sensitive receivers. If applicable, construction noise reduction measures shall be implemented to reduce cumulative noise levels to local jurisdiction or FTA (2018) construction noise criteria, as feasible. **MM NOI-2(c) Conduct Project-Level Noise Studies for Post-Construction Activities Where Noise Sensitive Receivers are Present** Prior to the commencement of construction activities for individual projects that may be implemented under the CAP where sensitive receivers are located within 1,000 feet of the individual project sites, project-level post-construction noise studies shall be conducted. Such noise studies shall identify the ambient noise levels, characterize the nearest sensitive receivers, estimate the noise levels receivers will experience during operation of individual projects during the post-construction period, compare estimated noise levels to the noise level standards of the applicable jurisdiction, outline any measures that may be used to reduce noise levels, and determine the amount of noise reduction that would occur with implementation of these measures. Noise reduction measures may include, but would not be limited to, alternative site design, alternative orientation of noise sources, and construction of berms and/or barriers. Noise reduction measures shall be implemented to reduce noise levels to the noise level standards of the applicable jurisdiction, as feasible.	

Impact	Mitigation Measure(s)	Significance After Mitigation
Impact NOI-B. Construction activities associated with implementation of individual projects under the proposed CAP may result in generation of excessive groundborne vibration or groundborne noise levels, depending on the nature and location of such projects. This impact would be potentially significant.	**NOI-3 (a) Locate Excavation Sites Away from Vibration-Sensitive Receivers, Where Feasible** Whenever practicable, vibration-generating equipment including bulldozers, loaded trucks, pile drivers/pneumatic post drivers, bore/drill rigs, vibratory rollers, and jackhammers shall operate outside the minimum distances specified in Table 33 of the draft PEIR for historic sites, other structures, and vibration-sensitive receivers during program construction activities. Furthermore, whenever practicable, vibration-generating equipment including bulldozers, loaded trucks, pile drivers/pneumatic post drivers, bore/drill rigs, vibratory rollers, and jackhammers shall not be operated concurrently with vibration-generating equipment associated with cumulative development projects located within 600 feet of program construction sites. **NOI-3(b) Conduct Project-Level Vibration Analysis for Construction Activities Where Vibration-Sensitive Receivers are Present** If operation of construction equipment outside the specified buffer distances is not practicable, a detailed study of vibration impacts shall be conducted prior to the commencement of construction for that project. Such vibration studies shall characterize the nearest historic sites, structures, and/or sensitive receivers; estimate the vibration levels receivers will experience during construction of individual projects; compare estimated vibration levels to applicable Caltrans (2020) standards for vibration impacts related to structural damage and human annoyance; outline any measures that may be used to reduce vibration levels; and determine the amount of vibration reduction that would occur with implementation of these measures. Vibration reduction measures may include, but would not be limited to, the use of non-vibratory equipment, vibration monitoring, and repair of structural damage. Construction vibration reduction measures shall be implemented to reduce vibration levels to Caltrans (2020) construction vibration thresholds as feasible. If the individual project would be constructed concurrently with cumulative development projects located within a 600-foot radius of the activity location, the vibration study shall also consider the cumulative impact of combined vibration levels at the nearest sensitive receivers by estimating the combined vibration levels receivers will experience during construction of individual projects and cumulative development; compare estimated vibration levels to applicable standards for vibration impacts related to structural damage and human annoyance described in the Caltrans (2020) *Transportation and Construction Vibration Guidance Manual* (CT-HWANP-RT-20-365.01.01); identify whether the individual project's contribution to any identified cumulative impact would be cumulatively considerable; outline any measures that may be used to reduce the project's contribution to combined vibration levels; and determine the amount of vibration reduction that would occur with implementation of these measures. Such measures may include, but are not limited to, the installation of wave barriers, maximization of the distance between vibratory equipment and receivers, restriction of vibration-generating activities to daytime hours, or temporary relocation of affected residents Construction vibration reduction measures shall be implemented to reduce cumulative vibration levels to Caltrans construction vibration thresholds as feasible.	Significant and unavoidable

Impact	Mitigation Measure(s)	Significance After Mitigation
Impact NOI-C. One individual project to be implemented under the proposed CAP is located within the vicinity of a private airstrip or within an airport land use plan. However, projects implemented under the proposed CAP would not expose people residing or working in the area to excessive noise levels. This impact would be less than significant.	This impact would be less than significant. No mitigation is required.	Less than significant. No mitigation required.
Tribal Cultural Resources		
Impact TCR-A. Implementation of projects under the proposed CAP would not cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code Section 5020.1(k), as Native American consultation completed pursuant to Assembly Bill (AB) 52 identified no resources that may be impacted by the proposed program. This impact would be less than significant.	This impact would be less than significant. No mitigation is required.	Less than significant. No mitigation required.
Impact TCR-B. Implementation of projects under the proposed CAP would not cause a substantial adverse change in the significance of a tribal cultural resource determined to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. Native American consultation completed pursuant to AB 52 identified no resources that may be impacted by the proposed program. This impact would be less than significant.	This impact would be less than significant. No mitigation is required.	Less than significant. No mitigation required.

1 Introduction

1.1 Overview of the Proposed Program

The Metropolitan Water District of Southern California (Metropolitan) is proposing a Climate Action Plan (CAP or proposed program) to identify strategies to reduce greenhouse gas (GHG) emissions and achieve the proposed GHG reduction targets. The CAP includes a baseline GHG emissions inventory of Metropolitan's operations from 1990 through 2017, emissions forecast through 2045, emissions reduction targets consistent with Senate Bill (SB) 32 and Executive Order B- 55-18, actions and policies that Metropolitan could implement to achieve GHG reductions, and an implementation roadmap. The CAP would apply to Metropolitan's operations throughout the state within a six-county Southern California region comprised of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties, and Metropolitan-owned facilities located in the Sacramento-San Joaquin Delta and Palos Verdes Valley, Imperial County, defined as the "Plan Area."

1.2 Purpose of the Program Environmental Impact Report

This Program Environmental Impact Report (PEIR) assesses the potential environmental effects of Metropolitan's proposed CAP. This PEIR has been prepared in accordance with the California Environmental Quality Act (CEQA) of 1970 (Public Resources Code [PRC] Section 21000 et seq.) and the Guidelines for Implementation of CEQA (*State CEQA Guidelines*) published by the Public Resources Agency of the State of California (California Code of Regulations [CCR], Title 14, Section 15000 et seq.). Metropolitan is the Lead Agency under CEQA (PRC Section 21067, as amended), is responsible for the preparation of the PEIR, and will use this document to objectively review and assess the proposed program prior to approval or disapproval.

An EIR is intended to: (1) inform decision-makers and the public about the potentially significant environmental effects of the proposed activities; (2) identify the ways that significant environmental effects can be avoided or reduced; (3) prevent significant, avoidable damage to the environment by requiring changes in the proposed program through the use of alternatives or mitigation measures, to the extent that Metropolitan determines the changes to be feasible (*State CEQA Guidelines* Section 15002; PRC Section 21002.1). Further, a PEIR can be prepared for a series of actions that can be characterized as one large project and are related either geographically, as logical parts in contemplated actions, or in the connection with issuance of rules, regulations, plans of other general criteria to govern the conduct of a continuing program (*State CEQA Guidelines* Section 15268; PRC Section 21002.1).

Subsequent activities covered under the proposed program must be examined in the light of the PEIR to determine whether an additional environmental document must be prepared. If a later activity would have effects that were not examined in the PEIR, a new Initial Study would need to be prepared leading to either an EIR or a Negative Declaration (Section 15168 of the *State CEQA Guidelines)*. If the agency finds that pursuant to Section 15162 of the *State CEQA Guidelines*, no new effects could occur or no new mitigation measures would be required, the agency can approve the activity as being within the scope of the project covered by the PEIR, and no new environmental document would be required. An agency must incorporate those feasible mitigation measures and alternatives developed in the PEIR into subsequent actions in the program where such actions would result in similar significant impacts. Where the subsequent activities involve site-specific operations, the agency should use a written checklist or similar device to document the evaluation of the site and the activity to determine whether the environmental effects of the operation were covered in the PEIR. A PEIR will be most helpful in dealing with subsequent activities if it deals with the effects of the program as specifically and comprehensively as possible. With a good and detailed analysis of the proposed program, many subsequent activities could be found to be within the scope of the project described in the PEIR, and no further environmental documents would be required.

1.3 Scope of the Program Environmental Impact Report

This draft PEIR focuses on impacts identified to be potentially significant after impact analysis. The following environmental resource areas were found to include potentially significant impacts and have been studied in-depth in this PEIR:

- Air Quality
- Biological Resources
- Cultural Resources
- Noise

Resource areas identified as having no impacts or less than significant impacts after impact analysis include the following:

- Aesthetics
- Agriculture and Forestry Resources
- Energy
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Population and Housing
- Public Services
- Recreation
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Wildfire

Additionally, this draft PEIR contains a Tribal Cultural Resources section describing Native American tribal outreach efforts conducted by Metropolitan pursuant to the requirements of Assembly Bill (AB) 52.

1.4 Format of the Program Environmental Impact Report

This draft PEIR is organized as follows:

- ***Executive Summary***. The summary includes a brief program description, a summary of environmental impacts and a list of proposed mitigation measures that would reduce or avoid impacts, discussion of alternatives considered, description of areas of controversy known to the lead agency, and any issues to be resolved (*State CEQA Guidelines* Section 15123).
- **Chapter 1, *Introduction***. This chapter introduces the program and describes the scope and purpose of the PEIR, provides a brief summary of the CEQA process, and establishes the document format.
- **Chapter 2, *Project Description***. This chapter provides background information on Metropolitan, a brief discussion on GHG emissions and climate change, the need for the CAP, the objectives of the CAP, the geographic area covered by the CAP, components of the CAP, and a description of the proposed emissions reduction measures.
- **Chapter 3, *Environmental Setting***. This chapter provides a general overview of the environmental setting for the Plan Area, including a regional setting, sub-regional setting, and a description of major Metropolitan facilities and land holdings. This chapter also outlines the PEIR baseline and approach to both program-level and cumulative impact analyses.
- **Chapter 4, *Environmental Impact Analysis***. This chapter constitutes the main body of the PEIR and includes the detailed impact analysis for each environmental resource area listed in Section 1.3, *Scope of the PEIR*. Sections 4.1 to 4.5 include a discussion of methods of analysis, existing conditions, the thresholds identified for the determination of significant impacts, and an evaluation of the impacts associated with the proposed program for each resource area. Where the impact analysis demonstrates the potential for the proposed program to have a significant impact on the environment, mitigation measures are provided that would minimize the significant effects. The PEIR indicates if the proposed mitigation measures would reduce impacts to less-than-significant levels. The cumulative impacts that would result from implementation of the proposed program in combination with other past, present, and reasonably foreseeable or probable future projects are discussed in each resource section. While enough project data exists to make reasonable assumptions about the potential level of significance for each project, additional project-level analysis will be completed when specific, project-level information becomes available for each project proposed in the CAP. The PEIR identifies the additional environmental analysis will be necessary at the project level.
- **Chapter 5, *Effects Found Not to be Significant*.** This chapter discusses the environmental resource areas indicated in Section 1.3, *Scope of the PEIR*, that would not be significantly impacted by the proposed program. Brief descriptions of why impacts would be less than significant in each of these resource areas are provided in this chapter.
- **Chapter 6, *Other Required CEQA Discussion*.** This chapter discusses additional topics required by CEQA, including unavoidable adverse impacts, growth inducement, and irreversible environmental changes.
- **Chapter 7, *Alternatives***. This chapter provides a description of alternatives to the proposed program and an evaluation of their potential to reduce or avoid the CAP's significant impacts.
- **Chapter 8, *References and Preparers***. This chapter contains references for all citations included in the draft PEIR, as well as a list of preparers and contributors.

1.5 Notice of Preparation

Development of the proposed program is subject to the requirements of CEQA, because it is an action subject to discretionary approval by a public agency (in this case, Metropolitan) that has the potential to result in a physical change in the environment. Pursuant to Section 15082 of the *State CEQA Guidelines*, a Notice of Preparation (NOP) of a Draft PEIR, dated June 23 to July 22, 2020, was prepared and circulated to interested agencies, organizations, and individuals to afford them an opportunity to respond with specific comments and/or questions regarding the scope and content of the PEIR. The NOP was also sent to the State Clearinghouse (SCH) at the California Governor's Office of Planning and Research. The SCH number assigned to this PEIR is SCH No. 2020060450. Pursuant to Section 15082 of the *State CEQA Guidelines*, recipients of the NOP for the proposed program were requested to provide responses within 30 days after their receipt of the NOP.

All comments received during the public review period were considered during the preparation of this PEIR. Metropolitan received letters from ten agencies in response to the NOP during the public review period. Written comments are addressed, as appropriate, in the analysis contained in the various subsections of Chapter 4, *Environmental Impact Analysis*, and Chapter 5, *Effects Found Not to be Significant*. The NOP is presented in Appendix A of this PEIR, along with the NOP responses received.

1.6 Availability of Draft Program Environmental Impact Report

This draft PEIR has been distributed to various federal, state, regional, county, and city agencies as well as interested parties for a 45-day public review period in accordance with Section 15087 of the *State CEQA Guidelines*. In addition, this draft PEIR, including supporting technical documentation, is available by appointment to the general public for review during normal operating hours at Metropolitan's offices at 700 North Alameda Street, Los Angeles, California, and can be viewed on Metropolitan's website at the following address: http://www.mwdh2o.com/CEQA.

Agencies and other interested parties may provide written comments on the draft PEIR before the end of the 45-day public review and comment period. Written comments on the draft PEIR must be received by 5 p.m. on the last day of the public review and comment period indicated in the Notice of Availability of a Draft PEIR and submitted to:

Ms. Malinda Stalvey
Senior Environmental Specialist
The Metropolitan Water District of Southern California
Environmental Planning Unit
P.O. Box 54153
Los Angeles, California 90054-0153

Comments may also be emailed to EP@mwdh2o.com (reference "Metropolitan CAP PEIR" in the subject line). Written comments should include the name, mailing address, telephone number, and email address, if available, of a contact person. Following the 45-day public review and comment period for the draft PEIR, Metropolitan will prepare a written response for each written comment received on the draft PEIR. The written comments and responses to those comments, as well as PEIR changes, if any, will be incorporated into a Final PEIR. Pursuant to Section 15092 of the *State CEQA Guidelines*, Metropolitan's Board of Directors will consider the following actions: certify the Final PEIR; adopt the findings of fact, statement of overriding considerations, and mitigation monitoring and reporting program; and approve the proposed program.

2 Project Description

The Metropolitan Water District of Southern California (Metropolitan), the lead agency under the California Environmental Quality Act (CEQA), is proposing a Climate Action Plan (CAP; proposed program) to identify strategies to reduce greenhouse gas (GHG) emissions and achieve the proposed GHG reduction targets. This chapter describes the CAP background and objectives, proposed project components, and the Plan Area. The chapter also provides a detailed summary of Metropolitan's emissions inventory and forecast, proposed emissions reduction targets, proposed emissions reduction measures, and a description of individual projects proposed under the CAP.

2.1 Background and Project Need

2.1.1 The Metropolitan Water District of Southern California

Metropolitan is a regional wholesaler that provides water for 26 member agencies to deliver either directly or through their sub-agencies to nearly 19 million people across a 5,200-square mile service area in six counties (Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura) in Southern California. On average, Metropolitan conveys approximately 1.7 billion gallons of water daily throughout its distribution system. Metropolitan imports water from the State Water Project (SWP) and from the Colorado River via the Colorado River Aqueduct (CRA). Approximately 45 percent of Southern California's water supply comes from these two sources. In addition to imported water, Metropolitan invests in local resource development along with its member agencies and utilizes groundwater banking and transfer programs. Metropolitan also manages water demands by promoting and investing in conservation and water use efficiency projects. Water supplies are conveyed through Metropolitan's extensive distribution system, which includes the CRA, 16 small hydroelectric facilities, nine reservoirs, 819 miles of large-scale pipes, and five water treatment plants.

Due to the large-scale water delivery services supplied by Metropolitan, large amounts of energy are required to bring the water from it source to its ultimate purchasing agency for delivery to the residents of Southern California. Metropolitan's activities include operation and maintenance of water infrastructure, offices, and other facilities throughout Southern California. Such activities require consumption of energy created from coal, hydrocarbon gas liquids, natural gas, petroleum, and renewable sources, many of which result in emissions of GHGs.

2.1.2 Greenhouse Gas Emissions and Global Climate Change

Greenhouse Gases

GHGs are gases that absorb and re-emit infrared radiation in the atmosphere, a process known as the greenhouse effect. As these gases accumulate in the atmosphere, the continued re-emission of radiation contributes to a warming of the planet, known as global warming or global climate change. While GHGs are emitted by both natural processes and human activities, emissions resulting from human activities have increased substantially since the Industrial Revolution during the 18th and 19th centuries, exacerbating the greenhouse effect and resulting in human-induced (or anthropogenic) climate change. GHGs that are widely seen as the principal contributors to human-induced climate change include carbon dioxide, methane, nitrous oxides, fluorinated gases such as hydrofluorocarbons and perfluorocarbons, and sulfur hexafluoride. While a potent GHG, water vapor is excluded from the list of GHGs because it is short-lived in the atmosphere, and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation.

As described above, GHGs are emitted by both natural processes and human activities. Of these gases, carbon dioxide and methane are emitted in the greatest quantities from human activities. Emissions of carbon dioxide are largely by-products of fossil fuel combustion, whereas methane results from off-gassing associated with agricultural practices and landfills.[1]

Human-made GHGs, many of which have greater heat-absorption potential than carbon dioxide, include fluorinated gases and sulfur hexafluoride (United States Environmental Protection Agency [U.S. EPA] 2018). Different types of GHGs have varying global warming potentials (GWP). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere over a specified timescale (generally 100 years). Because GHGs absorb different amounts of heat, a common reference gas (carbon dioxide) is used to relate the amount of heat absorbed to the amount of the individual GHG emission, referred to as "carbon dioxide equivalent" (CO_2e), which is the amount of a GHG emitted multiplied by its GWP. Carbon dioxide has a 100-year GWP of one. By contrast, methane has a 100-year GWP of 25, meaning its global warming effect is 25 times greater than carbon dioxide on a molecule per molecule basis over a 100-year timescale (Intergovernmental Panel on Climate Change [IPCC] 2007).

Climate Change

Globally, climate change has the potential to affect numerous environmental resources through potential impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. Long-term trends have found that each of the past three decades (from 1990 to 2020) has been warmer than all the previous decades in the instrumental record, and the decade from 2000 through 2010 has been the warmest.

The observed global mean surface temperature for the 10-year period from 2006 to 2015 was approximately 0.87 degrees Celsius (°C) higher than the average global mean surface temperature over the period from 1850 to 1900. Furthermore, several independently analyzed data records of global and regional Land-Surface Air Temperature (LSAT) obtained from station observations demonstrate that LSAT as well as sea surface temperatures have increased. Due to past and current activities, anthropogenic GHG emissions are increasing global mean surface temperature at a rate of 0.2°C per decade. In addition to these findings, there are identifiable signs that global warming is

[1] Off-gassing refers to production and emissions of methane, produced when animal waste and municipal solid waste is broken down by bacteria.

currently taking place, including substantial ice loss in the Arctic from 1996 to 2019 (National Aeronautics and Space Administration 2020; IPCC 2014, 2018).

While global in nature, climate change has the potential to result in unique and concentrated regional and localized impacts in California. According to *California's Fourth Climate Change Assessment*, statewide temperatures from 1986 to 2016 were approximately 1 degree Fahrenheit (°F) to 2°F higher than those recorded from 1901 to 1960. Potential impacts of climate change in California may include loss in water supply from snowpack, sea level rise, more extreme heat days per year, more large forest fires, and more drought years (State of California 2019). While there is growing scientific consensus about the possible effects of climate change at a global and statewide level, current scientific modeling tools are unable to predict what local impacts may occur with a similar degree of accuracy. In addition to statewide projections, *California's Fourth Climate Change Assessment* includes regional reports that summarize climate impacts and adaptation solutions for nine regions of the state as well as regionally-specific climate change case studies (State of California 2019).

2.1.3 Greenhouse Gas Emissions Reduction Policies and Climate Action Planning

California Emissions Reduction Regulations

California continues to lead the global effort of mitigating and adapting to climate change through progressive legislative and executive direction. Such actions have established a series of increasingly stringent GHG emissions reduction goals and targets intended to help reduce and reverse the effects of global climate change. These goals and targets include the following:

- **Executive Order S-3-05.** In recognition of California's vulnerability to the effects of climate change, former Governor Schwarzenegger established Executive Order S-3-05 in 2005, which sets forth targets to reduce GHG emissions to 1990 levels by 2020 and to 80 percent below 1990 levels by 2050.
- **Assembly Bill (AB) 32.** Signed into law in 2006, the California Global Warming Solutions Act codifies a statewide goal of reducing GHG emissions to 1990 levels by 2020.
- **Senate Bill (SB) 32.** SB 32 serves as an update to the emissions reduction target codified under AB 32. Signed into law in 2016, SB 32 establishes a statewide emissions reduction target of 40 percent below 1990 levels by 2030.
- **Executive Order B-55-18.** On September 10, 2018, the governor issued Executive Order B-55-18, which established a new statewide goal of achieving carbon neutrality by 2045 and maintaining net negative emissions thereafter.

Additionally, while it does not establish an emissions reduction target, SB 100 supports the reduction of GHG emissions from the electricity sector by accelerating the state's Renewables Portfolio Standard Program, which requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045.

Climate Action Planning

In response to mounting urgency surrounding global climate change and mandated emissions reductions, entities in California and around the world have developed CAPs. While the content of such plans varies depending on the specific emissions reduction objectives of the entity, CAPs generally include an inventory of baseline emissions, a forecast of future emissions, a GHG reduction goal consistent with applicable reduction targets, and a series of policies, measures, or actions intended to achieve the reduction goal.

Metropolitan's core mission of supplying its service area with adequate and reliable supplies of high-quality water is inextricably linked to the effects of global climate change, as changes in temperature and precipitation patterns create uncertainty around water supply availability and demand throughout Metropolitan's service area. Since its formation in 1928, Metropolitan's goal of securing water to meet the population demands in Southern California has evolved from meeting water needs, to providing this water delivery in an environmentally and economically responsible way. As Metropolitan's service population has grown, continued and increasing efforts to reduce the environmental and economic impact of Southern California's water supply have contributed to Metropolitan's resiliency and opportunities for neutralizing its carbon footprint.

Metropolitan furthers this commitment to sustainability and efficiency by proposing to adopt a CAP to establish an emissions reduction target and describe in detail reduction activities and policies Metropolitan may implement to achieve its reduction targets over time. Each of these core components of the CAP is described further in the following sections.

2.2 Proposed Program Objectives

This Program Environmental Impact Report (PEIR) analyzes potential environmental impacts associated with implementation of the proposed program, the CAP. Pursuant to Section 15124(b) of the *State CEQA Guidelines*, an EIR shall contain a statement of objectives sought by the proposed program. The objectives of the proposed program, the CAP, include the following:

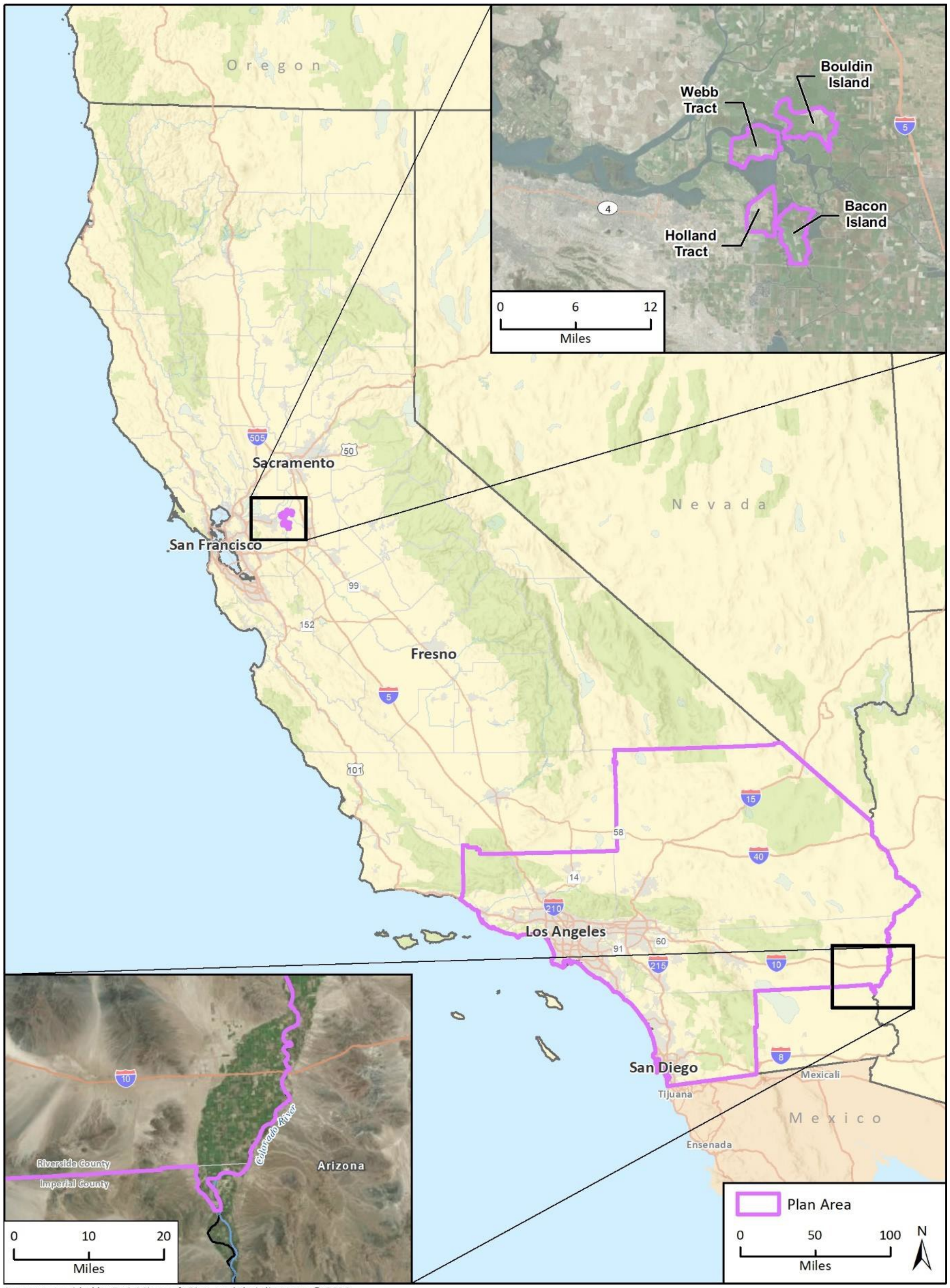
- Identify and quantify emissions associated with Metropolitan operations to prepare a baseline GHG emissions inventory in order to track emissions reduction progress over time
- Adopt an emissions reduction target that is both consistent with existing state emissions reduction targets while preparing Metropolitan to meet future state targets
- Identify and quantify specific reduction actions and policies that Metropolitan may implement to achieve the goal of reducing GHG emissions from its construction and operational activities
- Provide a roadmap for future activities to achieve consistency with the CAP and use CEQA streamlining tools for analysis of GHG emissions pursuant to the requirements of *State CEQA Guidelines* Section 15183.5

2.3 Climate Action Plan Area and Member Agencies

Plan Area

The CAP includes GHG emissions reduction measures for Metropolitan's construction, operation, and maintenance activities. It is anticipated that most reduction measures would be implemented throughout a six-county Southern California region comprising Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. These counties include all of Metropolitan's service area and most of its infrastructure facilities. The CAP may also involve implementation of GHG emissions reduction measures or programs at Metropolitan land holdings in Imperial County, specifically within the Palo Verde Valley; as well as Bacon Island, Bouldin Island, Holland Tract, and Webb Tract in the Sacramento-San Joaquin Delta region (San Joaquin County and Contra Costa County). Figure 1 shows the Plan Area for the CAP.

Figure 1 Plan Area



Imagery provided by Esri, Microsoft Bing, and their licensors © 2020.
Additional data provided by USGS, 2017.

While environmental emissions influence climate change at a global scale, the analysis in this PEIR focuses on potential impacts associated with implementation of the CAP in California—and specifically, the Plan Area—consistent with the requirements and applicability of CEQA.

Member Agencies

As described in Section 2.1, *Background and Project Need*, Metropolitan is comprised of 26 member agencies, including 14 cities and 12 water agencies, located throughout Southern California. These include:

- City of Anaheim
- City of Burbank
- City of Fullerton
- City of Long Beach
- City of Pasadena
- City of San Marino
- City of Santa Monica
- Calleguas Municipal Water District
- Eastern Municipal Water District
- Inland Empire Utilities Agency
- Municipal Water District of Orange County
- Three Valleys Municipal Water District
- West Basin Municipal Water District
- City of Beverly Hills
- City of Compton
- City of Glendale
- City of Los Angeles
- City of San Fernando
- City of Santa Ana
- City of Torrance
- Central Basin Municipal Water District
- Foothill Municipal Water District
- Las Virgenes Municipal Water District
- San Diego County Water Authority
- Upper San Gabriel Valley Municipal Water District
- Western Municipal Water District of Riverside County

All member agencies' jurisdictions and/or service areas are located within the Plan Area.

2.4 Project Components

2.4.1 Emissions Inventory

Metropolitan's operations inherently result in GHG emissions. Understanding the processes that generate these emissions is essential to identifying strategies to reduce GHG emissions.

Metropolitan's operational activities can be categorized into the following GHG emissions-generating sectors:

- **Water Conveyance and Treatment.** This sector comprises the majority of Metropolitan's emissions, which are a direct result of the purchase of energy consumed and delivered to pump, treat, and deliver water throughout Metropolitan's extensive service area.
- **Buildings/Infrastructure.** This sector includes emissions generated by energy consumed to power the command center/operational buildings, supporting infrastructure (including offices, facilities, control buildings, lighting, computers, and air conditioners), and other equipment required to support the treatment and delivery of water.
- **Transportation.** This sector includes the transportation of employees and equipment to and from offices and worksites. Emissions stem from both Metropolitan's fleet vehicles, which it

owns and operates, and vehicles owned by Metropolitan employees and used for commuting to work.

- **Waste Disposal.** The waste sector falls into three categories: mixed solids waste, mixed recycle, and organics. Metropolitan generates waste from various sources, ranging from employee lunches to office waste, which results in indirect GHG emissions as it decomposes in landfills.
- **Water Use.** Water sector GHG emissions by Metropolitan result from water use in facilities and irrigation. This sector includes indirect emissions associated with energy required to extract, convey, treat, and deliver water.
- **Construction.** As Metropolitan's infrastructure ages, there is a continued need for construction of new facilities and infrastructure or rehabilitation of existing facilities and infrastructure. Construction activities result in direct GHG emissions from fuel combustion associated with construction equipment usage, construction waste generation, and transportation of workers and materials.

The CAP inventories Metropolitan's emissions from 1990 to 2020. The inventory for 2017 is the most recent year for which complete Scope 3 data was available; inventories for 2018 through 2020 were included for carbon budget tracking purposes using estimated Scope 3 data. Due to the geographically disparate nature of Metropolitan's operations, emissions reported in the inventory are based on activities over which Metropolitan has direct operational control. The inventory delineates emissions by Scope, as defined in the Local Governments for Sustainability reporting frameworks and detailed below.[2] The emissions inventory reports Metropolitan's GHG emissions in metric tons (MT) of CO_2e.

Scope 1 Emissions

Scope 1 emissions are those associated with direct emissions from sources owned or controlled by Metropolitan. This includes emissions from direct fuel combustion, including natural gas, propane, welding gasses, and gasoline and diesel used to power Metropolitan's vehicle fleet. The CAP calculates Scope 1 emissions based on data reported by Metropolitan to The Climate Registry, such as therms[3] of natural gas or pounds of propane used at Metropolitan facilities.

Scope 2 Emissions

Scope 2 emissions are indirect emissions associated with the consumption of purchased electricity. Metropolitan purchases electricity from power generated from within California and from outside of California in the southwestern United States, which includes electricity generated from hydropower at the Hoover Dam. The CAP calculates Scope 2 emissions based on annually updated emissions factors, which are dependent on the specific mix of power purchased. For example, hydropower from the Hoover Dam has an emission factor of zero, while power purchased from other sources may have a higher emission factor based on the source. Scope 2 emissions also include transmission and distribution losses that occur as electricity is delivered to Metropolitan facilities.

Scope 3 Emissions

Scope 3 emissions are other indirect emissions resulting from Metropolitan's operations, including emissions associated with waste generation, water consumption, and wastewater generation from Metropolitan-owned buildings, employee commutes, and construction activities. The emissions inventory calculates emissions from water, wastewater, and solid waste based on utility invoices and appropriate energy intensity and emissions factors. Employee commute emissions are estimated based

[2] Emissions Scopes are delineated based on the emissions source in question, whether that source is under the control or ownership of the entity, and whether or not the emissions result directly or indirectly from the entity's operations and activities.
[3] A unit of heat equivalent to 100,000 Btu or 1.055 × 108 joules.

on Metropolitan's Employee Commute Survey and VanPool ridership data and emissions factor data from the California Air Resources Board's (CARB) EMissions FACtor 2017 (EMFAC2017) model (the latest emissions inventory model that calculates emissions inventories for motor vehicles operating on roads in California) and the Los Angeles County Metropolitan Transportation Authority. Construction emissions are estimated in the inventory based on GHG studies contained in CEQA documentation for Metropolitan projects and/or emissions factors from the U.S. EPA, the California Emissions Estimator Model (CalEEMod), and EMFAC2017.

Figure 2 depicts Scope 1, Scope 2, and Scope 3 emissions associated with Metropolitan's operations.

Table 2 summarizes the results of the emissions inventory for 1990 (the baseline year used by state legislation) and 2017, which is the most recent inventory year for which a complete Scope 3 analysis was completed. These dates are key to establishing an AB 32- and SB 32-compliant reduction target and measuring progress over time.

Table 2 1990 and 2017 Emissions by Scope and Sector

	1990		2017	
Scope	**GHG Emissions (MT of CO2e)**	**Percent of Total Emissions**	**GHG Emissions (MT of CO2e)**	**Percent of Total Emissions**
Scope 1	**8,482**	**1%**	**8,876**	**4%**
Stationary Combustion	1,082	<1%	1,918	1%
Fugitive Emissions	0	0%	71	<1%
Mobile Combustion	7,400	1%	6,886	3%
Scope 2	**739,845**	**96%**	**194,480**	**86%**
Electricity Consumption	726,994	94%	192,511	85%
T&D Losses	12,851	2%	1,969	1%
Scope 3	**23,187**	**3%**	**22,679**	**10%**
Water and Wastewater	99	<1%	184	<1%
Waste Generation	2,760	<1%	3,157	1%
Employee Commute	8,246	1%	7,257	3%
Construction Emissions	12,081	2%	12,081	5%
Total Emissions	**771,514**	**100%**	**226,036**	**100%**

MT = metric tons; CO_2e = carbon dioxide equivalent; T&D = transmission and distribution
Note: Totals may not sum exactly due to rounding.
Source: Metropolitan 2020

As described in Table 2, Scope 2 emissions constitute the majority of Metropolitan's overall emissions, comprising approximately 96 percent of Metropolitan's emissions in 1990 and 86 percent in 2017. Scope 1 emissions constitute 4 percent of Metropolitan's overall emissions in 2017, with the majority of Scope 1 emissions associated with mobile combustion. Scope 3 emissions constitute the remaining approximately 10 percent of Metropolitan's overall emissions in 2017.

The emissions inventory estimates that Metropolitan's GHG emissions have declined steadily from approximately 772,000 MT CO_2e in 1990 to approximately 226,000 MT CO_2e in 2017 (71 percent), despite Metropolitan's increasing service population. However, Metropolitan's annual emissions exhibit variability due to increases in CRA pumping during periods of drought, as water sourced via the CRA requires substantially higher electricity usage than water imported via the SWP.

Figure 2 Metropolitan Emissions by Scope

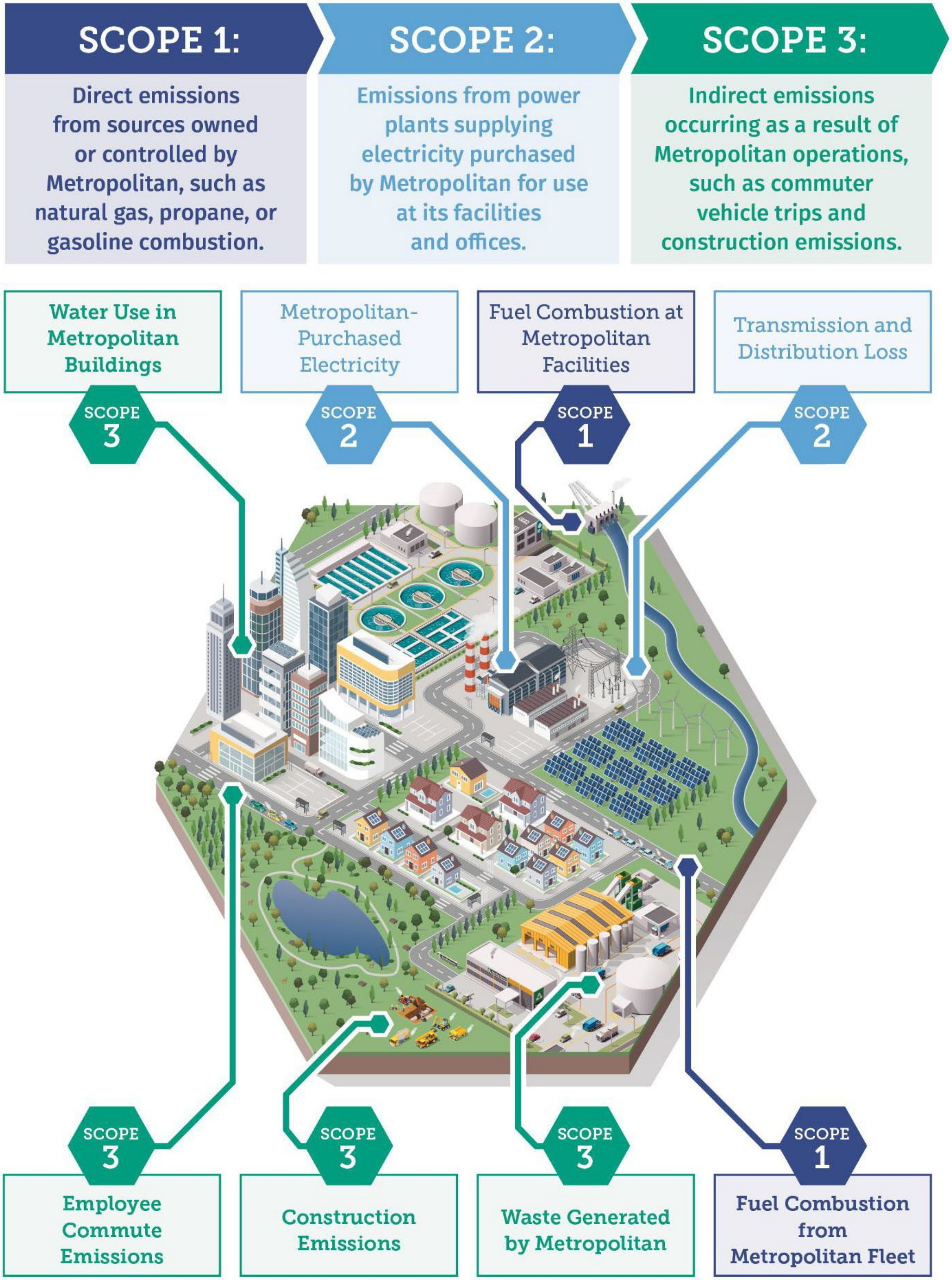
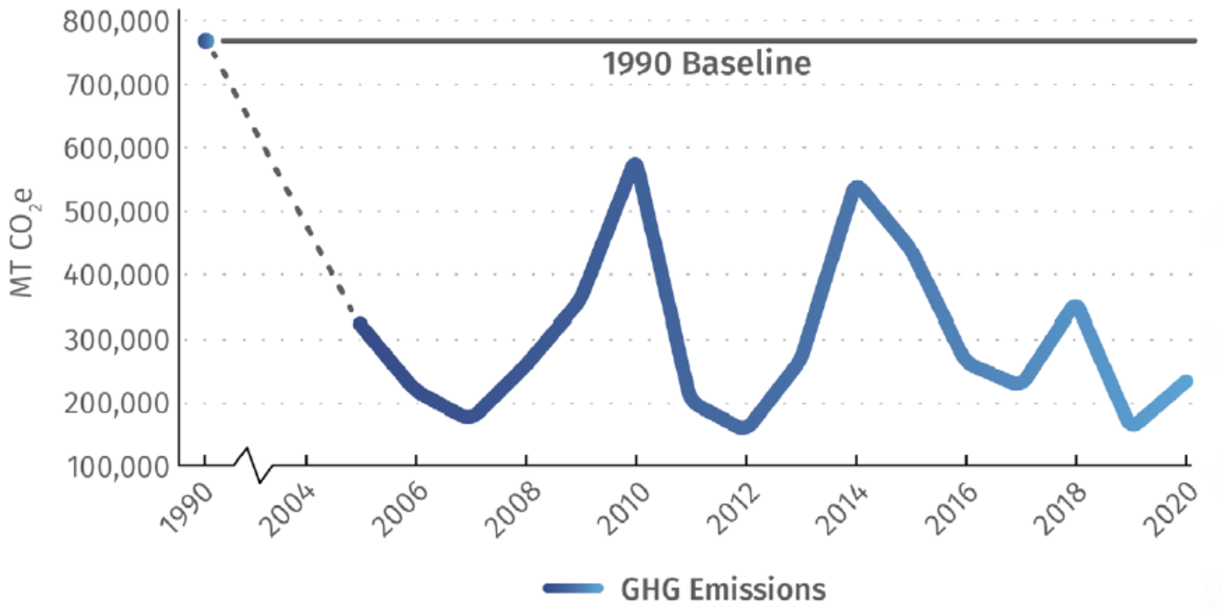


Figure 3 characterizes the nature and trend of Metropolitan's GHG emissions over time. The years of 2018, 2019 and 2020 were added to the inventories as data became available. However, 2017 remains the most recent year for which all Scope 3 data was available and therefore, was used for the GHG emissions forecast. A complete description of all inventory years, methodologies, and results can be found in the *Greenhouse Gas Inventory and Forecast Methodology* prepared for the CAP (Metropolitan 2021).

Figure 3 GHG Annual Emissions 1990 through 2020



2.4.2 Emissions Forecast

While the GHG emissions inventory described above provides reference points for emissions levels in past years, the CAP also includes an emissions forecast to account for how changes in hydrology, climate, climate and air quality regulations, population growth, operations, and future construction projects may affect Metropolitan's emissions into the future. Furthermore, the emissions forecast allows for comparison between forecasted GHG emissions and reduction targets to understand the reductions necessary to achieve Metropolitan's GHG reduction goals.

Forecast Scenarios

As described in Section 2.4.1, *Emissions Inventory*, Metropolitan's overall emissions vary substantially based on the amount of CRA pumping required in a given year because water sourced via the CRA requires substantially higher electricity usage than water imported via the SWP. The emissions forecast in the CAP accounts for this variability by forecasting emissions under the following scenarios:

- **High Emissions Scenario: Dry-year SWP with High CRA Pumping**. This scenario forecasts emissions based on the multiple dry-year water delivery demand defined in Metropolitan's 2020 Urban Water Management Plan (Metropolitan 2021) and the highest per acre-foot emissions[4]

[4] Quantified emissions per acre-foot of water conveyed by Metropolitan. One acre-foot is equivalent to approximately 325,850 gallons.

calculated in the emissions inventory from 2005[5] to 2017, which occurred in 2010. This scenario provides the highest potential GHG emissions forecast under the driest conditions.

- **Average Emissions Scenario: Average-year SWP with Average CRA Pumping.** This scenario forecasts emissions based on the single dry-year water delivery demand defined in Metropolitan's 2020 Urban Water Management Plan (Metropolitan 2021) and the average per acre-foot emissions calculated in the emissions inventory from 2005 to 2017. This scenario provides the emissions forecast under average conditions.
- **Low Emissions Scenario: Wet-year SWP with Low CRA Pumping.** This scenario forecasts emissions based on the average rainfall year water delivery demand defined in Metropolitan's 2020 Urban Water Management Plan (Metropolitan 2021) and the lowest per-acre emissions calculated in the emissions inventory from 2005 to 2017, which occurred in 2012. This scenario provides the emissions forecast under the rainiest conditions.

Proposed Regional Recycled Water Program

In addition to forecasting GHG emissions associated with ongoing operations and Capital Investment Plan construction projects, the emissions forecast in the CAP includes anticipated construction and operational emissions from the proposed Regional Recycled Water Program (RRWP). The RRWP is a partnership program with the Sanitation Districts of Los Angeles County intended to use an advanced purification process to produce high-quality water for reuse within Metropolitan's service area.

Emissions associated with RRWP construction include those required to construct the advanced water treatment plant (AWTP), and a conveyance and distribution system, which includes pipelines, pump stations, and groundwater injection wells. Construction emissions, which include a five-year construction schedule, include emissions from equipment use and fuel consumption, labor and material travel, and temporary electric power usage. Table 3 summarizes proposed RRWP construction emissions anticipated in the emissions forecast.

Table 3 Proposed Regional Recycled Water Program Construction Emissions

System	Construction Emissions (MT CO_2e)*
Advanced Water Treatment Plant	11,000
Pipelines	71,000
Pump Stations	630
Well Facilities	380
Total	**82,000**
5 Year Annual	**14,000**

MT = metric tons; CO_2e = carbon dioxide equivalent

*Values are rounded.

The emissions forecast in the CAP also quantifies anticipated operational GHG emissions from the proposed RRWP, including both process emissions and emissions associated with electricity consumption. Process emissions include nitrous oxide generation and emissions associated with consumption of carbon source additives used to facilitate denitrification and phosphorus removal during the water purification process. Electricity demand emissions would result from Metropolitan's purchase of electricity to power the AWTP and pump stations. The emissions forecast assumes

[5] 2005 is the first year in which Metropolitan's emissions were reported to The Climate Registry and the year in which detailed GHG emissions inventories were started.

electricity for the AWTP and pump stations would be supplied entirely from the retail market and, as such, emissions would decline over time as electricity providers incorporate more renewable energy supplies consistent with the requirements of the Renewables Portfolio Standard and SB 100. Table 4 summarizes overall RRWP emissions from 2025 through 2045.[6]

Table 4 Overall Estimated Proposed Regional Recycled Water Program Emissions

Year	Emissions (MT CO_2e)*
2025 (construction)	14,000
2030 (construction)	14,000
2035 (operational)	88,000
2040 (operational)	58,000
2045 (operational)	28,000

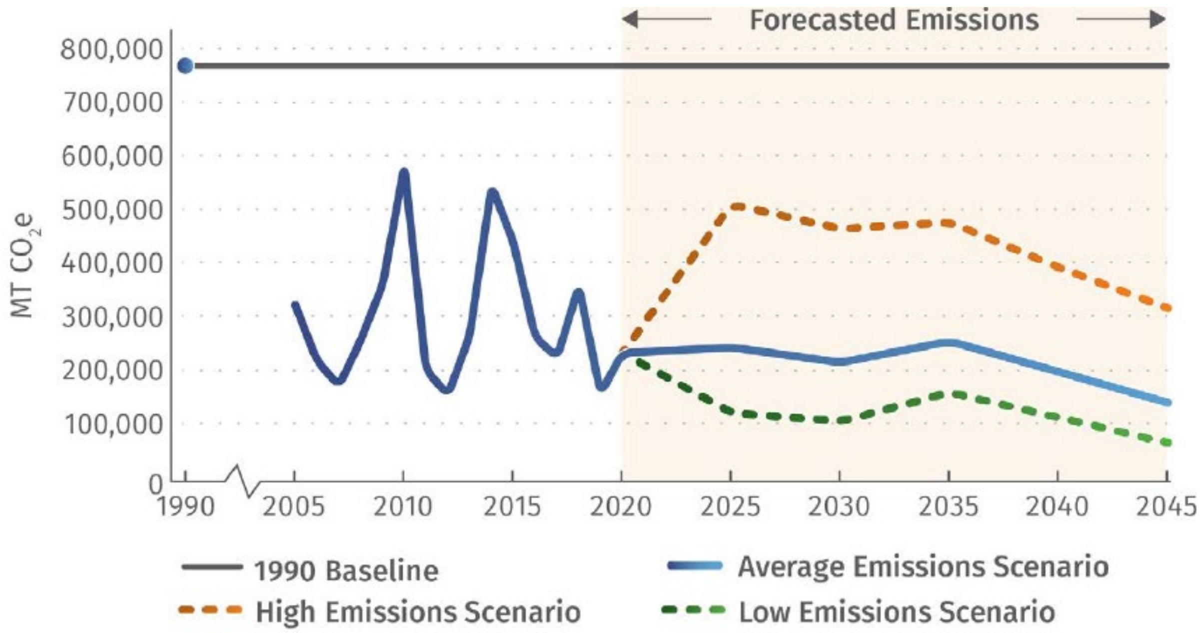
MT = metric tons; CO_2e = carbon dioxide equivalent
*Values are rounded.
Source: Metropolitan 2020

Forecast Results

The CAP emissions forecast includes the implementation of state regulations that would assist in reducing Metropolitan's emissions over time, such as increasing procurement of renewable retail energy pursuant to SB 100 and increasing water conservation pursuant to the Water Conservation Act of 2009 (SB X7-7). The CAP forecasts both mass emissions (Figure 4) and per capita emissions based on Metropolitan's service population (Figure 5). Based on the analysis in the CAP and depending on the emissions scenario assessed, Metropolitan's mass emissions would decrease between 40 to 86 percent below 1990 levels by 2030. By 2045, Metropolitan's mass emissions are expected to decrease between 59 to 91 percent below 1990 levels, depending on the emissions scenario evaluated. Figure 4 summarizes mass emissions forecasts through 2045 under the low, average, and high emissions scenarios. Though conservative, mass emissions analysis does not scale for population increases in Metropolitan's service area.

[6] SB 100 mandates that 100 percent of electricity supplied to the grid be procured from renewable sources by 2045. This is also the target year by which Metropolitan intends to achieve carbon neutrality, based on the emissions reduction target included in the CAP and described in detail in Section 2.4.3, *Reduction Target.*

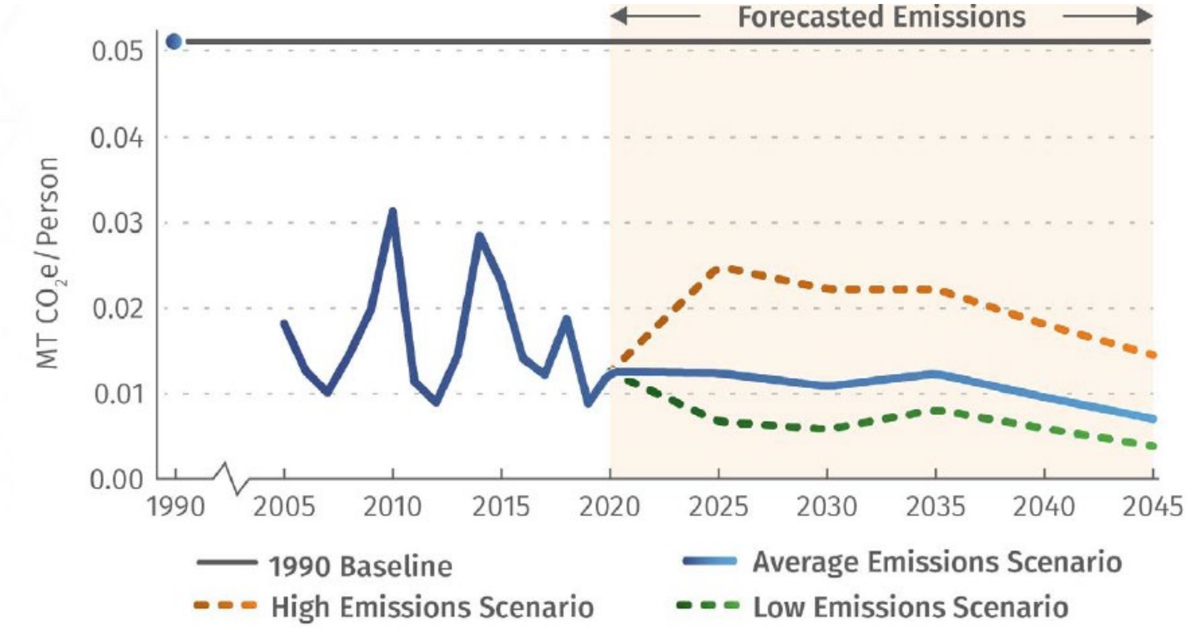
Figure 4 Historical and Forecasted Mass Emissions 1990-2045



The per capita emissions calculation uses Metropolitan's mass emissions and divides by the service area population. Metropolitan's service population is anticipated to reach just over 20.6 million people by 2030 and just over 22 million people by 2045.[7] Despite a growing service population, Metropolitan's emissions are anticipated to decrease steadily below 1990 levels under all emissions scenarios. Figure 5 shows Metropolitan's past and projected per capita emissions under all emissions scenarios. According to the CAP, Metropolitan's per capita emissions are expected to decrease between 56 and 90 percent below 1990 levels by 2030 and between 72 and 94 percent below 1990 levels by 2045, depending on the emissions scenario assessed.

[7] Service population is based on projections from the Southern California Association of Governments Regional Transportation Plan/Sustainable Communities Strategy and San Diego County Association of Governments Series 13 Forecasts. Service population forecasts are included in Appendix B of the CAP, *GHG Inventory and Forecast Methodology* prepared for the CAP (Metropolitan 2021).

Figure 5 Historical and Forecasted Per Capita Emissions 1990-2045



Using the per capita emissions forecast is a more accurate representation of Metropolitan's emission reductions over time because it recognizes how the substantial investments in water conservation have led to a reduction in water consumption in spite of a growing population in the service area.

2.4.3 Reduction Target

The CAP establishes a GHG reduction target aligned with applicable state GHG reduction policies. The CAP considers various reduction levels, target methodologies, and tracking mechanisms to quantify and measure progress toward GHG emissions reductions beyond those anticipated in the emissions forecast described above. Ultimately, the CAP utilizes a linear per capita target or "Linear Reduction to Carbon Neutral by 2045 – Per Capita Target" with a Carbon Budget tracking mechanism, described in greater detail later in this section.

Reduction Level

The CAP considers three reduction level options, all of which are consistent with current state GHG-reduction goals established by SB 32, California's most recent codified GHG reduction target.

However, the CAP utilizes a reduction level based on a linear reduction in emissions from baseline 1990 levels to carbon neutrality (zero emissions) in 2045. This strategy would reduce Metropolitan's emissions to approximately 73 percent below 1990 levels by 2030, a substantially more aggressive reduction than the 40 percent below 1990 levels by 2030 identified in SB 32. The CAP goals and policies are not only intended to demonstrate consistency with the statewide SB 32 target, but also achieve consistency with the carbon neutrality by 2045 goal established by Executive Order B-55-18.[8]

[8] As noted in Section 2.1, *Background and Project Need*, Metropolitan is not subject to the requirements of Executive Orders, and emissions reduction goals established by Executive Orders are not codified into state law. Nevertheless, the reduction level selected in the CAP demonstrates consistency with the emissions reduction goal established pursuant to Executive Order B-55-18 by achieving carbon neutrality (zero emissions) by 2045.

Target Methodology

There are three main approaches (target methodologies) the CAP examines to demonstrate progress towards meeting the established goal of carbon neutrality by 2045:

- **Mass Emissions Targets.** Mass emissions targets involve reducing total GHG emissions to a specified level (or lower) by a specific target year. An example of mass emissions reductions would be reducing to 200,000 MT CO_2e per year in 2030 (i.e., 26 percent of 1990 levels) and 0 MT CO_2e per year in 2045.
- **Per Capita Emissions Targets.** A per capita emissions target creates a per person emissions level based on Metropolitan's service population, such as reducing emissions to 0.02 MT CO_2e per capita by 2045.
- **Efficiency Targets.** Efficiency targets aim to reduce the emissions associated with each unit of production, such as reducing emissions to 0.1 MT CO_2e per acre-foot of water supplied by Metropolitan by 2045.

As mentioned above, Metropolitan's service population is projected to be over 22 million people by 2045. Therefore, to capture the substantial growth expected in the service area, the CAP establishes a per capita emissions reduction target approach, which accounts for population growth in the Metropolitan service area while capturing the reduction in emissions associated with water delivery and treatment from its past and ongoing water conservation efforts and other emissions reducing projects.

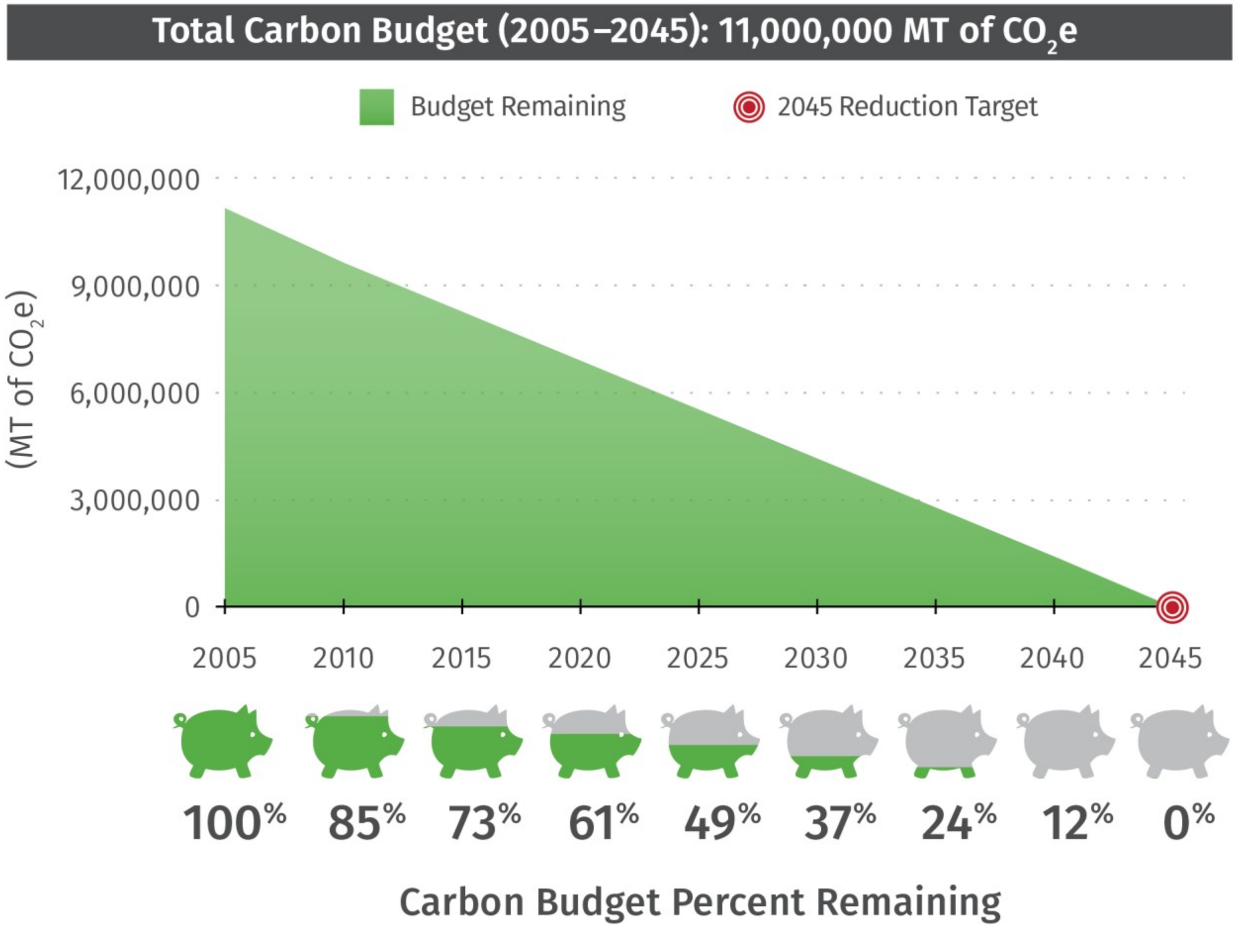
Tracking Mechanism

For most cities and other jurisdictions in California, emissions increase and decrease in a steady fashion along with population growth and in response to marginal GHG reduction actions.

Metropolitan's emissions, by contrast, can fluctuate widely year-to-year in response to CRA pumping levels, but generally track with wet years and drought years. This means emissions in any given year are not necessarily a good indicator of overall GHG reduction progress. As a result, the CAP proposes tracking GHG emissions reduction progress using a Carbon Budget methodology.

Simply put, the Carbon Budget acts as a debit account, wherein the cumulative amount of emissions allowed for Metropolitan over a given time period are calculated. Annually, Metropolitan's emissions will be debited from the total emissions "budget" and total emissions will be tracked over time to ensure Metropolitan is meeting its goal. Specifically, based on the Linear Reduction to Carbon Neutrality by 2045 reduction level described previously, Metropolitan could emit a total of 14,660,475 MT CO_2e between 2005 (the year in which detailed GHG emissions inventories were started) and 2045 under the Average Emissions forecast scenario. Figure 6 describes the Carbon Budget methodology conceptually, demonstrating a hypothetical Carbon Budget scenario and diminishing budget remaining as emissions cumulate over time.

Figure 6 Carbon Budget Conceptual Graph



The Carbon Budget is a more conservative and accurate approach to tracking GHG emissions reductions compared to simply calculating emissions in a single target year to determine if the target has been achieved because it tracks the total amount of CO_2e that enters the atmosphere that contributes to climate change rather than just total GHG emissions in the target year. This method ensures that Metropolitan is continually monitoring its emissions and provides an early warning system to ensure Metropolitan will meet its GHG reduction goals.

2.4.4 Emissions Reduction Measures

In order to achieve carbon neutrality by 2045, GHG emissions reductions measures would need to be implemented. As discussed under Section 2.4.1, *Emissions Inventory*, GHG emissions fall under three scopes. Scope 1 includes direct emissions sources owned or controlled by Metropolitan. Scope 2 includes indirect emissions from power plants that supply electricity to Metropolitan. Scope 3 includes other indirect emissions that occur as a result of Metropolitan's operations, such as from waste generation and employee commutes. The CAP includes 39 GHG emissions reduction measures that, if implemented, could help Metropolitan reduce its Scope 1, Scope 2, and Scope 3 emissions.

Reduction measures for each scope are grouped into strategies, which are described in more detail below.

The reduction measures do not include actions taken by Metropolitan to date that have resulted in GHG emissions reductions, such as Metropolitan's early adoption of hybrid-electric vehicles (EV) for its operational fleet and Leadership in Energy Efficiency and Design (LEED) certification for several of its facilities. However, the measures may build or expand upon these past actions. Most reduction measures are either administrative in nature or involve replacement of existing infrastructure with newer, more efficient infrastructure and, therefore, would not have physical impacts to the environment. Table 5 details the GHG reduction measures under consideration in the CAP and identifies whether each has the potential to impact the environment. Those that may have the potential to impact the environment are analyzed further in this PEIR.

Scope 1: Direct Emissions

Scope 1 reduction measures can be categorized into three main strategies: Direct Combustion (DC), Vehicle and Equipment Fleet (FL), and Alternative Fuels (AF). The DC strategy includes measures to reduce GHG emissions from natural gas combustion at Metropolitan facilities by phasing out natural gas-powered equipment. The FL strategy includes reduction measures to reduce Metropolitan's reliance on gasoline- and diesel-powered fleet vehicles. The AF category includes measures to increase the use of cleaner fuel sources, such as biodiesel for equipment that cannot be electrified. Measures addressing Scope 1 emissions are described in Table 5.

Scope 2: Indirect Emissions from Electricity Use

Scope 2 reduction measures fall into two main strategies: Electricity (E) and Energy Efficiency (EE). The E category includes measures to reduce GHG emissions by transitioning to cleaner sources of electricity, such as low-carbon and carbon-free electricity and expanding deployment of renewable energy generation at Metropolitan facilities. Measures in the EE category seek to increase the efficiency of Metropolitan's operations, for example, through energy efficient lighting upgrades and retrofitting older pumps and motors. Measures addressing Scope 2 emissions are described in Table 5.

Scope 3: Other Indirect Emissions and Carbon Sequestration

Scope 3 includes a broad range of GHG emissions sources and includes reduction measures across four main strategies. The Employee Commute (EC) strategy includes measures to reduce GHG emissions by encouraging ridesharing, public transit use, and EV charging options for employees and vanpool fleets. The Waste (WA) strategy seeks to reduce GHG emissions by reducing the waste produced at Metropolitan's facilities and increasing waste diversion. The Water Conservation and Local Water Supply (WC) strategy includes measures to increase water conservation in Metropolitan's operations and by its customer base, as well as measures to increase the local water supply through water recycling and reduced water loss. Lastly, the Carbon Sequestration (CS) strategy is comprised of measures that aim to improve the capacity to sequester carbon at Metropolitan-owned lands. Measures addressing Scope 3 emissions are described in Table 5.

Implementation Phase

The intent of the CAP is to achieve the 2030 GHG reduction target and demonstrate substantial progress toward the long-term state reduction goal of carbon neutrality by 2045. New opportunities are anticipated to emerge that could yield additional reductions beyond those identified in the CAP. At this time, Metropolitan has developed two implementation phases for the GHG reduction measures considered in the CAP, Phase 1 and Phase 2.

Phase 1 measures are ready for implementation over the next ten years based on their cost, available technology, and certainty about future conditions. Phase 1 measures would be implemented between now and 2030. Phase 2 measures would require more research, new technologies, or different financial conditions before they could be implemented. These measures are expected to be implemented between 2030 and 2045. The implementation phase for each measure is shown in Table 5.

Table 5 CAP GHG Reduction Measures with Potential Physical Impacts on the Environment

Measure Number	Measure Description	No Potential for Physical Impacts to the Environment	Potential to Result in Physical Impacts	Implementation Phase[1]
Scope 1: Direct Emissions				
Strategy 1 – Phase out Natural Gas Combustion at Facilities				
DC-1	Conduct a survey of all natural gas consuming devices in offices, control buildings, and residential structures and establish a schedule to replace natural gas equipment with electric by 2025.	X		1
DC-2	Reduce natural gas emissions by 50 percent by 2030 and 100 percent by 2045 through electrification.		X	1-2
DC-3	Update Metropolitan building standards to require all-electric construction for new buildings and retrofits.	X		1
Strategy 2 – Zero Emission Vehicle Fleet				
FL-1	Conduct a zero emission vehicle (ZEV)/electric vehicle (EV) Feasibility Study to determine which fleet vehicles can be converted, what chargers/fueling stations are required, and where they should be located by the end of 2022.	X		1
FL-2	Adopt an ZEV/EV first policy for fleet vehicles to obtain ZEVs when technological, operational, or cost effectiveness parameters are met.	X		1
FL-3	Replace fossil fuel passenger fleet vehicles as identified in the ZEV/EV Feasibility Study (Measure FL-1).	X		1
FL-4	Install EV charging and/or ZEV infrastructure at facilities pursuant to the findings of the ZEV/EV Feasibility Study (Measure FL-1).		X	1
Strategy 3 – Alternative Fuels to Bridge the Technology Gap to Zero Emission Vehicles and Equipment				
AF-1	Complete a pilot project on the use of renewable diesel rather than conventional diesel for all stationary equipment by 2025.	X		1
AF-2	Conduct a pilot project of renewable diesel use in on-road and off-road vehicles by providing at least one renewable diesel tank at Metropolitan-owned fueling depots in 2021.	X		1

Measure Number	Measure Description	No Potential for Physical Impacts to the Environment	Potential to Result in Physical Impacts	Implementation Phase[1]
AF-3	Based on the results of the study in AF-2, Metropolitan will begin using renewable diesel fuel in 100 percent of Metropolitan's diesel-consuming on-road and off-road vehicles by 2025.	X		1
Scope 2: Electricity				
Strategy 4: Utilize Carbon-Free Electricity				
E-1	Analyze marginal emissions rates and evaluate the feasibility of shifting energy use to lower emission periods.	X		1
E-2	Connect the Yorba Linda Hydroelectric Power Plant (YLHEP) behind Metropolitan's Southern California Edison (SCE) electricity meter to directly utilize carbon-free electricity at Metropolitan's Diemer facility by 2025.		X	1
E-3	In markets where available, Metropolitan will switch its retail accounts to green tariff options offered by power providers by 2025 to reduce the Scope 2 GHG emissions associated with retail electricity use.	X		1
E-4	Install 3.5 megawatt (MW) battery storage systems at the Jensen, Skinner, and Weymouth treatment plants. Investigate the use of a software system to track and optimize GHG emissions reduction due to time-of-use strategies by 2025.		X	1
E-5	Manage Metropolitan's energy purchases to ensure cost-effective energy supply while achieving the required GHG emissions objective.	X		1
Strategy 5 – Improve Energy Efficiency				
EE-1	Convert all interior and exterior lighting at 50 percent of Metropolitan facilities to light emitting diode (LED) technologies by 2030 and 100 percent by 2045.		X	1
EE-2	Continue programs to analyze CRA pump efficiency and replace or refurbish pumps when cost effective.	X		1
EE-3	Investigate feasibility of a large scale (100 MW) battery storage system for the CRA.	X		2
EE-4a	Replace pump impellers at the Iron Mountain pumping plant if directed by findings of the pump assessment (Measure EE-2).		X	2
EE-4b	Replace pump impellers at the Eagle Mountain or Hinds pumping plants if directed by findings of the pump assessment (Measure EE-2).		X	2
EE-4c	Refurbish motors at Iron Mountain if applicable based on the findings of the pump assessment (Measure EE- 2).		X	2

Measure Number	Measure Description	No Potential for Physical Impacts to the Environment	Potential to Result in Physical Impacts	Implementation Phase[1]
EE-4d	Refurbish motors at Eagle Mountain or Hinds pumping plants if directed by findings of the pump assessment (Measure EE-2).		X	2
EE-5	If the proposed RRWP is ultimately constructed, install an inter-stage pumping system on the reverse osmosis brine stream to reduce energy use.		X	2
Scope 3: Indirect Emissions and Sequestration				
Strategy 6 – Incentivize More Sustainable Commutes				
EC-1	Expand subsidized transit commute program to reduce employee commute miles.	X		1
EC-2	Expand employee use of carbon-free and low carbon transportation by providing education programs on the benefits of commute options including public transportation, EV/ ZEV options, and vanpools.	X		1
EC-3	Install ZEV and/or EV infrastructure as directed by the ZEV/EV Feasibility Study to support at least a 15 percent transition of employee-owned vehicles to ZEVs/EVs by 2025.		X	1
EC-4	Continue to offer benefits to employees who use alternative modes of transportation (e.g., public transportation, bikes).	X		1
EC-5	Allow 50 percent of employees located at Metropolitan's headquarters to telecommute or utilize flexible schedules through 2030 to reduce travel time, vehicle miles traveled (VMT), and GHG emissions.	X		1
EC-6	Replace all Metropolitan vanpool vehicles with ZEVs. Start with a pilot study (Measure FL-1) to evaluate the best approach.	X		2
Strategy 7 – Increase Waste Diversion to Achieve Zero Waste				
WA-1	Develop and implement net zero waste policies and programs at all facilities to reduce landfilled waste by 30 percent by 2030 and achieve zero landfilled waste by 2045.	X		1
WA-2	Implement a program to reduce organic waste at Metropolitan's Union Station building. Contract or team with local organizations and waste disposal companies to route organic waste to anaerobic digestion or composting facilities and edible food-to-food recovery centers.	X		1
WA-3	Develop and implement a sustainable procurement policy.	X		1

Measure Number	Measure Description	No Potential for Physical Impacts to the Environment	Potential to Result in Physical Impacts	Implementation Phase[1]
WA-4	Partner with municipal agencies, like the City of Los Angeles, to create programs that will allow Metropolitan to provide its fair share of diversion and help local jurisdictions meet the goals of SB 1383 for organics diversion, including food waste and composting.	X		2
Strategy 8 – Increase Water Conservation and Local Water Supply				
WC-1	Expand programs which educate customers on water conservation initiatives through workshops and speaking engagements.	X		1
WC-2	Continue to implement innovative water use efficiency programs.	X		1
WC-3	Continue Turf Removal Program to install an average of 1,500,000 square feet (sq. ft.) of water efficient landscapes per year through 2030 through the use of a rebate program.	X		1
WC-4	Provide funding for the development and monitoring of local stormwater recharge and use projects to evaluate the water supply benefit of stormwater.	X		1
WC-5	Continue to promote water efficiency technologies and innovative practices that can be adopted into future water conservation program updates.	X		1
WC-6	Implement advanced technology systems to increase Metropolitan- owned recycled and groundwater recovery systems to maintain local water supply (e.g., proposed RRWP).		X	2
Strategy 9 – Investigate and Implement Carbon Capture and Sequestration Opportunities				
CS-1	Study carbon capture protocols in the Sacramento-San Joaquin River Delta.	X		1
CS-2	Conduct a five-year research program to increase Metropolitan's knowledge of regenerative agriculture and carbon sequestration opportunities on Metropolitan properties in the Palo Verde Valley.		X	1
CS-3	Establish baseline soil carbon quantities through science based approaches then develop pilot projects to enhance carbon sequestration and implement larger scale carbon sequestration projects as deemed feasible.		X	2

[1] Phase 1 measures are planned for 2021-2030. Phase 2 measures are planned for 2031-2045

2.5 Description of Covered Projects with Potential for Physical Impacts

As mentioned above, most emission reduction measures are either administrative in nature or involve upgrades to existing infrastructure to improve function, which will reduce emissions (e.g., replacement or refurbishment of pump impellors). Activities with the potential for environmental impacts are analyzed at a program-level in the PEIR. Project-level CEQA analysis will be conducted and future environmental documentation prepared, as necessary, when additional site-specific project information becomes available for each of the proposed projects included in the proposed CAP. Updates to the proposed CAP are scheduled every five years. The CEQA documents for those updates will include the status of projects included in the proposed program, as well as analysis of any new projects that may be added to ensure progress towards meeting the proposed CAP GHG reduction goals. Future CEQA documents for the CAP updates will be prepared and made available for comment, as required. Project description information that is currently known for each of the projects that has potential to have physical impacts on the environmental is discussed below.

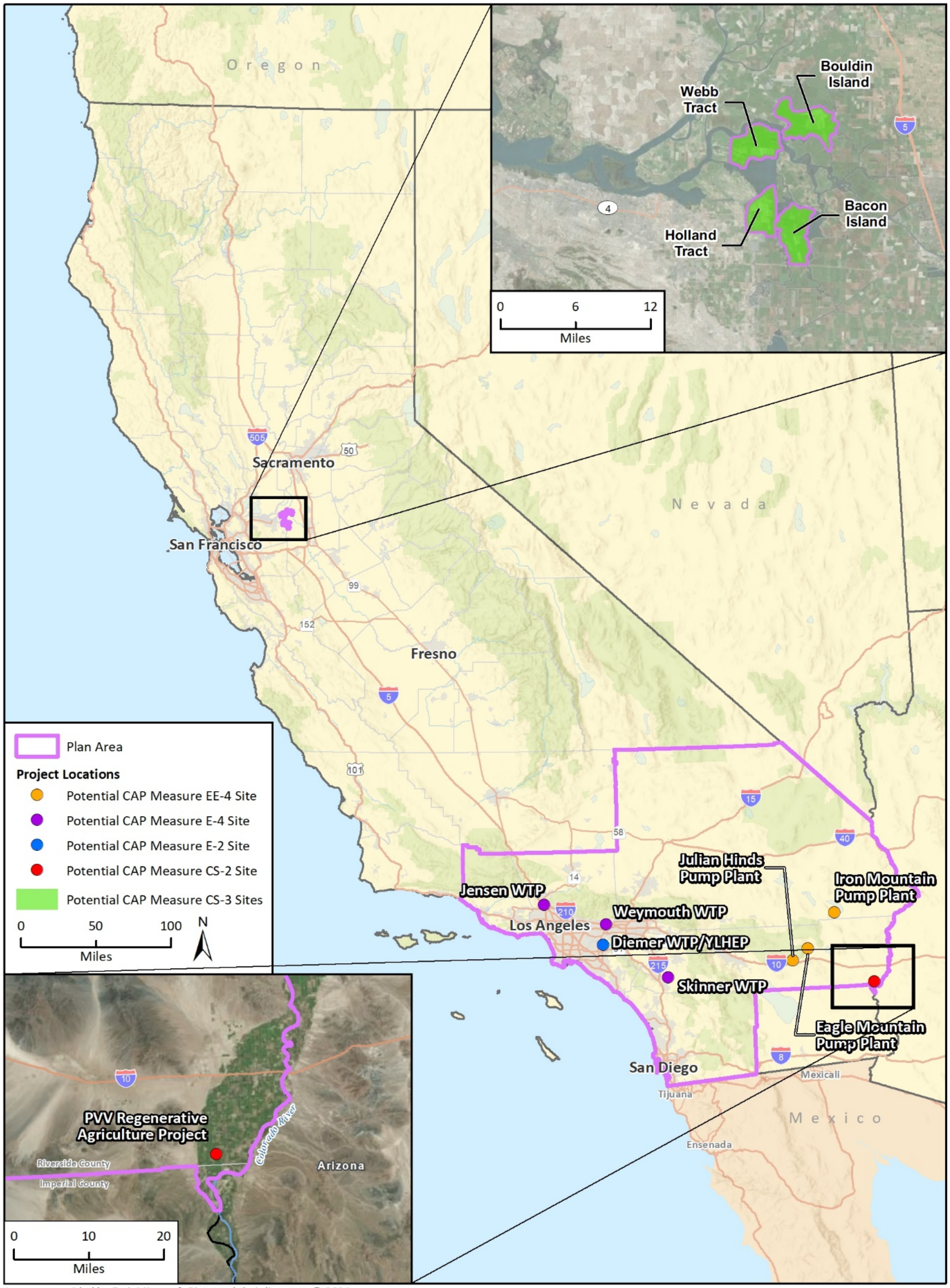
Project Locations

The precise locations of all proposed projects that may be implemented under the CAP are not known at this time. However, it is anticipated that construction of planned projects would occur at Metropolitan facilities or within Metropolitan rights-of-way. Specifically, the following Metropolitan-owned locations have been identified as potential project sites for projects that would be implemented under the CAP:

- **Robert B. Diemer (Diemer) Water Treatment Plant (WTP), Yorba Linda, California.** Proposed site for connection to the Yorba Linda Hydroelectric Power Plant (YLHEP) pursuant to CAP measure E-2.
- **Joseph Jensen (Jensen) WTP, Granada Hills, California.** Proposed site for battery energy storage system (BESS) facility pursuant to CAP measure E-4.
- **Robert A. Skinner (Skinner) WTP, Winchester, California.** Proposed site for BESS facility, pursuant to CAP measure E-4.
- **F.E. Weymouth (Weymouth) WTP, La Verne, California.** Proposed site for BESS facility, pursuant to CAP measure E-4.
- **Eagle Mountain Pump Plant, Unincorporated Riverside County, California.** Proposed site for pump rehabilitation projects pursuant to CAP measure EE-4b, EE-4d.
- **Iron Mountain Pump Plant Unincorporated San Bernardino County, California.** Proposed site for pump rehabilitation projects pursuant to CAP measure EE-4a, EE-4c.
- **Julian Hinds Pump Plant, Unincorporated Riverside County, California.** Proposed site for pump rehabilitation projects pursuant to CAP measure EE-4b, EE-4d.
- **Metropolitan-owned agricultural land at southwest corner of 35th Avenue and Keim Boulevard, unincorporated Riverside County, California.** Proposed site for regenerative agriculture pilot project pursuant to CAP measure CS-2.
- **Webb Tract, Holland Tract, Bouldin Island, and Bacon Island, San Joaquin/Contra Costa Counties, California.** Proposed sites for carbon sequestration and carbon capture projects pursuant to CAP measure CS-3.

Figure 7 shows the locations of these identified potential project sites within the Plan Area.

Figure 7 Potential Project Locations within Plan Area



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Additional data provided by USGS, 2017.

Project Descriptions

For currently planned projects, specific construction details associated with implementation of the emissions reduction measures, such as specific location, disturbance area, and schedule, are not known at this time. Every effort has been made to ensure a thorough impact analysis and, where necessary, impacts from similar projects have been used to conservatively estimate impacts that may change depending on circumstance (e.g., air quality or biological impacts). For example, exact construction equipment for a project may not yet be known, but a conservative estimate based on similar projects can be used. These covered activities form the basis for the environmental impact analysis in this PEIR. While enough project data exists to make reasonable assumptions about the potential level of significance for each project, additional project-level analysis will be completed when specific, project-level information becomes available for each project proposed in the CAP.

The following covered projects are analyzed in the PEIR:

- *DC-2 – Reduce natural gas emissions by 50 percent by 2030 and 100 percent by 2045 through electrification.*

  Metropolitan would replace natural gas and propane consuming equipment at its facilities with electrically powered equivalents at the end of their useful life or in an order that replaces the oldest and most antiquated pieces of equipment first. Some upgrades to existing electrical systems may be required to ensure proper function.

- *FL-4 – Install electric vehicle (EV) charging and/or zero emission vehicle (ZEV) infrastructure at facilities pursuant to the findings of a ZEV/EV Feasibility Study (CAP Measure FL-1).*

  Based on the results of a ZEV/EV study, which would analyze the existing fleet and develop a plan to replace fossil-fuel vehicles with ZEVs/EVs, this measure would install electric vehicle or other zero emissions infrastructure at Metropolitan facilities to ensure a smooth transition to clean fuel fleet vehicles. As the technology becomes available for large trucks and equipment, Metropolitan would transition to the newer technology to meet state requirements and ensure the success of the CAP.

  Installation of EV charging stations would include chargers, grid equipment, software, and communication networks. EV charging stations would be used by Metropolitan's fleet, both passenger vehicles and, as technology allows, larger fleet vehicles. Infrastructure would likely be required at Union Station Headquarters, the five treatment plants, pumping stations, and Metropolitan-owned housing, and other facilities. Minor trenching to install electrical lines or alternate fuel tanks may be required. All construction would be within existing Metropolitan-owned facilities. Though exact locations and timing of installation at each facility would be determined by the ZEV/EV study, construction is expected to begin at some locations before 2025.

- *E-2 – Connect the Yorba Linda Hydroelectric Power Plant (YLHEP) behind Metropolitan's Southern California Edison (SCE) electricity meter to directly utilize carbon-free electricity at Metropolitan's Diemer facility by 2025.*

  The YLHEP currently generates carbon-free electricity and sells the energy produced to the wholesale market through California Independent System Operator (CAISO). The Diemer WTP purchases energy from the retail utility SCE that has a GHG emission factor greater than zero. This measure would reconfigure the YLHEP to serve the Diemer WTP load behind the SCE meter, so that the electricity it generates would become directly available to the Diemer Plant enabling the Diemer Plant to fully meet its energy demands with carbon-free hydropower when the hydroelectric plant is running. Excess energy generated from YLHEP would continue to be sold to the wholesale market (CAISO). Work would occur entirely within the Diemer WTP boundary (Figure 8). The construction duration is estimated to be 12 to 18 months. The project would include:

- Installation of new 4.16 kilovolt (kV) underground electrical feeder(s) to connect the YLHEP to Diemer switchgear. Excavation would only be required if existing spare underground conduits are not available. This would be determined during the design phase.
- Modification of switchgears (YLHEP and Diemer).
- Installation of new breakers at the existing switchgears, if required.
- Modification/installation of auxiliary equipment.
- Replacement of existing SCE and CAISO meters.

Figure 8 Location of YLHEP work at the Robert B. Diemer WTP in Yorba Linda, California

- *E-4 – Install 3.5 megawatt (MW) battery energy storage systems (BESS) at the Jensen, Skinner, and Weymouth treatment plants. Investigate the use of a software system to track and optimize GHG emissions reduction due to time-of-use strategies by 2025.*

  Energy storage systems store energy produced during peak renewable power generation periods in order to power systems during periods when renewable power is not produced. The BESS is proposed to store energy generated by the solar generation system (Jensen, Skinner, Weymouth WTPs). The battery system will remain behind-the-meter and in a non-exporting state. The BESS size at each location is as follows:

  - 1,000 kW/4,000 kWh BESS at Jensen WTP in Granada Hills, California,
  - 1,000 kW/4,000 kWh BESS at Skinner WTP in Winchester, California, and
  - 1,000 kW/4,000 kWh BESS at Weymouth WTP in La Verne, California.

In August 2020, Metropolitan received a conditional reservation letter for participation in the California Public Utilities Commission's Self-Generation Incentive Program (SGIP). SGIP's conditional reservation letter covers the BESS at Jensen WTP and Skinner WTP under the SGIP's Equity Resiliency budget. The BESS at the Weymouth WTP has been placed on the waitlist. As such, Metropolitan initiated design for the BESS at the Jensen WTP and Skinner WTP. Design for the Weymouth WTP BESS will begin at a later time.

Figure 9 illustrates an example BESS facility similar in size to those proposed. Each site will consist of cast-in-place concrete pads supported on 18 inches of ¾ sized crushed aggregate base rock. Grading and paving will be limited to minor incidental adjustments to the existing grade and pavement, as needed, to accommodate the new equipment slabs. The infrastructure of a BESS contains the following major and ancillary components:

- Battery system as storage medium;
- Power conversion system (inverter);
- Power transformers and switchgear;
- Various power electronics control and monitoring and the related thermal management systems;
- Fire detection and suppression systems;
- System control and monitoring system; and
- Connections with the grid, the solar generation and backup emergency power generator.

Figure 9 Example BESS Facility

Proposed locations were selected based on specific criteria, including proximity to existing infrastructure (e.g., manholes, ductbanks, solar generation equipment), accessibility for maintenance activities and avoidance of design and construction conflicts with existing infrastructure. Three locations were considered at the Jensen WTP (Figure 10). Site 3 has been identified as the preferred location due to its proximity to existing electrical infrastructure. Two locations were considered at the Skinner WTP (Figure 11). Currently, Site 2 has been identified as the preferred alternative due to its proximity to the Substation Control Unit (SCU) Substation, existing solar facilities, and ease of access. Three locations were considered at the Weymouth WTP (Figure 12). Currently, no location has been identified as the preferred alternative.

Should the Jensen and Skinner projects be approved by the Board, construction could be expected to begin late 2021 with an expected construction duration for each site of approximately eight months. For the purposes of this PEIR, all construction is expected to occur concurrently.

Figure 10 Proposed BESS Locations at the Joseph Jensen WTP, Granada Hills, California

Figure 11 Proposed BESS Locations at the Robert A. Skinner WTP, Winchester, California

Figure 12 Proposed BESS Locations at the F.E. Weymouth WTP, La Verne, California

- *EE-1 – Convert all interior and exterior lighting at 50 percent of Metropolitan facilities to light emitting diode (LED) technologies by 2030 and 100 percent by 2045.*

  Metropolitan's facilities include extensive lighting systems. LED lights use only 20 to 25 percent of the energy of traditional incandescent lights and last 15 to 25 times longer. This measure would ensure that all incandescent lights are replaced at all Metropolitan facilities by 2045. This measure is limited to replacing lights and does not include the addition of new fixtures.

- *EE-4a-d – Implement findings of the CRA pump assessment (CAP Measure EE-2) to either refurbish or replace pumps at Eagle Mountain, Iron Mountain or Hinds pumping plants.*

  Based on the findings of the pump plant assessment, Metropolitan would replace impellers or refurbish pumps at the Iron Mountain, Eagle Mountain, or Hinds Pump Plants. All construction would occur inside the pump house buildings at the identified pump plants. As a Phase II measure, construction would not be expected until 2030 – 2045.

- *EE-5 – If the proposed RRWP is ultimately constructed, install an inter-stage pumping system on the reverse osmosis brine stream to reduce energy use.*

  This measure would ensure that if the proposed RRWP is constructed, an inter-stage pumping system would be installed on the reverse osmosis brine stream to reduce energy use. Construction of this measure would occur during construction of the RRWP, if construction of the facility is approved by the Board.

- *EC-3 – Install ZEV and/or EV infrastructure as directed by the ZEV/EV Feasibility Study (Measure FL-1) to support at least a 15 percent transition of employee-owned vehicles to ZEVs/EVs by 2025.*

  Currently Metropolitan has EV charging for employees at its Union Station Headquarters and the Weymouth and Diemer WTPs. Metropolitan would install or expand electric vehicle charging infrastructure for employee and visitor use at its facilities as recommended in the Feasibility Study from CAP Measure FL-1. The proposed measure would require upgrades to electrical systems, trenching for new duct banks, depending on the locations, and modifications to existing parking lot striping to accommodate EV vehicles parking only.

- *WC-6 – Implement advanced technology systems to increase Metropolitan-owned recycled and groundwater recovery systems to maintain local water supply (e.g., proposed RRWP).*

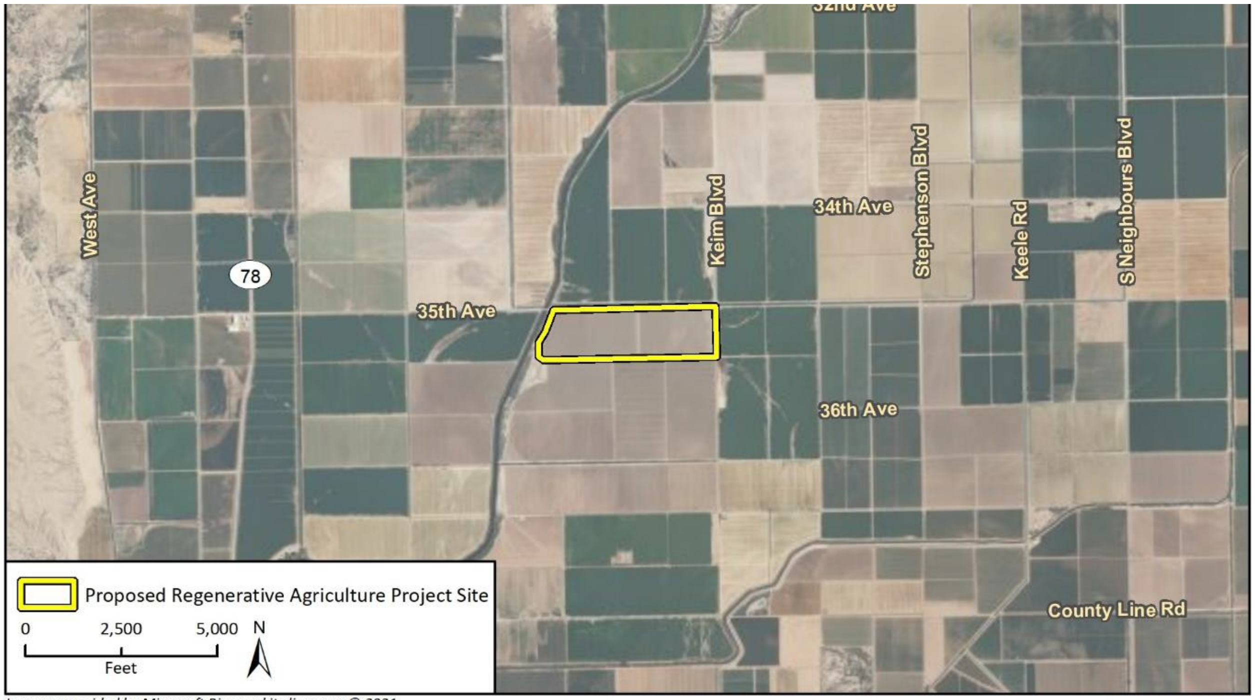
  This proposed measure would treat wastewater to potable water quality and send treated water to groundwater injection wells within the Los Angeles area. The development and operation of this facility would substantially increase the amount of local water available and potentially reduce the amount of imported water, reducing operational GHG emissions. The increased GHG emissions associated with the proposed RRWP have already been included in the GHG emissions forecast and the projected GHG savings are associated with estimates of reduced imported water pumping. Actual GHG emissions savings would depend on changes observed after RRWP implementation. The proposed RRWP is currently being considered by Metropolitan and is not a Board-approved project. The RRWP would undergo its own CEQA analysis. If the project is approved, implementation of the measure would not be expected until 2030-2045.

- *CS-2 – Conduct a five-year research program to increase Metropolitan's knowledge of regenerative agriculture and carbon sequestration opportunities on Metropolitan properties in the Palo Verde Valley.*

  Metropolitan would conduct a five-year research program with the California State University Chico Center for Regenerative Agriculture and Resilient Systems designed to increase Metropolitan's knowledge of regenerative agriculture and carbon sequestration opportunities.

The project would analyze impacts of traditional fallowing practices and investigate the effects of various cover crops and no-till practices. The proposed project would occur on plots of Metropolitan-owned land in the Palo Verde Valley designated for research purposes (Figure 13).

Figure 13 Proposed Regenerative Agriculture Project Site, Riverside County, California



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- *CS-3 – Establish baseline soil carbon quantities through science based approaches then develop pilot projects to enhance carbon sequestration and implement larger scale carbon sequestration projects as deemed feasible.*

  This Phase II measure would study carbon sequestration and carbon capture opportunities on Metropolitan-owned properties within the Sacramento-San Joaquin River Delta. Implementation of carbon capture projects would be aligned with CARB's Approved Carbon Capture and Sequestration Protocol if projects are deemed feasible and would comply with existing laws and regulations.

Environmental Requirements for Construction

Metropolitan has established environmental protocols and requirements for contractors and Metropolitan staff engaging in construction, including specialized requirements for desert locations and guidelines for projects in the public right-of-way. Environmental requirements for construction activities are evaluated and implemented for every construction project and operations and maintenance activity. These requirements are intended to ensure best practices are in place during all construction phases and to reduce and/or avoid environmental impacts. In addition, Metropolitan's engineering project specification package also specifies design practices for contractors during construction to reduce or avoid impacts to the environment.

Some of these construction requirements are summarized below:

- Obtain and comply with the applicable local, state, and federal environmental permits.

- Flag and/or fence any environmentally sensitive areas (ESAs) and abide by any conditions and measures implemented to protect ESAs.
- Implement best management practices (BMPs) to protect water quality, such as the use of drip pans below stationary equipment, proper storage and covering of stockpiled debris and soils, and proper cleanup of spills in accordance with environmental regulations.
- Use low sulfur fuels for construction vehicles and equipment, prohibit idling of vehicles and equipment, and comply with the applicable air district's fugitive dust control measures, such as South Coast Air Quality Management District's (SCAQMD) Rules 401 (Visible Emissions), 402 (Nuisance), 403 (Fugitive Dust) and 403.1 (Supplemental Fugitive Dust Control Requirements for Coachella Valley Sources).
- Comply with the Migratory Bird Treaty Act, California Fish Game Code 3503, including conducting pre-construction nesting bird surveys and implementation of avoidance measures, where applicable.
- Comply with applicable local tree ordinances.
- Protect any sensitive cultural and paleontological resources by halting work within 50 feet of an unanticipated discovery for evaluation of the find by a qualified professional, require archaeological and/or paleontological monitoring for sites with high sensitivity, and comply with California Health and Safety Code Section 7050.5 and Public Resources Code Section 5097.98 in the event that human remains are discovered.
- Properly store hazardous materials pursuant to state and federal regulations.
- Use spark arrestors and ensure availability of fire containment equipment to reduce fire risks.
- Use mufflers on construction vehicles and equipment to reduce noise impacts.
- Prepare and implement an approved Storm Water Pollution Prevention Plan (SWPPP) or Water Pollution Control Plan.
- All workers must attend a site-specific Worker's Environmental Awareness Training before being allowed on site.

Environmental Requirements for Desert Locations

In addition to the general environmental requirements discussed above, construction activities occurring in the desert locations must comply with special environmental requirements to protect sensitive desert habitat. These additional requirements include the following:

- All workers must attend a Desert Tortoise and Environmental Awareness Training before being allowed on site.
- Conduct preconstruction surveys for desert tortoise.
- Contract a qualified biologist to monitor for desert tortoise and other sensitive species, as needed.
- Limit vehicle speeds on all unpaved roadways.
- Check for desert tortoises beneath vehicles and equipment prior to operation.
- Use raven-proof containers for food and trash items to avoid attracting desert tortoise predators.

2.6 Permits and Approvals

Federal, state, and local agencies may rely on information in this PEIR to inform their decision-making regarding issuance of specific permits related to construction or operation of individual projects to be implemented under the proposed program. To the degree feasible, this PEIR identifies federal, state, and local permits and authorizations that may be required prior to construction for future projects envisioned as part of the proposed program, as well as the agencies that Metropolitan will likely need to coordinate with regarding these future program activities. These may include, but are not limited to, the following:

- CARB portable equipment registration and/or regional Air Pollution Control Districts (APCD) permit to operate for construction equipment.
- Encroachment permits, tree trimming/removal permits, and traffic control plans from local jurisdictions.
- California Department of Fish and Wildlife (CDFW) Lake and Streambed Alteration Agreement (Section 1602 Permit) and Regional Water Quality Control Board (RWQCB) Waste Discharge Requirements for impacts to Waters of the State.
- United States Army Corps of Engineers Clean Water Act Section 404 authorization for impacts to Waters of the United States.
- Federal Incidental Take Permit (ITP) from United States Fish and Wildlife Service for federally listed species or state ITP from CDFW for state listed species.
- Conformance with applicable State Water Resources Control Board National Pollutant Discharge Elimination System and/or Municipal Separate Storm Sewer System requirements.
- Review and approval by individual airport(s) and/or the Federal Aviation Administration.
- Regional Flood Control District permits.

3 Environmental Setting

This chapter provides a general overview of the environmental setting for the Plan Area, including a regional setting, sub-regional setting, and a description of major Metropolitan facilities and land holdings. This chapter also outlines the PEIR baseline and approach to both direct and cumulative impact analyses. More detailed descriptions of the environmental setting for each environmental resource area can be found in Chapter 4, *Environmental Impact Analysis*.

3.1 Regional Setting

As described in the Project Description, Section 2.3, *Climate Action Plan Area and Member Agencies*, the Plan Area consists of the following six counties in Southern California: Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura. Portions of northeastern Imperial County within the Palo Verde Valley, as well as four islands in the Sacramento-San Joaquin River Delta area[9], are also included in the Plan Area. The Plan Area includes all of Metropolitan's service area and its member agencies' jurisdictions, as well as all areas where Metropolitan owns land or facilities.

The Plan Area spans approximately 38,213 square miles across six ecoregions, including Southern California Mountains and Valley, Southern California Coast, Sonoran Desert, Mojave Desert, Colorado Desert, and California Central Valley (Great Valley) (United States Department of Agriculture 2007)[10]. The Plan Area contains a population[11] of approximately 22,176,450 across 202 incorporated cities and unincorporated county regions (California Department of Finance [DOF] 2020; United States Census Bureau 2020). The Plan Area includes over 220 miles of Pacific Ocean coastline, ranges in elevation from 234 feet below mean sea level to approximately 11,503 feet above mean sea level, and contains a national park, all or portions of four national forests, and three United States Census Bureau-designated Metropolitan Statistical Areas.

3.1.1 Sub-Regional Descriptions

Los Angeles County

Los Angeles County encompasses 4,058 square miles and is bounded by Ventura and Kern counties to the north, San Bernardino County to the east, Orange County to the south, and the Pacific Ocean to

[9] The Sacramento-San Joaquin River Delta area is made up of a series of branching waterways, which form islands and isolated tracts of land surrounded by rivers, streams, and channels. For simplicity, these features are referred to as islands in this document. The Webb Tract is surrounded by the San Joaquin River, Old River, and Fishermans Cut. Bouldin Island is surrounded by the South Mokelumne River and Little Potato Slough. The Holland Tract is surrounded by Roosevelt Cut, Holland Cut, Old River, Rock Slough, and Sand Mound Slough. Finally, Bacon Island is surrounded by Old River and Middle River.
[10] The portion of the Plan Area in the California Central Valley ecoregion is limited to four Metropolitan-owned islands in the Sacramento-San Joaquin River Delta region.
[11] Population includes 2020 population estimate for Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties, as well as population for the census-designated place of Palo Verde, Imperial County, California. Islands owned by Metropolitan in the Sacramento-San Joaquin River Delta region are largely uninhabited.

the west. Approximately 2,638 square miles of the county are unincorporated, with the remaining area consisting of the 88 incorporated cities within the county's boundaries (County of Los Angeles 2020a). An estimated 10,172,951 people live in Los Angeles County, accounting for approximately 45.9 percent of the population within the Plan Area (DOF 2020). The largest city within Los Angeles County is the city of Los Angeles, which encompasses 503 square miles and is home to 4,010,684 residents (DOF 2020). Other major population centers within the county include Long Beach, with 472,217 residents, Santa Clarita, with 221,932 residents, and Glendale, with 205,331 residents (DOF 2020).

The county contains a wide array of geological features. To the west, the county stretches along 75 miles of the Pacific Coast. In the northeastern portion of the county, large swathes of land are covered by the Angeles National Forest. In addition, the county contains portions of several mountain ranges, including the Santa Monica Mountains along the coast, the San Gabriel Mountains within the Angeles National Forest, the Peninsular Mountain Range in the south of the county, as well as desert areas within the Antelope Valley to the east (County of Los Angeles 2020b). The Los Angeles River is the largest river in the county and traverses 51 miles from Canoga Park to its terminus at the Pacific Ocean in Long Beach (Mountains Recreation and Conservation Authority 2020). Ecoregions present in the county include the Southern California Coast, Mojave Basin and Range, and Southern California Mountains (Griffith et al. 2016). The county is characterized by a Mediterranean climate, with hot, dry summers and mild, wet winters (County of Los Angeles 2015).

Metropolitan member agencies within the county include the Central Basin Municipal Water District, West Basin Municipal Water District, Upper San Gabriel Valley Municipal Water District, Las Virgenes Municipal Water District, Foothill Municipal Water District, Three Valleys Municipal Water District, the City of Beverly Hills, City of Burbank, City of Compton, City of Glendale, City of Long Beach, City of Los Angeles, City of Pasadena, City of Santa Monica, City of San Fernando, City of San Marino, and City of Torrance. Metropolitan facilities in Los Angeles County include the Weymouth WTP, Jensen WTP (Metropolitan's largest treatment plant), Live Oak Reservoir, Palos Verdes Reservoir, and Garvey Reservoir.

Orange County

Orange County covers 791 square miles and is bounded to the north by Los Angeles County, to the east by San Bernardino and Riverside counties, to the south by San Diego County, and to the west by the Pacific Ocean. There are 34 incorporated cities within the county, with 321 square miles of unincorporated territory (County of Orange 2005). The county has a population of 3,194,332, accounting for approximately 14.4 percent of the population within the Plan Area (DOF 2020).

Anaheim is the most populous city within the county, with 357,325 residents. Other major population centers include Santa Ana, with 335,052 residents, Irvine, with 281,707 residents, and Huntington Beach, with 201,281 residents (DOF 2020).

Orange County lies within an alluvial plain that is semi-enclosed by the Santiago Foothills and Santa Ana Mountains to the east, the Puente and Chino Hills to the north, and the San Joaquin Hills to the south. To the west, the county stretches along 40 miles of the Pacific coast. The Santa Ana River is the largest river within the county; it spans nearly 100 miles from the San Bernardino Mountains, enters Orange County between the Santa Ana Mountains and Chino Hills, and flows to the coast near Huntington Beach, where it empties into the Pacific Ocean (California Coastal Conservancy 2020). Climate in the county is influenced by its proximity to the ocean. The county lies within the Southern California Coast ecoregion (Griffith et al. 2016). Orange County has a Mediterranean climate with generally warm temperatures and light winds (County of Orange 2005).

The Municipal Water District of Orange County, City of Anaheim, City of Fullerton, and City of Santa Ana are the Metropolitan member agencies within the county. Metropolitan facilities in Orange County include the Diemer WTP, YLHEP, and Orange County Reservoir.

Riverside County

Riverside County encompasses 7,206 square miles within the eastern portion of Southern California. It is bordered by San Bernardino County to the north, the state of Arizona to the east, San Diego and Imperial counties to the south, and Orange County to the west. There are 28 incorporated cities within Riverside County, with approximately 6,416 square miles of unincorporated county land (County of Riverside 2019; DOF 2020). The county has a population of 2,442,304 which accounts for approximately 11.0 percent of the population within the Plan Area (DOF 2020). The city of Riverside is the most populous city within the county, with 328,155 residents. Other major population centers include Moreno Valley, with 208,838 residents, Corona, with 168,248 residents, and Murrieta, with 115,561 residents (DOF 2020).

The county contains mountainous areas, deserts, forests, rivers, and lakes. Major mountain ranges in the county include the Santa Ana, San Jacinto, and Santa Rosa mountain ranges in the western portion of the county and numerous desert ranges in the eastern portion of the county. The Cleveland National Forest and San Bernardino National Forest span mountainous regions of Riverside County. The southeastern part of the county lies within the Colorado Desert ecoregion, while a portion of north-central Riverside County is within the Mojave Desert ecoregion (County of Riverside 2015).

Portions of Joshua Tree National Park are also located in the eastern portion of the county. Major rivers that pass through the county include the Santa Ana, San Jacinto, and Whitewater rivers, the latter of which empties into the Salton Sea in the southeastern Coachella Valley, one of the largest inland seas in the world. In addition, the Colorado River runs along the eastern border of the county. There are also numerous lakes within the county, several of which are Metropolitan reservoirs that store water as part of the CRA system. Ecoregions present within Riverside County include the Southern California Coast, Mojave Basin and Range, Southern California Mountains, and Sonoran Basin and Range (Griffith et al. 2016). The county contains a variety of microclimates. Desert portions of the county are semi-arid to arid in climate with hot, dry summers and cool to cold winters depending on the elevation. In the western portion of the county, the climate is mild, with hot dry summers and wet winters (County of Riverside 2015).

Metropolitan member agencies within Riverside County include Eastern Municipal Water District and Western Municipal Water District. Metropolitan facilities in Riverside County include portions of the CRA, the Skinner WTP, Mills WTP, Diamond Valley Lake Reservoir, Lake Matthews Reservoir (CRA Western Terminus), Lake Skinner Reservoir, Eagle Mountain Pumping Plant, and Julian Hinds Pumping Plant.[12]

San Bernardino County

San Bernardino is the largest county in the Plan Area at 20,057 square miles (approximately 13 million acres). It is bordered by Inyo County to the north, the states of Nevada and Arizona to the east, Riverside and Orange counties to the south, and Los Angeles and Kern counties to the west. Approximately 78 percent of the land within San Bernardino County is under state or federal ownership; six million acres are controlled by the United States Bureau of Land Management, 1.9 million acres are owned by the United States Department of Defense, and 2.6 million acres are owned by the state. There are 24 incorporated cities within San Bernardino County, which account for 7

[12] The majority of Metropolitan's reservoirs are located within Riverside County.

percent of the land within the county (County of San Bernardino 2007). The county has a population of 2,180,537, accounting for approximately 9.8 percent of the Plan Area's population (DOF 2020).

The city of San Bernardino is the most populous city in the county, with 217,946 residents. Other major population centers include Fontana, with 213,000 residents, Ontario, with 182,871 residents, and Rancho Cucamonga, with 175,522 residents (DOF 2020).

The majority of San Bernardino County is comprised of desert areas, with mountain and valley regions in the southwest corner of the county (County of San Bernardino 2007). The San Bernardino Mountains and the eastern end of the San Gabriel Mountains run through the southwestern portion of the county and include the San Bernardino National Forest. Key riverine and lake resources within the county's mountains include Big Bear Lake, Baldwin Lake, the upper reaches of the Santa Ana River, Deep Creek, and Bear Creek. To the west of the mountains lies the valley region of the county, which is also the most urbanized part of the county. The Mojave Desert and Mojave Desert National Preserve are located in the northeastern portion of the county, while the Colorado Desert and portions of Joshua Tree National Park are located in the southeastern portion of the county. The Colorado River runs along the county's eastern boundary. Ecoregions present within San Bernardino County include Southern California Coast, Mojave Basin and Range, Southern California Mountains, and Sonoran Basin and Range (Griffith et al. 2016). The county contains a variety of microclimates.

Desert portions of the county are arid with hot, dry summers and mild to cold winters. The mountainous regions of the county are characterized by dry summers and wet, snowy winters. The valley regions exhibit a Mediterranean climate with hot, dry summers and cool winters (County of San Bernardino 2019).

The Inland Empire Utilities Agency is Metropolitan's only member agency within San Bernardino County. Metropolitan facilities in San Bernardino County include the Copper Basin Reservoir, Gene Wash Reservoir, Whitsett Intake (starting point of the CRA), Gene Pumping Plant, Iron Mountain Pumping Plant, portions of the CRA, and Etiwanda Reservoir.

San Diego County

San Diego County is the southernmost county in the Plan Area. It covers 4,207 square miles and is bordered by Riverside and Orange counties to the north, Imperial County to the east, the country of Mexico to the south; and the Pacific Ocean to the west. There are 18 incorporated cities within the county, all located within the western portion of San Diego County (County of San Diego 2011a). The county has a population of 3,343,355, accounting for approximately 15.1 percent of the Plan Area's total population (DOF 2020). The most populous city in the county is the city of San Diego, with 1,430,489 residents. Other major population centers include Chula Vista, with 272,202 residents, Oceanside, with 177,335 residents, and Escondido, with 153,008 residents (DOF 2020).

Urban land uses are concentrated in the westernmost portion of the county, while the eastern portions are largely undeveloped with mountains and desert landscapes. To the west, the landscape is characterized by low-lying coastal plains. To the east of the plains the mountains form the Peninsular Ranges. The easternmost portion of the county is characterized by desert, including the Anza-Borrego Desert State Park. Most of the land in the eastern, unincorporated portion of the county includes large areas of federal and state land, regional parks, and agricultural production (San Diego County 2011a). There are several federal and state protected lands within the county, including portions of the Cleveland National Forest, the San Diego National Wildlife Refuge, Tijuana Slough National Wildlife Reserve, Sweetwater Marsh Wildlife Refuge, Cuyamaca Rancho State Park, and Palomar Mountain State Park (County of San Diego 2011b). Major rivers within the county include the San Diego, San Dieguito, Sweetwater, and Otay rivers (Danskin 2010). Ecoregions present within the county include Southern California Coast, Southern California Mountains, and Sonoran Basin and Range (Griffith et al. 2016). The western portion of the county is characterized by a Mediterranean, semi-arid climate, while the eastern portion of the county is arid and has a desert climate (County of San Diego 2011b).

The San Diego County Water Authority is Metropolitan's only member agency within San Diego County.

Ventura County

Ventura County is a coastal county encompassing 1,843 square miles in the northwestern portion of the Plan Area. The county is bounded by Santa Barbara County to the west, Kern County to the north, Los Angeles County to the east, and the Pacific Ocean to the southwest (County of Ventura 2020).

There are 10 incorporated cities within the county, which account for approximately 10 percent of Ventura County's land area. Approximately 47 percent of the county's land area is comprised of the Los Padres National Forest. Unincorporated county land comprises 43 percent of the county (County of Ventura 2020). The county's population is 842,886, accounting for about 3.8 percent of the Plan Area's total population (DOF 2020). The most populous city within the county is Oxnard, with 206,352 residents. Other major population centers include Thousand Oaks, with 126,484 residents, Simi Valley, with 125,115 residents, and San Buenaventura (Ventura), with 106,276 residents (DOF 2020).

The county includes approximately 42 miles of Pacific Coast to the west-southwest, with coastal marshes and habitat, and mountains and forested areas to the north. The Transverse Ranges, including the Topatopa Mountains, cross the county within the Los Padres National Forest (County of Ventura 2020). There are three major rivers in the county, which run from the mountains to the coast: the Ventura and Santa Clara rivers, and Calleguas Creek (County of Ventura 2020). Protected lands within the county include the Los Padres National Forest, the Santa Monica Mountains National Recreation Area, the Channel Islands National Park, Coldwater Canyon Ecological Reserve, Lake Casitas Recreation Area, and Hopper National Wildlife Refuge. Ecoregions present within the county include Southern California Coast and Southern California Mountains (Griffith et al. 2016). The county's climate is mild, with mean annual precipitation varying from 15 to 35 inches (County of Ventura 2020).

The Calleguas Municipal Water District is Metropolitan's only member agency within the County and there are no major Metropolitan infrastructure facilities in the County.

Imperial County (Palo Verde Valley)

An approximately 18-square mile portion of the Plan Area is located in northeastern Imperial County. This portion of the Plan Area is within the Palo Verde Valley and is bordered by Riverside County to the north, the Colorado River and Arizona to the east, and desert regions of Imperial County to the south and west. The region is characterized by extensive agriculture and sparse population. The unincorporated community of Palo Verde, a census-designated place, is located in northeastern Imperial County within the Plan Area and has a population of approximately 85 (United States Census Bureau 2020). The Palo Verde Mountains are situated immediately west of the Imperial County portion of the Plan Area. The Palo Verde Valley lies within the Sonoran Basin and Range ecoregion and is characterized by an arid, desert climate (Griffith et al. 2016). A network of irrigation canals conveying Colorado River water extends throughout the Palo Verde Valley. There are no Metropolitan member agencies in Imperial County. While there are no major Metropolitan infrastructure facilities in northeastern Imperial County, Metropolitan owns land in the Palo Verde Valley in both Riverside and Imperial counties. Specifically, Metropolitan owns 21,079 acres of irrigated or available-to-irrigate farmland, as well as an additional 1,474 acres of rights of way, roads, and non-irrigated lands, and an additional 6,741 acres in the Palo Verde Valley but outside of the Palo Verde Irrigation District boundary.

San Joaquin and Contra Costa Counties (Delta Islands)

The Plan Area includes four Metropolitan-owned islands in the Sacramento-San Joaquin Delta region. Bacon Island (approximately 5,600 acres) and Bouldin Island (approximately 6,020 acres) are located in San Joaquin County, while Holland Tract (approximately 4,250 acres) and Webb Tract (approximately 5,500 acres) are located in Contra Costa County. These sparsely populated islands and tracts are characterized by extensive agriculture and marshland. The Sacramento and San Joaquin Rivers flow through the Delta region, with tributaries such as the Mokelumne, Old, and Middle Rivers surrounding the islands and tracts described above. An extensive network of canals and levees spans the islands and tracts. Most islands and tracts are relatively flat, and elevations are generally around or just below mean sea level. The Delta Islands are within the Central California Valley ecoregion (Griffith et al. 2016). The region is part of California's Central Valley, with temperatures regularly exceeding 100 degrees Fahrenheit (°F) in the summer, dropping to around 30 °F in the winter, and annual rainfall averaging approximately 14 inches (City of Stockton 2016). There are no Metropolitan member agencies in this portion of the Plan Area. There are no major Metropolitan infrastructure facilities on the islands or tracts, but the region includes numerous pumping stations, reservoirs, and conveyance channels associated with the State Water Project and Central Valley Project.

3.1.2 Approach for Program-Level and Cumulative Analyses

Baseline Conditions

Section 15125 of the *State CEQA Guidelines* states that an EIR "must include a description of the physical environmental conditions in the vicinity of the project." Section 15125 states that this description, or environmental setting, "normally constitute[s] the baseline physical conditions by which a lead agency determines whether an impact is significant." Furthermore, Section 15125(a)(1) of the *State CEQA Guidelines* states that, "Generally, the lead agency should describe the physical environmental conditions as they exist at the time the notice of preparation [NOP] is published."

This PEIR evaluates impacts against existing conditions at the time of the release of the NOP (2020). It was determined that a comparison to current, existing baseline conditions would provide the most relevant information for the public and Metropolitan decision-makers. For certain issue areas (including air quality, greenhouse gas [GHG] emissions/climate change, energy, noise and transportation/circulation), the impact analysis may discuss how changes in baseline conditions resulting from background population growth, urbanization, or increase in traffic volume may occur over time, with or without implementation of the proposed program. However, all impact determinations are based on a comparison to existing baseline conditions. General existing baseline conditions for the Plan Area are described above in Section 3.1.1, *Sub-Regional Descriptions*. Existing baseline conditions specific to each environmental resource area are described at the beginning of each impact analysis section.

Approach for Program-Level Impact Analysis

The programmatic nature of the CAP necessitates a general approach to the evaluation of existing conditions and impacts associated with the proposed program. As a programmatic document, this PEIR presents a regionwide assessment of the impacts of the CAP. The analyzed impacts would potentially result from implementation of the GHG reduction measures proposed in the CAP. The analysis considers both construction-related and post-construction (operational) impacts. Because the CAP is a long-term document intended to guide actions necessary to meet Metropolitan's 2045 emissions reduction target, a high-level, program-level or qualitative evaluation is included, where available When project-specific information is available, project-level analysis would be completed and the appropriate level of project-specific CEQA review would be, as needed. For analytical purposes, the baseline year examined throughout this PEIR is 2020.

Approach for Cumulative Impact Analysis

CEQA defines cumulative impacts as "two or more individual effects which, when considered together, are considerable, or which compound or increase other environmental impacts." Section 15130 of the *State CEQA Guidelines* requires that an EIR evaluate environmental impacts that are individually limited but cumulatively considerable. These impacts can result from the proposed project alone, or together with other projects. The *State CEQA Guidelines* state: "The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present and reasonably foreseeable probable future projects" (*State CEQA Guidelines*, Section 15355). A cumulative impact of concern under CEQA occurs when the net result of combined individual impacts compounds or increases other overall environmental impacts (*State CEQA Guidelines*, Section 15355). In other words, cumulative impacts can result from individually minor but collectively significant projects or programs taking place over a period of time. CEQA does not require an analysis of incremental effects that are not cumulatively considerable nor is there a requirement to discuss impacts which do not result in part from the project or program evaluated in the PEIR.

When evaluating cumulative impacts, CEQA allows the use of either a list of past, present and probable future projects, including projects outside the control of the lead agency, or a summary of projections in an adopted planning document, or a combination of the two approaches. The cumulative analysis used in this PEIR uses a projections-based approach (see *State CEQA Guidelines* Section 15130(b)(1)(A) and Section 15130(b)(1)(B)). Land use and growth projections for the Plan Area are described in Table 6.

Table 6 Population, Household, and Employment Projections for the Plan Area (2020-2045)

County	Area (square miles)[1]	Population		Households		Jobs	
		2020[2]	2045[3]	2020[2]	2045[3]	2020[4]	2045[3]
Los Angeles	4,058	10,172,951	11,677,000	3,590,574	4,125,000	4,589,500	5,383,000
Orange	791	3,194,332	3,535,000	1,111,421	1,154,000	1,664,700	1,980,000
Riverside	7,206	2,442,304	3,252,000	856,124	1,086,000	779,700	1,103,000
San Bernardino	20,057	2,180,537	2,815,000	726,680	875,000	797,700	1,064,000
San Diego	4,207	3,343,355	4,275,000[5]	1,226,879	1,500,000[5]	1,512,700	1,800,000[5]
Ventura	1,843	842,886	947,000	291,210	306,000	334,500	389,000
Other[6]	51	85[7]	85	24[8]	24	–[9]	–
Plan Area Total	**38,213**	**22,176,450**	**26,501,085**	**7,802,912**	**9,046,024**	**9,678,800**	**11,719,000**

[1] California State Association of Counties 2014

[2] California Department of Finance 2020

[3] Southern California Association of Governments 2019

[4] United States Bureau of Labor Statistics 2020. Figures reported as of the end of December 2019.

[5] San Diego Association of Governments 2011

[6] Includes northeastern Imperial County and sparsely populated islands and tracts in the Sacramento-San Joaquin Delta region. These areas are not anticipated to account for a substantial amount of growth in population, households, or jobs in the Plan Area.

[7] Based on United States Census Bureau population estimate for the census-designated community of Palo Verde.

[8] Based on an average household size of 3.56 persons per household in Imperial County (California Department of Finance 2020).

[9] Due to their sparsely populated nature, these portions of the Plan Area are not anticipated to account for a substantial amount of current or future jobs in the Plan Area.

As shown in Table 6, the Plan Area is anticipated to experience an approximately 19.5 percent growth in population, 15.9 percent growth in households, and 21.1 percent growth in jobs by 2045, resulting in increased population, household, and employment density throughout the region. These projections are accounted for in planning documents adopted by regional planning agencies within the Plan Area. These growth projections, in conjunction with the potential impacts of the proposed program, form the basis of the cumulative impact analysis presented in this PEIR. Cumulative impacts are analyzed at the end of the impact analysis section for each environmental resource area.

4 Environmental Impact Analysis

Introduction

This chapter introduces the organization of the environmental resource sections, which contain the various impact analyses, as well as the methodology and terminology used throughout this PEIR. It explains the overall methodology used to analyze impacts, along with the methodology for the cumulative analysis.

Environmental Analysis Scope and Organization

Resource Sections

Sections 4.1 through 4.5 of this chapter contain discussions on the potentially significant impacts of the proposed program. Each of these sections corresponds with a specific environmental resource area. To assist the reader in comparing information about the various environmental issues, each section of this chapter is organized in the following manner.

- **Existing Conditions**. Describes the existing or baseline conditions in each resource study area for the proposed program.
- **Regulatory Framework**. Provides the federal, state, regional, and local regulations for each resource area that apply to the proposed program.
- **Thresholds and Methodology**. Identifies the thresholds for determining whether a significant impact would occur with implementation of the proposed program, based on California Environmental Quality Act (CEQA) guidance and, in some cases, resource-specific guidance. Describes the methods used for the analysis of impacts and any assumptions that were made in the analysis of impacts.
- **Impacts Analysis**. Presents the evaluation of impacts that would result from implementation of the proposed program, and any mitigation measures that would be necessary to reduce these impacts. Includes the analysis of cumulative impacts for each environmental resource area, evaluated by considering the impacts of the proposed program when combined with impacts of other projects and programs within the resource study area, and a discussion on the level of significance after mitigation.

The impact analysis compares the proposed program to the existing conditions, also known as the CEQA baseline.

The analysis contained in this PEIR addresses both construction and post-construction (i.e., operational) impacts associated with implementation of the proposed program. When considering the existing conditions and potential project-level impacts for each resource area, sufficient information about the location and intensity of program activities is not available. To facilitate impact analysis, impacts were estimated by referencing a "typical," reasonable construction schedule and equipment mix that could be expected to be required for construction of individual projects described in

Chapter 2, *Project Description*. The sample program activity includes parameters based on reasonable, conservative assumptions that are anticipated to encompass most or all individual projects. The analysis is compared to local, regional, and statewide regulations to develop a conservative scenario against which supplemental environmental analysis would be compared to make a significance determination and to determine if feasible mitigation is available to reduce these impacts to less-than-significant levels. However, the lack of project- specific details, such as the location of construction sites and proposed construction methods, limits the ability of this PEIR to determine the severity of impacts of specific project-level activities covered by the proposed program. Supplemental environmental analysis for individual covered projects would be required when project-specific details are known and projects are further defined.

Methodology and Terminology Used in the Analysis

In evaluating the potential impacts of the proposed program, the level of significance is determined by applying the thresholds of significance presented for each resource area. The environmental analyses in Sections 4.1 through 4.5 include a detailed discussion and final impact determination for the proposed program.

To determine significance, the environmental conditions with implementation of the proposed program are compared to a baseline condition. The difference between the environmental conditions with implementation of the proposed program and the baseline is then compared to a threshold to determine if the difference is significant. Section 15125 of the *State CEQA Guidelines* requires that an EIR include a description of the physical environmental conditions in the vicinity of a proposed action that exist at the time the Notice of Preparation is published (the NOP was published for public review from June 23 to July 22, 2020). This environmental setting serves as the baseline by which the lead agency determines whether an impact is significant. The lead agency may also consider a baseline condition that better reflects fluctuations resulting from cyclical trends, such as drought and wet weather. The baseline to which the proposed program is compared is described in each resource section to determine the significance of impacts.

The following terms are used to describe the level of impact in each resource section.

- **No impact.** A designation of no impact is given when no adverse changes to the environment are expected.
- **Less-than-significant impact.** A less-than-significant impact is identified when the proposed program would cause no substantial adverse change to the environment (i.e., the impact would not reach the threshold of significance).
- **Significant impact.** A significant impact is identified when the proposed program would create a substantial adverse change in any of the physical conditions within the affected resource area. Such an impact would exceed the applicable significance threshold established by CEQA but would be reduced to a less-than-significant level with incorporation of one or more mitigation measures.
- **Mitigation.** Mitigation refers to measures that would be implemented to avoid or lessen potentially significant impacts. Mitigation includes:
    - Avoiding the impact altogether by not taking a certain action or parts of an action.
    - Minimizing the impact by limiting the degree or magnitude of the action and its implementation.
    - Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

  - Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
  - Compensating for the impact by replacing or providing substitute resources or environments.

Mitigation measures would be required as conditions of program approval and would be monitored to ensure compliance and implementation.

- **Significant and unavoidable impact.** A significant and unavoidable impact is identified when an impact that would cause a substantial adverse effect on the environment could not be reduced to a less-than-significant level through implementation of any feasible mitigation measure(s).

In some cases, a significant and unavoidable impact determination is made because project-specific detail is not available to ensure that the proposed mitigation could reduce the impact to a less-than-significant level. In such cases, program-level impacts are considered to be potentially significant and unavoidable. Additional analysis and CEQA documentation would identify whether project-specific mitigation would be required and whether the proposed mitigation would avoid or lessen any potentially significant impacts.

- **Level of Significance After Mitigation.** Level of Significance After Mitigation is the determination of the level of impact after the implementation of mitigation measures. The level of significance after mitigation would be expressed as no impact, less-than-significant impact, less-than-significant impact with mitigation incorporated, or significant and unavoidable impact, as defined above.

Cumulative Analysis Methodology

The *State CEQA Guidelines* define cumulative impacts as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts” (*State CEQA Guidelines* Section 15355). According to *State CEQA Guidelines* Section 15130, an EIR shall discuss cumulative impacts of a project when the project’s incremental effect is cumulatively considerable. A cumulative impact analysis must include either: (1) a list of past, present, and reasonably anticipated future projects (“list approach”); or (2) a summary of projections contained in adopted plans designed to evaluate regional or area-wide conditions (“plan approach”). A cumulative impact analysis considers the collective impacts posed by individual plans and projects. Cumulative impacts can result from individually minor, but collectively substantial, impacts taking place within a study area and/or over a period of time.

At the program level, the list approach is not possible because the specific location and timing of individual projects to be implemented under the program is not known, so the potential for the impacts of the proposed program components to combine with other specific projects is also not known. Instead, this document uses a plan approach, looking at ongoing and planned growth patterns in the Plan Area to identify where there would be the potential for program component impacts to combine with the impacts from other projects or programs to result in cumulative impacts. For more detailed discussion of the plan approach to cumulative analysis and growth projections within the Plan Area, refer to Chapter 3, *Environmental Setting*.

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4.1 Air Quality

4.1.1 Introduction

This section describes the existing conditions of the Plan Area for air quality, the regulatory framework associated with air quality, the impacts on air quality that would result from implementation of the proposed program, and the mitigation measures that would reduce these impacts. Impacts related to greenhouse gas emissions are evaluated in Chapter 5, *Effects Found Not to Be Significant*.

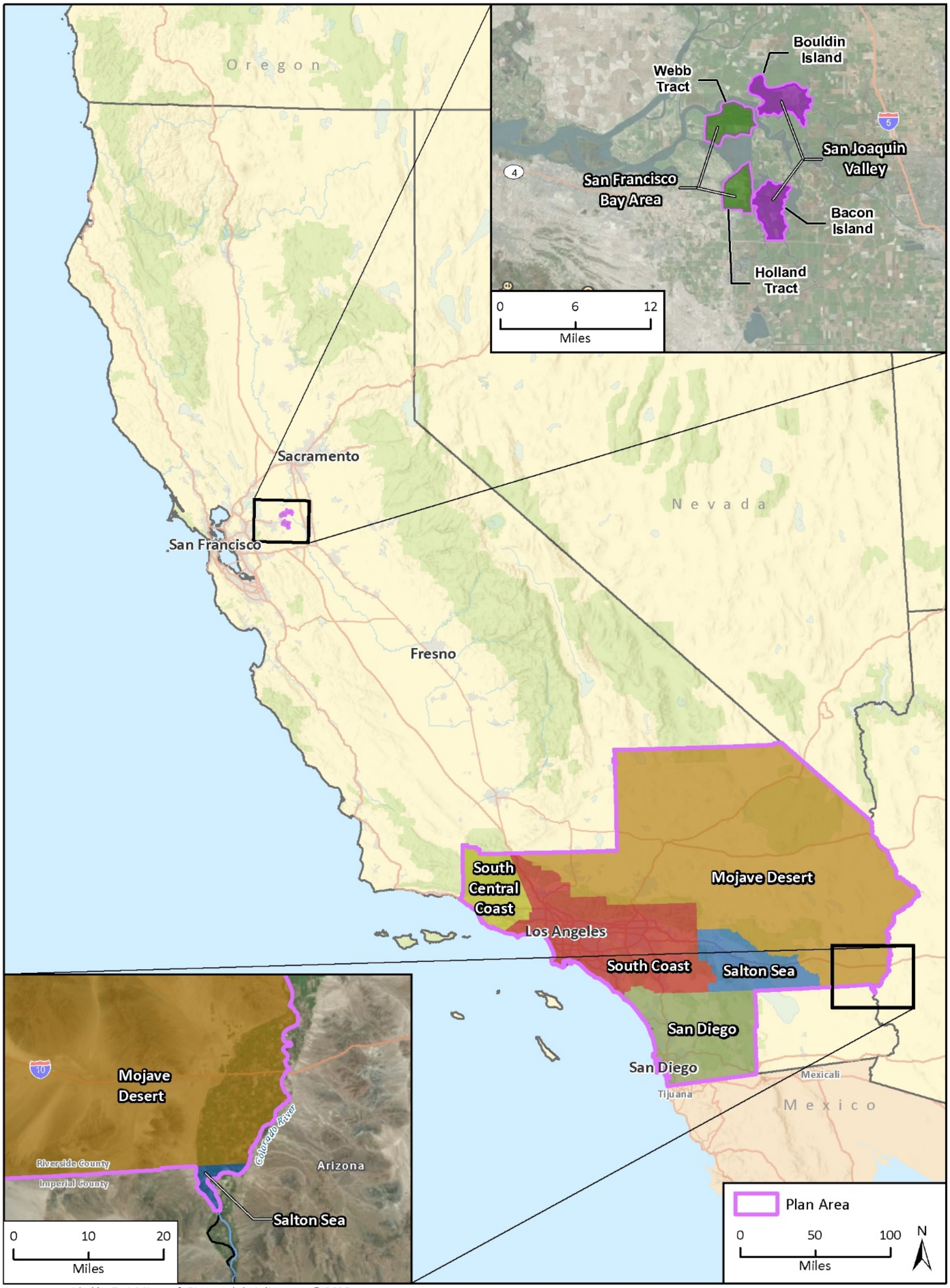
4.1.2 Existing Conditions

California is divided geographically into 15 air basins for managing the air resources of the state on a regional basis. Air basin boundaries were created by the CARB [13] largely by reviewing areas with similar geographical and meteorological characteristics; however, political boundaries are also accounted for in these boundaries. Some air basins are relatively small, while others are quite large (CARB 2014). Areas within each air basin are considered to share the same air masses and, therefore, are expected to have similar ambient air quality. The Plan Area includes five air basins in Southern California (South Coast, Mojave Desert, San Diego, Salton Sea, and South Central Coast) and two in Northern California (San Joaquin Valley and San Francisco Bay Area) that encompass all or portions of Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura, Imperial, San Joaquin, Contra Costa, and Solano counties. Table 7 and Figure 14 detail the air basins and the associated counties within the Plan Area.

Local air quality management control and planning is provided through 35 regional air districts established by CARB for the 15 individual basins. CARB is responsible for control of mobile emission sources, while the local air districts are responsible for control of stationary sources and enforcing regulations. The seven air basins listed above fall within the jurisdictional areas of the eight air districts listed below in Table 7 and shown in Figure 15. They include SCAQMD, Mojave Desert Air Quality Management District (MDAQMD), Imperial County Air Pollution Control District (ICAPCD), Ventura County Air Pollution Control District (VCAPCD), San Joaquin Valley Unified Air Pollution Control District (SJVAPCD), Antelope Valley Air Quality Management District (AVAQMD), San Diego Air Pollution Control District (SDAPCD) and the Bay Area Air Quality Management District (BAAQMD). Combined, the eight air districts have jurisdiction over an area of approximately 38,275 square miles, which encompasses 26 counties. All the known locations of proposed CAP projects are within the jurisdictional boundaries of the eight regional air districts listed in Table 7.

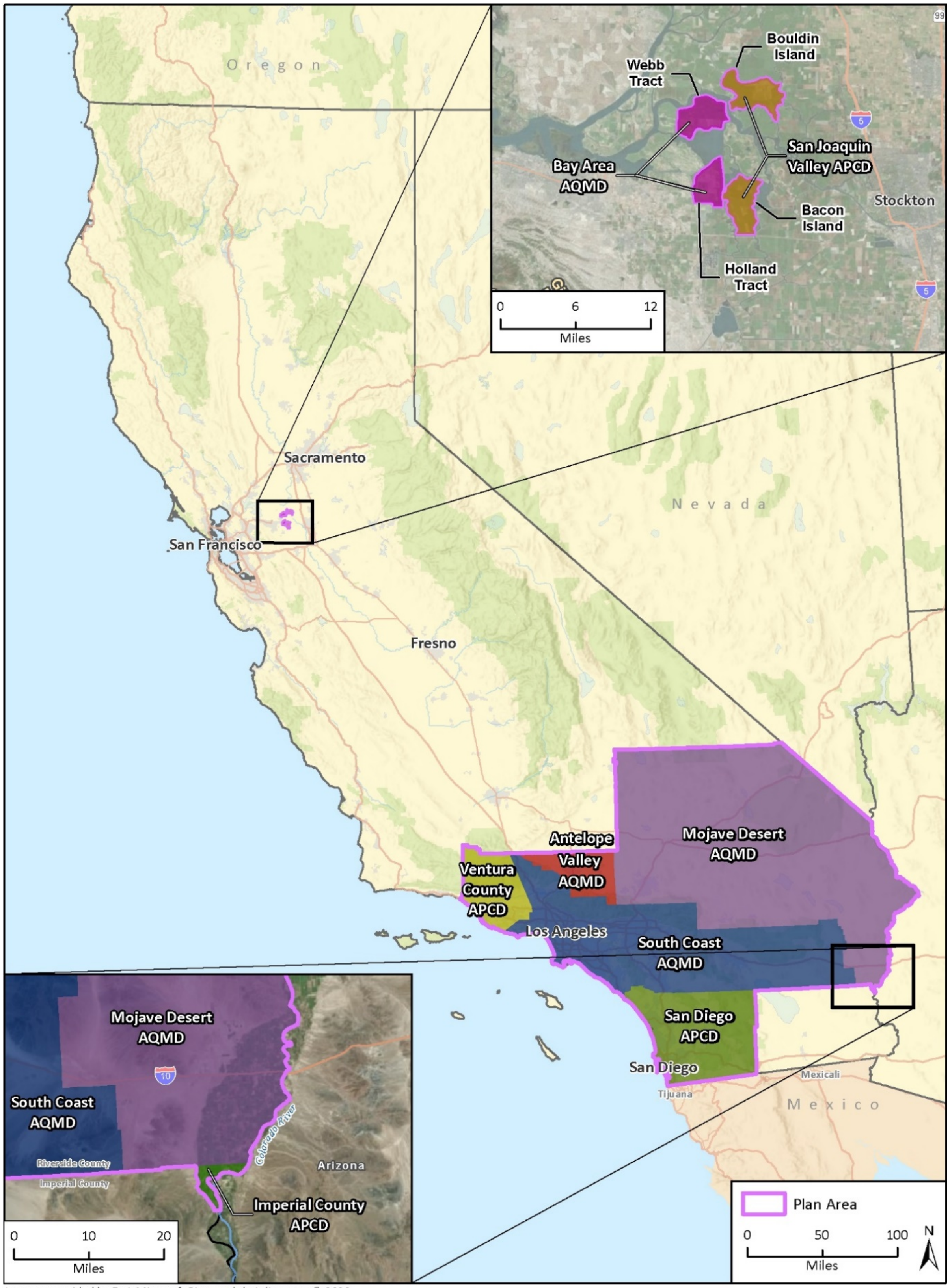
[13] CARB is the state agency designated to administer air quality regulations

Figure 14 Air Basins in the Plan Area



Imagery provided by Esri, Microsoft Bing, and their licensors © 2020.
Additional data provided by USGS, 2017 and CA Air Resources Board, 2019.

Figure 15 Air Districts in the Plan Area



Imagery provided by Esri, Microsoft Bing, and their licensors © 2020.
Additional data provided by USGS, 2017 and CA Air Resources Board, 2019.

Table 7 Air Basins and Associated Counties and Air Districts in the Plan Area

Air Basin	Counties	Air District(s)
South Coast Air Basin	Los Angeles Orange Riverside San Bernardino	South Coast Air Quality Management District
Mojave Desert Air Basin	Los Angeles San Bernardino Riverside	Mojave Desert Air Quality Management District Antelope Valley Air Quality Management District South Coast Air Quality Management District
San Diego Air Basin	San Diego	San Diego Air Pollution Control District
Salton Sea Air Basin	Imperial Riverside	Imperial County Air Pollution Control District South Coast Air Quality Management District
South Central Coast Air Basin	Ventura	Ventura County Air Pollution Control District
San Joaquin Valley Air Basin	San Joaquin	San Joaquin Valley Unified Air Pollution Control District
San Francisco Bay Area Air Basin	Contra Costa	Bay Area Air Quality Management District

4.1.2.1 Criteria Pollutants

The following discussion provides an introduction to air pollutants that are emitted into the ambient air by various stationary and mobile sources and are regulated by federal and state law. These regulated air pollutants are known as criteria air pollutants and are categorized either as primary pollutants or secondary pollutants. Primary air pollutants are those pollutants that are emitted directly from the various stationary and mobile sources, including carbon monoxide, volatile organic compounds (VOCs), nitrogen oxides, sulfur dioxide, and most fine particulate matter (particulate matter 10 microns or less in diameter [PM_{10}], particulate matter 2.5 microns or less in diameter [$PM_{2.5}$] such as lead and fugitive dust). Of these, carbon monoxide, sulfur dioxide, PM_{10}, and $PM_{2.5}$ are criteria pollutants. VOCs and nitrogen oxides are precursors that form secondary criteria pollutants, such as ozone and nitrogen dioxide, through chemical and photochemical reactions in the atmosphere. Presented below is a description of each of the primary and secondary criteria air pollutants and their known health effects.

Ozone

Ozone, a colorless toxic gas, is found in two regions of the Earth's atmosphere: at ground level and in the upper regions of the atmosphere. Ozone is produced by a photochemical reaction (triggered by sunlight) between nitrogen oxides and VOCs. Nitrogen oxides are formed during the combustion of fuels, while VOCs are formed during incomplete combustion of fuels as well as evaporation of organic solvents. Both types of ozone have the same chemical composition (O_3). Although upper atmospheric ozone protects the Earth from the sun's harmful rays, ground-level ozone is the main component of smog (U.S. EPA 2018). It enters the bloodstream and interferes with the transfer of oxygen, depriving sensitive tissues in the heart and brain of oxygen. It also damages vegetation by inhibiting growth. Although ozone is not directly emitted, it forms in the atmosphere through a photochemical reaction between VOCs and nitrogen oxides in the presence of sunlight (i.e., smog). The damaging effects of photochemical smog are generally related to the concentration of ozone, which is present in relatively high concentrations in the Plan Area's seven air basins. Meteorology and terrain play major roles in ozone formation. Ideal smog conditions typically occur during summer and early autumn on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies; however, smog conditions can also occur during the winter months in high-elevation areas in the western United States when snow is on the ground and temperatures are near or below freezing if high levels of local VOC and nitrogen oxide emissions are present (U.S. EPA 2016).

Organic Gases – Precursors to Ozone

There are several subsets of organic gases, including reactive organic gases and VOCs. Hydrocarbons are organic gases that are formed solely of hydrogen and carbon. Reactive organic gases include all hydrocarbons except those exempted by CARB. Therefore, reactive organic gases are a set of organic gases based on state rules and regulations. VOCs are similar to reactive organic gases in that they include all organic gases except those exempted by federal law. Both VOCs and reactive organic gases are emitted from incomplete combustion of hydrocarbons or other carbon-based fuels. Combustion engine exhaust, oil refineries, and oil-fueled power plants are the primary sources of hydrocarbons. Another source of hydrocarbons is evaporation from petroleum fuels, solvents, dry-cleaning solutions, and paint. In general, reactive organic gases and VOCs are used interchangeably to refer to the hydrocarbons that are a precursor to ozone formation. However, to avoid confusion, the following analysis only uses the term VOCs to denote organic gases.

The primary health effects of hydrocarbons result from the formation of ozone and its related health effects. High levels of hydrocarbons in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. Carcinogenic forms of VOCs are considered to be toxic air contaminants (TACs) (described later in this section).

Carbon Monoxide

Carbon monoxide is a colorless, odorless gas that can interfere with the transfer of oxygen to the brain. It can cause dizziness and fatigue and impair central nervous system functions. Carbon monoxide is emitted almost exclusively from incomplete combustion of fossil fuels. In urban areas, carbon monoxide is emitted by motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. Automobile exhaust is the largest carbon monoxide contributor in urban areas. Carbon monoxide is a non-reactive air pollutant that dissipates relatively quickly; therefore, ambient carbon monoxide concentrations generally follow the spatial and temporal distributions of vehicular traffic. Carbon monoxide concentrations are influenced by local meteorological conditions, primarily wind speed, topography, and atmospheric stability. Carbon monoxide from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, a typical situation at dusk in urban areas between November and February.

Nitrogen Dioxide

Nitrogen dioxide is a brownish gas that irritates the lungs. It can cause breathing difficulties at high concentrations. Similar to ozone, nitrogen dioxide is not directly emitted but is formed through a reaction between nitric oxide and atmospheric oxygen. Nitric oxide and nitrogen dioxide are collectively referred to as nitrogen oxides and are major contributors to ozone formation. Nitrogen dioxide also contributes to the formation of PM_{10} (see discussion of PM_{10} later in this section). At atmospheric concentrations, nitrogen dioxide is only potentially irritating. At high concentrations, the result is a brownish-red cast to the atmosphere and reduced visibility. There is some indication of a relationship between nitrogen dioxide and chronic pulmonary fibrosis. Some increase in bronchitis in children (2 to 3 years old) has also been observed at concentrations below 0.3 part per million (ppm) (SCAQMD 1993).

Particulate Matter

Particulate matter pollution consists of very small liquid and solid particles floating in the air, including smoke, soot, dust, salts, acids, and metals. Particulate matter also forms when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. PM_{10} and $PM_{2.5}$ represent fractions of particulate matter. PM_{10} refers to particulate matter 10 microns or less in diameter, about 1/7th the thickness of a human hair. $PM_{2.5}$ refers to particulate matter that is 2.5 microns or less in diameter, roughly 1/28th the diameter of a human hair. Major sources of PM_{10} include motor vehicles; wood burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. $PM_{2.5}$ results from fuel combustion (from motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, PM_{10} and $PM_{2.5}$ can be formed in the atmosphere from gases such as sulfur dioxide, nitrogen oxides, and VOCs.

Both PM_{10} and $PM_{2.5}$ pose a greater health risk than larger size particles because when inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. PM_{10} and $PM_{2.5}$ can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances, such as lead, sulfates, and nitrates, can cause lung damage directly. These substances can be absorbed into the bloodstream and cause damage elsewhere in the body; they can also transport adsorbed contaminants such as chlorides or ammonium into the lungs and cause injury. Particles measuring 2.5 to 10 microns in diameter tend to collect in the upper portion of the respiratory system, and $PM_{2.5}$ are so tiny that they can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle and contribute to haze and reduce regional visibility (SCAQMD 1993).

Sulfur Dioxide

Sulfur dioxide is a product of high-sulfur fuel combustion. The main source of sulfur dioxide is combustion of coal and oil used in power stations, industries, and domestic heating. Industrial chemical manufacturing is another source of sulfur dioxide. Sulfur dioxide is an irritant gas that attacks the throat and lungs. It can cause acute respiratory symptoms and diminished ventilator function in children. Sulfur dioxide can also cause plant leaves to turn yellow and erode iron and steel. In recent years, sulfur dioxide concentrations have been reduced by the increasingly stringent controls placed on stationary-source emissions of sulfur dioxide and limits on the sulfur content of fuels.

Lead

Lead is a metal found naturally in the environment, as well as in manufacturing products. Lead occurs in the atmosphere as particulate matter. Leaded gasoline has been regulated by the U.S. EPA since the early 1970s, which has resulted in dramatic reductions of lead found in the environment. As a result of those reductions, metal processing currently is the primary source of lead emissions. The highest level of lead in the air is generally found near lead smelters. Other stationary sources include waste incinerators, utilities, and lead-acid battery manufacturers. Lead may cause a range of health effects, including anemia, kidney disease, and, in severe cases, neuromuscular and neurological dysfunction.

Toxic Air Contaminants

With respect to criteria pollutants, federal and/or state ambient air quality standards represent the exposure level (with an adequate margin of safety) deemed safe for humans. No ambient air quality standards exist for TACs because no exposure level has been deemed safe for humans. Pollutants are identified as TACs because of their potential to increase the risk of developing cancer or their acute or chronic health risks. For TACs that are known or suspected carcinogens, CARB has consistently found that there are no levels or thresholds below which exposure is risk-free. Individual TACs vary greatly in the risk they present. At a given level of exposure, one TAC may pose a hazard that is many times greater than another. For certain TACs, a unit risk factor can be developed to evaluate cancer risk. For acute and chronic health risks, a similar factor, called a Hazard Index, is used to evaluate risk. In the early 1980s, CARB established a statewide comprehensive air toxics program to reduce exposure to air toxics.

To date, CARB has identified 21 TACs and adopted the U.S. EPA's list of hazardous air pollutants as TACs. In August 1998, CARB identified diesel exhaust particulate matter (DPM) emissions as a TAC. According to CARB, diesel engine emissions are believed to be responsible for about 70 percent of California's estimated known cancer risk attributable to toxic air contaminants and comprise about eight percent of outdoor $PM_{2.5}$ (CARB 2020). DPM accounts for a greater fraction of overall cancer risk in some regions, such as in the SCAB where 80 percent of overall cancer risk from TACs is attributed to DPM (SCAQMD 2015). In September 2000, CARB approved a comprehensive diesel risk reduction plan to reduce emissions from both new and existing diesel-fueled engines and vehicles. The goal of the plan is to reduce DPM emissions and the associated health risk by 75 percent by 2010 and by 85 percent by 2020 (CARB 2000). CARB estimates that DPM emissions in 2035 will be less than half of those in 2010 (CARB 2020).

4.1.2.2 Climate and Meteorological Conditions

The following subsections detail the location, climate, and metrological influences of each air basin in the Plan Area. Air quality in each basin is primarily influenced by its unique meteorology, its interactions with neighboring air basins, and a wide range of emissions sources, such as dense population centers, substantial vehicular traffic, and industry. All seven air basins are also influenced by the semi-permanent Pacific High subtropical pressure system off the coast. This pressure system consists of warm air from the low latitudes (i.e., the tropics) that is circulated to the North Pacific via atmospheric currents. As this air descends along the coast, the air warms and dries, which typically results in sunny and dry weather (National Oceanic and Atmospheric Administration 2020). The specific influences of the Pacific High subtropical pressure system in each air basin are discussed below. In addition, several air basins are influenced by regional "Santa Ana" conditions in which the prevailing westerly wind pattern is sometimes interrupted. Santa Ana conditions occur when a strong high pressure develops over the Nevada–Utah area and overcomes the prevailing westerly coastal winds, sending strong, steady, hot, dry northeasterly winds over the mountains and out to sea. The high pressure and strong Santa Ana winds tend to blow pollutants out over the ocean, thus producing clear days. However, at the onset or during breakdown of Santa Ana conditions, or if the Santa Ana is weak, dispersion of pollutants can be impeded. The specific influences of the Sana Ana conditions in some air basins are discussed below.

South Coast Air Basin

The South Coast Air Basin (SCAB) consists of all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties, in addition to the San Gorgonio Pass area in Riverside County. The SCAB is bordered by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east.

The regional climate in the SCAB is semi-arid and is characterized by warm summers, mild winters, infrequent seasonal rainfall, moderate daytime onshore breezes, and moderate humidity (SCAQMD 1993 and 2016). Most of the annual rainfall in the SCAB occurs between November and April with annual precipitation ranging from 12 to 15 inches along the coast and decreasing to less than 10 inches inland (CARB 2011). Summer rainfall is minimal and is generally limited to scattered thundershowers in coastal regions and slightly heavier showers in the eastern portion of the SCAB and along the coastal side of the mountains. Average temperatures vary widely throughout the SCAB from lows in the mid-50 degrees Fahrenheit (°F) and highs in the mid-70°F along the coast to average summertime highs in the mid- to high-90°F in the inland regions. The mountainous regions of the SCAB experience temperatures below freezing in the winter and precipitation in the form of snow (CARB 2011).

The SCAB experiences a persistent temperature inversion (warmer air on top of cooler air) as a result of the Pacific High subtropical pressure system. This inversion limits the vertical dispersion of air contaminants, holding them relatively near the ground. As the sun warms the ground and the lower air layer, the temperature of the lower air layer approaches the temperature of the base of the inversion (upper) layer until the inversion layer finally breaks, allowing vertical mixing with the lower layer. This phenomenon is observed in mid- to late afternoons on hot summer days. Winter inversions frequently break by midmorning. The combination of stagnant wind conditions and low inversions produces the greatest pollutant concentrations. On days of no inversion or high wind speeds, ambient air pollutant concentrations are lowest. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly onshore into Riverside and San Bernardino counties. In the winter, the greatest pollution problem is the accumulation of carbon monoxide and nitrogen oxides due to low inversions and air stagnation during the night and early morning hours. Longer daylight hours and brighter sunshine in the summer result in greater frequency of reactions between sunlight, hydrocarbons, and nitrogen oxides, which forms photochemical smog (SCAQMD 2017).

Mojave Desert Air Basin

The Mojave Desert Air Basin (MDAB) consists of the desert portions of Los Angeles, San Bernardino, Riverside, and Kern counties and is an assemblage of mountain ranges interspersed with long broad valleys that often contain dry lakes. The MDAB is separated from the southern California coastal and central California valley regions by the Tehachapi Mountains to the west and by the San Gabriel Mountains to the south. The mountains in the lower region generally reach heights of 1,000 to 4,000 feet above the valley floor.

The MDAB averages three to seven inches of rain annually. Thus, it is classified as a dry-hot desert climate where temperatures can be in excess of 95°F for 60 to 70 days per year with almost no precipitation. Prevailing winds in the MDAB come from the west and southwest and are produced by a combination of the proximity of the MDAB to coastal and central regions and the location of the Sierra Nevada Mountains to the north, which prevent air from passing through. During summer, the MDAB is normally influenced by the Pacific High subtropical pressure cell off the coast that prevents cloud formation and encourages daytime solar heating. Cold air masses moving south from Canada and Alaska do not generally influence the MDAB because the frontal systems are weak and diffuse before they reach the desert. Therefore, desert moisture is created through warm, moist, unstable air masses from the south (Eastern Kern Air Pollution Control District 2017).

San Diego Air Basin

The San Diego Air Basin (SDAB) consists of San Diego County and is bordered by the Pacific Ocean to the west, Orange and Riverside Counties to the north, Imperial County to the east, and the United States/Mexico border to the south. Temperature and precipitation can vary widely within the SDAB, where average annual precipitation ranges from approximately 10 inches in the coastal and inland areas to over 30 inches in the mountains. In general, milder annual temperatures are experienced in the maritime and coastal areas, whereas the interior and desert areas experience warmer summers and cooler winters. Regional wind patterns are dominated by onshore sea breezes during the day, and winds generally slow or reverse direction toward the sea at night.

High air pollution levels in the coastal portion of the SDAB can often occur when polluted air from the SCAB, particularly from the Los Angeles region, travels southwest over the Pacific Ocean at night and travels onshore into the SDAB via the sea breeze during the day (SDAPCD 2015). Ozone and its precursor emissions (VOCs and nitrogen oxides) are also transported to the SDAB during relatively mild Santa Ana weather conditions. During strong Santa Ana weather conditions, air pollutants are pushed away from the SDAB farther west to the Pacific Ocean.

Salton Sea Air Basin

The Salton Sea Air Basin (SSAB) consists of Imperial County and most of the low desert areas of central Riverside County and is bordered by the San Jacinto Mountains to the west, the Little San Bernardino Mountains and the Mojave Desert to the north and east, the Arizona border to the east, and the United States/Mexico border to the south. The SSAB is located in the Colorado Desert; although there are some mountainous regions, most of the SSAB lies below 1,000 feet above mean sea level.

Annual precipitation in the SSAB ranges from three to seven inches. Daytime temperatures in the winter average 70°F, and high temperatures in the summer frequently exceed 100°F (CARB 2011). The dominant meteorological feature affecting the SSAB is the Pacific High subtropical pressure system, which produces prevailing westerly to northwesterly winds. These winds tend to blow pollutants away from coastal regions of the SCAB, including Los Angeles, Orange, San Bernardino, and Riverside counties, and through the San Gorgonio Pass to the SSAB. As a result, air quality in the SSAB is affected by both local air emissions and air emissions from the coastal regions. Similar to the SDAB, the prevailing westerly wind pattern is sometimes interrupted by regional Santa Ana wind conditions.

The SSAB is susceptible to air inversions which trap a layer of stagnant air near the ground where it can be further loaded with pollutants. Due to local climactic conditions, inversions generally occur 6,000 to 8,000 feet above the desert ground surface. These occasional inversions create conditions of haziness caused by moisture, suspended dust, and a variety of chemical aerosols emitted by trucks and automobiles, furnaces and other sources. Increasing air emissions from nearby air basins, particularly the SCAB, have also led to poorer air quality in the SSAB.

South Central Coast Air Basin

The South Central Coast Air Basin (SCCAB) consists of San Luis Obispo, Santa Barbara, and Ventura counties and is bordered by the San Gabriel Mountains to the south, the Pacific Ocean to the west, Monterey County to the north, and the San Joaquin Valley to the east.

The climate of the SCCAB is strongly influenced by its proximity to the Pacific Ocean and the location of the Pacific High subtropical pressure system. The Mediterranean climate of the SCCAB produces moderate average temperatures along the coast with average minimums in the 40s °F and 50s °F and average maximums in the 60s °F and 70s °F. Average precipitation along the coast is between 15 and 25 inches per year. The inland regions of the SCCAB experience similar average minimum temperatures; however, average maximum temperatures are often in the high 70s and can exceed 100°F on some days. Precipitation in the inland regions is typically less than 15 inches per year (CARB 2011). The SCCAB is also subject to seasonal Santa Ana winds, which are particularly strong in the mountain passes and at the mouths of canyons.

Two types of temperature inversions are created in the SCCAB: subsidence and radiational. The subsidence inversion is a regional effect created by the Pacific High subtropical pressure system in which air is heated when it flows from high-pressure areas to the low-pressure areas inland and is compressed. This type of inversion generally forms at about 1,000 to 2,000 feet above mean sea level and can occur throughout the year, but it is most evident during the summer months. Radiational, or surface, inversions are formed by the more rapid cooling of air near the ground at night, especially during winter. This type of inversion is typically lower and is generally accompanied by stable air. Both types of inversions limit the dispersal of air pollutants within the regional airshed because more stable air conditions (i.e., low wind speeds and uniform temperatures) result in lower rates of pollutant dispersion.

San Joaquin Valley Air Basin

The San Joaquin Valley Air Basin (SJVAB) consists of all of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, and Tulare counties as well as a portion of Kern County. The SJVAB is bordered by the Sierra Nevada Mountain Range to the east, the Coastal Ranges to the west, the Transverse Mountains to the south, and the Sacramento Valley to the north.

The SJVAB is generally considered to have a Mediterranean climate, characterized by cool, wet winters, sparse rainfall, and hot, dry summers. Average temperatures increase from north to south with summertime maximum temperatures often exceeding 100°F through the valley while average annual precipitation decreases from an average of 14 inches in Stockton to six inches in Bakersfield (CARB 2011). With an average of over 260 sunny days per year, the SJVAB provides favorable conditions for ozone formation. While precipitation and fog during the winter block sunlight and reduce ozone concentrations, wintertime fog provides favorable conditions for the formation of particulate matter (SJVAPCD 2015).

The surrounding topographic features restrict air movement through and out of the SJVAB and, as a result, the SJVAB is highly susceptible to pollutant accumulation over time. Inversion layers are formed in the SJVAB throughout the summer and winter. During the summer, the San Joaquin Valley experiences daytime temperature inversions at elevations from 2,000 to 2,500 feet above the valley floor. During the winter months, inversions occur from 500 to 1,000 feet above mean sea level (SJVAPCD 2015). According to the U.S. EPA, the San Joaquin Valley has some of the nation's worst air quality. Poor air quality in the SJVAB is the result of several major air pollution sources including heavy truck traffic on Interstate 5 and State Route 99; diesel-burning locomotives, tractors and irrigation pumps; and wood-burning stoves and fireplaces, as well as the surrounding mountain ranges, which trap air pollution in the valley (U.S. EPA 2019).

San Francisco Bay Area Air Basin

The San Francisco Bay Area Air Basin (SFBAAB) is comprised of all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties, the southern portion of Sonoma County, and the southwestern portion of Solano County. The SFBAAB is characterized by coastal mountain ranges, inland valleys, and bays, and the topography distorts normal wind flow patterns. The coastal mountain range splits, resulting in a western coast gap (the Golden Gate) and an eastern coast gap (Carquinez Strait). These gaps allow air to flow in and out of the SFBAAB and the Central Valley. The greatest distortion occurs when low-level inversions are present and the air beneath the inversion flows independently of air above the inversion, a condition that is common in the summertime.

The SFBAAB is characterized by moderately wet winters and dry summers. Winter rains account for about 75 percent of the average annual rainfall. The amount of annual precipitation can vary greatly from one part of the SFBAAB to another even within short distances. In general, total annual rainfall can reach 40 inches in the mountains, but it is often less than 16 inches in sheltered valleys.

The climate of the SFBAAB is dominated by the strength and location of the North Pacific High, a subtropical pressure system. During the summer, the North Pacific High 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 because of the northwesterly flow produces a band of cold water off the coast. The cool and moisture-laden air approaching the coast from the Pacific Ocean is further cooled by the presence of the cold water band resulting in condensation and the presence of fog and stratus clouds. In the winter, the Pacific High cell weakens and shifts southward resulting in offshore wind flow, the absence of upwelling, and the occurrence of storms. Weak inversions coupled with moderate winds result in a low air pollution potential. The normal northwest wind pattern carries air onshore. Bay breezes push cool air onshore during the daytime and draw air from the land offshore at night. Winds are predominantly out of the northwest during the summer months (BAAQMD 2017a).

Regional and Localized Air Quality

Existing ambient air quality conditions in the Plan Area are a function of the number and type of pollutant sources located in each air basin, such as motor vehicles, industrial sources, and agricultural activities. Table 8 presents ambient air quality data for each of the seven air basins.

Sensitive Receptors

Certain population groups are considered more sensitive to air pollution than others, particularly children, the elderly, and acutely ill and chronically ill persons, especially those with cardio-respiratory diseases. Sensitive receptors include residences, schools and schoolyards, parks and playgrounds, day care centers, nursing homes, and hospitals (CARB 2005). Sensitive receptors are located throughout the Plan Area, however proposed projects would occur either within Metropolitan facilities, on Metropolitan-owned islands in the Sacramento-San Joaquin Delta or on agricultural lands in the Palo Verde Valley and The following list provides a summary of the nearest sensitive receptors to the known potential locations of proposed projects under the CAP that are described in Chapter 2, *Project Description*:

- YLHEP/Diemer WTP: residences located approximately 500 feet west and 1,000 feet southeast of the facility.
- Jensen WTP: residences located immediately to the west and south and the Van Gogh Charter School located approximately 1,000 feet southwest of the facility.
- Mills WTP: residences located immediately north and west and approximately 200 feet to the south of the facility.
- Skinner WTP: residences located approximately 600 feet west of the facility.
- Weymouth WTP: residences located immediately to the south, west, north, and east; Grace Miller Elementary School located immediately to the east; Calvary Baptist Schools located immediately to the west; and Joan Macy School located 800 feet south of the facility.
- Julian Hinds Pump Plant: Metropolitan residences located immediately west of the facility.
- Eagle Mountain Pump Plant: Metropolitan residences located immediately northeast of the facility.
- Iron Mountain Pump Plant: Metropolitan residences located immediately southwest of the facility.
- Gene Pump Plant: Metropolitan residences located immediately to the northwest and south of the facility.

Table 8 Ambient Air Quality for the Air Basins in the Plan Area in 2019[1]

Pollutant	SCAB	MDAB	SDAB	SSAB	SCCAB	SJVAB	SFBAAB
Ozone (ppm), Worst Hour[2]	0.137	0.119	0.110	0.106	0.091	0.110	0.106
Number of days of state exceedances (>0.09 ppm)	82	21	2	10	0	0	6
Ozone (ppm), 8-Hour Average	0.117	0.090	0.084	0.089	0.078	0.093	0.085
Number of days of state and federal exceedances (>0.07 ppm)	109	72	16	59	10	96	9
NO_2 (ppm), Worst Hour	0.0977	0.0598	0.0860	0.0962	0.0450	0.0887	0.0651
Number of days of state exceedances (>0.18 ppm)	0	0	0	0	0	0	0
Number of days of federal exceedances (>0.10 ppm)	0	0	0	0	0	0	0
PM_{10} (µg/m^3), Worst 24 Hours	283.5	248.7	199.0	324.4	187.8	652.2	75.4
Number of days of state exceedances (>50 µg/m^3)	110	15	8	108	55	118	4
Number of days of federal exceedances (>150 µg/m^3)	2	2	1	2	2	1	0
$PM_{2.5}$ (µg/m^3), Worst 24 Hours[2]	81.3	34.1	23.8	53.1	26.3	83.7	35.9
Number of days of federal exceedances (>35 µg/m^3)	12	0	0	1	0	29	1
Hydrogen Sulfide (ppm), Worst Hour[2]	N/A	0.078	N/A	N/A	0.017	N/A	0.034
Number of days of state exceedances (>0.03 ppm)	N/A	58	N/A	N/A	0	N/A	1

SCAB = South Coast Air Basin; MDAB = Mojave Desert Air Basin; SDAB = San Diego Air Basin; SSAB = Salton Sea Air Basin; SCCAB = South Central Coast Air Basin; SJVAB = San Joaquin Valley Air Basin; SFBAAB = San Francisco Bay Area Air Basin; ppm = parts per million; mg/m^3 = micrograms per cubic meter

[1] 2019 is the most recent year for which summary data is available from CARB.

[2] Worst-hour ozone and hydrogen sulfide do not have federal standards, while worst 24-hour $PM_{2.5}$ does not have a state standard; only applicable exceedances are provided for these pollutants.

Source: California Air Resources Board 2019

4.1.3 Regulatory Framework

This section describes the plans, policies, and regulations related to air quality that are applicable to the proposed program.

4.1.3.1 Federal

Federal Clean Air Act

The federal Clean Air Act regulates the emission of airborne pollutants from various mobile and stationary sources. The U.S. EPA is the federal agency designated to administer air quality regulation and has established national ambient air quality standards (NAAQS) for major pollutants at thresholds intended to protect public health. Federal standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, PM_{10}, and $PM_{2.5}$. Table 9 summarizes the NAAQS for each of these pollutants, and Table 10 shows each air basin's attainment status for the NAAQS.

Table 9 Current Federal and State Ambient Air Quality Standards

Pollutant	Federal Standard	California Standard
Ozone	0.070 ppm (8-hr avg)	0.09 ppm (1-hr avg) 0.070 ppm (8-hr avg)
Carbon Monoxide	35.0 ppm (1-hr avg) 9.0 ppm (8-hr avg)	20.0 ppm (1-hr avg) 9.0 ppm (8-hr avg)
Nitrogen Dioxide	0.100 ppm (1-hr avg) 0.053 ppm (annual avg)	0.18 ppm (1-hr avg) 0.030 ppm (annual avg)
Sulfur Dioxide	0.075 ppm (1-hr avg) 0.5 ppm (3-hr avg) 0.14 ppm (24-hr avg) 0.030 ppm (annual avg)	0.25 ppm (1-hr avg) 0.04 ppm (24-hr avg)
Lead	0.15 $\mu g/m^3$ (rolling 3-month avg) 1.5 $\mu g/m^3$ (calendar quarter)	1.5 $\mu g/m^3$ (30-day avg)
Particulate Matter (PM10)	150 $\mu g/m^3$ (24-hr avg)	50 $\mu g/m^3$ (24-hr avg) 20 $\mu g/m^3$ (annual avg)
Particulate Matter (PM2.5)	35 $\mu g/m^3$ (24-hr avg) 12 $\mu g/m^3$ (annual avg)	12 $\mu g/m^3$ (annual avg)
Visibility-Reducing Particles	No Federal Standards	Extinction coefficient of 0.23 per kilometer – visibility of ten miles or more (0.07 - 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape (8-hr avg)
Sulfates	No Federal Standards	25 $\mu g/m^3$ (24-hr avg)
Hydrogen Sulfide	No Federal Standards	0.03 ppm (1-hr avg)
Vinyl Chloride	No Federal Standards	0.01 ppm (24-hr avg)

ppm= parts per million; hr = hour; avg = average; mg/m^3 = micrograms per cubic meter

Source: California Air Resources Board 2016

Table 10 Federal and State Attainment Status for the Air Basins in the Plan Area

Pollutant	SCAB	MDAB	SDAB	SSAB	SCCAB – Ventura County	SJVAB	SFBAAB
Ozone							
Federal/State 8-hr	N-E	N-S	N-Mo	N-Ma/N-S[1]	N-S	N-E	N-Ma
State 1-hr	N	N	N	N	N	N	N
Carbon Monoxide							
Federal	A	U	A	U	A	A/U	A
State	A	A/U	A	A	A	A/U	A
Nitrogen Dioxide							
Federal	A	U	U	U	U	U	U
State	N[2]	A	A	A	A	A	A
Sulfur Dioxide							
Federal	U	U	U	U	U	U	U
State	A	A	A	A	A	A	A
Lead							
Federal	N[3]	U	U	U	U	U	U
State	A	A	A	A	A	A	A
Particulate Matter (PM_{10})							
Federal	N[4]	N[4]	U	N[5]	A	A	U
State	N	N	N	N	N	N	N
Particulate Matter ($PM_{2.5}$)							
Federal Annual Arithmetic Mean	N-Mo	U	U	N-Mo	A	N-Mo	U
Federal 24-hour	N-S	U	U	N-Mo	U	N-S	N-Mo
State	N	A/U	N	N[6]	A	N	N
Visibility-Reducing Particles							
State	U	U	U	U	U	U	U

Pollutant	SCAB	MDAB	SDAB	SSAB	SCCAB – Ventura County	SJVAB	SFBAAB
Sulfates							
State	A	A	A	A	A	A	A
Hydrogen Sulfide							
State	U	N[7]	U	U	U	U	U
Vinyl Chloride							
State	U	U	U	U	A	A	U

[1] The Imperial County portion of the SSAB is designated nonattainment-marginal, and the Coachella Valley portion of the SSAB is designated nonattainment-severe.

[2] Only the portion of the SCAB along State Route 60 between U.S. Highway 605 and the western limit of Riverside County is designated nonattainment.

[3] Only the Los Angeles county portion of the SCAB is designated nonattainment.

[4] Only the San Bernardino county portion of the SCAB and MDAB is designated nonattainment.

[5] Only the Imperial Valley and Coachella Valley portions of the SSAB are designated nonattainment.

[6] Only the city of Calexico is designated nonattainment.

[7] Only the Searles Valley portion of the MDAB is designated nonattainment. Remainder is unclassified.

SCAB = South Coast Air Basin; MDAB = Mojave Desert Air Basin; SDAB = San Diego Air Basin; SSAB = Salton Sea Air Basin' SCCAB = South Central Coast Air Basin; SJVAB = San Joaquin Valley Air Basin; SFBAAB = San Francisco Bay Area Air Basin; N-E = Nonattainment-Extreme; N-S = Nonattainment-Severe; N-Mo = Nonattainment-Moderate; N-Ma = Nonattainment-Marginal; N = Nonattainment; N-T = Nonattainment-Transitional; A/U = Attainment/Unclassified; A = Attainment; U = Unclassified

Sources: California Air Resources Board 2019a through 2019j and United States EPA 2020a through 2020h

4.1.3.2 State

California Clean Air Act

The California Clean Air Act, signed into law in 1988, requires all areas of the state to achieve and maintain the California ambient air quality standards (CAAQS) by the earliest practical date. The CAAQS incorporate additional standards for most of the criteria pollutants and set standards for other pollutants recognized by the state. In general, the California standards are more health protective than the corresponding NAAQS. California has also set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. As stated in Section 4.1.2, *Existing Conditions*, eight air districts have jurisdiction over various portions of the seven air basins within the Plan Area. Table 9 details the current CAAQS and Table 10 provides the attainment status of all seven air basins with respect to the CAAQS.

State Tailpipe Emission Standards

To reduce emissions from off-road diesel equipment, on-road diesel trucks, and harbor craft, CARB established a series of increasingly strict emission standards for new engines, such as the recently approved Advanced Clean Trucks regulation. New construction equipment used for the program, including medium- and heavy-duty trucks and off-road construction equipment, would be required to comply with the standards.

Toxic Air Contaminants

California regulates TACs primarily through the Toxic Air Contaminant Identification and Control Act (Tanner Act) and the Air Toxics “Hot Spots” Information and Assessment Act of 1987 (“Hot Spots” Act). In the early 1980s, CARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Tanner Act created California’s program to reduce exposure to air toxics. The “Hot Spots” Act supplements the Tanner Act by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks. In addition, in response to AB 617 (C. Garcia, Chapter 136, Statues of 2017), CARB established the Community Air Protection Program, which selects communities disproportionately impacted by high cumulative exposure burdens for criteria air pollutants and TACs and develops community air monitoring plans and community emissions reduction programs for these communities.

CARB identified DPM as a TAC in 1998. Shortly thereafter, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce emissions from both new and existing diesel-fueled engines and vehicles. The goal of the plan is to reduce DPM (respirable particulate matter) emissions and the associated health risk by 75 percent in 2010 and by 85 percent by 2020. The plan identifies several measures for CARB to implement, which have been enacted since publication of the plan (CARB 2000). CARB estimates that DPM emissions in 2035 will be less than half of those in 2010 (CARB 2020). The proposed program would be required to comply with applicable diesel control measures.

4.1.3.3 Regional

Air Pollution Control District Plans, Rules, and Regulations

As summarized in Table 7 in Section 4.1.2, *Existing Conditions*, the SCAQMD, MDAQMD, AVAQMD, SDAPCD, ICAPCD, VCAPCD, SJVAPCD, and BAAQMD all have jurisdiction over portions of the Plan Area. In accordance with the federal and state Clean Air Acts, each of these eight APCDs have prepared air quality management plans (AQMPs) that demonstrate each air district’s clean air strategy to achieve attainment of various federal and state air quality standards, including those for ozone, PM_{10}, and $PM_{2.5}$, depending on each district's attainment status. These plans outline a variety of stationary source, land use, and transportation control measures that each district proposes to implement as part of its clean air strategy. These measures include specific actions to implement new emissions control regulations and Reasonably Available Control Technology requirements; enforce New Source Review; reduce vehicle trips and vehicle miles traveled; facilitate use of public transit and alternative transportation modes; and retrofit, modernize, and electrify the vehicle fleet and equipment used for construction, freight, farming, and lawn and garden activities.

The following are the most recent versions of air quality management plans adopted in the Plan Area. These plans typically have a three- to six-year planning horizon and are updated on a periodic basis depending on the specific federal and state requirements for each nonattainment area and the discretion of each air district:

- SCAQMD (2017) Final 2016 Air Quality Management Plan
- MDAQMD (2017) Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)
- AVAQMD (2017) Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)
- SDAPCD (2016a) 2008 Eight-Hour Ozone Attainment Plan for San Diego County
- SDAPCD (2016b) 2016 Revision to the Regional Air Quality Strategy for San Diego County
- ICAPCD (2018) Imperial County 2018 Redesignation Request and Maintenance Plan for Particulate Matter Less than 10 Microns in Diameter
- ICAPCD (2017a) Imperial County 2017 State Implementation Plan for the 2008 8-Hour Ozone Standard
- ICAPCD (2014) Imperial County 2013 State Implementation plan for the 2006 24-Hour $PM_{2.5}$ Moderate Nonattainment Area
- VCAPCD (2016) Final 2016 Ventura County Air Quality Management Plan
- SJVAPCD (2016) 2016 Ozone Plan for 2008 8-Hour Ozone Standard
- SJVAPCD (2018) 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards
- BAAQMD (2017b) Spare the Air – Cool the Climate: A Blueprint for Clean Air and Climate Protection in the Bay Area

Each air district has also adopted a set of rules and regulations pertaining to various air emissions sources. Rules and regulations applicable to the proposed program would include those related to construction equipment, stationary emergency generators, nuisance odors, fugitive dust, metal coatings, cutback and emulsified asphalt, architectural coatings, consumer paint thinners and multi-purpose solvents, solvent degreasers, composting and related operations, storage tanks for VOCs, organic liquids, publicly owned treatment works operations (i.e., wastewater treatment plants), asbestos emissions from demolition/renovation activities, and particulate emissions from soils with TACs. A comprehensive list of rules and regulations adopted by each air district is available online at CARB's District Rules Database at https://ww3.arb.ca.gov/drdb/drdb.htm.

4.1.3.4 Local

Although local actions have important implications for air quality, regulation of air quality occurs primarily at the federal, state, and regional levels. Local general plans typically include several policies related to air quality that are directed at participating in regional collaboration with the applicable air district, achieving attainment of NAAQS and CAAQS, implementing the use of the applicable air district's thresholds of significance for CEQA analysis, and ensuring project-level compliance with applicable air district rules.

4.1.4 Thresholds and Methodology

4.1.4.1 Thresholds of Significance

Table 11 lists the thresholds from Appendix G of the *State CEQA Guidelines* that pertain to air quality. These thresholds are addressed in the draft PEIR.

Table 11 CEQA Thresholds for Air Quality

Threshold Would the proposed program:
a. Conflict with or obstruct implementation of the applicable air quality plan?
b. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?
c. Expose sensitive receptors to substantial pollutant concentrations?
d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Appendix G of the *State CEQA Guidelines* further states that the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the determinations in Table 11. As such, seven of the eight air districts with jurisdiction in the Plan Area (excluding the SDAPCD) have published guidance documents for use in evaluating the air quality impacts of projects under CEQA, including the following:

- SCAQMD (1993) CEQA Air Quality Handbook (currently being updated) and supplemental guidance
- SCAQMD (2008) Final Localized Significance Threshold Methodology
- SCAQMD (2019) South Coast AQMD Air Quality Significance Thresholds
- MDAQMD (2016) California Environmental Quality Act (CEQA) and Federal Conformity Guidelines
- AVAQMD (2016) California Environmental Quality Act (CEQA) and Federal Conformity Guidelines
- ICAPCD (2017b) CEQA Air Quality Handbook
- VCAPCD (2003) Ventura County Air Quality Assessment Guidelines
- SJVAPCD (2015) Guidance for Assessing and Mitigating Air Quality Impacts
- BAAQMD (2017a) California Environmental Quality Act Air Quality Guidelines

The following subsections discuss the significance thresholds adopted by each air district.

Consistency with Air Quality Plans

Based on a review of the CEQA guidance documents published by seven of the eight air districts with jurisdiction in the Plan Area (excluding the SDAPCD, which has not published guidance), the proposed program would be consistent with the applicable air quality plans listed in Section 4.1.3.3, *Regional*, if it meets all of the following conditions:

1. The program would not generate direct and/or indirect population growth that would exceed the population growth forecasts underlying the applicable air quality plans. Emissions forecasts are usually based on population growth forecasts; therefore, if the program would generate population growth in excess of population growth anticipated by the air quality plans, then it may result in higher emissions than those anticipated and mitigated by the plans.
2. The program would not generate emissions in excess of the thresholds of significance established by the applicable air district, which are often connected to the air quality plans.
3. The program would incorporate all applicable control measures from the applicable air quality plans.
4. The program would provide buffer zones around sources of odors and TACs.

Criteria Pollutant Emissions

Regional Thresholds of Significance

Seven of the eight air districts with jurisdiction in the Plan Area (excluding the SDAPCD) have adopted regional significance thresholds to evaluate air pollutant emissions. Thresholds of significance adopted by each air district for construction and operational emissions are summarized in Table 12 and Table 13, respectively.

Table 12 Thresholds of Significance for Construction Emissions

Air District	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	Lead	H_2S
SCAQMD	75 lbs/day	100 lbs/day	550 lbs/day	150 lbs/day	150 lbs/day	55 lbs/day	3 lbs/day	N/A
MDAQMD	137 lbs/day	137 lbs/day	548 lbs/day	137 lbs/day	82 lbs/day	65 lbs/day	3 lbs/day	54 lbs/day
	25 tons/ year	25 tons/ year	100 tons/ year	25 tons/ year	15 tons/ year	12 tons/ year	0.6 ton/year	10 tons/ year
AVAQMD	137 lbs/day 25 tons/ year	137 lbs/day 25 tons/ year	548 lbs/day 100 tons/ year	137 lbs/day 25 tons/ year	82 lbs/day 15 tons/ year	65 lbs/day 12 tons/ year	3 lbs/day 0.6 ton/year	54 lbs/day 10 tons/ year
SDAPCD[1]	N/A	250 lbs/day	550 lbs/day	250 lbs/day	100 lbs/day	67 lbs/day	N/A	N/A
ICAPCD	75 lbs/day	100 lbs/day	550 lbs/day	N/A	150 lbs/day	N/A	N/A	N/A
VCAPCD	25 lbs/day	25 lbs/day	N/A	N/A	N/A	N/A	N/A	N/A
SJVAPCD	10 tons/ year	10 tons/ year	100 tons/ year	27 tons/ year	15 tons/ year	15 tons/ year	N/A	N/A
BAAQMD	54 lbs/day	54 lbs/day	N/A	N/A	82 lbs/day (exhaust)	54 lbs/day (exhaust)	N/A	N/A
					BMPs (fugitive dust)	BMPs (fugitive dust)		

[1] The SDAPCD has not adopted thresholds for determining the significance of air quality impacts under CEQA. However, the SDAPCD has adopted Air Quality Impact Analysis (AQIA) trigger levels for new, modified, or relocated stationary sources (SDAPCD Rules 20.1, 20.2, and 20.3). These AQIA trigger levels do not generally apply to construction, mobile sources, or general land development projects; however, it is general practice for local lead agencies in the jurisdiction of the SDAPCD to use these trigger levels as thresholds of significance for evaluating air quality impacts. The SDAPCD does not consider AQIA trigger levels to represent significance thresholds because exceedances do not necessarily result in air quality impacts; rather, AQIA trigger levels were developed to identify sources with emissions that are too small to cause or substantially contribute to violations of NAAQS or CAAQS and therefore do not warrant further air quality analysis or permitting. In lieu of adopted thresholds, these trigger levels are used as thresholds of significance for the purpose of this analysis.

VOC = volatile organic compounds; NO_X = nitrogen oxides; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with a diameter of 10 microns or less; $PM_{2.5}$ = particulate matter with a diameter of 2.5 microns or less; H_2S = hydrogen sulfide; lbs/day = pounds per day; N/A = not adopted (The air district has not adopted a threshold of significance for this pollutant.); CAAQS = California Ambient Air Quality Standards; BMPs = Best Management Practices; SCAQMD = South Coast Air Quality Management District; MDAQMD = Mojave Desert Air Quality Management District; AVAQMD = Antelope Valley Air Quality Management District; SDAPCD = San Diego Air Pollution Control District; ICAPCD = Imperial County Air Pollution Control District; VCAPCD = Ventura County Air Pollution Control District; SJVAPCD = San Joaquin Valley Air Pollution Control District; BAAQMD = Bay Area Air Quality Management District

Sources: SCAQMD 2019; MDAQMD 2016; AVAQMD 2016; SDAPCD 2019; ICAPCD 2017b; VCAPCD 2003; SJVAPCD 2015; BAAQMD 2017a

Table 13 Thresholds of Significance for Operational Emissions

Air District	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	Lead	H_2S
SCAQMD	55 lbs/day	55 lbs/day	550 lbs/day	150 lbs/day	150 lbs/day	55 lbs/day	3 lbs/day	N/A
MDAQMD	137 lbs/day	137 lbs/day	548 lbs/day	137 lbs/day	82 lbs/day	65 lbs/day	3 lbs/day	54 lbs/day
	25 tons/year	25 tons/year	100 tons/year	25 tons/year	15 tons/year	12 tons/year	0.6 ton/year	10 tons/year
AVAQMD	137 lbs/day	137 lbs/day	548 lbs/day	137 lbs/day	82 lbs/day	65 lbs/day	3 lbs/day	54 lbs/day
	25 tons/year	25 tons/year	100 tons/year	25 tons/year	15 tons/year	12 tons/year	0.6 ton/year	10 tons/year
SDAPCD[1]	N/A	250 lbs/day	550 lbs/day	250 lbs/day	100 lbs/day	67 lbs/day	N/A	N/A
ICAPCD	137 lbs/day	137 lbs/day	550 lbs/day	150 lbs/day	150 lbs/day	550 lbs/day	N/A	N/A
VCAPCD	25 lbs/day	25 lbs/day	N/A	N/A	N/A[2]	N/A	N/A	N/A
SJVAPCD	10 tons/year	10 tons/year	100 tons/year	27 tons/year	15 tons/year	15 tons/year	N/A	N/A
BAAQMD	54 lbs/day	54 lbs/day	Violation of the CAAQS	N/A	82 lbs/day	54 lbs/day	N/A	N/A
	10 tons/year	10 tons/year			15 tons/year	10 tons/year		

[1] The SDAPCD has not adopted thresholds for determining the significance of air quality impacts under CEQA. However, the SDAPCD has adopted Air Quality Impact Analysis (AQIA) trigger levels for new, modified, or relocated stationary sources (SDAPCD Rules 20.1, 20.2, and 20.3). These AQIA trigger levels do not generally apply to construction, mobile sources, or general land development projects; however, it is general practice for local lead agencies in the jurisdiction of the SDAPCD to use these trigger levels as thresholds of significance for evaluating air quality impacts. The SDAPCD does not consider AQIA trigger levels to represent significance thresholds because exceedances do not necessarily result in air quality impacts; rather, AQIA trigger levels were developed to identify sources with emissions that are too small to cause or substantially contribute to violations of NAAQS or CAAQS and therefore do not warrant further air quality analysis or permitting. In lieu of adopted thresholds, these trigger levels are used as thresholds of significance for the purpose of this analysis.

[2] The VCAPCD recommends that the fugitive dust mitigation measures described in Section 7.4.1 of the *Air Quality Assessment Guidelines* be implemented as part of all project-related dust-generating operations and activities (VCAPCD 2003).

VOC = volatile organic compounds; NO_X = nitrogen oxides; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter with a diameter of 10 microns or less; $PM_{2.5}$ = particulate matter with a diameter of 2.5 microns or less; H_2S = hydrogen sulfide; lbs/day = pounds per day; N/A = Not adopted (The air district has not adopted a threshold of significance for this pollutant.); CAAQS = California Ambient Air Quality Standards; BMPs = Best Management Practices; SCAQMD = South Coast Air Quality Management District; MDAQMD = Mojave Desert Air Quality Management District; AVAQMD = Antelope Valley Air Quality Management District; SDAPCD = San Diego Air Pollution Control District; ICAPCD = Imperial County Air Pollution Control District; VCAPCD = Ventura County Air Pollution Control District; SJVAPCD = San Joaquin Valley Air Pollution Control District; BAAQMD = Bay Area Air Quality Management District

Sources: SCAQMD 2019; MDAQMD 2016; AVAQMD 2016; SDAPCD 2019; ICAPCD 2017b; VCAPCD 2003; SJVAPCD 2015; BAAQMD 2017a

Localized Thresholds of Significance

In addition to the regional thresholds of significance identified above, the SCAQMD has developed Localized Significance Thresholds (LSTs) in response to the Governing Board's Environmental Justice Enhancement Initiative (1-4), which was prepared to supplement the *CEQA Air Quality Handbook* (SCAQMD 1993). LSTs were devised in response to concern regarding exposure of individuals to criteria pollutants in local communities and have been developed for nitrogen oxides, carbon monoxide, PM_{10}, and $PM_{2.5}$. LSTs represent the maximum emissions from a project that will not cause or contribute to an air quality exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest sensitive receptor, taking into consideration ambient concentrations in each source receptor area (SRA), distance to the sensitive receptor, and project size. LSTs have been developed for emissions generated at construction sites up to five acres in size. However, LSTs only apply to emissions in a fixed stationary location and are not applicable to mobile sources, such as cars on a roadway (SCAQMD 2008). As such, typically LSTs are referred to for on-site construction emissions, because most operational emissions and off-site construction emissions are associated with vehicle trips. The SCAQMD provides LSTs for one-, two-, and five-acre project sites for receptors at a distance of 82 feet to 1,640 feet (25 to 500 meters) from a project site's boundary[14].

Due to the programmatic nature of the proposed CAP, there is currently not sufficient detail to allow for the quantification of emissions from individual projects proposed under the program; therefore, the applicability of LSTs to specific proposed projects is also largely unknown. To provide a conservative estimate of project impacts in consideration of the LSTs, this analysis uses the most stringent LSTs recommended by the SCAQMD for use within its jurisdictional area, which are for one-acre sites within the SRA 12 (South Central Los Angeles County) within 82 feet (25 meters) of the nearest sensitive receptor (SCAQMD 2009). These LSTs are summarized in Table 14.[15]

Table 14 SCAQMD LSTs for Construction (SRA 12)

Pollutant	LSTs for a 1-acre Site in SRA 12 for a Receptor 82 Feet Away (lbs/day)
Gradual conversion of NO_X to NO_2	46
CO	231
PM_{10}	4
$PM_{2.5}$	3

SCAQMD = South Coast Air Quality Management District; LSTs = Localized Significance Thresholds; SRA = South Receptor Area; lbs/day = pounds per day; NO_X = nitrogen oxides; NO_2 = nitrogen dioxide; CO = carbon monoxide; PM_{10} = particulate matter with a diameter of 10 microns or less; $PM_{2.5}$ = particulate matter with a diameter of 2.5 microns or less

Source: SCAQMD 2009

Toxic Air Contaminants

Five of the eight air districts with jurisdiction in the Plan Area have adopted thresholds of significance for evaluating impacts related to TAC emissions to be evaluated at the most exposed receptor within 1,000 feet of individual projects that may be implemented under the proposed CAP. The thresholds of significance for TAC emissions are shown in Table 15.

[14] It should be noted that use of LSTs is voluntary.
[15] SRA 12 is bound by Interstate 110 to the west, State Route 91 to the south, Interstate 710 to the east, and Slauson Avenue to the north.

Table 15 Thresholds of Significance for Toxic Air Contaminants

Air District	Excess Cancer Risk	Excess Chronic and Acute Hazard Index	Excess Cancer Burden	Annual Average $PM_{2.5}$ Concentration
SCAQMD (2019)	≥ 10 in 1 million	≥ 1.0	> 0.5 cancer cases in areas with cancer risk greater than or equal to one case in 1 million	N/A
BAAQMD – Individual Source	≥ 10 in 1 million	≥ 1.0	N/A	≥ 0.3 μg/m³
BAAQMD – Cumulative Sources	≥ 100 in 1 million from all local sources	≥ 10.0 from all local sources[1]	N/A	> 0.8 μg/m³ from all local sources
VCAPCD	≥ 10 in 1 million	≥ 1.0	N/A	N/A
SJVAPCD	≥ 20 in 1 million	≥ 1.0	N/A	N/A
SDAPCD[2]	≥ 10 in 1 million	≥ 1.0	≥ 1.0	N/A

SCAQMD = South Coast Air Quality Management District; BAAQMD = Bay Area Air Quality Management District; VCAPCD = Ventura County Air Pollution Control District; SJVAPCD = San Joaquin Valley Air Pollution Control District; SDAPCD = San Diego Air Pollution Control District; N/A = not applicable; μg/m³ = micrograms per cubic meter

[1] Chronic Hazard Index only.

[2] Based on Public Health Risk Notification Requirements defined by SDAPCD Rule 1210.

Sources: SCAQMD 2019; BAAQMD 2017a; VCAPCD 2003; SJVAPCD 2015; SDAPCD 2019

Valley Fever

San Joaquin Valley Fever (Valley Fever; formally known as Coccidioidomycosis) is an infectious disease caused by the fungus *Coccidioides immitis*. Valley Fever is a disease of concern in arid and semiarid areas of the western United States, including in the dry, inland regions of southern California. Infection is caused by inhalation of *Coccidioides immitis* spores that become airborne when dry, dusty soil or dirt is disturbed by natural processes such as wind or earthquakes, or by human induced ground-disturbing activities such as construction, farming, or other activities (VCAPCD 2003).

The VCAPCD recommends consideration of the following factors that may indicate a program's potential to result in impacts related to Valley Fever:

- Disturbance of the topsoil of undeveloped land (to a depth of about 12 inches)
- Presence of dry, alkaline, sandy soils
- Ground-disturbing activities in virgin, undisturbed, non-urban areas
- Activities occurring in windy areas
- Presence of archaeological resources probable or known to exist in the area (e.g., Native American midden sites)[16]
- Special events (e.g., fairs, concerts) and motorized activities (e.g., motocross track, All Terrain Vehicle activities) on unvegetated soil (non-grass)
- Exposure of non-native population (e.g., out-of-area construction workers)

[16] The presence of archaeological resources can indicate that soils have been historically undisturbed and therefore have higher potential to contain *Coccidioides immitis* spores.

Odors

The threshold of significance for evaluating odor-related impacts is whether the proposed project would result in the discharge of quantities of air contaminants (including odors from non-agricultural sources) that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety or any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business of property.[17]

Cumulative Impacts

Project-level thresholds for criteria air pollutant emissions are typically set at levels that are not cumulatively considerable because these thresholds are developed to address the cumulative air quality impacts already occurring in the air basin. However, several air districts with jurisdiction in the Plan Area have published the following additional guidance on assessing cumulative air quality impacts:

- **SCAQMD**: The SCAQMD's approach to determining cumulative air quality impacts for criteria air pollutants is to first determine whether a proposed project would result in a significant project-level impact to regional air quality based on the SCAQMD significance thresholds. If the project would not generate emissions exceeding the SCAQMD thresholds, then the lead agency needs to consider the additive effects of related projects only if the proposed project is part of an ongoing regulatory program, such as a market program for reducing air pollution, or is contemplated in a PEIR, and the related projects are located within approximately one mile of the project site. If there are related projects within the vicinity (one-mile radius) of the project site that are part of an ongoing regulatory program or are contemplated in a PEIR, then the additive effect of the related projects should be considered (SCAQMD 1993).
- **ICAPCD**: For criteria pollutant emissions, lead agencies should utilize the project-level thresholds to identify whether a project's contribution to a significant cumulative air quality impact is significant (see Table 12 and Table 13). In addition, cumulative traffic volumes should be accounted for in the carbon monoxide hotspot analysis (ICAPCD 2017).
- **VCAPCD**: A project with estimated emissions two pounds per day or greater of VOCs, or two pounds per day or greater of nitrogen oxides that is inconsistent with the AQMP would have a significant cumulative adverse air quality impact (VCAPCD 2003).
- **SJVAPCD**: Any proposed program that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact. In addition, cumulative traffic volumes should be accounted for in the carbon monoxide hotspot analysis. Because impacts from TACs are localized and the thresholds of significance for TACs have been established at such a conservative level, risks over the individual thresholds of significance are also considered cumulatively significant (SJVAPCD 2015).
- **BAAQMD**: In developing thresholds of significance for air pollutants, the BAAQMD considered the emission levels for which a program's individual emissions would be cumulatively considerable. If a program exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, additional analysis to assess cumulative impacts is unnecessary (BAAQMD 2017a).

[17] This threshold of significance is based on AVAQMD Rule 402, BAAQMD Rule 1-0, ICAPCD Rule 407, MDAQMD Rule 402, SDAPCD Rule 51, SJVAPCD Rule 4102, SCAQMD Rule 402, and VCAPCD Rule 51.

4.1.4.2 Methodology

Due to the programmatic nature of the proposed CAP, there is currently not sufficient detail to allow for the quantification of emissions from individual projects proposed under the program. Therefore, construction emissions were estimated by referencing a “typical,” reasonable construction schedule and equipment mix that could be expected to be required for construction of individual projects described in Chapter 2, *Project Description*, such as installation of electric vehicle infrastructure (CAP measure FL-4; CAP measure EC-3), electric-powered equipment (to replace natural gas-powered equipment)(CAP measure DC-2), or BESS facilities (CAP measure E-4) and construction of a direct meter connection between the YLHEP and Diemer WTP (CAP measure E-2). Construction emissions were estimated using the California Emissions Estimator Model (CalEEMod) version 2016.3.2.[18] CalEEMod was developed by the SCAQMD as a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions associated with both construction and operations from a variety of land use projects (California Air Pollution Control Officers Association 2017). The sample program activity included the following parameters based on reasonable, conservative assumptions that are anticipated to encompass most or all individual projects:

- Construction site size of five acres
- Construction schedule of 12 months, which includes phases for demolition, site preparation, grading, construction/installation, paving, and architectural coating
- Use of the following diesel-powered construction equipment equipped with Tier 3 certified engines for eight hours a day, five days a week during each phase:[19]
    - Demolition: one 81-horsepower (hp) concrete/industrial saw, one 158-hp excavator, and one 247-hp dozer
    - Site Preparation: one 247-hp dozer, two 97-hp tractors/loaders/backhoes, and one water truck
    - Grading: one 158-hp excavator, one 187-hp grader, one 247-hp dozer, and one water truck
    - Construction/Installation: one 231-hp crane, three 89-hp forklifts, one 84-hp generator, three 97-hp tractors/loaders/backhoes, and one 46-hp welder
    - Paving: two 130-hp pavers, two 132-hp paving equipment, and two 80-hp rollers
    - Architectural Coating: one 78-hp air compressor
- Demolition of 20,000 square feet of structures
- Import of 1,000 cubic yards of soil material and export of 1,000 cubic yards of soil material over a 16-day period
- Architectural coating of 10,000 square feet of interior surfaces and 10,000 square feet of exterior surfaces
- Use of architectural coatings with a maximum VOC content of 250 grams per liter[20]
- Implementation of the following standard fugitive dust control measures:

[18] Additional information on the CalEEMod model, including the User Guide, default data tables, technical source documentation is incorporated by reference and is available online at: http://www.caleemod.com/ (click on “User’s Guide”).
[19] Horsepower values are based on CalEEMod defaults.
[20] All contractors would be required to comply with the applicable air district rule(s) regarding the VOC content limits of architectural coatings, which may be lower than 250 grams per liter depending on the air district and type of coating.

- Water all exposed surfaces two times daily. Exposed surfaces include, but are not limited to soil piles, graded areas, unpaved parking areas, staging areas, and unpaved access roads.
- Limit vehicle speeds on unpaved roads to 15 miles per hour.

4.1.5 Impacts Analysis

4.1.5.1 Program Analysis

Threshold AQ-A: *Would the project conflict with or obstruct implementation of the applicable air quality plan?*

Construction

The following subsections discuss the consistency of proposed program construction activities with the 12 air quality plans adopted by the eight air districts with jurisdiction in the Plan Area (see Section 4.1.3.3, *Regional*) using the four criteria identified in Section 4.1.4.1, *Thresholds of Significance*. As discussed below, proposed program construction activities would be potentially inconsistent with the applicable air quality plans, therefore impacts would be **significant**.

<u>Population Growth</u>

Due to the nature of individual projects to be implemented under the proposed CAP (e.g., replacement of lighting, installation of BESS facilities, installation of electric vehicle infrastructure, installation of electric-powered equipment, construction of a direct meter connection between the YLHEP and Diemer WTP) and their geographic distribution throughout the Plan Area, it is anticipated workers required for construction activities would be from the existing local or regional workforce. As a result, construction of the proposed program would not result in substantial indirect population growth.

<u>Criteria Pollutant Emissions</u>

As discussed under Threshold AQ-B, the individual projects that may be implemented under the proposed CAP do not have sufficient detail to allow specific project-level analysis of criteria pollutant emissions during construction at this time. However, construction emissions were estimated for a sample program activity (see parameters in Section 4.1.4.2, *Methodology*) and compared to the most stringent daily and annual emissions thresholds in Table 12 and to the SCAQMD LSTs in Table 14 to provide a screening level below which individual projects proposed under the CAP would have a less-than-significant impact related to criteria air pollutant emissions. Individual projects that involve construction activities with an intensity (i.e., size, schedule, equipment, demolition, import/export of soil, architectural coating) equal to or less than the sample program activity would have a less-than-significant construction impact associated with criteria air pollutant emissions regardless of location. Therefore, construction emissions associated with proposed CAP measures would not conflict with the applicable air quality plans. However, for individual proposed projects that involve construction activities with an intensity (i.e., size, schedule, equipment, demolition, import/export of soil, architectural coating) greater than the sample program activity, the severity and location of the impacts cannot be determined until the construction details of individual projects are known. As a result, for these projects, construction impacts related to consistency with the applicable air quality plan would be potentially significant because criteria pollutant emissions have the potential to exceed the applicable air district thresholds of significance. Mitigation may be available to reduce emissions of criteria air pollutants during construction (see Mitigation Measures [MM] AQ-1 and AQ-2);

however, it is not possible to determine whether impacts would be reduced to less-than-significant levels because the magnitude of construction emissions is not known at this time. Therefore, criteria pollutant emissions would be **significant.**

Control Measures

The proposed program includes a suite of GHG emission reduction measures, some of which would have the co-benefits of reducing air pollutant emissions generated during construction activities associated with the program. For example, CAP measure AF-2 includes conducting a pilot study of renewable diesel use in on-road and off-road vehicles by providing at least one renewable diesel tank at Metropolitan-owned fueling depots. Based on the results of this study, CAP measure AF-3 includes use of renewable diesel fuel in Metropolitan's diesel-consuming on-road and off-road vehicles. These measures would be consistent with the control measures identified in the 12 air quality plans related to the Plan Area. Furthermore, existing programs implemented by Metropolitan such as the agency's Small Business and Regional Business Programs encourage use of local contractors for construction projects, resulting in fewer vehicle miles traveled and associated mobile source emissions during construction.

Buffer Zones for Odors and TACs

As discussed under Thresholds AQ-C and AQ-D, construction activities associated with the proposed program would not result in substantial sources of TAC or odor emissions because CAP measures would generally result in small-scale and temporary construction activities.

Post-Construction

The following subsections discuss the consistency of post-construction activities with the 12 air quality plans adopted by the eight air districts with jurisdiction in the Plan Area (see Section 4.1.3.3, *Regional*) using the four criteria identified in Section 4.1.4.1, *Thresholds of Significance*. As discussed below, post-construction activities would be consistent with the applicable air quality plans, and **no impact** would occur.

Population Growth

The proposed program includes a suite of GHG emissions reduction measures that would not directly generate population growth because they do not involve construction of housing. As discussed in Chapter 2, *Project Description*, GHG emissions reduction measures proposed under the CAP may include replacement of lighting, installation of BESS facilities, installation of electric vehicle infrastructure, installation of electric-powered equipment to replace natural gas-powered equipment, and construction of a direct meter connection between the YLHEP and Diemer WTP. Implementation of these proposed measures would not be expected to create substantial employment opportunities because measures would either serve existing Metropolitan facilities or require minimal numbers of new employees for operations and maintenance. Given the nature of these employment opportunities, it is anticipated that new employees would be hired from the existing local or regional workforce. As a result, implementation of the proposed program would not result in substantial indirect population growth. Impacts would be **less than significant**.

Criteria Pollutant Emissions

As discussed under Threshold AQ-B, the proposed CAP measures would have the co-benefits of reducing air pollutant emissions and/or would generate *de minimis* post-construction air pollutant emissions beyond those generated by existing Metropolitan operations. Therefore, post-construction activities under the proposed program would be consistent with the applicable air quality plans and impacts would be **less than significant**.

Control Measures

Upon implementation, many of the proposed CAP measures would have the co-benefits of reducing air pollutant emissions by reducing natural gas, gasoline, and diesel fuel consumption. Measures that would have co-benefits related to air quality include, but are not limited to, reducing natural gas consumption (CAP measure DC-2), increasing use of renewable energy (CAP Strategy 4), improving energy efficiency (CAP Strategy 5), and electrifying fleet vehicles (CAP Strategy 2). These measures would be consistent with the control measures identified in the 12 air quality plans related to the Plan Area.

Buffer Zones for Odors and TACs

As discussed under Thresholds AQ-C and AQ-D, the proposed program would not include post-construction sources of substantial TAC or odor emissions that would potentially impact sensitive receptors and **no impact** would occur.

Threshold AQ-B: *Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?*

Construction and implementation of individual projects that may be implemented under the proposed CAP would generate criteria pollutant emissions and fugitive dust emissions, which are discussed further in the following subsections.

Construction

Criteria Pollutant Emissions

Construction of individual projects that may be implemented under the proposed CAP would cause temporary emissions of various air pollutants from fuel combustion by on-site construction equipment, demolition, grading, construction worker travel to and from construction sites, use of architectural coatings, and transport of construction supplies and soil material to and from construction sites. These proposed construction activities would temporarily create emissions of dust, fumes, equipment exhaust, and other air pollutants, particularly during individual projects that require demolition, site preparation, and/or grading. The extent of daily emissions, particularly emissions of VOCs and nitrogen oxides, generated by construction equipment would depend on the equipment used and the hours of operation for each individual project that may be implemented under the CAP. The extent of PM_{10} and $PM_{2.5}$ emissions would primarily depend upon the following factors: 1) the amount of disturbed soils; 2) the length of disturbance time; 3) whether excavation is involved; and 4) whether transporting excavated materials off site is necessary.

At this time, there is not sufficient detail about the proposed individual projects that may be implemented under the CAP to allow for the quantification of construction emissions for each project. Therefore, it is not possible to compare construction-related emissions for each individual project to the thresholds of significance adopted by the appropriate air district, as summarized in Table 12 and it would be too speculative to analyze project-level impacts of individual projects that may be implemented under the CAP.

However, construction emissions were estimated for a sample program activity (see parameters in Section 4.1.4.2, *Methodology*) and compared to the most stringent daily and annual emissions thresholds in Table 12 and to the SCAQMD LSTs in Table 14 to provide a screening level below which individual projects that may be implemented under the proposed CAP would have a less-than-significant impact related to criteria air pollutant emissions. Table 16 summarizes estimated maximum daily construction emissions from the sample program activity, and Table 17 presents estimated annual construction emissions from the sample program activity. To provide a conservative evaluation of impacts, emissions are compared to the most stringent thresholds adopted by air districts with jurisdiction in the Plan Area. As shown in Table 16 and Table 17, construction of the sample program activity would generate temporary VOC, nitrogen oxides, carbon monoxide, sulfur dioxide, PM_{10}, and $PM_{2.5}$ emissions. However, maximum daily and annual construction emissions from the sample program activity would not exceed the most stringent daily and annual regional significance thresholds of those adopted by the eight air districts with jurisdiction in the Plan Area. In addition, as shown in Table 18, maximum daily on-site construction emissions from the sample program activity would not exceed the most stringent SCAQMD LSTs. Therefore, individual projects that may be implemented under the proposed CAP that involve construction activities with an intensity (i.e., size, schedule, equipment, demolition, import/export of soil, architectural coating) equal to or less than the sample program activity would have a less-than-significant construction impact associated with criteria air pollutant emissions regardless of location.

Table 16 Estimated Maximum Daily Construction Emissions – Sample Program Activity

	Maximum Daily Emissions (lbs/day)					
	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Maximum Emissions from Sample Program Activity	21.4	19.1	22.5	< 0.1	3.7	2.0
Most Stringent Thresholds[1]	25	25	548	137	82	55
Threshold Exceeded?	No	No	No	No	No	No

[1] The most stringent daily construction emissions thresholds listed in Table 12 are the VOC and NO_X thresholds adopted by the VCAPCD; the CO, SO_X, and PM_{10} thresholds adopted by MDAQMD/AVAQMD; and the $PM_{2.5}$ threshold adopted by the SCAQMD.

lbs/day = pounds per day; VOC = volatile organic compounds, NO_X = nitrogen oxides, CO = carbon monoxide, SO_2 = sulfur dioxide, PM_{10} = particulate matter 10 microns in diameter or less, $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; VCAPCD = Ventura County Air Pollution Control District; MDAQMD = Mojave Desert Air Quality Management District; AVAQMD = Antelope Valley Air Quality Management District; SCAQMD = South Coast Air Quality Management District; CalEEMod = California Emissions Estimator Model

Notes: All emissions modeling was completed using CalEEMod. See Appendix B for modeling results. Some numbers may not add up due to rounding.

Table 17 Estimated Maximum Annual Construction Emissions – Sample Program Activity

	Maximum Annual Emissions (tons per year)					
	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Maximum Emissions from Sample Program Activity	0.5	2.5	2.2	< 0.1	0.2	0.1
Most Stringent Thresholds[1]	10	10	100	25	15	12
Threshold Exceeded?	No	No	No	No	No	No

[1] The most stringent annual construction emissions thresholds listed in Table 12 are the VOC, NO_X, and CO thresholds adopted by the SJVAPCD and the SO_X, PM_{10}, and $PM_{2.5}$ thresholds adopted by the MDAQMD/AVAQMD.

VOC = volatile organic compounds, NO_X = nitrogen oxides, CO = carbon monoxide, SO_2 = sulfur dioxide, PM_{10} = particulate matter 10 microns in diameter or less, $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; SJVAPCD = San Joaquin Valley Air Pollution Control District; MDAQMD = Mojave Desert Air Quality Management District; AVAQMD = Antelope Valley Air Quality Management District; CalEEMod = California Emissions Estimator Model

Notes: All emissions modeling was completed using CalEEMod. See Appendix B for modeling results. Some numbers may not add up due to rounding.

Table 18 Estimated Maximum Daily On-site Construction Emissions – Sample Program Activity

	Maximum On-Site Emissions (lbs/day)					
	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Maximum Emissions from Sample Program Activity	21.4	15.2	19.1	< 0.1	3.3	1.9
Most Stringent LSTs[1]	N/A	46	231	N/A	4	3
Threshold Exceeded?	No	No	No	No	No	No

[1] The most stringent LSTs are for construction sites in SRA 12 that are one acre (or less) in size within 82 feet (25 meters) of the nearest sensitive receptor. See Table 14.

VOC = volatile organic compounds, NO_X = nitrogen oxides, CO = carbon monoxide, SO_2 = sulfur dioxide, PM_{10} = particulate matter 10 microns in diameter or less, $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; lbs/day = pounds per day; N/A = not adopted (The SCAQMD has not adopted LSTs for these pollutants.); LSTs = Localized Significance Thresholds; SCAMQD = South Coast Air Quality Management District; SRA = Source Receptor Area; CalEEMod = California Emissions Estimator Model

Notes: All emissions modeling was completed using CalEEMod. See Appendix B for modeling results. Some numbers may not add up due to rounding.

For individual projects that may be implemented under the proposed CAP that involve construction activities with an intensity (i.e., size, schedule, equipment, demolition, import/export of soil, architectural coating) greater than the sample program activity, the severity and location of the impacts cannot be determined until the construction details and locations of such projects are known. The severity of the impacts would vary depending upon the size of the individual project and the intensity of construction activities. Therefore, for these individual projects, the magnitude of construction impacts related to criteria pollutant emissions cannot be determined at this time. As a result, it is possible that construction emissions associated with individual projects that may be implemented under the proposed CAP would exceed the applicable air district thresholds. Therefore, construction impacts related to criteria air pollutant emissions associated with implementation of the CAP would be **significant**. Mitigation would reduce emissions of criteria pollutants during construction of specific individual projects (see MM AQ-1 and AQ-2); however, it is not possible to determine whether impacts would be reduced to less-than-significant levels because the magnitude of construction emissions is not known.

Even if individual projects that may be implemented under the proposed CAP require construction activities with an intensity (i.e., size, schedule, equipment, demolition, import/export of soil, architectural coating) equal to or less than the sample program activity, it is possible that more than one individual project would be constructed simultaneously. Simultaneous construction of two or more individual projects under the CAP within the jurisdiction of the same air district would combine to generate higher total air pollutant emissions than those modeled for the individual sample program activity. The severity of the impacts would vary depending upon the size of each individual project implemented under the CAP, the intensity of its construction activities, and the number of individual projects constructed simultaneously within the jurisdiction of the same air district. Therefore, for individual projects that would be constructed simultaneously within the jurisdiction of the same air district, it cannot be determined at this time if combined construction impacts related to criteria air pollutant emissions would exceed the relevant thresholds or by how much. As a result, construction impacts related to criteria air pollutant emissions resulting from implementation of the proposed CAP would be **significant**. Implementation of MM AQ-1 and AQ-2 would reduce combined emissions of criteria pollutants during construction of specific individual projects that may be implemented under the proposed CAP; however, it is not possible to determine whether impacts would be reduced to less-than-significant levels at the program-level because the magnitude of combined construction emissions is not known.

Fugitive Dust Emissions

Site preparation and grading may cause wind-blown dust that could contribute particulate matter into the local atmosphere. As discussed in Chapter 2, *Project Description*, in addition to Metropolitan's standard Environmental Requirements for Construction, Metropolitan implements environmental requirements for construction detailed in Metropolitan's engineering project specification package, which includes compliance with the applicable air district's fugitive dust control measures, such as SCAQMD Rule 403 (Fugitive Dust) and MDAQMD Rule 403 (Fugitive Dust). The BAAQMD requires implementation of additional BMPs for all projects to reduce fugitive dust impacts to less-than-significant levels, and the VCAPCD and the ICAPCD recommend implementation of additional fugitive dust control measures for all projects undergoing CEQA review (BAAQMD 2017a; VCAPCD 2003; ICAPCD 2017). Implementation of Metropolitan's engineering project specification package, which includes fugitive dust control BMPs and compliance with the applicable air district's fugitive dust control measures would ensure that individual project-specific construction impacts related to fugitive dust emissions would be reduced to **less-than-significant** levels.

Post-Construction

Upon implementation, many of the proposed CAP measures would have the co-benefits of reducing air pollutant emissions by reducing natural gas, gasoline, and diesel fuel consumption. Measures that would have co-benefits related to air quality include, but are not limited to, electrifying natural gas-consuming equipment and devices (CAP measure DC-2), reducing electricity demand (CAP Strategy 5), increasing use of renewable energy (CAP Strategy 4), electrifying fleet vehicles (CAP Strategy 2), reducing vehicle miles traveled (CAP Strategy 6), expanding the subsidized transit commute program (CAP measure EC-1), and facilitating alternative transportation (CAP measure EC-4) and alternative work schedules (CAP measure EC-5). Alternatively, some post-construction activities for individual projects would have the potential to result in sources of criteria pollutant and fugitive dust emissions, such as regular maintenance trips and activities for the proposed BESS facilities that may result in additional mobile source emissions of air pollutants.

Because proposed CAP measures are intended to reduce GHG emissions from Metropolitan operations, several of the air pollutant emissions sources identified above would not generate net new emissions as compared to existing conditions. Furthermore, any net new post-construction sources of emissions for individual projects, such as additional maintenance trips and activities, would be minimal and would therefore generate *de minimis* emissions of criteria air pollutants and fugitive dust. Therefore, post-construction impacts related to criteria air pollutant and fugitive dust emissions would be **less than significant**.

Threshold AQ-C: *Would the project expose sensitive receptors to substantial pollutant concentrations?*

Individual projects that may be implemented under the proposed CAP would potentially generate localized emissions of carbon monoxide, TACs, and *Coccidioides immitis* spores during the construction and post-construction periods. As discussed in Section 4.1.2, *Existing Conditions*, sensitive receptors in the Plan Area include residences, schools and schoolyards, parks and playgrounds, day care centers, nursing homes, and hospitals. Sensitive receptors nearest to the known potential locations of proposed individual projects (i.e., the YLHEP/Diemer WTP, the Colorado River Aqueduct Pump Plant facilities, Jensen, Mills, Skinner, Weymouth WTPs) include existing and planned (under construction) residences, the Van Gogh Charter School in the city of Granada Hills, and the Grace Miller Elementary, Calvary Baptist, and Joan Macy schools in the city of La Verne.

Carbon Monoxide Hotspots

A carbon monoxide hotspot is a localized concentration of carbon monoxide that is above a carbon monoxide ambient air quality standard. Specifically, hotspots can be created at intersections and along roadways where traffic levels are sufficiently high such that the local carbon monoxide concentration exceeds the federal one-hour standard of 35.0 ppm or the federal and state eight-hour standard of 9.0 ppm (CARB 2016). Localized carbon monoxide concentrations are primarily the result of the volume of cars along a road and the level of emissions generated by vehicles. Restricted vehicular traffic flows can contribute to higher volumes of vehicles on a given roadway in a period of time but are not the cause of high carbon monoxide concentrations. As shown in Table 10, all seven air basins in the Plan Area are in attainment or are unclassified for the NAAQS and CAAQS for carbon monoxide. Stringent vehicle emission standards in California have reduced the level of carbon monoxide emissions generated by vehicles over time such that carbon monoxide hotspots are rarely a concern, except for roadways with very high traffic volumes. The BAAQMD has established a volume of 44,000 vehicles per hour as the level above which traffic volumes may contribute to a localized violation of carbon monoxide standards (BAAQMD 2017a). The maximum hourly traffic volume on a highway in California in 2017 was 35,500 vehicles on Interstate 405 at its junction with State Route 10 in Los Angeles (California Department of Transportation 2018). Therefore, the minimum number of trips that would need to be added to a roadway in the Plan Area to result in a carbon monoxide hotspot would be approximately 8,500 vehicles per hour (i.e., 44,000 – 35,500).

Construction

Construction activities associated with the proposed program would require vehicle trips to deliver heavy-duty construction equipment and materials, import/export soil, haul demolition debris, and transport construction workers. For example, during construction of the one sample program activity discussed under Threshold AQ-B, up to approximately 127 daily one-way trips would occur in the region of the given sample program activity (see Appendix B for CalEEMod modeling results on which this trip estimate is based). Due to the relatively small scale of individual projects that may be implemented under the CAP and their geographic distribution throughout the Plan Area, construction-related trips would not have the potential to add 8,500 vehicles per hour on any given roadway in the Plan Area (see previous paragraph above) and therefore would not cause hourly traffic volumes on any roadways in the Plan Area to exceed 44,000 vehicles (per BAAQMD guidelines, described above). Therefore, **no impact** related to carbon monoxide hotspots would occur during construction.

Post-Construction

Individual projects that may be implemented under the proposed CAP would require a minimal number of vehicle trips related to operations and maintenance activities, the majority of which would travel on local and regional roadways that experience hourly traffic volumes far less than 44,000 vehicles per hour. Nevertheless, even if operations and maintenance trips utilize high-volume highways and freeways, these trips would not have the potential to add 8,500 vehicles per hour on any given roadway in the Plan Area due to the relatively small scale of individual projects that may be implemented under the proposed CAP and their geographic distribution throughout the Plan Area. Therefore, post-construction activities would not cause hourly traffic volumes on any roadways in the Plan Area to exceed 44,000 vehicles. Furthermore, the CAP includes measures intended to reduce vehicle trips and vehicle miles traveled, which would result in decreased traffic volumes on some roadways in the Plan Area. As a result, **no impact** related to carbon monoxide hotspots would occur during post-construction activities.

Toxic Air Contaminants

Construction

The greatest potential for TAC emissions during construction would be from DPM emissions associated with heavy equipment operations. According to CARB methodology, health effects from carcinogenic air toxics are usually described in terms of individual cancer risk, which is expressed as an estimate of the increased changes of developing cancer due to emissions over a 70-year lifetime (CARB 2005). The 2015 California Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments does not include recommendations for assessing the health risk of TACs associated with temporary construction projects because there is “considerable uncertainty” in evaluating cancer risk over short-term durations (OEHHA 2015).

Construction activities in any one location would be temporary and short-term given the relatively small scale of individual projects that may be implemented under the proposed CAP, after which time all construction-related TAC emissions would cease in that area. Furthermore, DPM emissions would be distributed geographically throughout the Plan Area, and it is unlikely that DPM emissions from construction of one project implemented under the CAP would affect the same sensitive receptor as DPM emissions from construction of another project implemented under the CAP. Therefore, construction impacts related to TAC emissions would be **less than significant**.

Post-Construction

The primary sources of TAC emissions in urbanized and suburban areas are industrial uses and vehicle trips on area roadways. The proposed program would not include new stationary sources of TAC emissions such as diesel generators, dry cleaners, distribution centers, or warehouses. In addition, as discussed under *Carbon Monoxide Hotspots*, the proposed program would not generate a substantial increase in operational vehicle trips. Therefore, the proposed program would not result in a significant increase in DPM emissions from mobile sources on roadways in the Plan Area. As a result, post-construction impacts related to TAC emissions would be **less than significant**.

Valley Fever

Construction

Construction activities, including site preparation and grading, would have the potential to release *Coccidioides immitis* spores. The populations of arid and semiarid areas in the Plan Area have been and will continue to be exposed to Valley Fever from agricultural and construction activities occurring throughout these regions. Substantial increases in the number of reported cases of Valley Fever tend to occur only after major ground-disturbing events, such as the 1994 Northridge earthquake (VCAPCD 2003). Construction activities under the proposed program would not result in a comparable major ground disturbance, and because of compliance with applicable air district rules related to fugitive dust control, construction activities under the proposed program would not release a large number of spores. As discussed in Section 4.1.4.1, *Thresholds of Significance*, the VCAPCD recommends consideration of the following factors that may indicate the program's potential to result in significant impacts related to Valley Fever:

- Disturbance of the topsoil of undeveloped land (to a depth of about 12 inches)
- Dry, alkaline, sandy soils
- Virgin, undisturbed, non-urban areas
- Windy areas
- Archaeological resources probable or known to exist in the area (Native American midden sites)[21]
- Special events (fairs, concerts) and motorized activities (motocross track, All Terrain Vehicle activities) on unvegetated soil (non-grass)
- Non-native population (i.e., out-of-area construction workers)

The proposed program involves activities that would occur primarily in urbanized areas at or near existing Metropolitan facilities on relatively small project sites (five acres or less). While possible that individual projects may occur on virgin, undisturbed land, due to the relatively small scale of individual projects and their geographic distribution throughout the Plan Area, it is anticipated that construction workers would be from the local or regional area and would therefore have previous exposure to and immunity from Valley Fever. As discussed in Chapter 2, *Project Description*, in addition to Metropolitan's standard Environmental Requirements for Construction, Metropolitan implements environmental requirements for construction that are detailed in Metropolitan's engineering project specification package, which includes compliance with the applicable air district's fugitive dust control measures, such as SCAQMD Rule 403 (Fugitive Dust) and MDAQMD Rule 403 (Fugitive Dust). Therefore, construction activities associated with the proposed program would not result in a substantial increase in entrained fungal spores that cause Valley Fever above existing background levels, and construction impacts related to Valley Fever would be **less than significant**.

[21] The presence of archaeological resources can indicate that soils have been historically undisturbed and therefore have higher potential to contain *Coccidioides immitis* spores.

Post-Construction

Upon completion, individual projects that may be implemented under the CAP would not require substantial ground disturbance on undisturbed land in close proximity to sensitive receptors that could mobilize *Coccidioides immitis* spores. Therefore, **no impacts** related to Valley Fever would occur during post-construction activities.

Threshold AQ-D: *Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?*

Construction

Construction activities under the proposed program are small in nature and generally occur within the boundaries of Metropolitan -owned facilities and would not require a substantial amount of paving or use of heavy equipment that would generate oil and diesel fuel odors. Any odors would be limited to the construction period and would be temporary. Because the projects under the proposed program are small in nature and would not be expected to generate emissions that would adversely affect a substantial number of people, construction impacts related to odors would be **less than significant**.

Post-Construction

Based on a review of the CEQA guidance documents published by seven of the eight air districts with jurisdiction in the Plan Area (excluding the SDAPCD, which has not published guidance), odor-generating land uses include wastewater treatment facilities, sanitary landfills, solid waste transfer stations, composting facilities, petroleum extraction/transfer/processing/refining operations and facilities, asphalt batch plants, chemical manufacturing, fiberglass manufacturing, painting/coating operations (e.g., auto body shops), food processing facilities, coffee roasters, commercial charbroiling, green waste and recycling operations, wastewater pumping facilities, mushroom farms, metal smelting plants, rendering plants, feed lot/dairies, and agriculture. None of the proposed CAP measures involve these types of facilities or land uses, except planned regenerative agricultural studies on existing agricultural lands in the Palos Verde Valley (CAP measure CS-2). The proposed studies would analyze impacts of traditional fallowing practices and investigate the effects of various cover crops and no-till practices on existing agricultural lands. None of the proposed study activities would result in new or additional odor-generating land uses; therefore, **no impact** related to odors would occur during post-construction activities.

Cumulative Analysis

The geographic scope for the cumulative air quality impact analysis is the area covered by the seven air basins that encompass the Plan Area. In general, there are cumulative air quality impacts in air basins that are designated nonattainment for one or more criteria pollutants, as shown in Table 10. As discussed in the BAAQMD (2017a) *California Environmental Quality Act Air Quality Guidelines*, "By its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts."

As summarized in Section 4.1.4.1, *Thresholds of Significance*, the proposed program would have a cumulatively considerable contribution to a significant cumulative air quality impact if any of the following criteria are met:

1. The project would be inconsistent with the applicable air quality plan, which is intended to address cumulative air quality impacts;

2. Emissions associated with the proposed program would exceed the project-level thresholds of significance, which are set at levels at which air districts have determined that individual projects would not have a cumulatively considerable contribution to cumulative air quality impacts; and/or
3. Cumulative traffic volumes in addition to program-related traffic volumes would result in a carbon monoxide hotspot.

As discussed under Thresholds AQ-A and AQ-B, the individual projects that may be implemented under the proposed CAP do not have sufficient detail to allow project-level analysis of criteria pollutant emissions during the construction phase at this time; however, post-construction activities under the CAP would not generate substantial air quality emissions. As discussed under Threshold AQ-C, the proposed program would not have the potential to generate a substantial number of vehicle trips on any one roadway; therefore, it is unlikely that cumulative traffic volumes in addition to program-related traffic volumes would result in a carbon monoxide hotspot along roadways in the Plan Area. As discussed under Threshold AQ-D, the proposed program activities are small in nature and would not generate emissions (such as those leading to odors) that would adversely affect a substantial number of people.

Nevertheless, for individual projects that may be implemented under the proposed CAP that involve construction activities with an intensity (i.e., size, schedule, equipment, demolition, import/export of soil, architectural coating) greater than the sample program activity as shown in Table 16 through Table 18, it cannot be determined at this time if cumulatively considerable construction and post-construction impacts related to the applicable air quality plans and criteria air pollutants or their severity. Mitigation would reduce emissions of criteria air pollutants during the construction phases for these individual projects to the extent feasible; however, it is not possible to determine whether impacts would be reduced to less-than-significant levels because the magnitude of emissions is not known. Therefore, even with implementation of MM AQ-1 and AQ-2, at the program-level, cumulative impacts are considered potentially **significant** and the CAP's contribution **cumulatively considerable**. Further environmental analysis and documentation is necessary at the project -level prior to construction for each individual project to determine if a potentially significant impact would occur and if mitigation would reduce the project-level impact to less than cumulatively considerable.

4.1.5.2 Mitigation Measures

MM AQ-1 **Construction Air Quality Assessment.** For individual projects to be implemented under the CAP that involve construction activities with an intensity (i.e., size, schedule, equipment, demolition, import/export of soil, architectural coating) greater than the sample program activity, an air quality assessment shall be prepared to evaluate construction emissions in light of the applicable air district thresholds.

MM AQ-2 **Implement Emission Reduction Measures.** If construction emissions would exceed any of the applicable thresholds, emission reduction measures shall be implemented to reduce emissions below the thresholds. Measures may include, but would not be limited to:

- All construction equipment shall be equipped with Tier 4 certified engines or CARB-certified Level 3 diesel particulate filters. All diesel particulate filters shall be kept in working order and maintained in operable condition according to manufacturer's specifications, as applicable.
- Construction equipment with lower horsepower ratings shall be utilized, as applicable and practicable.

- Ultra-low-sulfur diesel fuel shall be used for stationary construction equipment, as applicable.
- Low-emission on-site stationary equipment shall be used, as applicable.
- Alternatively-fueled construction equipment (e.g., renewable diesel, natural gas, electric) shall be utilized instead of diesel-fueled construction equipment, as applicable.
- The schedule for soil import and/or export shall be extended to reduce the number of daily haul truck trips, as applicable.
- The schedule for the coating/painting phase shall be extended to reduce the square footage coated/painted each day, as applicable.
- Architectural coatings with a VOC content of less than 250 grams per liter shall be utilized.

4.1.5.3 Level of Significance After Mitigation

Implementation of MM AQ-1 and AQ-2 would reduce conflicts with applicable air quality plans and criteria air pollutants; however, these impacts are assumed to be **significant and unavoidable**, as the severity of impacts from individual projects carried out under the proposed program cannot be determined at this time. Once project-specific information is available regarding each individual project under the proposed CAP, further environmental analysis and documentation is necessary at a project-level prior to construction to determine if a significant impact would occur and if mitigation would reduce the impact to a less-than-significant level.

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4.2 Biological Resources

4.2.1 Introduction

This chapter describes the existing conditions for biological resources, the regulatory framework associated with biological resources, the potential impacts to biological resources that would result from the proposed program, and the mitigation measures that would reduce these impacts.

4.2.2 Existing Conditions

The existing conditions related to biological resources, including habitat classifications, drainages and wetlands, sensitive natural communities, special-status plants and animals, and wildlife movement corridors are provided in Appendix C.

4.2.3 Regulatory Framework

Federal, state, and local authorities, under a variety of statutes and guidelines, share regulatory authority over biological resources. The primary authority for general biological resources lies within the land use control and planning authority of local jurisdictions, which in this instance are the counties of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura, in addition to the portions of Imperial, San Joaquin, and Contra Costa counties, as well as other local jurisdictions including cities within these counties. The CDFW is a trustee agency for biological resources throughout the state as defined in CEQA and also has direct jurisdiction under the California Fish and Game Code (CFGC), which includes, but is not limited to, resources protected by the State of California under the California Endangered Species Act (CESA) and Section 1600 *et. seq*. In addition, the RWQCB is the responsible agency for "waters of the state".

4.2.3.1 Federal

Endangered Species Act

The United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) share responsibility and regulatory authority for implementing the federal Endangered Species Act (FESA) (16 United States Code [USC] Section 1531 *et seq*.). Under the FESA, authorization is required to "take" a listed species. Take is defined under FESA Section 3 as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Under federal regulation (50 Code of Federal Regulations [CFR] Sections 17.3), "harm" is further defined as "an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." Critical habitat is a specific geographic area(s) containing physical or biological features essential for the conservation of a threatened or endangered species and that may require special management considerations or protection. Critical habitat may include an area that is not currently occupied by the species but will be needed for its recovery.

FESA Section 7 outlines procedures for federal interagency cooperation to conserve federally listed species and designated critical habitat. Section 7(a)(2) of the FESA and its implementing regulations require federal agencies to consult with USFWS or NMFS to ensure that they are not authorizing, funding, or carrying out actions likely to jeopardize the continued existence of listed species, or result in the destruction or adverse modification of critical habitat.

For program activities where federal action is not involved and take of a listed species may occur, the proponent may seek to obtain an incidental take permit (ITP) under FESA Section 10(a)(1)(B). This section, in conjunction with Section 10(a)(2)(A), allows USFWS to permit the incidental take of listed species if such take is accompanied by a Habitat Conservation Plan (HCP)[22] that includes components to minimize and mitigate impacts associated with the take.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) protects native birds and bird parts (16 USC Section 703-712). Under the provisions of the MBTA, it is unlawful to take (pursue, hunt, take, capture, or kill) migratory birds, except under permits issued by the USFWS for special situations, such as imminent threat to human safety or scientific research. The law currently applies to more than 1,000 species (50 CFR Section 10.13), including most native birds, and covers the destruction or removal of active nests of those species. These protections apply regardless of whether other entitlements are in place, such as approvals under CEQA.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act is the primary law protecting eagles, including individuals and their nests and eggs (16 USC Section 668-668d, 54, Stat. 250 and Amendments). It states “no person shall take, possess, sell, purchase, barter, offer for sale, transport, export, or import any bald or golden eagle alive or dead, or any part, nests or eggs, thereof without a valid permit to do so.”

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) is the primary law governing marine fisheries management in United States federal waters. The act was first passed in 1976 and revised in 1996 and 2007. The purpose of the act is to provide long-term biological and economic sustainability of United States marine fisheries.

The NMFS has regulatory authority for implementing the Magnuson-Stevens Act. The NMFS requires regional fishery management councils to develop Fisheries Management Plans (FMP) specific to their regions, fisheries and fish stocks. For waters off the United States West Coast, the Pacific Fishery Management Council has developed four FMPs, which are implemented through fisheries regulations for coastal pelagic species, groundfish species, highly migratory species and salmon species. These FMPs also identify Essential Fish Habitat which is broadly defined as those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity. Federal agencies which fund, permit, or undertake activities that may adversely affect Essential Fish Habitat are required to consult with National Oceanic and Atmospheric Administration (NOAA) Fisheries regarding the potential effects of their actions on Essential Fish Habitat and to respond to NOAA’s conservation recommendations.

[22] HCPs are planning documents required as part of an application for an ITP. They describe the anticipated effects of the proposed taking; how those impacts will be minimized or mitigated; and how the HCP is to be funded. HCPs can apply to both listed and nonlisted species, including those that are candidates or have been proposed for listing.

Section 10 of the River and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 requires authorization from the Secretary of the Army, acting through the USACE, for any structure or work in, under, or over any navigable water of the United States. Regulated activities include dredging or disposal of dredged materials, excavation, filling, re-channelization and construction of any structure or any other modification of a navigable water of the United States.

Clean Water Act

The Clean Water Act was enacted to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Under Section 404 of the Clean Water Act, the USACE, with U.S. EPA oversight, regulates activities that result in discharge of dredged or fill material into wetlands or other "waters of the United States." Any discharge of dredged or fill material into jurisdictional waters requires a Section 404 permit from the USACE prior to the start of work. In administering its regulatory program to achieve the goals of the Clean Water Act, the USACE implements a mitigation sequencing requirement whereby impacts must be avoided, then minimized, and finally compensated for if avoidance and minimization are not sufficient to reduce adverse effects on the aquatic ecosystem. When compensatory mitigation is required, it should comply with the following hierarchy established by the USACE/U.S. EPA 2008 Mitigation Rule (in descending order): (1) mitigation banks; (2) in-lieu fee programs; (3) permittee-responsible mitigation under a watershed approach; (4) permittee-responsible mitigation through on-site and in-kind mitigation; and, (5) permittee-responsible mitigation through off-site and/or out-of-kind mitigation.

The scope of waters of the United States has been the subject of recent agency rulemaking. On April 21, 2020, the USACE and U.S. EPA published the "Navigable Waters Protection Rule," to finalize a revised definition of waters of the United States under the Clean Water Act. Under the revised definition, ephemeral drainages are non-jurisdictional, as are wetlands that do not exhibit, at least seasonally, a continuous surface connection to jurisdictional waters.

Also, in accordance with Section 401 of the Clean Water Act, applicants for a Section 404 permit must obtain water quality certification from the appropriate RWQCB. The certification requirement functions as a mechanism for states to review proposed Section 404 permits and to ensure that proposed discharges do not violate state water quality standards. For program activities that would occur in multiple regions, the water quality certification is issued by the State Water Resources Control Board.

4.2.3.2 State

Endangered Species Act

The CESA (CFGC Section 2050 et. seq.) prohibits take of state-listed threatened and endangered species without a CDFW ITP. Take under California law means "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill," and does not include indirect harm by way of habitat modification. In issuing an ITP, CDFW must make several findings, including that the proposed take would not jeopardize the continued existence of the species and that the impacts of the take would be minimized and fully mitigated.

Fully Protected Species

Protection of fully protected species is described in CFGC Sections 3511, 4700, 5050 and 5515. These statutes prohibit take or possession of fully protected species. Incidental take of fully protected species may be authorized under an approved Natural Community Conservation Plan (NCCP; see CFGC sections 2800 *et seq*.).

California Fish and Game Code sections 3503, 3503.5 and 3513

CFGC sections 3503, 3503.5 and 3513 protect all birds, as well as their nests and eggs, for species that are not already listed as fully protected and that occur naturally within the state. Sections 3503 and 3503.5 of the CFGC stipulate the following regarding eggs and nests: Section 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by CFGC or any regulation made pursuant thereto; and Section 3503.5 states that is it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by CFGC or any regulation adopted pursuant thereto. Section 3513 states that it is unlawful to take or possess any migratory nongame bird as designated in the MBTA or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the MBTA. In November 2018, the CDFW and California Attorney General issued an advisory to affirm that relevant statutes in the CFGC continue to provide protections for birds, including their active nests. Specifically, the advisory notes that for purposes of these statutes, California courts have held that the CFGC's protections include prohibitions on incidental take and that such take is not limited to hunting, fishing, and other activities that are lawfully permitted to take/kill wildlife.

Native Plant Protection Act

The Native Plant Protection Act (NPPA) of 1977 (CFGC Sections 1900 *et seq.*) authorizes the CDFW to designate rare and endangered native plants and provides specific protection measures for these listed species. Under Section 1913(c) of the NPPA, the owner of land where a rare or endangered native plant is growing is required to notify the department at least 10 days in advance of changing the land use to allow for salvage of the plant(s).

Section 1600 *et seq*. of the California Fish and Game Code

Sections 1600 through 1617 of the CFGC describe CDFW's Lake and Streambed Alteration program. Section 1602 of the CFGC provides that an entity shall not substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake, without prior notification to CDFW. Upon receiving such notification, CDFW assesses whether the proposed activity would adversely affect fish and wildlife resources. If an adverse effect is identified, CDFW issues a Lake/Streambed Alteration Agreement authorizing the activity to proceed subject to required measures CDFW believes are necessary to protect fish and wildlife resources. Although CDFW has not promulgated regulatory definitions of "Lake" or "Stream" for use in this regulatory program, all lakes, ponds, perennial, intermittent and ephemeral streams, and associated riparian vegetation are typically subject to the program.

Natural Community Conservation Planning Act

The NCCP Act (CFGC Sections 2800 *et seq.*) is administered by the CDFW as a means to protect habitat in California. The NCCP Act takes a regional approach to preserving habitat. The designation of a NCCP area identifies and provides for the regional protection of plants, animals and their habitats, while allowing compatible and appropriate economic activity. Once an NCCP has been approved, CDFW may provide take authorization for all covered species, including fully protected species, under Section 2835 of the CFGC. Working with landowners, environmental organizations, and other interested parties, a local agency oversees the numerous activities that compose the development of an NCCP. Refer to Section 4.2.3.3, *Local Policies and Adopted/Approved Plans*, below for a summary of NCCPs within the Plan Area.

Porter-Cologne Water Quality Control Act

The State Water Resources Control Board (SWRCB) and each of nine local RWQCBs have jurisdiction over waters of the State pursuant to the Porter-Cologne Water Quality Control Act. Waters of the State are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The Porter-Cologne Act regulates discharges of waste into waters of the State and includes discharges from both point and non-point sources. Discharges of dredge or fill material are considered discharges of waste and are regulated by the RWQCBs under this statute. Because the limits of Porter-Cologne Act jurisdiction are unaffected by the recent reductions in federal Clean Water Act jurisdiction, the RWQCBs are increasingly relying on their authority under the Porter-Cologne Act to regulate discharges into non-federal waters. The SWRCB has issued general Waste Discharge Requirements regarding discharges to "isolated" waters of the state (Water Quality Order No. 2004-0004-DWQ, Statewide General Waste Discharge Requirements for Dredged or Fill Discharges to Waters Deemed by the USACE to be Outside of Federal Jurisdiction). Additionally, a new set of procedures for regulating discharges of dredge and fill material was approved by the SWRCB in April 2019 and became effective on May 28, 2020.

4.2.3.3 Local Policies and Adopted/Approved Plans

General Plans typically contain elements which address protection of biological resources. Typically, these elements consist of goals, policies and actions that protect natural resources, such as environmentally sensitive habitats, special status species, native trees, creeks, wetland and riparian habitats. Local jurisdictions generally approve development as long as it is consistent with those elements of the General Plan.

Some resources are afforded protection via local ordinances that protect trees, riparian corridors and environmentally sensitive habitats. Each county and many cities in the Plan Area have municipal codes which protect natural resources and address compliance with environmental regulations. For example, local ordinances and policies may be in place that protect native and nonnative trees in urban landscapes, as well as in unincorporated county lands. These ordinances and policies vary in their definitions of protected trees (e.g., certain species, minimum diameter at breast height [dbh], trees that form riparian corridors or a combination thereof) and in the requirements for ordinance or policy compliance. In addition, counties and cities may have local ordinances or policies that are intended to protect other biological resources such as wetlands and drainages, riparian habitat and other sensitive habitat areas. Due to the programmatic nature of the proposed CAP, a precise, project-level analysis of the specific impacts associated with individual program activities is not possible, thus, evaluation of compliance with local ordinances would be completed on a case-by-case basis as covered activities progress through the project planning phase and subsequent CEQA analysis and documentation, as required, as project-level details become available regarding individual proposed projects.

According to the CDFW NCCP website, the following are those NCCPs and HCPs that occur within the Plan Area (CDFW 2019b):

- **Los Angeles County**
    - **City of Rancho Palos Verdes NCCP/HCP**. The City of Rancho Palos Verdes NCCP/HCP covers approximately 3,146 acres within Rancho Palos Verdes. It covers 10 species of plants and wildlife as well as several natural vegetation communities.
- **Orange County**
    - **County of Orange Central/Coastal Subregion NCCP/HCP.** The County of Orange Central/Coastal Subregion NCCP/HCP covers approximately 208,000 acres within the central and coastal portions of Orange County. It covers 45 species of plants and wildlife as well as several natural vegetation communities.
- **Riverside County**
    - **Western Riverside Multiple Species Habitat Conservation Plan (MSHCP).** The Western Riverside Multiple Species HCP covers approximately 1.26 million acres within western Riverside County. It covers 118 species of plants and wildlife as well as many natural vegetation communities.
    - **Coachella Valley MSHCP**. The Coachella Valley Multiple Species HCP covers approximately 1.2 million acres within eastern Riverside County. It covers 27 species of plants and wildlife as well as 27 natural vegetation communities.
- **San Bernardino County**
    - **Town of Apple Valley Multi-Species Conservation Plan.** The Town of Apple Valley Multi-Species Conservation Plan covers approximately 221,180 acres within the town of Apple Valley as well as in unincorporated San Bernardino County to the north and east. It covers 21 species of plants and wildlife as well as 17 natural vegetation communities.
- **San Diego County**
    - **San Diego County Multiple Habitat Conservation Program (East County).** The San Diego County Multiple HCP covers approximately 1.6 million acres within eastern San Diego County. It covers 253 species of plants and wildlife as well as many natural vegetation communities.
    - **San Diego North County Multiple Species Conservation Plan.** The San Diego North County Multiple Species HCP covers approximately 345,000 acres within northern San Diego County. It covers 62 species of plants and wildlife as well as several natural vegetation communities.
    - **San Diego County Multiple Species Conservation Program (South County).** The San Diego County Multiple Species HCP for South San Diego County covers approximately 576,000 acres within southern San Diego County. It covers 80 species of plants and wildlife and several natural vegetation communities.

4.2.4 Thresholds and Methodology

4.2.4.1 Thresholds of Significance

Table 19 lists thresholds from Appendix G of the *State CEQA Guidelines* that pertain to impacts associated with biological resources. These thresholds are addressed in the draft PEIR.

Table 19 CEQA Thresholds for Biological Resources

Threshold Would the proposed program:
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service;
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service;
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; and/or
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

4.2.4.2 Methodology

Section 4.2.5, *Impacts Analysis*, below presents a programmatic-level discussion of impacts to special status biological resources from implementation of the proposed CAP. As discussed in Section 1.2, *Purpose of the Program Environmental Impact Report*, a project-level analysis of the specific impacts associated with all individual projects and program activities would occur when project details are available. Potential impacts to plants and animal species would be identified during subsequent environmental analysis conducted when additional project-level details are available prior to construction. If species are identified, the mitigation measures described in this section would apply.

The following section summarizes the impacts associated with implementation of emission reduction measures proposed in the CAP. It is anticipated that construction of planned projects would occur at Metropolitan facilities or within Metropolitan rights-of-way. Specifically, the following Metropolitan locations have been identified as potential project sites for projects that would be implemented under the proposed CAP: Diemer WTP (Orange County), Jensen WTP (Los Angeles County), Mills WTP (Riverside County), Skinner WTP (Riverside County), Weymouth WTP (Los Angeles County), headquarters building (Los Angeles County), CRA pump plants (Riverside and San Bernardino counties), Metropolitan-owned facilities throughout the Plan Area, Metropolitan-owned agricultural land at the southwest corner of 35th Avenue and Keim Boulevard in the Palo Verde Valley (Imperial County), and Webb Tract, Holland Tract, Bouldin Island, and Bacon Island in the Bay Delta (San Joaquin/Contra Costa counties). In general, implementation of proposed program activities envisioned by the CAP could result in the biological resources impacts as described in the following section. Data used for this analysis include aerial photographs, topographic maps, and data on special status species and sensitive habitat information obtained from the CDFW BIOS (CDFW 2020c), the CNDDB (CDFW 2020a), the CNPS Online Inventory of Rare and Endangered Plants (CNPS 2020), the USFWS IPaC (USFWS 2020b), and accepted scientific texts to identify species. The USFWS Critical Habitat Mapper (USFWS 2020c) and USFWS National Wetlands Inventory (USFWS 2020a) were also queried. Due to the large Plan Area, field surveys were not conducted. Analysis is based solely on desktop analysis and literature review.

4.2.5 Impacts Analysis

4.2.5.1 Program Analysis

Threshold BIO-A: *Would the proposed program have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?*

For the purposes of this analysis, special status plant and animal species include those designations described in Appendix C. Most of the program activities proposed under the CAP would occur in urbanized areas at or near existing Metropolitan facilities. While the proposed covered projects located within existing Metropolitan facilities would be unlikely to directly impact special status species, several Metropolitan facilities are located in close proximity to suitable habitat for special status species and proposed covered projects in these locations may potentially result in indirect effects (e.g., disturbance from noise, dust, equipment staging) to adjacent sensitive habitat, if present. Specifically, special status species with potential to occur at the proposed project sites could include:

- Diemer WTP: Adjacent to coastal scrub that may support coastal California gnatcatcher (*Polioptila californica californica*)
- Jensen WTP: Adjacent to riparian habitat surrounding Bull Creek that may support coastal California gnatcatcher, least Bell's vireo (*Vireo bellii pusillus*), and southwestern pond turtle (*Actinemys pallida*)
- Mills WTP: Adjacent to habitat that may support coastal California gnatcatcher, least Bell's vireo, and Stephens' kangaroo rat (*Dipodomys stephensi*)
- Skinner WTP: Adjacent to habitat that may support burrowing owl (*Athene cunicularia*), coastal California gnatcatcher, and Stephens' kangaroo rat
- Weymouth WTP: Existing facilities may support special status bat species
- CRA Pump Plants: Existing facilities and adjacent habitat may support desert tortoise (*Gopherus agassizii*)
- Palo Verde: Agricultural land and adjacent irrigation ditches within and adjacent to the proposed project site may support burrowing owl and rail species
- Bay Delta: Aquatic habitat surrounding the islands may support special status aquatic species including Delta smelt (*Hypomesus transpacificus*), green sturgeon (*Acipenser medirostris*), salmon species, and steelhead (*Oncorhynchus mykiss irideus*)

It is unlikely that construction activities would occur on natural, undisturbed areas, with the exception of sites in the Bay Delta region. Nonetheless, because the specific project-level details regarding program activities are unknown at this time, these activities could have the potential to impact areas occupied by special status plant and animal species. There are 883 special status species known to occur or with potential to occur within the Plan Area (see Appendix C). One hundred fifty-one of these species are given high levels of protection by the federal government through listing under FESA or by the state government through listing under CESA or designation of Fully Protected status (animals only). A full list of species is presented in Appendix C. Most special status species have very limited ranges within the subject counties and have specific habitat requirements. Many special status species also tend to be associated with sensitive habitats, such as riparian habitats and drainages.

Various proposed program activities could affect special status species or their habitats. Vegetation clearing and excavation could remove habitat or individuals. Excavation, ground clearing, equipment and materials storage, access routes, and other activities could result in impacts on runoff and/or water quality, potentially affecting habitat. Excavation, ground clearing, and access routes could result in air quality impacts (dust, exhaust) that could affect adjacent individuals. Equipment or construction-related traffic could introduce hazardous materials into habitats. Equipment and construction-related traffic could result in noise impacts affecting noise-sensitive species. Equipment and construction personnel could also introduce harmful, noxious, and/or invasive species that could damage habitats (such as by tracking in invasive weed seeds). Most projects under the proposed CAP are relatively small in scope and located in previously disturbed areas so the likelihood of a significant impact to special status species or their habitat is low. In addition, projects would be designed/located to avoid or minimize impacts to the extent possible, where feasible. However, impact to special status species would be examined at a project-level during subsequent environmental review when more detailed project description information is available for each individual project proposed under the CAP. If it is determined that construction or operation of any covered activity would result in significant impacts on special status species, implementation of MM BIO-1 through BIO-6 would reduce these impacts to **less than significant**.

Even in fully developed areas, proposed program activities have the potential to result in impacts on protected species. Migratory birds, including most birds that nest in the Plan Area, are protected by the federal MBTA, which prohibits take (including killing, capturing, selling, trading and transport) of protected migratory bird species, including to their active nests. In addition, CFGC Section 3503 makes it unlawful to destroy nests or eggs of any bird. Where vegetation, and especially trees, are removed as part of construction, there is the potential for impacts to nests or eggs under the MBTA and Section 3503 of the CFGC, but the level of impact would need to be determined at the project level when specific details are known about each of the proposed projects covered under the CAP. Compliance with the CFGC and the MBTA would ensure that impacts to migratory birds would be **less than significant**.

Threshold BIO-B: *Would the proposed program have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?*

Threshold BIO-C: *Would the proposed program have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*

Program activities that may be implemented under the proposed CAP have the potential to impact sensitive habitats, including riparian areas and wetlands. Most of the program activities proposed under the CAP would occur in urbanized areas at or near existing Metropolitan facilities except for projects occurring in the Palo Verde and Bay Delta regions. While work within existing Metropolitan facilities would be unlikely to directly impact wetlands, riparian habitat or other sensitive communities, several Metropolitan facilities are located near these resources, specifically:

- Diemer WTP: Adjacent to coastal sage scrub and California black walnut woodland (considered sensitive communities by CDFW) as well as potentially jurisdictional drainages
- Jensen WTP: Adjacent to riparian habitat within and adjacent to Bull Creek
- Skinner WTP: Adjacent to riparian habitat within and adjacent to Tucalota Creek.
- Bay Delta: Mapped as a wetland by the USFWS National Wetlands Inventory

Due to the programmatic nature of the proposed CAP, the specific details of individual project activities are unknown at this time, so specific project-level analysis cannot be conducted and impacts identified at this time; however, some examples of potential impacts to riparian/wetland habitats include, but are not limited to, the following: vegetation clearing and excavation could remove habitat or result in runoff and/or water quality impacts; excavation, ground clearing, and use of unpaved access routes could result in air quality impacts (dust, exhaust) that could affect adjacent habitat; equipment or construction-related traffic could introduce hazardous materials into habitats; and equipment and construction personnel could also introduce harmful, noxious, and/or invasive species that could damage habitats (such as by tracking in weed seeds). Riparian areas provide wildlife habitat and movement corridors, enabling both terrestrial and aquatic organisms to move along river systems between areas of suitable habitat. The impacts, if any, to riparian or wetland habitat would need to be determined at the project level when specific details are known about each project proposed under the CAP. Construction activities under the proposed program are relatively small in scope and generally located within previously disturbed areas such as Metropolitan pump or treatment plant boundaries or on existing agricultural lands. Projects would be designed and located to avoid or minimize impacts to the extent feasible. Additionally, the projects under the proposed program are small in nature and would not be expected to have a substantial adverse effect on riparian or wetland habitats. However, if, during project-level analysis, it is determined that construction or operation of any covered activity would result in significant impacts to riparian habitats, sensitive natural communities, or state or federally protected wetlands, implementation of MM BIO-7 through MM-BIO-9 would reduce these impacts to **less than significant**.

Threshold BIO-D: *Would the proposed program interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?*

Most of the program activities proposed under the CAP would occur primarily in urbanized areas at or near existing Metropolitan facilities with the exception of proposed projects occurring in the Palo Verde and Bay Delta regions. Proposed projects occurring within existing Metropolitan facilities, including Diemer WTP, Jensen WTP, Skinner WTP, Weymouth WTP, and the CRA pump plants would not interfere with wildlife movement as those facilities are currently fenced and developed. Although the exact locations of program activities in the Bay Delta regions have not been identified at this time, individual project activities in both the Palo Verde and the Bay Delta regions would be small in nature and would be located to not impede or interfere with movement of native resident or migratory fish or wildlife species, established native resident or migratory wildlife corridors, or the use of native wildlife nursery sites. Construction activity and noise could temporarily alter the behavior of wildlife in the area and therefore temporarily disrupt wildlife movement patterns. However, the portions of the Plan Area within the undeveloped areas of the Palo Verde and Bay Delta regions comprise a very small portion of the surrounding habitat areas available for wildlife movement. Therefore, it is unlikely that proposed program activities implemented in these areas would substantially interfere with wildlife movement as there is sufficient adjacent habitat in these areas to facilitate wildlife movement and development in these areas would not isolate wildlife from adjacent movement corridors. Impacts would be **less than significant,** and no mitigation would be required.

Threshold BIO-E: *Would the proposed program conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?*

Protected trees and other biological resources that are protected by city and/or county ordinances and/or policies may be encountered at the locations where program activities are proposed under the CAP and therefore there is potential for conflict with local ordinances and/or policies. Most of the program activities proposed under the CAP, however, would occur primarily in urbanized areas at existing Metropolitan facilities. Because ground disturbances would be limited, the removal of native trees and disturbances to other biological resources protected by local policies or ordinances would likely be minimal for most program activities. Metropolitan would comply with any local policies or ordinances protecting biological resources, therefore impacts would **be less than significant** and no mitigation would be required.

Threshold BIO-F: *Would the proposed program conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?*

Portions of the Plan Area are within established habitat conservation plans including the Town of Apple Valley Multi-Species Conservation Plan, City of Rancho Palos Verdes NCCP/HCP, County of Orange Central/Coastal Subregion NCCP/HCP, Western Riverside MSHCP, Coachella Valley MSHCP, San Diego County Multiple HCP (East County), San Diego North County Multiple Species Conservation Plan, and San Diego County Multiple Species Conservation Program (South County). However, the only planned projects under the proposed CAP that would occur within the boundaries of an established HCP/NCCP or other approved local, regional, or state HCP would occur at the Skinner WTP and Mills WTP, both of which are in the Western Riverside MSHCP. Proposed activities would not conflict with the provisions of the Western Riverside MSHCP as those facilities are currently developed and the proposed projects are small in nature with minimal impacts. Therefore, program activities that may occur within areas covered by an HCP/NCCP or other approved local, regional, or state habitat conservation plan would be **less than significant** and no mitigation would be required.

4.2.5.2 Mitigation Measures

Depending on the results of the project-specific biological resource assessment completed during subsequent environmental review for each proposed project under the CAP, the following mitigation measures would be applied, as applicable:

MM BIO-1 Special Status Plant Species Surveys

If completion of the project-specific biological resources assessment determines that special status plant species have potential to occur on site, surveys for special status plants shall be completed prior to any vegetation removal, grubbing, or other construction activity of each program activity (including staging and mobilization). The surveys shall be floristic in nature and shall be seasonally timed to coincide with the target species identified in the program activity-specific biological resources assessment. All plant surveys shall be conducted by a qualified biologist no more than one year prior to project implementation (annual grassland habitats may require yearly surveys). Surveys shall be conducted in accordance with current protocols established by the CDFW, USFWS and the local jurisdictions if said protocols exist. If special status plant species are identified, Mitigation Measure BIO-2 shall apply.

MM BIO-2 Special Status Plant Species Avoidance, Minimization, and Mitigation

If state- or federally-listed special status and/or CRPR 1 and 2 plant species are identified during the project-specific biological assessment, the activity shall be re-designed to avoid impacting these plant species to the maximum extent feasible. If CRPR 3 and 4 species are found, the biologist shall evaluate if they meet criteria to be considered special status, and if so, the same process as identified for CRPR 1 and 2 species shall apply.

If special status plant species cannot be avoided and would be impacted by a program activity implemented under the proposed CAP, all impacts shall be mitigated at an appropriate ratio (minimum ratio of 1:1) to fully offset program activity impacts, as determined by a qualified biologist for each species. A restoration plan shall be prepared and implemented, as applicable.

MM BIO-3 Endangered/Threatened Animal Species Habitat Assessment and Protocol Surveys

If the results of the project-specific biological resources assessment determine suitable habitat may be present for any federally and/or state endangered or threatened animal species, habitat assessments and/or protocol surveys shall be completed in accordance with CDFW and/or USFWS/NMFS protocols prior to construction.

Alternatively, in lieu of conducting protocol surveys, Metropolitan may choose to assume presence within the activity footprint and proceed with implementing appropriate avoidance measures, consultation, and permitting, as applicable.

If the target species are detected during protocol surveys, or protocol surveys are not conducted and presence is assumed based on suitable habitat, Mitigation Measure BIO-4 shall apply.

MM BIO-4 Endangered/Threatened Animal Species Avoidance and Mitigation

If habitat is occupied or presumed occupied by federal and/or state-listed species and would be impacted by program activities, the program activity shall be redesigned in coordination with a qualified biologist to avoid impacting occupied/presumed occupied habitat to the maximum extent feasible. If occupied or presumed occupied habitat cannot be avoided, Metropolitan shall consult with USFWS, NMFS, and/or CDFW in order to determine the appropriate course of action, which may include a Biological Opinion (BO) or HCP/ITP issued by the USFWS/NMFS (relevant to federally listed species) and/or the ITP issued by the CDFW (relevant to state listed species).

If occupied or presumed occupied habitat cannot be avoided, compensatory mitigation shall be provided (minimum ratio of 1:1) to fully offset impacts to habitat prior to the construction. Compensatory mitigation may be provided through purchase of mitigation bank credits, in-lieu fee, or permittee-responsible habitat restoration/establishment/enhancement/preservation. Compensatory mitigation may be combined/nested with special status plant species and sensitive natural community restoration, where applicable. Temporary impact areas shall be restored to similar pre-project conditions.

If on and/or off-site habitat restoration/conservation is identified, a Habitat Mitigation and Monitoring Plan (HMMP) shall be prepared to ensure the success of compensatory mitigation sites. The HMMP shall identify long-term site management needs, routine monitoring techniques, and performance standards for determining that the conservation site has met the necessary criteria to function as a suitable mitigation site.

MM BIO-5 Endangered/Threatened Species Avoidance and Minimization During Construction

The following measures shall be applied to aquatic and terrestrial species, where appropriate. Metropolitan shall select from these measures as appropriate depending on site conditions, the species with potential for occurrence, and the results of the project-specific biological resources assessment (Mitigation Measure BIO-1).

Pre-construction surveys for federal and/or state listed species with potential to occur shall be conducted where suitable habitat is present by a qualified biologist not more than 72 hours prior to the start of construction activities. The survey area shall include the proposed disturbance area and all proposed ingress/egress routes, plus a species-specific buffer. If any life stage of federal and/or state listed species is found within the survey area, the appropriate measures in the BO or HCP/ITP issued by the USFWS/NMFS (relevant to federally listed species) and/or the ITP issued by the CDFW (relevant to state listed species) shall be implemented; or if such guidance is not in place for the activity, the qualified biologist shall recommend an appropriate course of action, which may include consultation with USFWS, NMFS, and/or CDFW.

- The activity limits of disturbance shall be flagged. Areas of special biological concern within or adjacent to the limits of disturbance shall have Environmental Sensitive Area fencing installed between said area and the limits of disturbance.
- All activities occurring within or adjacent to sensitive habitats that may support federally and/or state endangered/threatened species shall have a qualified biologist present during all initial ground disturbing/vegetation clearing activities. Once initial ground disturbing/vegetation clearing activities have been completed, the biologist shall conduct pre-activity clearance surveys, as needed to ensure protection of endangered/threatened species.
- If pumps are used for dewatering activities, all intakes shall be completely screened with wire mesh not larger than five millimeters to prevent animals from entering the pump system.
- If at any time during construction of the program activity an endangered/threatened species enters the construction site or otherwise may be impacted by the program activity, all program activities shall cease. At that point, a qualified biologist shall recommend an appropriate course of action, which may include consultation with USFWS, NMFS, and/or CDFW. Alternatively, the appropriate measures shall be implemented in accordance with the BO or HCP/ITP issued by the USFWS (relevant to federal listed species) and/or the ITP issued by the CDFW (relevant to state listed species) and work can then continue as guided by those documents and the agencies, as appropriate.
- All trenches, pipes, culverts or similar structures shall be inspected for animals prior to burying, capping, moving, or filling.
- Upon completion of the program activity, a qualified biologist shall prepare a final compliance report documenting all compliance activities implemented for the activity, including the pre-construction survey results.

MM BIO-6 Non-Listed Special Status Animal Species Avoidance and Minimization

Depending on the species identified in the project-specific biological resource assessment, the following applicable measures shall be implemented to reduce the potential for impacts to non-listed special status animal species:

- Pre-construction clearance surveys shall be conducted by a qualified biologist within 14 days prior to the start of construction (including staging and mobilization). The surveys shall cover the entire disturbance footprint plus a minimum 100-foot buffer and shall identify all special status animal species that may occur on-site. The qualified biologist shall make recommendations for avoidance of non-listed special status species, such as through the use of exclusion fencing, buffer zones, etc.
- A qualified biologist shall be present during all initial ground disturbing activities, including vegetation removal, to recover special status animal species encountered during construction activities.
- Upon completion of the program activity, a qualified biologist shall prepare a final compliance report documenting all compliance activities implemented for the program activity, including the pre-construction survey results.
- If special status bat species may be present and impacted by the program activity, within 30 days of the start of construction, a qualified biologist shall conduct presence/absence surveys for special status bats where suitable roosting habitat is present. Surveys shall be conducted using acoustic detectors and by searching tree cavities, crevices, and other areas where bats may roost. If active bat roosts or colonies are present, the biologist shall evaluate the type of roost to determine the next step.
- If a maternity colony is present, all construction activities shall be postponed within a 250-foot buffer around the maternity colony until it is determined by a qualified biologist that the young have dispersed. Once it has been determined that the roost is clear of bats, the roost shall be removed immediately.
- If a roost is determined by a qualified biologist to be used by a large number of bats (large hibernaculum), alternative roosts, such as bat boxes if appropriate for the species, shall be designed and installed near the program activity site. The number and size of alternative roosts installed will depend on the size of the hibernaculum and shall be determined by a qualified biologist.
- If other active roosts are located, exclusion devices shall be installed such as valves, sheeting or flap-style one-way devices that allow bats to exit but not re-enter roosts to discourage bats from occupying the site.

MM BIO-7 Jurisdictional Delineation and Impact Avoidance

If the results of Mitigation Measure BIO-1 indicate program activities implemented under the proposed CAP would impact wetlands, drainages, riparian habitats, or other areas that may fall under the jurisdiction of the CDFW, USACE, and/or RWQCB, a qualified biologist shall complete a jurisdictional delineation. The jurisdictional delineation shall determine the extent of the jurisdiction for each of these agencies within the program activity site and shall be conducted in accordance with the requirement set forth by each agency. The results shall be provided in a jurisdictional delineation report submitted to Metropolitan, USACE, RWQCB, and CDFW, as appropriate, for review and approval. The program activity shall be designed to avoid or minimize impacts to jurisdictional areas to the maximum extent feasible.

MM BIO-8 Wetlands, Drainages and Riparian Habitat Restoration

If impacts to jurisdictional drainages, wetlands, riparian habitat, and sensitive vegetation communities cannot be avoided, impacts shall be mitigated at an appropriate ratio to fully offset project-specific impacts (minimum ratio of 1:1). Where feasible, temporarily impacted areas shall be restored to pre-project conditions. An HMMP shall be developed by a qualified biologist and submitted to the agency overseeing the program activity for approval. Alternatively, mitigation shall be accomplished through purchase of credits from an approved mitigation bank or in-lieu fee program.

MM BIO-9 Sensitive Natural Community Avoidance and Mitigation

If the results of Mitigation Measure BIO-1 indicate program activities implemented under the proposed CAP would impact sensitive natural communities, impacts shall be avoided through final program activity design modifications.

If Metropolitan determines sensitive communities cannot be avoided, impacts shall be mitigated on-site or off-site at an appropriate ratio to fully offset program activity impacts (minimum ratio of 1:1). Temporarily impacted areas shall be restored to pre-project conditions. An HMMP shall be developed by a qualified biologist and submitted to the agency overseeing the program activity for approval.

4.2.5.3 Level of Significance After Mitigation

Implementation of MM BIO-1 through BIO-9 would reduce potential impacts evaluated under Thresholds BIO-A through BIO-C discussed in Section 4.2.5.1, *Program Analysis*, to **less than significant**.

4.2.5.4 Cumulative Analysis

The geographic scope for the cumulative biological resources impact analysis is the area covered by the seven counties that encompass the Plan Area, particularly areas surrounding identified proposed project activities, as described in Chapter 2, *Project Description*. The following factors are considered with respect to analyzing cumulative impacts to biological resources:

- The cumulative contribution of other approved and proposed projects to fragmentation of open space in the program activity vicinity;
- The loss of sensitive habitats and species;
- Contribution of the program activity to urban expansion into natural areas; and
- Isolation of open space within the vicinity by proposed/future projects.

Cumulative impacts depend on the proximity of cumulative projects to proposed program activities within the Plan Area, as well as impacts from past projects in the vicinity. Native vegetation communities and open areas were once more widespread in the vicinity of the Plan Area. Over the last half-century or more, naturally vegetated open areas diminished as the landscape surrounding the Plan Area has been built out with residential and commercial uses.

This program, in conjunction with other nearby planned, pending, and potential future projects on undeveloped land, would have the potential to adversely impact sensitive habitats and biological resources. Cumulative development in the region would continue to disturb areas with the potential to contain sensitive habitats and biological resources. It is anticipated that for other projects that would have significant impacts on these resources, similar mitigation measures as those described herein would be imposed on those other projects, along with requirements to comply with all applicable laws and regulations governing said resources.

Depending on the specific locations of covered activities, it is possible that cumulative development is currently resulting in a significant cumulative impact to biological resources. Therefore, cumulative impacts may be potentially significant. As discussed above, because the specific details regarding covered activities are unknown at this time, the level of impact to biological resources would need to be determined at the project level when specific individual program activity information is known; however, projects proposed under the scope are relatively small and MM BIO-1 through BIO-8 would reduce project-specific impacts to biological resources. Therefore, cumulative impacts are considered **less than significant with mitigation incorporated** and the proposed program's contribution would **not be cumulatively considerable**.

4.3 Cultural Resources

4.3.1 Introduction

This chapter describes the existing conditions, regulatory framework, and potential impacts to cultural resources which would result from the proposed program, as well as mitigation measures to reduce these impacts. Cultural resources under CEQA include archaeological sites (both prehistoric and historic) and built environment resources (including buildings, structures, water conveyance systems, etc.).

4.3.2 Existing Conditions

The Plan Area includes all of Metropolitan's service area and spans approximately 38,280 square miles, including all of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties, as well as a portion of northeastern Imperial County and four islands in the Sacramento-San Joaquin River Delta region. As discussed in Chapter 3, *Environmental Setting*, the Plan Area includes six ecoregions: Southern California Mountains and Valley, Southern California Coast, Sonoran Desert, Mojave Desert, Colorado Desert, and California Central Valley (Great Valley). The Plan Area includes over 220 miles of Pacific Ocean coastline, ranges in elevation from 234 feet below mean sea level to approximately 11,503 feet above mean sea level, and contains a national park, all or portions of four national forests, and three U.S. Census Bureau-designated Metropolitan Statistical Areas.

Within the Plan Area, population centers are concentrated near coastal areas in the western portions of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties. An extensive freeway network links the major cities of Los Angeles and San Diego to one another and their respective metropolitan areas. Riverside, San Bernardino, and San Diego counties and northeastern Imperial County have experienced some urban development but are sparsely developed overall. Large portions of these areas are agricultural in character. Portions of the Plan Area located in the Sacramento-San Joaquin River Delta region are predominantly rural and characterized by the surrounding estuary system. Land use in the area is predominantly agricultural.

Historic built-environment resources are most likely to be identified in urban areas because they are more densely developed with buildings and infrastructure. Such areas have been densely developed with residential, commercial, institutional, and industrial districts, as well as infrastructure related to transportation, utilities, and other uses. These same areas are most likely to contain historic archaeological resources, particularly in residential areas constructed prior to the mid twentieth century. More rural and agricultural areas may also contain built-environment resources, which could include landscape elements. Areas located near fresh water sources and other natural resources are likeliest to contain prehistoric archaeological resources.

4.3.2.1 Cultural Background

The cultural background discussion is provided in Appendix D. The cultural background is divided into pre- and post-European contact histories. The pre-contact history includes a discussion of the four archaeological regions present in the Plan Area. The post-contact history includes a discussion of the area broken down by county.

4.3.3 Regulatory Framework

This section includes a discussion of the applicable laws, ordinances, regulations, and standards governing cultural resources.

4.3.3.1 Federal

National Register of Historic Places

The National Register of Historic Places (NRHP) was established by the National Historic Preservation Act of 1966 as "an authoritative guide to be used by Federal, state, and local governments, private groups and citizens to identify the Nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment" (36 Code of Federal Regulations 60.2). The NRHP recognizes properties that are significant at the national, state, and local levels. To be eligible for listing in the NRHP, a resource must be significant in American history, architecture, archaeology, engineering, or culture. Districts, sites, buildings, structures, and objects of potential significance must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. A property is eligible for the NRHP if it meets any one of the following criteria:

Criterion A: Are associated with events that have made a significant contribution to the broad patterns of our history

Criterion B: Are associated with the lives of persons significant in our past

Criterion C: **E**mbody the distinctive characteristics of a type, period, or method of installation, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction

Criterion D: Have yielded, or may be likely to yield, information important in prehistory or history

In addition to meeting at least one of the above designation criteria, resources must also retain integrity. The National Park Service recognizes seven aspects or qualities that, considered together, define historic integrity. To retain integrity, a property must possess several, if not all, of these seven qualities, defined in the following manner:

Location: The place where the historic property was constructed or the place where the historic event occurred

Design: The combination of elements that create the form, plan, space, structure, and style of a property

Setting: The physical environment of a historic property

Materials: Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property

Workmanship: The physical evidence of the crafts of a particular culture or people during any given period in history or prehistory

Feeling: A property's expression of the aesthetic or historic sense of a particular period of time

Association: The direct link between an important historic event or person and a historic property

4.3.3.2 State

California Environmental Quality Act

The CEQA requires that a lead agency determine whether a project could have a significant effect on historical resources and tribal cultural resources (Public Resources Code [PRC] Section 21074 [a][1][A]-[B]). A historical resource is a resource listed in or determined to be eligible for listing in the California Register of Historical Resources (CRHR) (Section 21084.1), a resource included in a local register of historical resources (Section 15064.5[a][2]), or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant (Section 15064.5[a][3]).

PRC Section 5024.1 requires an evaluation of historical resources to determine their eligibility for listing in the CRHR. The purpose of the register is to maintain listings of the state's historical resources and to indicate which properties are to be protected from substantial adverse change. The criteria for listing resources in the CRHR were expressly developed to be in accordance with previously established criteria developed for listing in the NRHP, as enumerated according to CEQA and quoted below.

Section 15064.5(a)(3). […]Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (PRC, § 5024.1, Title 14 California Code of Regulations, Section 4852) including the following:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage

(2) Is associated with the lives of persons important in our past

(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values

(4) Has yielded, or may be likely to yield, information important in prehistory or history

Section 15064.5(a)(4). The fact that a resource is not listed in or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources (pursuant to section 5020.1(k) of the PRC), or identified in an historical resources survey (meeting the criteria in section 5024.1(g) of the PRC) does not preclude a lead agency from determining that the resource may be an historical resource as defined in PRC sections 5020.1(j) or 5024.1.

Section 15064.5(b). A project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.

In addition, if a project can be demonstrated to cause damage to a unique archaeological resource, the lead agency may require reasonable efforts to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that resources cannot be left undisturbed, mitigation measures are required (PRC, Section 21083.2[a], [b], and [c]).

PRC Section 21083.2(g) defines a unique archaeological resource as an artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it does one or more of the following:

a. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information

b. Has a special and particular quality such as being the oldest of its type or the best available example of its type

c. Is directly associated with a scientifically recognized important prehistoric or historic event or person

Impacts to significant cultural resources that affect the characteristics of any resource that qualify it for the NRHP or adversely alter the significance of a resource listed in or eligible for listing in the CRHR are considered a significant effect on the environment. These impacts could result from physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired (*State CEQA Guidelines* Section 15064.5 [b][1]). Material impairment is defined as demolition or alteration in an adverse manner [of] those characteristics of an historical resource that convey its historical significance and that justify its inclusion or eligibility for inclusion in the CRHR (*State CEQA Guidelines* Section 15064.5[b][2][A]).

4.3.4 Thresholds and Methodology

4.3.4.1 Thresholds of Significance

Table 20 lists thresholds from Appendix G of the *State CEQA Guideline* that pertain to impacts associated with cultural resources. These thresholds are addressed in the draft PEIR.

Table 20 CEQA Thresholds for Cultural Resources

Threshold Would the proposed program:
a. Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?
b. Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?
c. Disturb any human remains, including those interred outside of formal cemeteries?

4.3.4.2 Methodology

Section 4.3.5, *Impacts Analysis,* presents a programmatic-level discussion of potential impacts to cultural resources which may occur from implementation of the proposed CAP. These potential impacts and associated mitigation measures would apply throughout the Plan Area and are directly tied to individual projects with physical impacts to the environment. The CAP is programmatic in nature and due to the extensive size of the Plan Area, field surveys and a records search of the California Historical California Historical Resources Information System were not completed. Rather methods were limited to desktop analysis and definition of the existing conditions which characterize the prehistory and history of the Plan Area. As applicable, Metropolitan-adopted cultural resources guidance is also addressed.

4.3.5 Impacts Analysis

4.3.5.1 Program Analysis

Threshold CUL-A: *Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?*

Individual projects implemented under the proposed CAP would have a significant impact on historical resources if such activities would cause a substantial adverse change in the significance of a historical resource. Historical resources are those eligible for listing on the NRHP or CRHR. In addition, as explained in Section 15064.5 of the *State CEQA Guidelines*, "substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired."

The California Office of Historic Preservation recognizes any evidence of human activities over 45 years of age, including buildings, structures, sites, objectives, and districts, may be eligible for listing in the CRHR. An extensive survey and inventory of the historical resources located within the Plan Area was not completed. However, background research confirms the presence of many known historical resources within the Plan Area. National Park Service data confirms there are over 1,000 resources in the Plan Area listed in the NRHP and the CRHR. Some of these resources include facilities owned and operated by Metropolitan, including the CRHR-eligible Weymouth Water Treatment Plant Historic District at the Weymouth WTP and the Colorado River Aqueduct and associated facilities. Due to insufficient detail to allow specific project-level analysis at this time and the extensive Plan Area, an extensive survey and inventory of the historical resources located within the Plan Area was not completed.

In addition to known historical resources, the Plan Area includes many other potential resources, which are over 45 years of age (or will cross this threshold over the course of proposed CAP implementation) and have yet to be evaluated for historical resources eligibility. This includes not only historic-age buildings, but also structures such as canals, reservoirs, pipelines, pump plants, and other sites. A review of historic aerial imagery indicates that many of the Metropolitan facilities where construction activities would occur under the proposed CAP are over 45 years of age (or will cross this threshold over the course of CAP implementation).

Implementation of projects under the proposed CAP that include physical impacts to the environment may occur at any of the Metropolitan facilities, as described in Chapter 2, *Project Description,* including the Yorba Linda HEP at the Diemer WTP (CAP measure E-2); Diemer WTP, Jensen WTP, Skinner WTP, and Weymouth WTP (CAP measure E-4); pump refurbishment/replacement at the desert pumping plants (CAP measure EE-4a through EE-4d); installation at of EV charging infrastructure at WTPs, pump plants, and other Metropolitan-owned facilities (CAP measure EC-3), agricultural studies on Metropolitan-owned land in the Palo Verde Valley (CAP measure CS-2), and carbon sequestration pilot projects in the Sacramento-San Joaquin River Delta (CAP measure CS-3). Additional measures included in the proposed CAP may be implemented at other existing or planned Metropolitan facilities within the Plan Area but have not been fully developed, and the location of these activities is not known at this time.

Projects proposed under the CAP which could impact historical resources include the alteration of buildings and facilities and the removal or addition of infrastructure that may be necessary components of construction associated with GHG reduction measures (CAP measures DC-2, FL-4). Activities proposed within the boundaries of the Weymouth Water Treatment Plant Historic District would be avoided or mitigated to the greatest extent feasible through adherence to the *Cultural*

Resource Treatment Plan for the Weymouth Water Treatment Plant Historic District, City of La Verne, Los Angeles County, California (Chasteen et al. 2016).The alteration of a historical resource through activities such as renovation or the installation of new infrastructure may result in a significant impact should that activity materially impair, or alter the physical characteristics of a historical resource which conveys its significance and justifies its listing in the CRHR. Projects would be designed and located to avoid or minimize impacts to the extent feasible. If, during project-level analysis, it is determined that construction or operation of any covered activity would result in significant impacts to historic resources MM CUL-1 and CUL-3 would be implemented to avoid or minimize impacts to historical resources to the greatest extent feasible. However, this impact would remain **significant and unavoidable**.

Threshold CUL-B: *Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?*

Due to the extensive Plan Area included in the proposed CAP and insufficient detail to allow specific project-level analysis at this time, a study to identify archaeological resources within the Plan Area is infeasible. Effects on archaeological resources can only be determined once a specific project footprint has been identified because the effects are highly dependent on both the individual project site conditions and the characteristics of the proposed ground-disturbing activity. Projects described in the proposed CAP with the potential to result in physical impacts to the environment are listed in Table 5 (CAP GHG Reduction Measures with Potential Physical Impacts on the Environment). Future ground-disturbing activities associated with these projects may have the potential to impact historic or prehistoric archaeological resources that may be present on or below the ground surface, especially in areas that have not previously been studied through a cultural resources investigation, or where proposed excavation depths exceed those previously attained. Consequently, damage to or destruction of archaeological resources could occur as a result of covered activities, thus impacts to archaeological resources are potentially significant. Projects would be designed and located to avoid or minimize impacts to the extent feasible. If, during project-level analysis, it is determined that construction or operation of any covered activity would result in significant impacts to archaeological resources MM CUL-2 and CUL-3 has been included to reduce impacts to archaeological resources to the extent feasible. However, this impact would remain **significant and unavoidable**.

Threshold CUL-C: *Disturb any human remains, including those interred outside of formal cemeteries?*

The discovery of human remains is always a possibility during ground disturbing activities. If human remains are found, existing regulations outlined in the state of California Health and Safety Code Section 7050.5 state no further disturbance may occur until the County Coroner has made a determination of origin and disposition pursuant to PRC Section 5097.98. In the event of an unanticipated discovery of human remains, the County Coroner where the remains are found must be notified immediately. If the human remains are determined to be prehistoric, the County Coroner will notify the Native American Heritage Commission, which will determine and notify a most likely descendant (MLD). The MLD must complete the inspection of the site within 48 hours of being granted access and provide recommendations as to the treatment of the remains to the landowner. With adherence to existing regulations, impacts to human remains would be **less than significant**.

4.3.5.2 Cumulative Analysis

Cumulative development across the Plan Area could disturb areas that may potentially contain historical and archaeological resources. The potential for impacts from projects in the proposed program is generally site-specific and depends on the location and nature of each individual project.

Individual projects implemented under the proposed program would continue to be subject to applicable federal, state, and local requirements. As discussed above, individual projects implemented under the proposed program have the potential to result in impacts to historical and archaeological resources. While mitigation would reduce impacts to the greatest extent feasible, there is still potential for impacts to historical and archaeological resources to be **significant and unavoidable**. Therefore, the potential for cumulative impacts to historical and archaeological resources is significant, and the proposed program's contribution to such impacts would be **cumulatively considerable**.

4.3.5.3 Mitigation Measures

MM CUL-1(a) **Built Environment Investigation.** A historic resources evaluation shall be prepared for any future proposed project facilitated by the CAP involving a property which includes buildings, structures, objects, landscape/site plans, or other features that are 45 years of age or older. The evaluation shall be prepared by a qualified architectural historian or historian who meets the Secretary of the Interior's (SOI) Professional Qualifications Standards (PQS) in architectural history or history. The qualified architectural historian or historian shall conduct an evaluation in accordance with the guidelines and best practices promulgated by the State Office of Historic Preservation to identify any potential historical resources within the proposed project area. The evaluation of the potential resource within its historic context shall be documented. All evaluated properties shall be documented on Department of Parks and Recreation Series 523 Forms. If a property is identified as an eligible historical resource under CEQA, Mitigation Measure CUL-1(b) shall be implemented.

MM CUL-1(b) **Built Environment Documentation Program.** If eligible built environment historical resources are identified for a future proposed project implemented under the CAP, efforts shall be made to the extent feasible to ensure that impacts are avoided. If avoidance is not possible, a Built Environment Documentation Program shall be implemented. Measures may include but are not limited to, compliance with the Secretary of the Interior's Standards for Treatment of Historic Properties and documentation of the historical resource in the form of a Historic American Building Survey (HABS)- report or HABS-Like report. The HABS or HABS-Like report shall comply with the Secretary of the Interior's Standards for Architectural and Engineering Documentation and shall generally follow the HABS Level III requirements, including digital photographic recordation, detailed historic narrative report, and compilation of historic research. Application of mitigation shall generally be overseen by a qualified architectural historian or historic architect meeting the PQS, unless unnecessary in the circumstances (e.g., preservation in place).

MM CUL-2(a) **Phase 1 Archaeological Resource Investigation.** If archaeological resources are identified during project-specific analysis that may be adversely affected by any future proposed project implemented under the CAP, Metropolitan shall retain a qualified archaeologist meeting the Secretary of the Interior standards in archaeology to complete a Phase 1 cultural resources assessment of the site. A Phase 1 cultural resources assessment will include an archaeological pedestrian survey of the site, if feasible, and sufficient background archival research to determine whether subsurface prehistoric or historic remains may be present. Archival research should include a current records search from the appropriate

California Historical Resources Information System information center and a Sacred Lands File search conducted with the Native American Heritage Commission. A Phase 1 report or results documentation shall be submitted to Metropolitan prior to any ground disturbing activities. Recommendations contained therein shall be implemented throughout all ground disturbance activities.

MM CUL-2(b) **Extended Phase 1 Investigation.** For any projects proposed within 100 feet of a known archaeological site and/or in areas identified as sensitive by the Phase 1 study, an Extended Phase 1 (XPI) study shall be conducted to determine the presence/absence and extent of archaeological resources on the project site. XPI testing should comprise a series of shovel test pits and/or hand augured units and/or mechanical trenching intended to establish the horizontal and vertical boundaries of archaeological site(s) on the project site. No archaeological resources would be collected during the XPI Investigation. If an archaeological site is identified, MM CUL-2(c) or CUL-2(d) shall be implemented.

MM CUL-2(c) **Avoidance of Archaeological Resources.** Identified prehistoric or historic archaeological resources shall be avoided and preserved in place, where feasible. Where avoidance and preservation in place is not feasible, additional measures shall be applied as identified in MM CUL-2(d) through CUL-2(g).

MM CUL-2(d) **Phase 2 Archaeological Resources Investigation and Evaluation.** Where preservation is not feasible, each resource shall be evaluated for significance and eligibility for listing in the CRHR through a Phase 2 archaeological resource evaluation. A Phase 2 evaluation shall include any necessary archival research to identify significant historical associations as well as mapping of surface artifacts, collection of functionally or temporally diagnostic tools and debris, and excavation of a sample of the cultural deposit to characterize the nature of the sites, define the artifact and feature contents, determine horizontal boundaries and depth below surface, and retrieve representative samples of artifacts and other remains. A final Phase 2 Testing and Evaluation report shall be submitted to Metropolitan prior to any ground disturbing activities. Recommendations contained therein shall be implemented throughout all ground disturbance activities.

MM CUL-2(e) **Phase 3 Archaeological Data Recovery Program.** If an archaeological resource meets the CRHR eligibility and cannot be avoided, Metropolitan shall implement a Phase 3 Archaeological Data Recovery Program, conducted to exhaust the data potential of significant archaeological sites. The Phase 3 Archaeological Data Recovery Program shall follow a research design prepared by a qualified archaeologist meeting the SOI PQS standards for archaeology and approved by Metropolitan in advance of Phase 3 fieldwork and excavations. The Phase 3 Data Recovery research design will use appropriate archaeological field and laboratory methods consistent with the California Office of Historic Preservation Planning Bulletin 5 (1991), Guidelines for Archaeological Research Design, or the latest edition thereof. The final Phase 3 Data Recovery report shall be submitted to Metropolitan prior to and any ground disturbing activities. Recommendations contained therein shall be incorporated into project design and implemented throughout all ground disturbance activities.

MM CUL-2(f) **Processing and Curation of Archaeological Materials.** Archaeological materials collected from the sites during the implementation of MM CUL-2(d) through CUL-2(e) shall be processed and analyzed in the laboratory according to standard archaeological procedures. The age of the materials shall be determined using radiocarbon dating and/or other appropriate procedures; lithic artifacts, faunal remains, and other cultural materials shall be identified and analyzed according to current professional standards. The significance of the sites shall be evaluated according to the criteria of the CRHR. The results of the investigations shall be presented in a technical report following the standards of the California Office of Historic Preservation publication "Archaeological Resource Management Reports: Recommended Content and Format (1990 or latest edition)". Upon completion of the work, all artifacts, other cultural remains, records, photographs, and other documentation shall be curated an appropriate established curation facility based on the location of the fieldwork and/or repatriated to local Native Americans as appropriate. All fieldwork, analysis, report production, and curation shall be fully funded by Metropolitan.

MM CUL-2(g) **Cultural Resources Monitoring.** If recommended by Phase 1 (MM CUL-2(a)), XPI (MM CUL-2(b)), Phase 2 (MM CUL-2(d)), or Phase 3 (MM CUL-2(e)) studies, Metropolitan shall retain a qualified archaeologist to monitor project-related, ground-disturbing activities.

MM CUL-3 **Previously Unidentified Resources Encountered During Construction.** In the event that any potentially significant cultural resources are unexpectedly encountered during construction, work will be immediately halted and the discovery shall be protected in place. A 50-foot buffer around the exposed resource shall be established until a qualified cultural resources specialist evaluates the discovery. If the qualified cultural resources specialist determines that the discovery represents a potentially significant cultural resource, including a potential historical resource, additional investigations may be required to mitigate adverse impacts from project implementation. This additional work may include avoidance, testing, and evaluation or data recovery excavation. Work shall be prohibited in the restricted area until Metropolitan provides written authorization.

Level of Significance After Mitigation

At this time, there is insufficient specific project-level analysis to assess impacts to historical resources associated with individual covered activities under the proposed program. As such, impacts may be significant. Further environmental analysis and documentation is necessary prior to construction to determine if a significant impact would occur at the project-level and if mitigation would reduce the impact to a less-than-significant level. Implementation of MM CUL-1 and CUL-3 would reduce impacts to historical built environment resources to the maximum extent feasible; however, mitigation measures which reduce impacts to a less-than-significant level cannot be assured in all cases and demolition, removal, or substantial alteration of a historically significant built-environment resource typically cannot be mitigated to below a level of significance under CEQA. Therefore, impacts to historical built environment resources associated with implementation of the proposed CAP are assumed to be **significant and unavoidable**. Further environmental analysis and documentation is necessary prior to construction to determine if a significant impact would occur at the project-level and if mitigation would reduce the impact to a less-than-significant level.

Impacts to archaeological resources, including those that may be considered historical or unique archaeological resources, associated with the construction or operation of individual projects to be implemented under the proposed program may be significant, but the impacts to archaeological resources or the location of the impacts cannot be determined at this time. Implementation of MM CUL-2 and CUL-3 may reduce these impacts; however, whether this measure would reduce all impacts to archaeological resources to less-than-significant levels is not known. Therefore, at this stage of planning, impacts to archaeological resources associated with implementation of the proposed CAP are assumed to be **significant and unavoidable**. Further environmental analysis and documentation is necessary prior to construction to determine if a significant impact would occur at the project-level and if mitigation would reduce the impact to a less-than-significant level.

Cumulative impacts to historical and archaeological resources may be significant, and the proposed program's contribution to such impacts may be cumulatively considerable. The mitigation measures described in this section would reduce these impacts by requiring project-specific historical resources evaluation for individual projects involving properties with historic-age buildings, structures, or other features and archaeological resources investigations for covered activities involving ground disturbance. However, because the specific locations of individual projects and potential cultural resources that may be affected are not presently known, the program's contribution to potentially significant cumulative impacts is assumed to remain cumulatively considerable.

4.4 Noise

4.4.1 Introduction

This section describes the existing conditions related to noise, the regulatory framework associated with noise, the impacts caused by noise that would result from the proposed program implementation, and the mitigation measures that would reduce these impacts.

4.4.2 Existing Conditions

4.4.2.1 Environmental Noise

Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by the hearing organs (e.g., the human ear). Noise is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (California Department of Transportation [Caltrans] 2013).

Noise levels are commonly measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels so that they are consistent with the human hearing response, which is most sensitive to frequencies between 250 Hertz (Hz) and 10,000 Hz (Federal Transit Administration [FTA] 2018). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as a doubling of traffic volume, would increase the noise level by 3 dB; similarly, dividing the energy in half would result in a decrease of 3 dB (Crocker 2007).

Human perception of noise has no simple correlation with sound energy: the perception of sound is not linear in terms of dBA or in terms of sound energy. Two sources of equivalent noise level do not “sound twice as loud” as one source. It is widely accepted that the average healthy ear can barely perceive an increase (or decrease) of up to 3 dBA in noise levels (i.e., twice [or half] the sound energy); that a change of 5 dBA is readily perceptible (8 times the sound energy); and that an increase (or decrease) of 10 dBA sounds twice (or half) as loud (10.5 times the sound energy) (Crocker 2007).

Sound changes in both level and frequency spectrum as it travels from the source to the receiver. The most obvious change is the decrease in sound level as the distance from the source increases. The manner by which noise reduces with distance depends on factors such as the type of sources (e.g., point or line), the path the sound will travel, site conditions, and obstructions. Noise levels from a point source (e.g., construction, industrial machinery, ventilation units) typically attenuate, or drop off, at a rate of 6 dBA per doubling of distance. Noise from a line source (e.g., roadway, pipeline, railroad) typically attenuates at about 3 dBA per doubling of distance (Caltrans 2013). The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site, such as a parking lot or smooth body of water, provides no additional ground attenuation and the changes in noise levels with distance (drop-off rate) result simply from the geometric spreading of sound waves from the source. An additional ground attenuation value of 1.5 dBA per doubling of distance applies to a soft site (e.g., soft dirt, grass, or scattered bushes and trees) (Caltrans 2013). Noise levels may also be reduced by intervening structures; the amount of attenuation provided by this "shielding" depends on the size of the object and the frequencies of the noise levels. Natural terrain features, such as hills and dense woods, and man-made features, such as buildings and walls, can significantly alter noise levels. Generally, any large structure blocking the line of sight will provide at least a 5-dBA reduction in source noise levels at the receiver (Federal Highway Administration [FHWA] 2011). Structures can substantially reduce occupants' exposure to noise as well. The FHWA's guidelines indicate that modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows.

The impact of noise is not a function of sound level alone. The time of day when noise occurs and the duration of the noise are also important. Most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors have been developed. One of the most frequently-used noise metrics is the equivalent noise level (L_{eq}); it considers both duration and sound power level. L_{eq} is defined as the single steady A-weighted level equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time. Typically, L_{eq} is summed over a one-hour period. L_{max} is the highest root mean squared (RMS) sound pressure level within the sampling period, and L_{min} is the lowest RMS sound pressure level within the measuring period (Crocker 2007). Normal conversational levels are in the 60 to 65 dBA L_{eq} range; ambient noise levels greater than 65 dBA L_{eq} can interrupt conversations (FTA 2018).

Noise that occurs at night tends to be more disturbing than that occurring during the day. Community noise is usually measured using Day-Night Average Level (DNL), which is the 24-hour average noise level with a +10 dBA penalty for noise occurring during nighttime hours (10:00 p.m. to 7:00 a.m.). Community noise can also be measured using Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a +5 dBA penalty for noise occurring from 7:00 p.m. to 10:00 p.m. and a +10 dBA penalty for noise occurring from 10:00 p.m. to 7:00 a.m. (Caltrans 2013).

4.4.2.2 Groundborne Vibration

Groundborne vibration consists of oscillatory waves that move from a source through the ground to adjacent structures. The number of cycles per second of oscillation makes up the vibration frequency, described in terms of Hz. The frequency of a vibrating object describes how rapidly it oscillates. The normal frequency range of most groundborne vibration that can be felt by the human body is from a low of less than 1 Hz up to a high of about 200 Hz (Crocker 2007). Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration.

While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low-frequency vibration. Vibration in buildings, such as from nearby construction activities, may cause windows, items on shelves, and pictures on walls to rattle. Building vibration components can also take the form of an audible low-frequency rumbling noise, referred to as groundborne noise. Groundborne noise is usually only a problem when the originating vibration spectrum is dominated by frequencies in the upper end of the range (60 to 200 Hz), or when foundations or utilities, such as sewer and water pipes, physically connect the structure and the vibration source (FTA 2018). Although groundborne vibration is sometimes noticeable in outdoor environments, it is almost never perceived as annoying to people who are outdoors (FTA 2018). The primary concern from vibration is that it can be intrusive and annoying to building occupants and vibration-sensitive land uses.

Vibration energy spreads out as it travels through the ground, causing the vibration level to diminish with distance away from the source. High-frequency vibrations diminish much more rapidly than low frequencies, so low frequencies tend to dominate the spectrum at large distances from the source.

Discontinuities in the soil strata can also cause diffractions or channeling effects that affect the propagation of vibration over long distances (Caltrans 2020). When a building is impacted by vibration, a ground-to-foundation coupling loss will usually reduce the overall vibration level. However, under rare circumstances, the ground-to-foundation coupling may actually amplify the vibration level due to structural resonances of the floors and walls.

Vibration amplitudes are usually expressed in peak particle velocity (PPV) or RMS vibration velocity. The PPV and RMS velocity are normally described in inches per second. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is often used in monitoring of blasting vibration because it is related to the stresses that are experienced by buildings (Caltrans 2020).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. It takes some time for the human body to respond to vibration signals. In a sense, the human body responds to average vibration amplitude. The RMS of a signal is the average of the squared amplitude of the signal, typically calculated over a one-second period. As with airborne sound, the RMS velocity is often expressed in decibel notation as vibration decibels (VdB), which serves to compress the range of numbers required to describe vibration (FTA 2018).

Vibration significance ranges from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, the general threshold where minor damage can occur in fragile buildings[23] (FTA 2018). The general human response to different levels of groundborne vibration velocity levels is described in Table 21.

Table 21 Human Response to Different Levels of Groundborne Vibration

Vibration Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception for many people
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible – many people find that transportation-related vibration at this level is unacceptable
85 VdB	Vibration acceptable only if there are an infrequent number of events per day

VdB = vibration decibels

Source: FTA 2018

4.4.2.3 Sensitive Receivers

Noise-sensitive land uses are generally considered to be residential homes, transient lodging (i.e., hotels and motels), hospitals, nursing homes, public assembly and entertainment venues (e.g., auditoriums, theaters, music halls, meeting halls); places of worship, schools, daycare centers, libraries, museums, parks, playgrounds, recreation and open space areas, and cemeteries. Each local jurisdiction typically includes its definition of noise-sensitive land uses in the Noise Element of its General Plans and/or in its Noise Ordinance.

Vibration-sensitive receivers, which are similar to noise-sensitive receivers, include residences and institutional uses, such as schools, places of worship, and hospitals. Vibration-sensitive receivers also include other places where people sleep, such as hotels and motels, fragile buildings, and buildings where vibrations may interfere with vibration-sensitive equipment that is affected by vibration levels that may be well below those associated with human annoyance (e.g., recording studios or laboratory facilities with sensitive equipment).

[23] Fragile buildings may generally include buildings in disrepair, old or historic buildings, or buildings of poor structural integrity due to inadequate engineering or materials.

Noise- and vibration-sensitive receivers are located throughout the Plan Area. Because the specific locations of individual projects that may be implemented under the proposed CAP are not all known at this time, the specific locations and proximities of sensitive receivers nearest to the sites of all individual projects that may be implemented under the proposed CAP are also not known. However, the following list provides a summary of the nearest sensitive receivers to the known potential project locations, as described in Chapter 2, *Project Description*:

- **YLHEP/Diemer WTP:** residences located approximately 500 feet west and 1,000 feet southeast and the Black Gold Golf Club golf course located approximately 660 feet south of the facility.
- **Jensen WTP:** residences located immediately to the west and south, sports fields located immediately to the east, and the Van Gogh Charter School located approximately 1,000 feet southwest of the facility.
- **Mills WTP:** residences located immediately north and west and approximately 200 feet south of the facility.
- **Skinner WTP:** residences located approximately 600 feet west of the facility.
- **Weymouth WTP:** residences located immediately to the south, west, north, and east; Grace Miller Elementary School located immediately to the east; Calvary Baptist Church and School located immediately to the west; Kuns Park located approximately 460 feet southeast; Joan Macy School located 800 feet south; and Wheeler Avenue Park located approximately 1,200 feet south of the facility.
- **Hinds Pump Plant:** Metropolitan-owned residences located immediately west of the facility within Hinds Pump Plant boundary.
- **Eagle Mountain Pump Plant:** Metropolitan-owned residences located immediately northeast of the facility within the Eagle Mountain Pump Plant boundary.
- **Iron Mountain Pump Plant:** Metropolitan-owned residences located immediately southwest of the facility within the Iron Mountain Pump Plant boundary.

4.4.2.4 Existing Noise Environment

Existing noise levels vary widely throughout the Plan Area depending on the nature, type, and intensity of existing development. Rural and suburban residential areas generally experience lower ambient noise levels while areas in highly urbanized regions, along high-volume roadways, and near industrial development generally experience higher ambient noise levels. Generally, quiet suburban areas typically have noise levels in the range of 40 to 50 dBA, while those along arterial streets are in the 50 to 60+ dBA range. Highly urbanized areas, such as downtown Los Angeles, typically have noise levels in the range of 65 to 80+ dBA.

4.4.3 Regulatory Framework

This section describes the plans, policies, and regulations related to noise that are applicable to the proposed program.

4.4.3.1 Federal

There are no federal regulations related to noise applicable to the proposed program.

4.4.3.2 State

California Noise Control Act (California Health and Safety Code Section 46010 et seq.)

The California Noise Control Act of 1973 gave cities and communities the power to set noise ordinances and enforce them as necessary. The goal of the state and local governments is to prohibit unnecessary, annoying, intrusive, or dangerous noise.

California Office of Planning and Research General Plan Noise Element Guidelines

The California Office of Planning and Research recommends use of the noise/land use compatibility criteria shown in Table 22 in local General Plan Noise Elements (Office of Planning and Research 2017).

Table 22 Noise/Land Use Compatibility Criteria

Land Use	Community Noise Exposure (L_{dn} or CNEL) 55	60	65	70	75	80
Residential – Low Density Single Family, Duplex, Mobile Homes						
Residential – Multiple-Family						
Transient Lodging - Motels, Hotels[1]						
Schools, Libraries, Churches, Hospitals, Nursing Homes						
Auditoriums, Concert Halls, Amphitheaters						
Sports Arena, Outdoor Spectator Sports						
Playgrounds, Neighborhood Parks						
Golf Courses, Riding Stables, Water Recreation, Cemeteries						
Office Buildings, Business Commercial and Professional						
Industrial, Manufacturing, Utilities, Agriculture						

Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Clearly Unacceptable: New construction or development should generally not be undertaken.

L_{dn} = Day-Night Noise Level; CNEL = Community Noise Exposure Level

[1]Transient lodging generally consists of hotels, motels, inns, hostels, or other short-term living accommodations.

Source: California Office of Planning and Research 2017

4.4.3.3 Local

Each city and county in California is required to include a Noise Element in its General Plan. Most jurisdictions have also adopted Noise Ordinances, and several have adopted noise guidelines for CEQA analysis as well. It should be noted that California Government Code Section 53091 exempts Metropolitan, as a regional public water purveyor and utility, from local zoning and building ordinances but not from codified stand-alone noise ordinances. Despite this exemption from local planning ordinances, for purposes of full disclosure of potential impacts on the environment, this assessment of potential noise impacts broadly considers the potential for noise generated by individual projects that may be implemented under the proposed CAP to exceed locally-applicable noise-related standards contained in the general plans and noise ordinances of the cities and counties in the Plan Area.

The Plan Area encompasses a variety of local jurisdictions throughout the state, including the cities of Los Angeles (Jensen WTP) and La Verne (Weymouth WTP); Contra Costa and San Joaquin Counties (Delta properties); Imperial County (Palo Verde Valley properties); unincorporated Orange County (YLHEP/Diemer WTP); unincorporated Riverside County (Skinner WTP, Hinds and Eagle pump plants); and unincorporated San Bernardino County (Iron Mountain and Gene pump plants). Because the specific locations of individual projects that may be implemented under the proposed CAP are not all known at this time, specific local noise standards and regulations are not detailed in this PEIR. However, local noise standards and regulations generally include some or all of the following components:

- Statement that it is the policy of the city/county to prohibit unnecessary, excessive, and annoying noise within its jurisdiction in order to protect the public health, welfare, and safety of its citizens
- Definition of noise-sensitive receivers
- Procedures for sound level measurements
- Noise/Land use compatibility standards
- Limits on the allowed hours of construction and/or construction noise level limits
- Exemptions for construction noise generated during the allowed hours of construction and for work performed by private or public utilities in the maintenance or modification of their facilities
- Exterior daytime and nighttime noise level limits for stationary noise sources
- Exterior and interior noise level standards for noise-sensitive land uses
- Noise level standards for specific noise sources, such as radios, television sets, powered landscaping equipment, powered hand tools, and heating, ventilation, and air conditioning equipment

4.4.4 Thresholds and Methodology

4.4.4.1 Thresholds of Significance

Table 23 lists the thresholds from Appendix G of the *State CEQA Guidelines* that pertain to impacts associated with noise. These thresholds are addressed in the draft PEIR.

Table 23 CEQA Thresholds for Noise

Threshold Would the proposed program:
a. Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
b. Generate excessive groundborne vibration or groundborne noise levels?
c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels?

Temporary or Permanent Increase in Ambient Noise Levels

Construction Noise

Metropolitan has not adopted thresholds for evaluating the significance of construction noise impacts. Although local jurisdictions often restrict hours of construction to reduce construction noise impacts, they do not always adopt quantitative construction noise level limits. Jurisdictions with quantitative noise construction level limits set varying thresholds, which may depend on the urban or rural environment, daytime or nighttime hours, and mobile or stationary equipment. For the purposes of this analysis, the FTA (2018) *Transit Noise and Vibration Impact Assessment Manual* criteria for construction noise are used for local jurisdictions that do not have quantitative construction noise level limits. The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction. The daytime noise thresholds are 80 dBA L_{eq} for residential uses, 85 dBA L_{eq} for commercial uses, and 90 dBA L_{eq} for industrial uses for an 8-hour period (FTA 2018).

On-site Operational Noise

Metropolitan has not adopted thresholds for evaluating the significance of on-site operational noise impacts. Most local jurisdictions throughout the Plan Area have their own noise level standards, which are often contained in each jurisdiction's General Plan Noise Element, Noise Ordinance, and/or CEQA noise guidelines. As discussed in Section 4.4.3.3, *Local*, despite Metropolitan's exemption from local zoning and building ordinances, this analysis broadly considers the potential for operational noise generated by individual projects that may be implemented under the proposed CAP to exceed the locally-applicable operational noise standards outlined in the general plans and noise ordinances of the cities and counties in the Plan Area for purposes of full disclosure of potential impacts on the environment.

Off-site Roadway Noise

Metropolitan has not adopted thresholds for evaluating the significance of off-site roadway noise impacts. Therefore, for traffic-related noise, impacts would be significant if project-generated traffic would result in exposure of sensitive receivers to an unacceptable increase in noise levels. For purposes of this analysis, a significant impact would occur if project-related traffic increases the ambient noise environment of noise-sensitive locations by 3 dBA or more (a barely perceptible increase) if the locations are subject to noise levels in excess of 60 CNEL for exterior areas or 45

CNEL for interior noise levels, or by 5 dBA or more (a readily perceptible increase) if the locations are not subject to noise levels in excess of the aforementioned standards.[24]

Vibration

Metropolitan has not adopted thresholds for evaluating the significance of vibration impacts. Therefore, vibration limits used in this analysis to determine a potential impact to local land uses are based on information contained in Caltrans' (2020) *Transportation and Construction Vibration Guidance Manual* and the FTA (2018) *Transit Noise and Vibration Impact Assessment Manual*. Maximum recommended vibration limits by the American Association of State Highway and Transportation Officials (AASHTO) are identified in Table 24.

Table 24 AASHTO Maximum Vibration Levels for Preventing Structural Damage

Type of Situation	Limiting PPV (in/sec)
Historic sites	0.1
Residential buildings, plastered walls	0.2 - 0.3
Residential buildings in good repair with gypsum board walls	0.4 - 0.5
Engineered structures, without plaster	1.0 - 1.5

AASHTO = American Association of State Highway and Transportation Officials; PPV = peak particle velocity; in/sec = inches per second

Source: Caltrans 2020

Based on AASHTO recommendations, limiting vibration levels to below 0.1 PPV inches per second would prevent structural damage regardless of the situation. These limits are applicable regardless of the frequency of the source. However, as shown in Table 25 and Table 26, potential human annoyance associated with vibration is usually different if it is generated by a steady state or a transient vibration source.

Table 25 Human Response to Steady State Vibration

PPV (in/sec)	Human Response
3.6 (at 2 Hz) to 0.4 (at 20 Hz)	Very disturbing
0.7 (at 2 Hz) to 0.17 (at 20 Hz)	Disturbing
0.10	Strongly perceptible
0.035	Distinctly perceptible
0.012	Slightly perceptible

PPV = peak particle velocity; Hz = hertz; in/sec = inches per second

Source: Caltrans 2020

[24] An exterior noise level of 60 CNEL is considered a "normally acceptable" noise level for single-family residential areas by the California Office of Planning and Research (see Table 4.4-1). In addition, California Code of Regulations, Title 24, Part 2 (2019 California Building Code), Chapter 12, Section 1206.4 requires that interior noise levels attributable to exterior sources not exceed 45 CNEL in any habitable room within a residential structure.

Table 26 Human Response to Transient Vibration

PPV (in/sec)	Human Response
2.0	Severe
0.9	Strongly perceptible
0.24	Distinctly perceptible
0.035	Barely perceptible

PPV = peak particle velocity; in/sec = inches per second

Source: Caltrans 2020

As shown in Table 25, the vibration level threshold at which steady vibration sources are considered to be distinctly perceptible is 0.035 inches per second PPV, which is roughly equivalent to the FTA criterion of 78 VdB for identifying impacts to residential land uses from infrequent events, such as passing trains. However, as shown in Table 26, the vibration level at which transient vibration sources (such as construction equipment) are considered to be distinctly perceptible is 0.24 inches per second PPV, which is roughly equivalent to 94 VdB. As a point of reference for the purposes of this analysis, the distinctly perceptible vibration level of 94 VdB is utilized as a significance threshold for assessing vibration impacts. This threshold is appropriate because proposed program activities would result in transient vibration sources, such as construction activities, (distinctly perceptible at 0.24 PPV) and would not result in steady state vibration (distinctly perceptible at 0.035 PPV).

4.4.4.2 Methodology

Temporary or Permanent Increase in Ambient Noise Levels

Construction Noise

Construction noise was estimated using the FHWA (2006) Roadway Construction Noise Model (RCNM). RCNM predicts construction noise levels for a variety of construction operations based on empirical data and the application of acoustical propagation formulas. RCNM provides reference noise levels for standard construction equipment, with an attenuation rate of 6 dBA per doubling of distance. Table 27 summarizes typical noise levels generated by a variety of equipment used in construction activities.

Table 27 Construction Equipment Noise Levels

Equipment	Noise Level at 50 feet (dBA L_{max})	Equipment	Noise Level at 50 feet (dBA L_{max})
Auger Drill Rig	85	Generator (25 kVA or less)	70
Backhoe	80	Generator (more than 25 kVA)	82
Chain Saw	85	Grader	85
Clam Shovel	93	Impact Pile Driver (diesel or drop)	95
Compactor (Ground)	80	Jackhammer	85
Compressor (Air)	80	Paver	85
Concrete Batch Plant	83	Pickup Truck	55
Concrete Mixer Truck	85	Pneumatic Tools	85
Concrete Pump	82	Pumps	77
Concrete Saw	90	Rock Drill	85
Crane (mobile or stationary)	85	Scraper	85
Dozer	85	Tractor	84
Dump Truck	84	Vacuum Street Sweeper	80
Excavator	85	Vibratory Concrete Mixer	80
Flat Bed Truck	84	Vibratory Pile Driver	95
Front End Loader	80	Welder	73

dBA = A-weighted decibel; kVA = kilovolt-amperes; Lmax = highest root mean squared sound pressure level within the sampling period

Source: Adapted from Federal Highway Administration (2006) Construction Noise Handbook

Because there is currently not sufficient detail to allow for the quantification of construction noise generated by each individual project to be implemented under the proposed CAP, construction noise levels were estimated using RCNM for sample program construction phases with different combinations of construction equipment based on reasonable assumptions at distances of 25, 50, and 100 feet to evaluate the intensity of construction activities that would result in less-than-significant impacts related to construction noise. The various combinations of construction equipment are representative of those expected to be used for construction of proposed individual projects, such as installation of electric vehicle infrastructure (CAP measure FL-4) and electric-powered equipment (to replace natural gas-powered equipment)(CAP measure DC-2) and construction of BESS facilities (CAP measure E-4) and a direct meter connection between the YLHEP and Diemer WTP (CAP measure E-2). Table 28 details the type and number of equipment modeled for each sample construction scenario. Because different construction phases have different objectives, each construction scenario has a specific equipment mix, depending on the work to be accomplished during that phase. Each construction scenario also has its own noise characteristics; some will have higher continuous noise levels than others, and some may have higher instantaneous noise levels. The maximum hourly L_{eq} of each phase is determined by combining the L_{eq} contributions from each piece of equipment used in that scenario (FTA 2018).

Table 28 Construction Equipment for Sample Program Construction Scenarios

Sample Construction Scenario	Construction Equipment
1	Excavator, Dozer, Jackhammer
2	Dozer, Front End Loader
3	Excavator, Grader, Dozer
4	Crane, Generator, Front End Loader
5	Pavers (2), Roller

Construction equipment operate in either a stationary or mobile mode during a construction noise assessment. As a rule, stationary equipment operates in a single location for one or more days at a time, with either fixed-power operation (e.g., pumps, generators, and compressors) or variable-power operation (e.g., pile drivers, rock drills, and pavement breakers). Mobile equipment, such as bulldozers, graders, and loaders, move around the construction site with power applied in cyclic fashion (FTA 2018). Noise impacts from stationary equipment are assessed from the center of the equipment, while noise impacts from mobile construction equipment are assessed from the center of the equipment activity area (e.g., construction site). In order to provide a conservative analysis for noise impacts, it is assumed that diesel engines would power all construction equipment.

Variation in power adds additional complexity in characterizing the noise source level from construction equipment. Power variation is accounted for by describing the noise at a reference distance from the equipment operating at full power and adjusting it based on the duty cycle, or percent of operational time, of the activity to determine the L_{eq} of the operation (FTA 2018). RCNM calculations are included in Appendix E.

Operational Noise

Individual projects that may be implemented under the proposed CAP would be located in a variety of jurisdictions with varying noise level standards and restrictions. As a result, the analysis does not use specific quantitative thresholds to evaluate program impacts but rather generally discusses the relationship between the types of noise levels likely to be produced during individual projects under the proposed program and local jurisdictions' noise level standards.

Vibration

The individual projects that may be implemented under the proposed CAP do not include any substantial vibration sources associated with operation, such as the installation of stationary vibration-generating equipment or railroad tracks. Metropolitan complies with all applicable engineering standards and implements up-to-date design measures to ensure infrastructure functions efficiently and excessive vibration is minimized. Accordingly, construction activities have the greatest potential to generate groundborne vibration affecting nearby receivers, especially during site preparation and grading of construction sites. Construction vibration estimates are based on vibration levels and equations developed by Caltrans and the FTA (Caltrans 2020; FTA 2018). Table 29 shows vibration levels used in the assessment of construction vibration (FTA 2018) for various pieces of typical construction equipment expected to be used during construction of projects proposed under the CAP.

Table 29 Vibration Levels Measured during Construction Activities

Equipment	PPV at 25 feet (in/sec)	Approximate VdB at 25 feet
Large bulldozer	0.089	87
Small bulldozer	0.003	58
Loaded trucks	0.076	86
Jackhammer	0.035	79

PPV = peak particle velocity; in/sec = inches per second; VdB = vibration decibels

[1] Caisson drilling was used as a proxy for bore/drill rigs.

Source: FTA 2018

Exposure to Existing Aircraft Noise

The potential for construction workers and Metropolitan employees to be exposed to excessive noise levels in areas near public use airports and private airstrips is addressed in this analysis.

4.4.5 Impacts Analysis

4.4.5.1 Program Analysis

Threshold NOI-A: *Would the proposed program result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

Construction

During construction, individual projects that may be implemented under the proposed CAP would temporarily increase ambient noise levels in the vicinity of the construction sites due to the operation of construction equipment. The magnitude of the temporary noise level increase would depend on the type and number of equipment pieces used. At this time, there is currently not sufficient detail regarding the proposed individual projects under the CAP to allow for the quantification of construction noise that would be generated by these projects. As a result, it would be speculative to analyze project-level impacts of individual projects that may be implemented under the proposed CAP.

It is, however, possible to evaluate the intensity of construction activities that would result in a less than significant construction noise impact. Some individual projects may only require the use of one piece of construction equipment at a time. Table 30 summarizes the minimum distances at which noise generated by individual pieces of construction equipment would attenuate to less-than-significant levels at various receiving land uses based on the FTA (2018) construction noise thresholds, described in Section 4.4.4.1, *Thresholds of Significance*. Because noise thresholds are lowest for residential uses and highest for industrial uses, the minimum distance for a less than significant impact is furthest for residential uses and closest for industrial uses. Program construction activities utilizing only one piece of equipment at a time at the minimum distances from receiving land uses as shown in Table 30 would have a less than significant construction noise impact.

Table 30 Construction Noise Screening Criteria for Single Equipment Use

	Minimum Distance to Receiving Land Use for a Less-than-Significant Impact[1]		
Equipment	**Industrial[2] (feet)**	**Commercial[3] (feet)**	**Residential[4] (feet)**
Auger Drill Rig	30	50	90
Backhoe	20	30	50
Chain Saw	30	50	90
Clam Shovel	75	130	225
Compactor (Ground)	20	30	50
Compressor (Air)	20	30	50
Concrete Batch Plant	25	40	75
Concrete Mixer Truck	30	50	90
Concrete Pump	20	35	65
Concrete Saw	50	90	160
Crane (mobile or stationary)	30	50	90
Dozer	30	50	90
Dump Truck	25	45	80
Excavator	30	50	90
Flat Bed Truck	25	45	80
Front End Loader	20	30	50
Generator (25 kVA or less)	5	10	20
Generator (more than 25 kVA)	20	35	65
Grader	30	50	90
Impact Pile Driver (diesel or drop)	90	160	285
Jackhammer	30	50	90
Paver	30	50	90
Pickup Truck	5	5	5
Pneumatic Tools	30	50	90
Pumps	15	20	35
Rock Drill	30	50	90
Scraper	30	50	90
Tractor	25	45	80
Vacuum Street Sweeper	20	30	50
Vibratory Concrete Mixer	20	30	50
Vibratory Pile Driver	90	160	285
Welder	10	15	20

dBA = A-weighted decibel; L_{max} = maximum instantaneous noise level; L_{eq} = equivalent noise level; kVA = kilo volt-amperes

Notes: Noise levels are based on an attenuation rate of 6 dBA per doubling of distance. Distances are rounded up to the nearest 5 feet. This analysis is based on the L_{max} noise level contour of each piece of equipment rather than the L_{eq} noise level contour, which is conservative because average noise levels (L_{eq}) generated by each piece of equipment over an 8-hour period (the typical time period for construction noise limits in noise ordinances) would be less than its estimated instantaneous maximum noise level (L_{max}).

[1] As measured from the center of construction activities.

[2] Distance to the 90 dBA L_{max} contour.

[3] Distance to the 85 dBA L_{max} contour.

[4] Distance to the 80 dBA L_{max} contour.

While some proposed individual projects under the CAP may utilize only one piece of construction equipment at a time, others would require simultaneous use of multiple pieces of equipment during construction. Table 31 summarizes construction noise levels for sample construction scenarios at various distances. For example, the simultaneous use of an excavator, dozer, and jackhammer during sample construction scenario 1 would generate a noise level of approximately 90 dBA L_{eq} at 25 feet from the center of construction activities, 84 dBA L_{eq} at 50 feet from the center of construction activities, and 78 dBA L_{eq} at 100 feet from the center of construction activities.

Table 31 Construction Noise Levels for Sample Construction Scenarios

Sample Construction Scenario	Equipment	Noise Levels (dBA L_{eq}) 25 Feet from Center of Construction Activities	50 Feet from Center of Construction Activities	100 Feet from Center of Construction Activities
1	Excavator, Dozer, Jackhammer	90	84	78
2	Dozer, Front End Loader	86	80	74
3	Excavator, Grader, Dozer	90	84	78
4	Crane, Generator, Front End Loader	86	80	74
5	Pavers (2), Roller	85	79	73

dBA = A-weighted decibel; L_{eq} = equivalent noise level

Based on the results presented in Table 31, the combined noise levels of various combinations of construction equipment are greater than the individual noise levels for each piece of equipment. Using the data provided in Table 31, Table 32 identifies the minimum distances at which noise generated by combined operation of construction equipment for each of the sample construction scenarios would attenuate to less-than-significant levels at various receiving land uses.

Program construction activities utilizing equipment equivalent to or less intensive than those specified in Table 28 at the minimum distances from receiving land uses as shown in Table 32 would have less than significant construction noise impacts. For example, a proposed program construction activity that requires use of an excavator, dozer, and jackhammer (equivalent to sample construction scenario 1) at a distance of 25 feet from the nearest industrial receiver, 60 feet from the nearest commercial receiver, and 100 feet from the nearest residential receiver would have a less-than-significant impact because the construction activity would occur at a distance equal to or further than the specified minimum distances for receiving land uses. Similarly, a project construction activity that only requires the use of an excavator (i.e., less intensive than sample construction scenario 1) at the same distances from the land uses previously specified would have a less-than-significant impact because construction activities would be less intensive than those evaluated for sample construction scenario 1.

As project-specific information becomes available for proposed projects under the CAP, subsequent CEQA analysis will be conducted. For these proposed projects, construction activities that utilize equipment with louder noise levels and/or are located within the minimum distances of receiving land uses shown in Table 32 would result in a potentially significant construction noise impact and would be required to implement MM NOI-1 and NOI-2. For example, a program construction activity that requires the use of a dozer and front end loader (equivalent to sample construction scenario 2) at a distance of 30 feet from the nearest residential receiver (i.e., closer than the specified distance of 50 feet) would result in a potentially significant construction noise impact, and mitigation would be required. Similarly, a program construction activity that requires the use of a concrete saw, dozer and front-end loader at a distance of 50 feet from the nearest residential receiver would generate higher noise levels than those evaluated for sample construction scenario 4 because of the additional concrete saw. Therefore, construction noise impacts would be potentially significant, and mitigation would be required.

Table 32 Construction Noise Screening Criteria for Combined Equipment Use

Sample Construction Scenario	Equipment	Minimum Distance to Receiving Land Use for a Less-than-Significant Impact[1] Industrial[2] (feet)	Commercial[3] (feet)	Residential[4] (feet)
1	Excavator, Dozer, Jackhammer	25	45	80
2	Dozer, Front End Loader	20	30	50
3	Excavator, Grader, Dozer	25	45	80
4	Crane, Generator, Front End Loader	20	30	50
5	Pavers (2), Roller	15	25	45

dBA = A-weighted decibel; L_{eq} = equivalent noise level

Notes: Noise levels are based on an attenuation rate of 6 dBA per doubling of distance. Distances are rounded to the nearest 5 feet.

[1] As measured from the center of construction activities.

[2] Distance to the 90 dBA L_{eq} contour.

[3] Distance to the 85 dBA L_{eq} contour.

[4] Distance to the 80 dBA L_{eq} contour.

If construction equipment is used within the minimum distances provided in Table 30 and/or Table 32, then proposed individual projects would result in a potentially significant construction noise impact. The severity of the noise impacts from construction activities would vary depending upon the number and type of equipment utilized for each phase and the proximity to residential, commercial, and industrial receiving land uses. Therefore, construction noise impacts at the program level are considered potentially significant and would be analyzed at the project-level once specific construction parameters are known. With the implementation of MM NOI-1 and NOI-2, noise generated during construction activities would be reduced; however, it is not possible to determine whether impacts would be reduced to less-than-significant levels because the magnitude of the construction noise impacts would need to be determined on a project-by-project basis. Therefore, at a program level of analysis, construction noise impacts would remain **significant and unavoidable**.

Post-Construction

On-site Operational Noise

Upon implementation, none of the proposed CAP measures would generate new on-site operational noise except the BESS facilities proposed under CAP measure E-4, which may include cooling fans and transformers with the potential to generate continuous noise during operation. Projects would be designed and located to avoid or minimize impacts to the extent feasible. Project-level analysis would evaluate noise impacts, including evaluating noise impacts at the nearest sensitive receivers and comparing estimated noise levels to the noise level standards adopted by the applicable local jurisdiction. The severity of the impacts would vary depending upon the type and intensity of the individual project, its proximity to sensitive receivers, and the relevant local noise standards. As a result, it would be speculative to analyze project-level impacts of individual projects that may be implemented under the proposed CAP, and it cannot be determined at this time if post-construction activities would result in a substantial permanent increase in noise levels or the severity of this impact. Therefore, post-construction operational conditions would result in a potentially significant permanent increase in noise levels. The BESS proposed at the Skinner WTP would be more than

1,000 feet from the nearest sensitive receivers, at which distance noise impacts would not be significant. Feasible mitigation for the remainder of the individual projects proposed for implementation under the proposed CAP may reduce noise generated during the post-construction period (see MM NOI-2(c)); however, due to the programmatic nature of the proposed program, it is not possible to determine whether impacts could be reduced to less-than-significant levels. Therefore, these impacts at a program level of analysis are assumed to be **significant and unavoidable**.

Off-site Roadway Noise

As discussed in Section 4.4.2, *Existing Conditions*, a doubling of traffic volumes would increase roadway noise by 3 dBA. Local roadways have the greatest potential to experience roadway noise impacts because low existing traffic volumes result in lower ambient noise levels, which increases the potential for noise generated by program-related traffic volumes to be more perceptible. However, operations and maintenance trips related to individual proposed CAP projects would be distributed throughout the Plan Area. Measures considered in the proposed CAP generally involve efficiency improvements to existing Metropolitan infrastructure and processes and generally do not involve construction of substantial trip-generating land use projects. Due to the scale and nature of the individual projects that would implement CAP measures, each project would likely add an estimated two to ten daily trips to local roadways. The limited number of trips would not have the potential to double traffic volumes even on low-volume local roadways. Thus, it is unlikely the proposed program would increase noise levels by 3 dBA. Operational roadway noise impacts would be **less than significant,** and no mitigation would be required.

Threshold NOI-B: *Would the proposed program result in the generation of excessive groundborne vibration or groundborne noise levels?*

Construction

Construction activities associated with the proposed program would potentially require the use of equipment that may generate substantial levels of vibration, such as bulldozers, loaded trucks, pile drivers/pneumatic post drivers, bore/drill rigs, vibratory rollers, and jackhammers. As shown in Table 29 in Section 4.4.4.2, *Methodology*, the use of this construction equipment would generate vibration levels ranging from 0.003 to 0.089 inches per second PPV, or 58 to 87 VdB, at a distance of 25 feet. At this time, the individual projects that may be implemented under the proposed CAP identified above do not have sufficient detail to allow project-level analysis of vibration impacts during construction.

Nevertheless, it is possible to evaluate the intensity of construction activities that would result in a less-than-significant construction vibration impact on historic sites, other structures, and sensitive land uses as defined in Section 4.4.2.3, *Sensitive Receivers*. Table 33 summarizes the minimum distances at which vibration generated by construction equipment would attenuate to less-than-significant levels at various receivers. Program construction activities utilizing equipment at the minimum distances shown in Table 33 would have a less-than-significant construction vibration impact.

Table 33 Vibration Level Contours during Construction Activities

Equipment		Minimum Distance to Receiving Land Use for a Less-than-Significant Impact (feet)		
		Historic Sites[1]	All Other Structures[2]	Vibration-Sensitive Land Uses[3]
Large bulldozer		25	15	15
Small bulldozer		5	5	5
Loaded trucks		20	10	10
Impact Pile Driver	Upper Range	300	160	165
	Typical	140	75	75
Caisson Drilling[4]		25	15	15
Vibratory Roller		50	30	25
Jackhammer		10	5	5

PPV = peak particle velocity in inches per second; VdB = vibration decibels

Note: Distances are rounded to the nearest 5 feet.

[1] Distance to the 0.1 PPV contour.

[2] Distance to the 0.2 PPV contour.

[3] Distance to the 94 VdB contour.

[4] Caisson drilling was used as a proxy for bore/drill rigs.

If historic sites, structures, or sensitive receivers are located within the minimum distances to construction equipment shown in Table 33, then individual proposed projects would result in a potentially significant construction vibration impact and implementation of MM NOI-3 would be required. The severity of the impacts would vary depending upon the type of equipment used for each construction activity, the nature of the nearest structures and sensitive receivers (see Section 4.4.2.3, *Sensitive Receivers*), and the proximities of the nearest structures and sensitive receivers. Because detailed information is not currently available to conduct a project-level analysis of proposed projects under the CAP, it cannot be determined at this time if significant construction impacts related to vibration would occur or what the severity of the impact would be. As a result, construction impacts related to vibration at a program level of analysis would be potentially significant. Mitigation may be available to reduce vibration levels during construction activities (see MM NOI-3); however, it is not possible to determine whether impacts would be reduced to less-than-significant levels because the nature and intensity of the vibration impact is not fully known at this time. Thus, at a program-level of analysis, construction vibration impacts associated with implementation of the individual projects that may be implemented under the proposed CAP are assumed to be **significant and unavoidable**.

Post-Construction

Post-construction activities and/or conditions associated with individual projects proposed under the CAP would not include sources of vibration, such as heavy machinery. Program components such as BESS facilities (CAP measure E-4), LED lighting (CAP measure EE-1), electric vehicle charging stations (CAP measure FL-4 and CAP measure EC-3), and electric-powered equipment (to replace natural gas-powered equipment)(CAP measure DC-2), do not generate substantial vibration. Therefore, **no impact** would occur.

Threshold NOI-C: *For a program located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the proposed program expose people residing or working in the area to excessive noise levels?*

Public use airports and private air strips are located throughout the Plan Area (see Figure 16 for a map of public use airports within the Plan Area). Airport land use plans establish allowable land uses within areas that are subject to high noise levels related to aircraft operations. Of the individual proposed projects under the CAP identified in Chapter 2, *Project Description*, the only known potential location within two miles of a public or private airport is the Weymouth WTP, located approximately 0.9 mile north of the public use airport Brackett Field Airport.

Construction

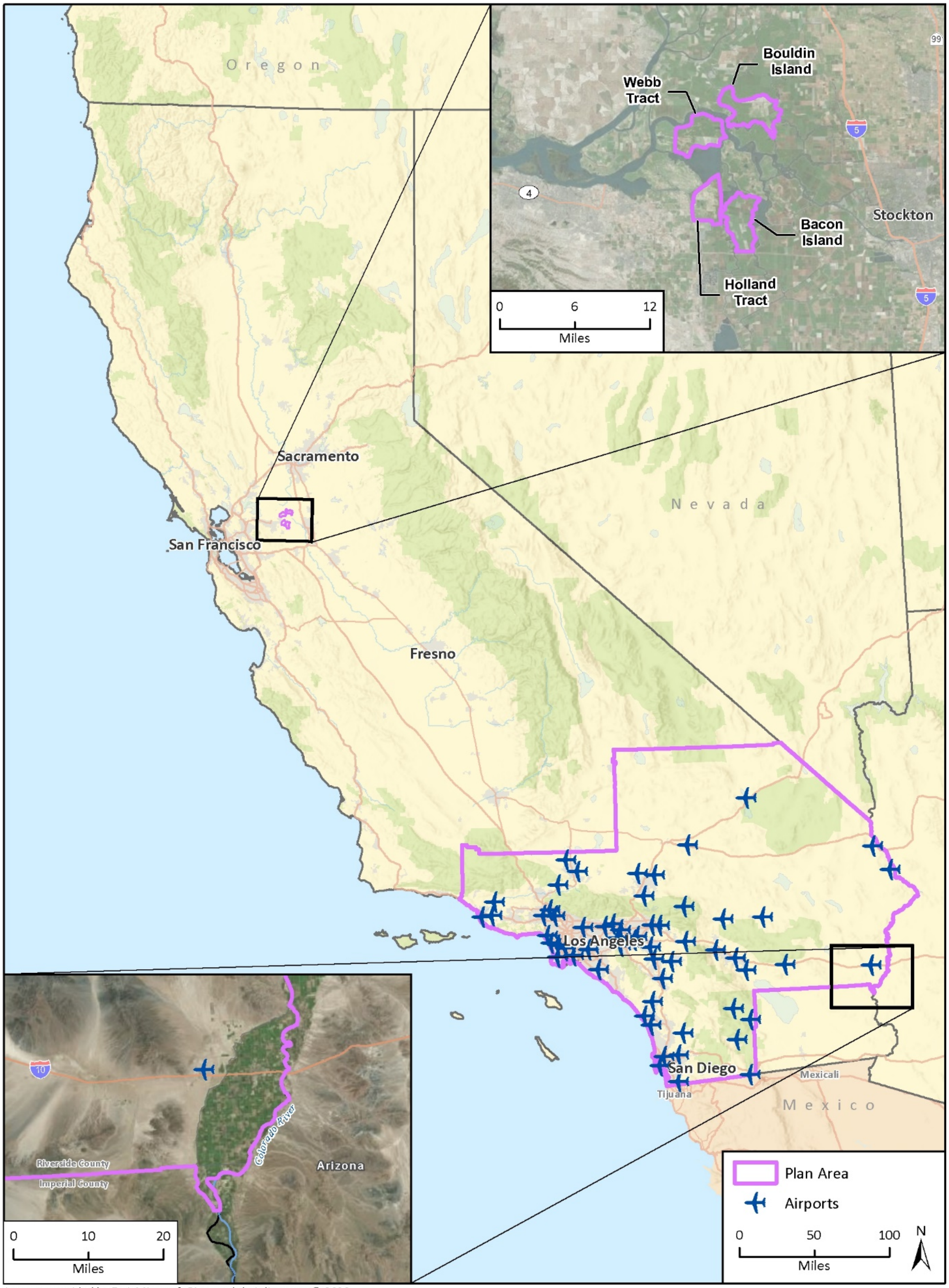
For individual projects proposed under the CAP that are located within two miles of a public use airport or private airstrip, construction workers would be intermittently exposed to elevated noise levels during aircraft take-off and landing events, especially within the 75 and 85 dBA noise level contours of the nearest airport or airstrip. Although aircraft take-off and landing events would contribute to the noise environment, construction noise would be the dominant source of noise exposure for construction workers. Construction contractors would be required to comply with California Occupational Safety and Health Administration (Cal OSHA) regulations related to worker exposure to noise. Section 5096 of these regulations sets duration-based noise exposure limits for construction workers that require provision of personal protective equipment should exposure exceed the specified limits. The requisite adherence to these regulations would reduce construction worker exposure to high noise levels such that proposed program construction activities would not expose employees to excessive noise levels. Therefore, construction workers would not be exposed to excessive noise levels from aircraft noise. Construction impacts related to aircraft noise would be **less than significant** and no mitigation would be required.

Post-Construction

Some individual projects implemented under the proposed CAP may be located within two miles of a public use airport or private airstrip, such as those at the Weymouth WTP. None of the proposed CAP measures involve operation of noise-sensitive receptors, such as residences or schools, that would be exposed to excessive airport noise in the Plan Area.

Most proposed program activities, including the proposed BESS facility at the Weymouth WTP (CAP measure E-4), would either be unmanned or would not require new on-site employees. However, some individual projects may require new exterior operations and maintenance activities beyond those currently occurring that could expose staff to elevated noise levels during aircraft take-off and landing events, especially within the 75 and 85 dBA noise level contours of the nearest airport or airstrip. Given the nature of individual projects, maintenance activities would occur infrequently and likely would not require extended exposure to aircraft noise. As stated previously, Metropolitan would be required to comply with Cal OSHA regulations related to worker exposure to noise. These regulations would reduce employee exposure to high noise levels such that post-construction activities would not expose employees to excessive noise levels. Therefore, post-construction impacts related to aircraft noise would be **less than significant**.

Figure 16 Public Airports in the Plan Area



Imagery provided by Esri, Microsoft Bing, and their licensors © 2020.
Additional data provided by USGS, 2017 and the Federal Aviation Administration, 2019.

Cumulative Analysis

The geographic scope for cumulative noise impacts is generally within 0.5 mile of the locations of individual projects that may be implemented under the proposed CAP. This geographic scope is appropriate for noise because the proposed program's noise impacts are localized and site-specific. Beyond this distance, typical construction and operational noise would be indistinguishable from the background noise level due to distance attenuation and interference from environmental conditions (e.g., topography and air disturbance).

If concurrent construction activities occur in close proximity to proposed program activities, combined construction noise would have the potential to impact the same sensitive receivers and result in cumulative construction noise and vibration levels that exceed the applicable thresholds of significance. The severity of the impacts would vary depending upon the intensity of construction activities for cumulative projects and the proximities of residential, commercial, and industrial land uses to each construction site. Therefore, it cannot be determined at this time if significant cumulative construction noise and vibration impacts would occur or whether the proposed program's contribution to those significant cumulative impacts would be considerable. As a result, cumulative construction noise and vibration impacts would be potentially significant, and proposed program activities would have a **cumulatively considerable contribution**. Mitigation may be available to reduce cumulative noise and vibration generated during construction of individual projects that may be implemented under the proposed CAP (see MM NOI-1 through NOI-3); however, it is not possible to determine whether impacts would be reduced to less than significant levels because the magnitudes of the noise and vibration impacts are not known.

Depending on the specific locations of individual projects that may be implemented under the proposed CAP, it is possible that cumulative development is currently resulting in a significant cumulative operational noise impact if operational noise exceeds the applicable jurisdiction's noise level standards at sensitive receivers. Therefore, cumulative operational noise impacts may be potentially significant. Nevertheless, per MM NOI-2(c), individual projects with the potential to generate on-site operational noise would be required to complete project-level post-construction noise studies and incorporate noise reduction measures to reduce noise levels to the noise level standards of the applicable jurisdiction, as feasible. As a result, regardless of whether a significant cumulative operational noise impact is occurring, the proposed program's noise contribution would **not be cumulatively considerable** with incorporation of MM NOI-2(c).

Cumulative growth in the Plan Area would result in increased traffic volumes on local and regional roadways. However, as discussed under Threshold NOI-A, due to the relatively low number of anticipated operations and maintenance trips associated with individual CAP projects, impacts related to off-site roadway noise would be incremental and likely inaudible; therefore, the proposed program would **not have a cumulatively considerable contribution to this potential cumulative impact**, significant or otherwise.

As discussed under Threshold NOI-C, public use airports and private airstrips are located throughout the Plan Area. The specific locations of individual projects that may be implemented under the proposed CAP are not all known at this time; therefore, it is also unknown whether individual projects or cumulative projects would be located within the vicinity of airports, other than the proposed BESS facility to be located at Weymouth WTP, which would be within 0.9 mile of Brackett Field Airport. Nevertheless, individual projects and cumulative projects would be required to comply with the applicable airport land use plan, federal and state OSHA regulations, and applicable California Building Code standards related to the protection of residents and workers from exposure to excessive aircraft noise. As a result, regardless of whether a significant cumulative noise impact related to airport operations exists, the proposed program would **not have a cumulatively considerable contribution to this potential cumulative impact**, significant or otherwise.

4.4.5.2 Mitigation Measures

MM NOI-1 **Locate Excavation Sites Away from Noise-Sensitive Receivers, Where Feasible.** Construction staging and activities shall be located in areas as far as practicable from sensitive receivers or in areas where receivers can be shielded from construction noise.

MM NOI-2(a) **Conduct Project-Level Noise Studies for Construction Activities Where Noise-Sensitive Receivers are Present.** Project-level construction noise studies shall be conducted for project activities that would exceed the screening criteria for a less-than-significant impact, as summarized in Table 30 and Table 32 of the draft PEIR. Such noise studies shall identify the existing ambient noise levels, characterize the nearest sensitive receivers, estimate the noise levels receivers will experience during construction of individual projects, compare estimated noise levels to the local jurisdiction's noise limits or to the construction noise criteria in the FTA (2018) *Transit Noise and Vibration Impact Assessment Manual* for those that do not have quantitative construction noise level limits, outline any measures that may be used to reduce noise levels, and determine the amount of noise reduction that would occur with implementation of these measures. If the project-level noise study concludes that noise reduction measures are required, MM-NOI-2(b) shall be implemented.

MM-NOI-2(b) **Implement Noise Reduction Measures.** If the results of the noise study determine noise reduction measures are required, noise reduction measures shall be implemented. Construction noise reduction measures may include, but would not be limited to, the use of mufflers, sound blankets/barriers, and/or enclosures and scheduling construction activities to minimize simultaneous operation of noise-producing equipment. Construction noise measures shall be implemented to reduce noise levels to FTA (2018) construction noise criteria, as feasible.

If the individual project would be constructed concurrently with development projects located within a 0.5-mile radius of the individual project location, the noise study shall also consider the cumulative impact of construction noise on sensitive receivers. If applicable, construction noise reduction measures shall be implemented to reduce cumulative noise levels to local jurisdiction or FTA (2018) construction noise criteria, as feasible.

MM NOI-2(c) **Conduct Project-Level Noise Studies for Post-Construction Activities Where Noise Sensitive Receivers are Present**. Prior to the commencement of construction activities for individual projects that may be implemented under the CAP where sensitive receivers are located within 1,000 feet of the individual project sites, project-level post-construction noise studies shall be conducted. Such noise studies shall identify the ambient noise levels, characterize the nearest sensitive receivers, estimate the noise levels receivers will experience during operation of individual projects during the post-construction period, compare estimated noise levels to the noise level standards of the applicable jurisdiction, outline any measures that may be used to reduce noise levels, and determine the amount of noise reduction that would occur with implementation of these measures. Noise reduction measures may include, but would not be limited to, alternative site design, alternative orientation of noise sources, and construction of berms and/or barriers. Noise reduction measures shall be implemented to reduce noise levels to the noise level standards of the applicable jurisdiction, as feasible.

MM NOI-3(a) **Locate Excavation Sites Away from Vibration-Sensitive Receivers, Where Feasible.** Whenever practicable, vibration-generating equipment including bulldozers, loaded trucks, pile drivers/pneumatic post drivers, bore/drill rigs, vibratory rollers, and jackhammers shall operate outside the minimum distances specified in Table 33 of the draft PEIR for historic sites, other structures, and vibration-sensitive receivers during program construction activities. Furthermore, whenever practicable, vibration-generating equipment including bulldozers, loaded trucks, pile drivers/pneumatic post drivers, bore/drill rigs, vibratory rollers, and jackhammers shall not be operated concurrently with vibration-generating equipment associated with cumulative development projects located within 600 feet of program construction sites.

MM NOI-3(b) Conduct Project-Level Vibration Analysis for Construction Activities Where Vibration-Sensitive Receivers are Present. If operation of construction equipment outside the specified buffer distances is not practicable, a detailed study of vibration impacts shall be conducted prior to the commencement of construction for that project. Such vibration studies shall characterize the nearest historic sites, structures, and/or sensitive receivers; estimate the vibration levels receivers will experience during construction of individual projects; compare estimated vibration levels to applicable Caltrans (2020) standards for vibration impacts related to structural damage and human annoyance; outline any measures that may be used to reduce vibration levels; and determine the amount of vibration reduction that would occur with implementation of these measures. Vibration reduction measures may include, but would not be limited to, the use of non-vibratory equipment, vibration monitoring, and repair of structural damage. Construction vibration reduction measures shall be implemented to reduce vibration levels to Caltrans (2020) construction vibration thresholds as feasible.

If the individual project would be constructed concurrently with cumulative development projects located within a 600-foot radius of the activity location, the vibration study shall also consider the cumulative impact of combined vibration levels at the nearest sensitive receivers by estimating the combined vibration levels receivers will experience during construction of individual projects and cumulative development; compare estimated vibration levels to applicable standards for vibration impacts related to structural damage and human annoyance described in the Caltrans (2020) *Transportation and Construction Vibration Guidance Manual* (CT-HWANP-RT-20-365.01.01); identify whether the individual project's contribution to any identified cumulative impact would be cumulatively considerable; outline any measures that may be used to reduce the project's contribution to combined vibration levels; and determine the amount of vibration reduction that would occur with implementation of these measures. Such measures may include, but are not limited to, the installation of wave barriers, maximization of the distance between vibratory equipment and receivers, restriction of vibration-generating activities to daytime hours, or temporary relocation of affected residents Construction vibration reduction measures shall be implemented to reduce cumulative vibration levels to Caltrans construction vibration thresholds as feasible.

4.4.5.3 Level of Significance After Mitigation

Implementation of MM NOI-1 and NOI-2 are intended to reduce potential impacts from construction and post-construction noise; however, whether these measures would reduce all construction and post-construction noise impacts to less-than-significant levels is not known. Therefore, as discussed under Threshold NOI-A, these impacts associated with projects covered under the implementation of the proposed CAP are assumed to be **significant and unavoidable**. Further environmental analysis and documentation is necessary prior to construction of each individual project to determine if a significant project-level impact would occur and if proposed mitigation would reduce the impact to a less-than-significant level.

Implementation of MM NOI-3 is intended to reduce construction vibration impacts; however, whether this measure would reduce all vibration impacts to less-than-significant levels is not known. Therefore, as discussed under Threshold NOI-B, the vibration impact associated with implementation of the proposed CAP is assumed to be **significant and unavoidable**. Further environmental analysis and documentation is necessary prior to construction of each individual project to determine if a significant impact project-level would occur and if mitigation would reduce the impact to a less than significant level.

Adherence to existing regulations regarding worker safety and noise exposure would ensure project-level impacts and the project's contribution to potential cumulative impacts associated with aircraft noise are **less than significant** and **not cumulatively considerable**. No mitigation is required.

Implementation of MM NOI-1, NOI-2, and NOI-3 are intended to reduce cumulative construction noise and vibration impacts; however, whether these measures would reduce the proposed program's contributions to potentially significant cumulative impacts to less-than-significant levels is not known. Therefore, the proposed program's contributions to significant cumulative construction noise and vibration impacts are assumed to be **cumulatively considerable**. As discussed under *Cumulative Analysis*, the project would **not have a cumulatively considerable contribution to cumulative impacts** related to operational noise with implementation of MM NOI-2(b).

4.5 Tribal Cultural Resources

4.5.1 Introduction

This section describes the existing conditions, regulatory framework, and potential impacts to tribal cultural resources which could result from the proposed program, as well as mitigation measures to reduce these impacts. Tribal cultural resources are those resources identified by California Native American tribes in consultation with lead agencies during tribal consultation (also referred to as Assembly Bill (AB) 52 consultation). See Section 4.5.3, *Regulatory Framework*, for a description of AB 52 and its requirements.

4.5.2 Existing Conditions

4.5.2.1 Setting

The Plan Area encompasses the traditional territory of numerous Native American ethnographic groups. Metropolitan has received formal notification for consultation from the following ten California Native American tribes that are traditionally and culturally affiliated with the geographic area of the Plan Area:

- Barbareño-Ventureño Band of Mission Indians
- Barona Band of Mission Indians
- Cabazon Band of Mission Indians
- Fernandeño Tataviam Band of Mission Indians
- Gabrieleño Band of Mission Indians-Kizh Nation
- San Gabriel Band of Mission Indians
- Pechanga Band of Luiseño Indians
- San Manuel Band of Mission Indians
- Soboba Band of Luiseño Indians
- Twenty-Nine Palms Band of Mission Indians

As previously described, most emission reduction measures that would be implemented under the plan are either administrative in nature or involve upgrades to existing infrastructure to improve function, which will reduce emissions (e.g., replacement or refurbishment of pump impellors). While enough project data exists to make reasonable assumptions about the potential level of significance for each project, additional project-level analysis will be completed when project-specific information becomes available for each project proposed in the CAP. Subsequent CEQA documentation will be prepared, as necessary. Future CEQA documents for the CAP updates may require additional consultation with tribes and will be made available for comment, as required.

4.5.2.2 Tribal Cultural Resource Consultation

As part of the process of identifying tribal cultural resources in or near the Plan Area, Metropolitan sent letters inviting all ten tribes whom had previously requested formal notice to consult on the proposed program on June 25, 2020. Metropolitan requested a response within 30 days of receipt of the notification, as specified by Section 21080.3.1 of the CEQA Statute. Metropolitan received one response requesting consultation from the San Manuel Band of Mission Indians on August 2, 2020. A consultation telephone conference meeting took place on August 19, 2020 between Metropolitan staff and Ms. Jessica Mauck, Director of Cultural Resources Management, and Ryan Nordness, Cultural Resource Analyst, for the San Manuel Band of Mission Indians.

During the consultation meeting, Metropolitan staff provided a brief history of Metropolitan, an overview of Metropolitan's cultural resource management and identification efforts and tribal cultural resource identification efforts, description of Metropolitan facilities in the vicinity of the San Manuel Reservation and Serrano ancestral tribal territory, and an overview of the proposed program and milestones. Metropolitan staff also reiterated that the proposed program does not include any specific projects slated for construction, and that any future project incorporating the Plan as a mitigation measure would subject to a project-specific environmental document with required tribal cultural resource outreach and consultation. The Tribe acknowledged understanding that the CAP is a high-level planning document with no direct construction activities and was also supportive of potential projects described in the Plan such as expansion of BESS facilities, electric vehicle charging infrastructure, and other "green" energy projects.

4.5.3 Regulatory Framework

4.5.3.1 Federal

Tribal cultural resources are a resource category identified by state law; there are no federal regulations pertaining to tribal cultural resources.

4.5.3.2 State

Assembly Bill 52 of 2014

AB 52 expanded CEQA by defining a new resource category, "tribal cultural resources." AB 52 establishes that "a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment" (Public Resources Code [PRC] Section 21084.2). AB 52 further states when feasible, the lead agency shall establish measures to avoid impacts that would alter the significant characteristics of a tribal cultural resource (PRC Section 21084.3). PRC Section 21074(a)(1) defines tribal cultural resources as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe," that satisfy either of the following criteria:

(A) Included or determined to be eligible for inclusion in the California Register of Historic Resources.

(B) Included in a local register of historical resources as defined in PRC Section 5020.1(k).

And PRC Section 21074(a)(2) defines tribal cultural resources as "A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe."

In recognition of California Native American tribal sovereignty and the unique relationship of California local governments and public agencies with California Native American tribal governments and with respect to the interests and roles of project proponents, it is the intent AB 52 to accomplish all of the following:

1. Recognize that California Native American prehistoric, historic, archaeological, cultural, and sacred places are essential elements in tribal cultural traditions, heritages, and identities.
2. Establish a new category of resources in CEQA called "tribal cultural resources" that considers the tribal cultural values in addition to the scientific and archaeological values when determining impacts and mitigation.
3. Establish examples of mitigation measures for tribal cultural resources that uphold the existing mitigation preference for historical and archaeological resources of preservation in place, if feasible.
4. Recognize that California Native American tribes may have expertise with regard to their tribal history and practices which concern the tribal cultural resources with which they are traditionally and culturally affiliated (because CEQA calls for a sufficient degree of analysis, tribal knowledge about the land and tribal cultural resources at issue should be included in environmental assessments for projects that may have a significant impact on those resources).
5. In recognition of their governmental status, establish a meaningful consultation process between California Native American tribal governments and lead agencies, respecting the interests and roles of all California Native American tribes and project proponents and the level of required confidentiality concerning tribal cultural resources early in the CEQA environmental review process, so that tribal cultural resources can be identified and culturally appropriate mitigation and mitigation monitoring programs can be considered by the decision-making body of the lead agency.
6. Recognize the unique history of California Native American tribes and uphold existing rights of all California Native American tribes to participate in, and contribute their knowledge to, the environmental review process pursuant to CEQA.
7. Ensure that local and tribal governments, public agencies, and project proponents have information available, early in CEQA environmental review process, for purposes of identifying and addressing potential adverse impacts to tribal cultural resources and to reduce the potential for delay and conflicts in the environmental review process.
8. Enable California Native American tribes to manage and accept conveyances of, and act as caretakers of, tribal cultural resources.
9. Establish that a substantial adverse change to a tribal cultural resource has a significant effect on the environment.
10. AB 52 also establishes a formal consultation process for California tribes regarding those resources. The consultation process must be completed before a CEQA document can be certified or adopted. AB 52 requires that lead agencies "begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project." Native American tribes to be included in the process are those that have requested notice of projects proposed in the jurisdiction of the lead agency.

4.5.4 Thresholds and Methodology

4.5.4.1 Thresholds of Significance

Table 34 lists the thresholds from Appendix G of the *State CEQA Guidelines* that pertain to impacts associated with tribal cultural resources. These thresholds are addressed in the draft PEIR.

Table 34 CEQA Thresholds for Tribal Cultural Resources

Threshold Would the proposed program:
a. Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is: 1. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), or 2. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

4.5.4.2 Methodology

The following section presents a programmatic-level discussion of impacts to tribal cultural resources which could occur from implementation of the proposed CAP. These potential impacts would apply throughout the Plan Area and are directly tied to emissions reduction measures with physical construction activities. Due to the programmatic nature of the CAP, a precise, project-level analysis of the specific impacts associated with individual projects is not possible and would be speculative at this time. However, all program activities proposed under the CAP that are subject to CEQA must comply with AB 52.

Refer to Section 4.5.2.2, *Tribal Cultural Resource Consultation*, for a summary of Metropolitan's consultation outreach efforts.

4.5.5 Impacts Analysis

4.5.5.1 Program Analysis

Threshold TCR-A: *Would the program cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)?*

As part of its tribal cultural resource identification process, Metropolitan sent letters via certified mail to ten Native American tribes that had previously requested to be informed through formal notification of proposed projects in the geographic area that is traditionally and culturally affiliated with the tribes. One tribe, the San Manuel Band of Mission Indians, requested consultation. A consultation telephone conference meeting took place on August 19, 2020. During consultation, the San Manuel Band of Mission Indians did not identify any specific tribal cultural resources that would be impacted by the proposed program.

No tribal cultural resources were identified during consultation and no resources eligible for the California Register of Historical Resources or local register have been identified as being impacted by the proposed program. The proposed CAP would have **less than significant** to tribal cultural resources and no mitigation would be required.

Threshold TCR-B: *Would the program cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and is a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1.?*

As described under Threshold TCR-A, Metropolitan sent letters via certified mail to ten Native American tribes that had previously requested to be informed through formal notification of proposed projects in the geographic area that is traditionally and culturally affiliated with the tribes. The San Manuel Band of Mission Indians requested consultation. Metropolitan, as lead agency, has not determined any significant impacts to resources pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. Additionally, the San Manuel Tribe did not identify any specific tribal cultural resources potentially impacted by the proposed program. For these reasons, the CAP would have a **less than significant** impact to tribal cultural resources and no mitigation would be required.

4.5.5.2 Cumulative Analysis

Tribal cultural resources are regionally specific and determined by the consulting tribes. As described above, based on Metropolitan's outreach to Native American tribes in the Plan Area and the fact that no tribal cultural resources have been identified that may be impacted by the CAP, a **less than significant** cumulative impact associated with implementation of the proposed program would occur and no mitigation would be required.

4.5.5.3 Mitigation Measures

No mitigation is required.

4.5.5.4 Level of Significance After Mitigation

Impacts are **less than significant,** and no mitigation would be required.

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5 Effects Found Not to be Significant

According to Section 15128 of the *State CEQA Guidelines*, an EIR shall contain a statement that briefly indicates the reasons that various possible significant effects of a project were determined not to be significant and were therefore not discussed in detail in the PEIR. Such a statement may be contained in an attached copy of an Initial Study.

This chapter includes a brief description and analysis of the impact categories described in Appendix G of the *State CEQA Guidelines* that were found not to be significant. The analysis includes a review of resources, a detailed impact assessment conducted during the PEIR preparation process, and incorporation of comments received during the NOP process. Impacts that are found not to have a significant effect on the environment include Aesthetics, Agriculture and Forestry, Energy, Geology and Soils, Greenhouse Gases, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Mineral Resources, Population and Housing, Public Services, Recreation, Transportation, Utilities and Service Systems, and Wildfire. The Appendix G of the *State CEQA Guidelines* thresholds and a discussion of the impacts associated with implementation of the proposed program on these resources are discussed below.

5.1 Aesthetics

Pursuant to Appendix G of the *State CEQA Guidelines*, potentially significant aesthetic impacts would occur if implementation of the proposed program would:

- Have a substantial adverse effect on a scenic vista; or
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway; or
- Substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage points. If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality); or
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

Individual projects under the proposed CAP identified in Chapter 2, *Project Description*, include electrification, infrastructure, and renewable energy storage improvements at existing Metropolitan facilities (e.g., BESS facilities under CAP measure E-4), as well as carbon capture and sequestration pilot studies on agricultural land in the Palo Verde Valley and Sacramento-San Joaquin River Delta Islands (e.g., CAP measures CS-1 through CS-3). None of the individual projects under the CAP are located near a scenic vista such that they would have a substantial adverse effect on a scenic vista. None of the projects are located near a state scenic highway and would, therefore, not result in damage to scenic resources located within a state scenic highway.

Though some projects could be seen from a publicly accessible vantage point, individual projects would be small in nature and occur entirely within existing Metropolitan facilities that already include buildings, fuel pumps, water conveyance and treatment infrastructure, parking structures, maintenance facilities, etc. The addition of new structures at these facilities would not represent a major change in visual character of the sites. In urban areas, local jurisdictions may adopt zoning or other regulations governing scenic quality. Generally, projects implemented under the CAP would not conflict with such local regulations because California Government Code Section 53091 exempts Metropolitan, as a regional public water purveyor and utility, from local zoning and building ordinances. Furthermore, the CAP includes measures, such as carbon capture and sequestration initiatives, that may improve views of project sites from publicly accessible viewpoints by enhancing vegetation cover and improving the quality of those views. Therefore, none of the individual CAP projects would substantially degrade the existing visual character of a public view or conflict with applicable zoning or other regulations governing scenic quality. Impacts related to scenic resources, scenic highways, and visual character associated with aesthetics resources would be less than significant and no mitigation would be required.

Metropolitan plans to convert all interior and exterior lighting to light emitting diode (LED) technology (CAP measure EE-1), which is more energy efficient and emits light in a specific direction, unlike incandescent and compact fluorescent lamp technology, which emits light in all directions. Lighting would be directed downward or would be shielded and would not adversely affect day or nighttime views in the area. Though projects such as the proposed BESS facilities (CAP measure E-4) would include new lighting to illuminate the buildings/structures, new lighting would be shielded, directed downwards, and would use low wattage bulbs to reduce impacts to nighttime views in the area. Project lighting would be designed to reduce intrusion onto adjacent properties. In addition, the project designs do not propose new highly reflective materials that could potentially cause significant glare during the day, such as stainless-steel panels or expansive glass. Lighting may be required during construction activities for individual projects, particularly if overnight work is necessary. However, such lighting would conform to Metropolitan’s standard construction specifications, which require contractors to direct floodlights downward and shield them to avoid nuisance. Therefore, the projects identified in the proposed CAP would not create substantial light or glare that would adversely affect day or nighttime views in the area. Impacts related to light and glare associated with aesthetics resources would be less than significant and no mitigation would be required.

5.2 Agriculture and Forestry

Pursuant to Appendix G of the *State CEQA Guidelines*, potentially significant agriculture and forestry impacts would occur if implementation of the proposed program would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use; or
- Conflict with existing zoning for agricultural use, or a Williamson Act contract; or
- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)); or
- Result in the loss of forest land or conversion of forest land to non-forest use; or

- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use.

Most of the individual projects under the proposed CAP identified in Chapter 2, *Project Description*, are not related to agriculture and are not anticipated to have an impact on agricultural or forestry resources, either directly or indirectly, within the Plan Area. Activities that may occur on existing farmland include regenerative agriculture studies and investigation of carbon sequestration opportunities in the Palo Verde Valley (CAP measure CS-2) that would involve the use of small plots of existing agricultural land to study how current conventional agricultural practices may benefit from regenerative land management practices, including reduced soil loss, increased soil health, and reduced time, labor, and fuel use. Carbon sequestration and carbon capture pilot projects in the Sacramento-San Joaquin Delta (CAP measure CS-3) would utilize small plots of land to study how to improve soil health and reduce soil erosion, while protecting the Delta Islands from the impacts of climate change.

Individual projects under the proposed CAP would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to nonagricultural use or conflict with a Williamson Act contract. As discussed above, most projects to be implemented under the proposed CAP would occur at existing Metropolitan facilities and would not result in direct or indirect farmland or forestland conversion. Proposed activities that may occur on farmland pursuant to CAP measure CS-2 would involve the study of regenerative agricultural practices that would improve farming practices, reduce soil loss, and increase soil health to improve current farming practices and would not, therefore, conflict with land zoned for agricultural use or Williamson Act contracts. Proposed studies associated with CAP measure CS-3 would include carbon sequestration and carbon capture pilot programs on the Delta Islands aimed at reducing soil loss by studying the use of cover crops or planting tules at the margins of the islands and unfarmable areas to protect the islands from sea level rise while providing habitat for aquatic and avian species. The proposed CAP does not include construction of commercial or residential land uses on existing agricultural sites that would substantially preclude future agricultural use or productivity of such sites.

The proposed CAP does not include measures that would add new homes, businesses, or large increases in employment that would trigger expansion of development into agricultural or forested areas. Thus, the proposed program activities would not result in the loss of forest land or conflict with existing zoning for forest land, timberland, or timberland production or involve other changes in the existing environment that would result in conversion of farmland to non-agricultural use or conversion of forest land to non-forest use. Therefore, no impact related to farmland, Williamson Act contracts, forest land, and associated agricultural resources would occur, and no mitigation would be required.

5.3 Energy

Pursuant to Appendix G of the *State CEQA Guidelines*, a potentially significant impact to energy would occur if implementation of the proposed program would:

- Result in wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Construction associated with specific individual projects under the proposed CAP would result in short-term energy consumption. Short-term energy consumption includes consumption of petroleum-based fuels used to power off-road construction equipment on individual project sites, worker travel to and from construction sites, and vehicles used to deliver construction materials to project sites during construction activities. Construction activities would be required to comply with all applicable regulations limiting wasteful or inefficient energy use, including compliance with the CARB In-Use Off-Road Diesel-Fueled Fleets Regulation, which imposes limits on idling and restricts the use of older, less fuel-efficient equipment. Compliance would reduce fuel consumption and lead to the use of more fuel-efficient vehicles and equipment on construction sites. Construction equipment would be maintained to applicable standards, and construction activity and associated fuel consumption and energy use would be temporary. In addition to Metropolitan's standard Environmental Requirements for Construction, Metropolitan implements environmental requirements for construction projects that are detailed in Metropolitan's engineering project specification package, which includes specific practices for contractors to implement during construction to reduce or avoid impacts to the environment, including limitations on engine idling to reduce unnecessary fuel consumption and emissions (refer to Chapter 2, *Project Description,* for more details).

As described in Chapter 2, *Project Description,* many of the individual projects under the proposed CAP would improve energy efficiency, increase procurement of renewable energy, and promote energy conservation. CAP measures include efforts to promote energy conservation at existing and planned Metropolitan facilities (CAP measures EE-1 through EE-5); reduce generated waste and increase waste diversion (CAP measures WA-1 through WA-4); encourage use of alternative transportation, alternative fuel types, and electric vehicles (CAP measures EC-1 through EC-6); and promote water conservation (CAP measures WC-1 through WC-6). The CAP promotes energy efficiency and, therefore, would not result in wasteful, inefficient, or unnecessary consumption of energy resources.

The proposed CAP itself is a plan that will enable Metropolitan to meet specific GHG reduction goals by increasing the use of renewable energy and promoting energy efficiency. As discussed above, the CAP includes various GHG reduction measures focused on improving energy efficiency and increasing procurement of renewable energy (e.g., CAP measures DC-2, E-1 through E-5, and EE-1 through EE-5). The CAP includes the proposed construction and operation of BESS facilities under CAP measure E-4 that will store renewable energy during peak periods and discharge that energy during periods when renewable energy may not be available. These facilities will be used to power existing or future Metropolitan facilities. Furthermore, SB 100 mandates 100 percent clean electricity for California by 2045. Future infrastructure projects would be connected to the existing electricity grid and would eventually be powered by renewable energy pursuant to SB 100 requirements. Therefore, the CAP would not conflict with or obstruct implementation of any state plan for renewable energy or energy efficiency and no impact would occur.

5.4 Geology and Soils

Pursuant to Appendix G of the *State CEQA Guidelines*, a potentially significant impact on geology and soils would occur if the proposed program would:

- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
    - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault. Refer to Division of Mines and Geology Special Publication 42;
    - Strong seismic ground shaking;

- ◦ Seismic-related ground failure, including liquefaction;
- ◦ Landslides; or
- ◦ Result in substantial soil erosion or the loss of topsoil; or
- ◦ Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse; or
- ◦ Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property; or
- ◦ Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater; or
- ◦ Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

Projects associated with implementation of the proposed CAP would be located within existing Metropolitan facilities. Of the facilities described in Chapter 2, *Project Description*, only portions of the Jensen WTP are located within or adjacent to a fault zone. Portions of the Jensen, Diemer, and Skinner WTPs are located within liquefaction and landslide hazard zones, and the Webb and Holland Tracts in the Sacramento-San Joaquin River Delta are located within a liquefaction hazard zone[25]. As such, the probability of damage to facilities from significant nearby surface fault rupture, seismic-related ground failure, or landslides is considered moderate to high. However, projects covered under the CAP involve the installation of small structures (such as BESS facilities; CAP measure E-4), replacing or refurbishing old or outdated equipment (CAP measures EE-4a through EE-4d), and the installation of new infrastructure to support zero-emission vehicles (CAP measure FL-4 and Cap measure EC-3). Design of the proposed projects would be developed in accordance with California Building Code (CBC) standards for seismic stability. None of the proposed projects would include the development of structures for human occupancy that would occur within 50 feet of an identified fault. Any proposed new structures that would be located on sites with liquefiable soils or at risk of landslides would similarly be constructed in accordance with the requirements of the CBC, which specifies foundation and other construction requirements for sites with unstable soils, as well as project-specific recommendations from any applicable geotechnical studies completed. If structures are proposed in areas subject to liquefaction or earthquake induced landslides, compliance with the applicable regulatory requirements and project-specific geotechnical recommendations would reduce the potential for adverse effects. Therefore, individual projects to be implemented under the CAP would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic shaking, liquefaction, or landslides. Impacts associated with earthquakes, seismic shaking, landslides, liquefaction, and expansive soils would be less than significant and no mitigation would be required.

While proposed construction activities could result in loss of topsoil or soil erosion, the implementation of BMPs, including a SWPPP would be required for sediment and erosion control, pollutant treatment, outlet protection, and general site management, and coverage under the National Pollutant Discharge Elimination System Construction General Permit would be required when construction would disturb an area greater than one acre in size. These standard measures would ensure that construction activities do not result in a substantial loss of topsoil or erosion. Implementation of other proposed CAP projects, such as regenerative agricultural practices and cover cropping conducted as part of carbon capture and sequestration initiatives (CAP measures CS-1

[25] Bouldin Island, Bacon Island, and land within the Palo Verde Valley are not located within a fault zone and have not been evaluated for liquefaction or landslide hazards.

through CS-3), would have the added benefit of reducing erosion and topsoil loss relative to traditional, intensive agricultural practices; therefore, loss of topsoil or soil erosion would be less than significant and no mitigation would be required.

None of the projects associated with the CAP would require the installation of a septic system or alternative wastewater disposal systems, therefore no impact would occur.

Paleontological resources, or fossils, are the evidence of once-living organisms preserved in the rock record. They include both the fossilized remains of ancient plants and animals and the traces thereof (e.g., trackways, imprints, burrows, etc.). Paleontological resources are not found in "soil" but are contained within the geologic deposits or bedrock that underlies the soil layer. The Plan Area spans six of the eleven major geomorphic provinces in California: the Great Central Valley, Basin and Range, Mojave Desert, Colorado Desert, Transverse Ranges, and Peninsular Ranges (California Geological Survey 2002). Each geomorphic province has its own unique geologic history, lithology, and potential to yield paleontological resources.

Paleontological sensitivity refers to the potential for a geologic unit to produce scientifically significant fossils. Sensitivity is determined by rock type, preservation potential (i.e., likelihood) of the geologic unit to yield significant fossils, and fossil localities recorded from that unit, if any. In general, ground disturbing activities located in areas of high paleontological sensitivity have the potential to damage or destroy a unique paleontological resource or site or unique geologic feature, if any such resources or features are present. Direct impacts to paleontological resources occur when earthwork activities, such as grading or trenching, cut into the geologic deposits within which fossils are buried and physically destroy the fossils. Since fossils are the remains of prehistoric animal and plant life, they are considered to be nonrenewable resources.

There are numerous paleontological resources known to occur within the Plan Area; however, assessing the unit-specific potential to yield sensitive paleontological resources for all geologic units present within the Plan Area is beyond the scope of this programmatic analysis. Regionally, the surface geology with the Plan Area includes a large number of igneous, metamorphic, and sedimentary units, with a corresponding paleontological sensitivity that ranges from no potential to high potential for containing significant non-renewable fossiliferous resources (Society of Vertebrate Paleontology 2010). However, most of the individual projects to be implemented under the CAP would be located at existing Metropolitan facilities that are currently heavily disturbed due to existing water infrastructure and its appurtenant development. For projects proposed in the CAP, excavation and/or grading activities would be shallow in nature and would occur in mostly previously disturbed areas. Planned studies in the Palo Verde Valley (CAP measure CS-2) and the San Joaquin-Sacramento Delta Islands (CAP measure CS-3) would occur on existing agricultural lands or would require ground disturbing activities on previously disturbed agricultural land. Activities under these CAP measures would be consistent with existing ground disturbance associated with the ongoing agricultural use of the area. Furthermore, in addition to Metropolitan's standard Environmental Requirements for Construction, Metropolitan implements environmental requirements for construction projects that are detailed in Metropolitan's engineering project specification package which includes specific practices for contractors to implement during construction to reduce or avoid impacts to the environment, including cessation of construction within 50 feet of an unplanned discovery, protection of the discovery area, and evaluation of the discovery by a qualified paleontologist (refer to Chapter 2, *Project Description,* for more details). Therefore, construction and post-construction activities involving trenching, excavation, or other ground disturbance for the proposed CAP projects would be located in previously disturbed areas and would have low potential to adversely impact paleontological resources. Given the location and nature of the individual projects proposed under the CAP and Metropolitan's standard project specifications, impacts to paleontological resources would be less than significant and no mitigation would be required.

5.5 Greenhouse Gases

Pursuant to Appendix G of the *State CEQA Guidelines*, a potentially significant GHG impact would occur if implementation of the proposed program would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Construction associated with individual projects proposed under the CAP would result in short-term increases of GHG emissions due to combustion of petroleum-based fuels, such as fuels used to power off-road construction equipment on individual project sites, fuel consumed from construction worker travel to and from project sites, and vendor vehicles used to deliver materials to sites. However, these short-term emissions would be balanced against long-term GHG emissions reductions that would be realized as a result of program measure implementation. It should be noted that construction GHG emissions were accounted for in the GHG forecast prepared for the CAP, on which the carbon budget is based. Projects under the proposed CAP are intended to increase the purchase of renewable energy (CAP measure E-3), develop battery storage (CAP measure E-4), identify carbon sequestration opportunities (CAP measures CS-1 through CS-3), increase CRA pump efficiency (CAP measures EE-4a through EE-4d), install recycled water infrastructure (CAP measure WC-6), and increase water conservation and waste diversion (CAP measures WC-1 through WC-6 and WA-1 through WA-4), which would result in a net decrease in overall GHG emissions. Furthermore, as discussed above under Section 5.3, *Energy*, construction activities would be subject to applicable state regulations and Metropolitan specifications intended to improve construction fleet efficiency through equipment idling restrictions and decommissioning of older, less efficient engines.

Post-construction implementation of the proposed CAP would result in a long-term reduction in Metropolitan's GHG emissions, as the CAP itself is a plan adopted for the purpose of reducing emissions of GHGs. As discussed in detail in Chapter 2, *Project Description*, the CAP adopts a per capita emissions reduction target intended to achieve carbon neutrality by 2045 using a carbon budget tracking mechanism. This reduction target is more aggressive than the emissions reduction target established by SB 32 (40 percent below 1990 levels by 2030, adopted in 2006) and consistent with the goal of carbon neutrality by 2045 established by Executive Order B-55-18. As such, the proposed CAP would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment and would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. The proposed program would result in a beneficial impact with respect to GHG and therefore, no impact would occur.

5.6 Hazards and Hazardous Materials

Pursuant to Appendix G of the *State CEQA Guidelines*, a potentially significant hazards and hazardous materials impact would occur if implementation of the proposed program would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials; or
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment; or

- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school; or
- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment; or
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, result in a safety hazard or excessive noise for people residing or working in the project area; or
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- Expose people, structures, either directly or indirectly, to a significant risk or loss, injury or death involving wildland fires.

Construction and operation of the proposed projects under the CAP would temporarily require the routine transport, use, storage, and disposal of hazardous materials and petroleum products (i.e., diesel fuel, lubricants, paints and solvents, and cement products potentially containing strong alkali or acidic chemicals) that are commonly used during construction and operational activities. Several federal and state laws regulate the routine use, transport, storage, and disposal of hazardous materials to minimize potential health risks, including the Toxic Substance Control Act, Resource Conservation and Recovery Act (RCRA), U.S. Department of Transportation (DOT) regulations, California Health and Safety Code (CHSC), Unified Program, and the California Hazardous Waste Control Act.

All individual projects to be implemented under the proposed CAP would be required to comply with applicable federal, state, and local regulatory requirements. Furthermore, Metropolitan’s standard construction practices would ensure that all materials are stored safely within the project footprint. BMPs required pursuant to Metropolitan’s standard construction specifications include the designation of special storage areas and labeling, containment berms, coverage from rain, and use of concrete washout areas. In addition to Metropolitan’s standard Environmental Requirements for Construction, Metropolitan implements environmental requirements for construction projects that are detailed in Metropolitan’s engineering project specification package which includes specific practices for contractors to implement during construction to reduce or avoid impacts to the environment, including implementation of drip pans below stationary equipment, proper storage and covering of stockpiled debris and soils, proper cleanup of spills in accordance with environmental regulations, and proper storage of all hazardous materials pursuant to state and federal requirements (refer to Chapter 2, *Project Description*, for more details). Finally, development and implementation of a Water Pollution Control Plan (WPCP) in accordance with the RWQCB guidance would be required during construction of individual projects under the CAP and would comply with local, state, and federal regulations. As such, the proposed program would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials and no reasonably foreseeable upset or accident conditions involving the release of hazardous substances used during construction are anticipated. Because construction activities would comply with federal, state, or local laws, standards, or requirements, impacts related to hazardous materials associated with construction of the proposed GHG emissions reduction measures would be less than significant and no mitigation would be required.

As described in Chapter 2, *Project Description*, individual projects that may be implemented under the proposed CAP are primarily located within existing Metropolitan facilities; however, schools are located within one-quarter mile of some proposed project locations. Table 35 lists schools located within one-quarter mile of potential project locations. For some GHG emissions reduction measures, construction, operation, and maintenance activities associated with implementation of the CAP would require the handling of small quantities of hazardous materials as described above. The potential for accidental releases of hazardous materials, primarily fuel and lubricants from equipment fuel leaks and spills, could result from construction and maintenance activities. However, the small quantities of hazardous materials that would be handled would not create an impact to nearby schools. Additionally, none of the projects proposed under the CAP would use or generate acutely hazardous materials. Multiple local and state regulations require a discretionary process that results in the consultation of databases which store information related to contaminated sites, soils testing of potential project sites, project-level environmental assessments before grading, and compliance with various regulations which heavily restrict the use and storage of hazardous materials within one-quarter mile of a school. While grading and site preparation activities have the potential to pose health concerns to workers and nearby sensitive receptors, including schools, none of the projects are located near known hazardous waste clean-up sites or leaking underground storage sites within one-quarter mile of a school. Implementation of the GHG emissions reduction measures would comply with all applicable federal, state, and local laws, standards, and requirements regarding the handling of hazardous materials. Therefore, the impact would be less than significant, and no mitigation would be required.

Table 35 Schools within One-Quarter Mile of a Proposed Project Location

Metropolitan Facility	School Facility	Address
Weymouth WTP	Grace Miller Elementary School	1629 Holly Oak Street, La Verne
Weymouth WTP	Calvary Baptist School	2990 Damien Avenue, La Verne
Weymouth WTP	La Verne Parent Participation Preschool	909 Juanita Avenue, La Verne
Weymouth WTP	La Verne KinderCare	3602 Wheeler Avenue, La Verne
Weymouth WTP	Damien High School	2280 Damien Avenue, La Verne
Weymouth WTP	Ramona Middle School	3490 Ramona Avenue, La Verne
Weymouth WTP	Ramona Avenue Christian Church	909 E. Juanita Avenue, La Verne
Weymouth WTP	Joan Macy School	1350 3rd Street, La Verne
Jensen WTP	Van Gogh Charter School	17160 Van Gogh Street, Granada Hills

Because of the size of the Plan Area, there are numerous existing contaminated sites within the Plan Area listed in the Department of Toxic Substances Control's EnviroStor and the SWRCB's Geotracker databases, including Metropolitan's existing Skinner, Weymouth, and Diemer WTP facilities. However, all of these Metropolitan facilities are listed as case closed following necessary remediation actions. As such, none of the proposed project locations would be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and expected to create a significant hazard to the public or the environment as a result. Therefore, this impact would be less than significant.

As discussed in Chapter 2, *Project Description*, several GHG emissions reduction measures may require construction, demolition, excavation and/or renovation activities. Most of these projects would be completed within existing Metropolitan facilities that currently comply with any applicable airport land use plans. Of the individual project locations identified in Chapter 2, *Project Description*, only Weymouth WTP is located within the airport influence area of an existing airport (Brackett Field Airport; Los Angeles County Airport Land Use Commission 2015). The proposed CAP projects do not include construction of residential or other sensitive land uses that would result in exposure of people residing or working in the project area to excessive noise or safety hazards. Any proposed GHG emissions reduction projects in proximity to existing public use airports or private airstrips would be required to comply with applicable federal, state, and local aviation safety requirements, including the facility's airport land use compatibility plan. Because projects covered under the proposed CAP would comply with applicable regulations, impacts associated with aviation hazards would be less than significant and no mitigation would be required.

Finally, most of the proposed projects to be implemented under the CAP would be completed within existing Metropolitan facilities and would not require street modifications such as road widening that would interfere with an adopted emergency response or evacuation plan. Other proposed projects, such as implementation of regenerative agricultural practices on agricultural lands in the Palo Verde Valley and Delta Islands pursuant to CAP measures CS-1 through CS-3, would involve similar land uses to those already occurring on these agricultural sites. Given that individual projects would generally either occur within the footprints of existing, developed Metropolitan facilities or involve similar land uses to those already occurring on individual project sites, construction and operation of the proposed CAP projects are unlikely to require closure of roadways, travel lanes, or create other impediments to emergency access, response, or evacuation. Implementation of the proposed CAP measures would not conflict or interfere with emergency response plans. Therefore, impacts would be less than significant and no mitigation would be required.

For discussion of potential impacts related to wildland fire, refer to Section 5.15, *Wildfire*.

5.7 Hydrology and Water Quality

Pursuant to Appendix G of the *State CEQA Guidelines*, a potentially significant hydrology impact would occur if implementation of the proposed program would:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface groundwater quality; or
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin; or
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
  - Result in substantial erosion or siltation on- or off-site;
  - Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
  - Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
  - Impede or redirect flood flows; or
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation; or
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

Individual projects implemented under the proposed CAP would generally be located at existing, developed Metropolitan facilities. As such, these projects would not result in substantial changes to drainage patterns resulting in siltation, erosion, runoff, or flooding. Individual project construction may result in minor ground disturbance, which has the potential to result in water quality impacts due to soil erosion and pollutant runoff during construction activities. Where the anticipated total disturbance for a project would be greater than one acre, coverage under the statewide Construction General Permit (SWRCB Water Quality Order 2009-0009-DWQ) would be fulfilled by compliance with the Construction General Permit and SWPPP implementation. The SWPPP would include project-specific BMPs to control erosion, sedimentation, and release of hazardous materials from construction sites into surface waters. Additionally, project-construction BMPs and the SWPPP would be updated and amended, as necessary, during construction to ensure adequate compliance due to changes to the construction site conditions. In addition, the SWPPP must identify the following: equipment storage, cleaning, and maintenance areas/activities; points of ingress and egress to the construction site; material loading, unloading, and storage practices and areas, including construction materials, building materials, and waste materials; and materials, equipment, or vehicles that may come in contact with stormwater. Implementation of these measures would prevent excavated soils, construction materials, or debris from being transported to receiving waters.

As described in Chapter 2, *Project Description,* Metropolitan's standard construction specifications for all construction activities prohibit contractors from violating any applicable water quality standards for receiving waters associated with waste storage, and require use of drip pans, secondary containment, and prohibit storage of equipment within drainage channels. Furthermore, carbon capture and sequestration initiatives, such as regenerative agricultural practices implemented pursuant to CAP measures CS-1 through CS-3, may result in water quality benefits by promoting vegetation cover (i.e., cover crops) on agricultural land. Given the nature of individual projects under the proposed CAP and compliance with existing regulations, implementation of the CAP would not result in violation of water quality standards, degradation of groundwater or surface water quality, or substantial alterations to drainage patterns. Therefore, such impacts would be less than significant and no mitigation would be required.

Individual projects that may involve placement of structures, such as BESS projects implemented pursuant to the proposed CAP measure E-4, would be located at existing Metropolitan facilities. None of the facilities where BESS projects are proposed, as identified in Chapter 2, *Project Description*, are located within a flood, tsunami, or seiche hazard zone and, therefore, these projects would not risk release of pollutants due to inundation. Other projects under the proposed CAP, such as electrification or infrastructure efficiency improvements (e.g., CAP measures EE-4a through EE-4d), would also occur at existing Metropolitan facilities. These projects would not require the use of acutely hazardous pollutants that could be released in the event of inundation.

As discussed above, projects implemented under the CAP would occur primarily at existing Metropolitan facilities. They would not substantially increase impervious surface cover in a manner that would substantially impede groundwater recharge. Furthermore, the CAP does not involve any projects that would directly or indirectly increase water demand that could decrease groundwater supplies. Given the analysis above, impacts related to floods, tsunami, seiche, and groundwater impacts associated with hydrology and water quality would be less than significant and no mitigation would be required.

5.8 Land Use and Planning

Pursuant to Appendix G of the *State CEQA Guidelines*, a potentially significant land use and planning impact would occur if implementation of the proposed program would:

- Physically divide an established community; or
- Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Implementation of individual projects under the proposed CAP would not result in land use and planning conflicts. Individual projects under the CAP include electrification (CAP measure DC-2), BESS (CAP measure E-4), and infrastructure efficiency improvements (CAP measures EE-4a through EE-4d) at existing Metropolitan facilities and carbon capture and sequestration projects on agricultural land owned by Metropolitan (CAP measures CS-1 through CS-3). Existing facilities owned and operated by Metropolitan are currently developed with water and energy infrastructure, and agricultural land owned by Metropolitan proposed for carbon capture and sequestration projects is surrounded by existing agricultural land. Because projects would occur at facilities on land currently owned by Metropolitan and the nature of individual proposed projects would be consistent with the current land use at these locations, the proposed CAP would not physically divide an established community or cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. Therefore, there are no impacts associated with land use and planning and no mitigation would be required.

5.9 Mineral Resources

Pursuant to Appendix G of the *State CEQA Guidelines*, a potentially significant mineral resources impact would occur if implementation of the proposed program would:

- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or
- Result in the loss of availability of a locally important mineral resources recovery site delineated on a local general plan, specific plan, or other land use plan.

Mineral resources found in the Plan Area include construction aggregate (sand, gravel, and crushed stone), clay, and petroleum. The Surface Mining and Reclamation Act of 1975 requires policy makers to consider mineral resource recovery areas that have been designated Mineral Resource Zone (MRZ)-2, which indicates significant mineral deposits are present or likely to be present. Furthermore, many local jurisdictions have general plan policies in place that provide oversight and management of mineral resources. Implementation of some of the proposed GHG reduction measures would necessitate earth moving or ground disturbing activities, the removal or installation of facilities and infrastructure, or placement of permanent structures. However, proposed new structures (e.g., BESS facilities constructed pursuant to CAP measure E-4) and other potential infrastructure improvements would be located at existing Metropolitan facilities, which are already developed with water treatment and conveyance infrastructure. These projects would not result in expansion of the footprints of existing Metropolitan facilities, would not convert land uses, and would not impact the availability of a known mineral resource. Other potential projects under the CAP would include carbon capture and sequestration projects on land currently in agricultural production (CAP measures CS-1 through CS-3). The proposed land use and extent of ground disturbance associated with these projects would be consistent with the current conditions at these agricultural sites. As such, individual projects under the proposed CAP would not damage or otherwise preclude access to mineral resources in the Plan Area beyond current conditions.

Implementation of individual projects under the proposed CAP would not result in the loss of availability of mineral resources that are of value to the region, to the residents of the state, or identified in any local jurisdiction's land use plans. No impact to mineral resources would occur, and no mitigation would be required.

5.10 Population and Housing

Pursuant to Appendix G of the *State CEQA Guidelines*, a potentially significant impact to population and housing would occur if implementation of the proposed program would:

- Induce substantial unplanned population growth in an area either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure); or
- Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.

Implementation of individual projects under the proposed CAP would not induce population growth directly or indirectly, remove existing housing, or displace existing populations because the CAP does not propose changes to policies related to land use or residential zoning. Construction activities for individual proposed projects would be temporary in nature and would require mobilization of construction crews to individual project sites. However, it is anticipated that construction labor would be sourced from the local/regional labor pool and would not result in substantial population growth in the Plan Area.

Operation of individual projects, such as BESS facilities pursuant to CAP measure E-4 or retrofitting and installing new equipment pursuant to CAP measures EE-4a through EE-4d, generally would not have a population-generating component and would not be expected to substantially increase population in the Plan Area. The proposed CAP does not include measures that would propose new homes or businesses, nor would projects require large increases in employment.

The proposed CAP would include projects on Metropolitan's existing facilities located throughout the Plan Area. Therefore, implementation of proposed CAP projects would not induce substantial unplanned population growth either directly or indirectly, nor displace substantial numbers of existing people or housing, thus there is no impact to population and housing associated with projects implemented under the proposed program, and no mitigation would be required.

5.11 Public Services

Pursuant to Appendix G of the *State CEQA Guidelines*, the proposed program would have a potentially significant impact on public services if it would:

- Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:
- Fire protection;
- Police protection;
- Schools;
- Parks; or
- Other public facilities.

Construction associated with individual projects proposed under the CAP would be temporary in nature and would involve mobilization of construction crews to project construction sites throughout the Plan Area. It is anticipated that construction labor would be sourced from a local/regional labor pool. Future projects proposed under the CAP would not require the long-term relocation of workers or families that would increase demand on public services or increase in police or fire protection response times near construction sites. It is possible that construction activities may require temporary relocation of construction workers, such as projects occurring in more remote sites (e.g., desert locations) of the Plan Area. However, such relocation would be temporary in nature and not of a scale expected to result in an increased demand for public services necessitating new or physically altered facilities. As such, there would be no impact from construction to public services.

As described in Section 5.10, *Population and Housing*, the proposed CAP would not result in substantial population growth in the Plan Area. Post-construction implementation of proposed individual projects, such as operation of BESS projects (CAP measure E-4) and retrofitting and installing new equipment (CAP measures EE-4a through EE-4d), would not result in substantial population growth that would require the provision of new public services or physically altered government facilities because these projects do not have a population-generating component. If needed, minor increases in employment needed for operation and maintenance of new or improved infrastructure would not be expected to result in substantial population growth in the Plan Area, as such employment would generally be expected to be sourced from the regional labor pool. Based on the analysis above, construction and operation of individual projects under the proposed CAP would not result in a need for new police and fire protection facilities, schools, parks, or other public facilities that may result in significant environmental impacts. Therefore, there would be no impact related to governmental facilities such as police and fire protection, schools, and parks associated with public services, and no mitigation would be required.

5.12 Recreation

Pursuant to Appendix G of the *State CEQA Guidelines*, the proposed program would have a potentially significant impact on recreation if it would:

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
- Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

The projects proposed under the CAP would not increase the use of existing neighborhood or regional parks or other recreational facilities. As described in Section 5.11, *Public Services*, construction activities for projects under the CAP may result in a temporary increase in employment associated with construction workers at individual project sites. However, construction labor would generally be sourced locally or regionally and would not result in long-term relocation of construction workers that would increase the use of existing recreational facilities. Given the nature of projects under the CAP, any temporary increase in the use of neighborhood or regional parks or other recreational facilities resulting from construction workers would not be of a scale to result in substantial physical deterioration to such facilities.

Further, as discussed in Section 5.10, *Population and Housing*, post-construction implementation of the CAP would not result in substantial population growth in the Plan Area. As such, the program would not increase the use of existing neighborhood and regional parks or other recreational facilities in the Plan Area. Potential impacts related to parks and recreational facilities associated with recreation resources would be less than significant and no mitigation would be required.

5.13 Transportation

Pursuant to Appendix G of the *State CEQA Guidelines*, the proposed program would have a potentially significant impact on transportation if it would:

- Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities; or
- Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b); or
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); or
- Result in inadequate emergency access.

As discussed in Section 5.10, *Population and Housing*, and Section 5.11, *Public Services,* proposed projects to be implemented under the CAP would be located at existing Metropolitan facilities throughout the Plan Area. Construction activities for individual projects implemented under the proposed program would be temporary in nature and would require mobilization of construction crews to individual project sites. It is anticipated that construction labor would be sourced from the local/regional labor pool. Operation of individual projects, such as BESS facilities pursuant to CAP measure E-4 or retrofitting and installing new equipment pursuant to CAP measures EE-4a through EE-4d, generally would not be expected to substantially increase employment to operate the proposed project. Studies proposed under CAP measure CS-2 and CS-3 would be small in nature and would not require substantial travel to and from the study sites. The CAP does not include measures that would propose new homes or businesses that would result in a substantial increase in vehicle miles travelled (VMT). Given the relatively small nature of the projects proposed under the CAP, VMT during construction and operation of the proposed projects are not expected to increase substantially.

Construction trips for individual projects that may be implemented under the proposed CAP can be estimated using established criteria for estimating worker and delivery trips by construction workers and vendors (e.g., material delivery, concrete truck, water truck)[26] using CalEEMod, which is also used for analyzing potential air quality impacts. Construction trips for example projects of similar sizes to those of representative projects proposed under the CAP, such as the construction of the BESS facilities (CAP measure E-4) are shown in Table 36.

Table 36 Construction Trips Associated with Example Projects

	Number of Daily One-Way Trips[1]	
Phase	**1-Acre Project**	**5-Acre Project**
Demolition	10 worker trips	16 worker trips
Site Preparation	6 worker trips	18 worker trips
Grading	10 worker trips	16 worker trips
Building Construction[2]	18 worker trips 8 vendor trips	92 worker trips 36 vendor trips
Paving	18 worker trips	20 worker trips
Architectural Coating	18 worker trips	92 worker trips

[1] Based on CalEEMod methodology, the number of construction worker trips for the demolition, site preparation, grading, and paving phases assumes 1.25 construction workers (or 2.5 daily one-way construction worker trips) per piece of construction equipment. For the building construction and architectural coating phases for commercial and industrial land uses, the number of construction worker trips assumes 0.42 daily one-way trips per 1,000 square feet and the number of vendor trips assumes 0.1639 daily one-way vendor trips per 1,000 square feet.

[2] Vendor trips include material delivery, concrete, and water trucks.

Source: California Air Pollution Control Officers Association 2017

[26] Given the nature of the proposed CAP measures, it is not anticipated that substantial soil import or export would be required.

As shown in Table 36, construction trips for "typical" construction activities would represent a negligible increase in daily traffic volumes in areas surrounding existing and potential future Metropolitan facilities where the majority of proposed individual CAP projects would be implemented (such as the locations of the proposed BESS projects at Metropolitan facilities in the cities of Los Angeles and La Verne; and unincorporated Riverside County pursuant to CAP measure E-4). Furthermore, individual projects proposed under the CAP would be located at existing Metropolitan facilities and would not be expected to require partial or full closures of public roadways. Therefore, construction activities associated with proposed individual projects would not conflict with an applicable plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities; substantially increase hazards due to a geometric design feature or incompatible uses; or result in inadequate emergency access. Construction-related impacts to the transportation network would be less than significant and no mitigation would be required.

During operation, traffic generated by proposed individual projects would include minimal employee maintenance, repair, and inspection trips (approximately two to 10 daily trips on days when maintenance, repair, or inspection is required). However, many program activities are anticipated to occur at existing Metropolitan facilities where maintenance trips to these existing facilities are already occurring. Furthermore, maintenance activities would likely be conducted on a monthly or weekly basis, rather than a daily basis. As a result, individual projects under the CAP would not substantially increase the number of required maintenance trips. Therefore, operation of the proposed program would not conflict with an applicable plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. In addition, implementation of the proposed CAP would not result in any permanent alterations to existing roadway alignments or intersections that could create a traffic hazard, incompatible use, or limit emergency access. Furthermore, as described in Chapter 2, *Project Description*, several of the proposed CAP measures would reduce vehicle trips including, but not limited to, expanding the subsidized transit commute program (CAP measure EC-1), providing employee education programs on public transportation and vanpools (CAP measure EC-2), incentivizing use of alternative transportation (CAP measure EC-4), and facilitating alternative work schedules (e.g., telecommuting and flexible schedules; CAP measure EC-5). Therefore, post-construction impacts to the transportation network would be less than significant and no mitigation would be required.

CEQA Guidelines Section 15064.3(b) identifies criteria for evaluating transportation impacts using VMT. VMT is a measurement of miles traveled by vehicles within a specified area over a specific time period. Unlike level of service, VMT does not measure delay or traffic congestion levels. Specifically, the guidelines state VMT exceeding an applicable threshold of significance may indicate a significant impact. According to CEQA Guidelines Section 15064.3(b)(3), a lead agency may include a qualitative analysis of operational and construction traffic. Currently, official measures and significance thresholds related to VMT are still being developed and have not yet been adopted by Metropolitan. A VMT calculation is typically conducted on a daily or annual basis, for long-range planning purposes. As discussed above, traffic on local roadways would be temporarily increased during construction of individual projects due to construction worker and vendor trips. Increases in VMT from construction would be limited to the duration of construction activities and temporary in nature. Because construction would not result in a permanent increase to area VMT and due to the minimal amount of construction work required for individual projects proposed under the CAP, construction crews would likely be locally or regionally sourced, rather than commuting large distances from another region, which would minimize construction-related VMT. Additionally, operation of individual projects under the proposed CAP would also involve minimal employee operations and maintenance trips at existing facilities. Thus, operation of individual projects under the CAP would not be expected to substantially increase VMT associated with travel to and from these facilities. Furthermore, as discussed above, several emissions reduction measures described in

Chapter 2, *Project Description*, would reduce VMT in the Plan Area by encouraging alternative transportation (CAP measure EC-4), telecommuting (CAP measure EC-5), and vanpool commuting options for Metropolitan employees (CAP measure EC-2). Therefore, the proposed program would not substantially increase VMT in the Plan Area. Impacts associated with VMT per CEQA Guidelines Section 15064.3(b) would be less than significant, and no mitigation would be required.

5.14 Utilities and Service Systems

Pursuant to Appendix G of the *State CEQA Guidelines*, the proposed program would have a potentially significant impact on utilities and service systems if it would:

- Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects; or
- Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years; or
- Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments; or
- Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals; or
- Not comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

Individual projects under the proposed CAP may involve replacement of existing water infrastructure (i.e., pump refurbishment pursuant to CAP measure EE-4a through EE-4d) or construction of new or expanded electric power infrastructure (i.e., BESS facilities pursuant to CAP measure E-4, EV charging stations pursuant to CAP measure FL-4 and CAP measure EC-3). However, as described in Chapter 2, *Project Description*, these infrastructure improvements would be located at and within the existing footprints of Metropolitan facilities. Furthermore, such improvements would serve to improve the efficiency of Metropolitan's operations by reducing energy consumption and emissions. Individual projects under the proposed CAP would not require new or relocated wastewater treatment, stormwater drainage, natural gas, or telecommunications facilities.

The proposed CAP includes measures intended to increase water conservation, such as turf removal programs and water conservation education (CAP measures WC-1 through WC-6). None of the individual projects to be implemented under the CAP would generate substantial new water demand. As such, there would be sufficient water supplies available to serve these projects and reasonably foreseeable future development during normal, dry, and multiple dry years.

Construction of individual projects under the proposed CAP would result in the temporary generation of solid waste, such as demolition debris. However, impacts to solid waste infrastructure associated with construction activities would be temporary and reduced by compliance with the California Green Building Code and Senate Bill 1016, which require that construction operations recycle a minimum of 50 percent of waste generated. Compliance with this requirement would ensure that solid waste generated from construction of individual projects would be minimized to the extent practical.

Non-diverted waste generated by construction and operation of individual projects would require disposal in area landfills. There are active landfills throughout the Plan Area with substantial remaining capacity for receiving construction waste. These facilities include, but are not limited to, Scholl Canyon Landfill in Glendale (approximately 9,900,000 cubic yards [cy] remaining capacity), El Sobrante Landfill in Corona (approximately 143,977,170 cy remaining capacity) and Frank R. Bowerman Sanitary Landfill in Irvine (approximately 205,000,000 cy remaining capacity). In addition, AB 939 requires that all California counties provide at least 15 years of ongoing landfill capacity. With this long-range landfill capacity planning, adequate landfill capacity would exist or be constructed to accommodate the solid waste generated by individual projects under the proposed CAP.

Additionally, as described in Chapter 2, *Project Description*, the proposed CAP includes GHG reduction measures that would increase solid waste diversion through partnering programs with municipal waste agencies and reduce the existing solid waste generation from Metropolitan facilities to achieve zero waste (CAP measures WA-1 through WA-4). Implementation of the proposed CAP would have a less than significant impact to utilities and service systems, and no mitigation would be required.

5.15 Wildfire

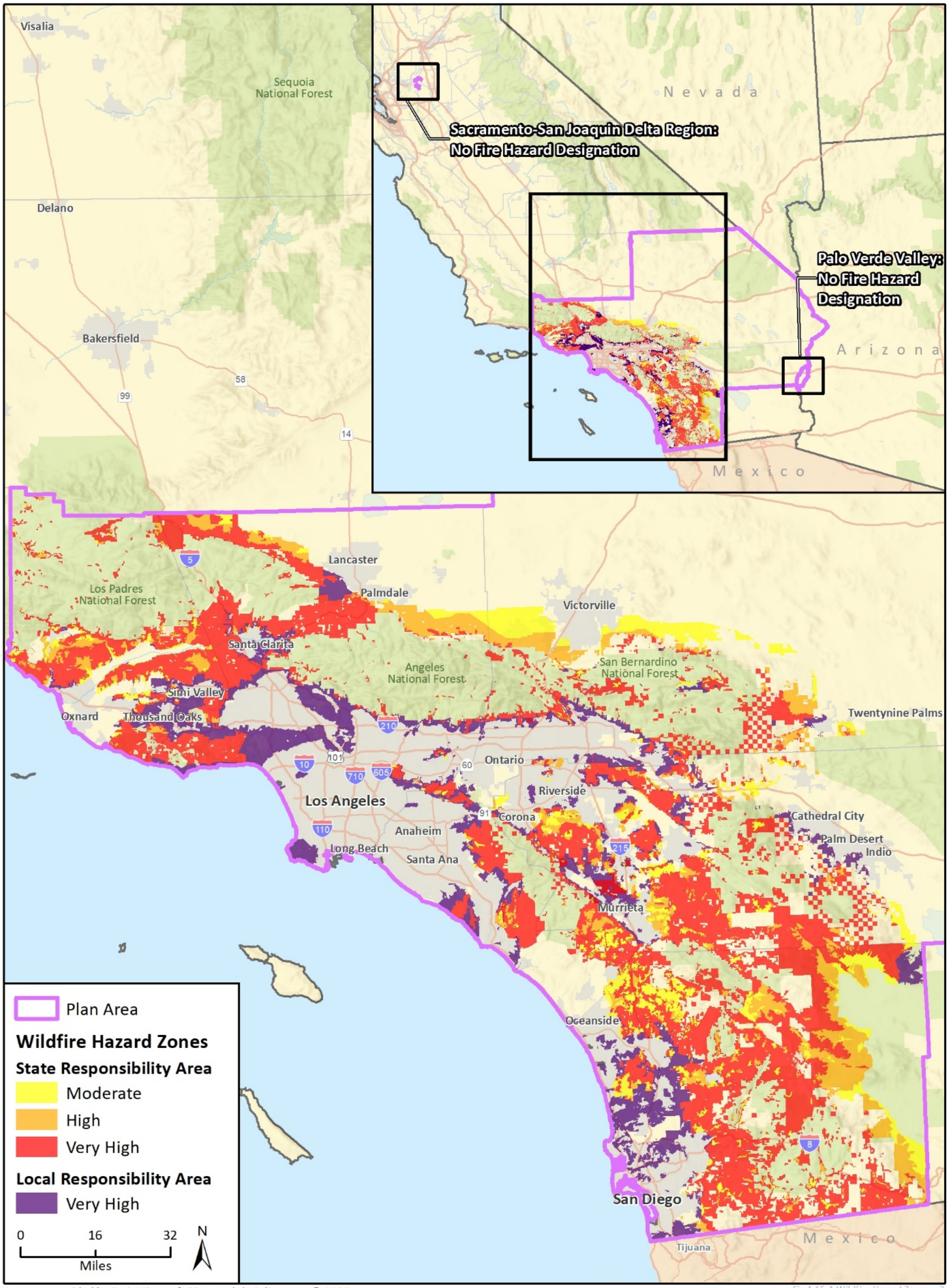
Pursuant to Appendix G of the *State CEQA Guidelines*, a potentially significant wildfire impact would occur if implementation of the proposed program would, within or near a State Responsibility Area (SRA) or Very High Fire Hazard Severity Zone (FHSZ):

- Substantially impair an adopted emergency response plan or emergency evacuation plan; or
- Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire; or
- Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment; or
- Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.

In California, responsibility for wildfire prevention and suppression is shared by federal, state, and local agencies. Federal agencies are responsible for federal lands in Federal Responsibility Areas; California has determined that some non-federal lands in unincorporated areas with watershed value are of statewide interest and have classified those lands as SRA, which are managed by the California Department of Forestry and Fire Protection (CAL FIRE). All incorporated areas and other unincorporated lands are classified as Local Responsibility Areas (LRA).

While nearly all of California is subject to some degree of wildfire hazard, there are specific features that make certain areas more hazardous. CAL FIRE is required by PRC Section 4201-4204 and California Government Code Section 51175-89 to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. The primary factors that increase an area's susceptibility to fire hazards include slope, aspect, vegetation type and condition, and atmospheric conditions. CAL FIRE maps fire hazards based on zones, referred to as FHSZs. CAL FIRE maps three zones for SRA: 1) Moderate FHSZ; 2) High FHSZ; and 3) Very High FHSZ. Only the Very High FHSZs are mapped for LRA. Each of the zones influence how people construct buildings and protect property to reduce risk associated with wildfires. Under state regulations, areas within Very High FHSZ must comply with specific building and vegetation management requirements intended to reduce property damage and loss of life within these areas. Figure 17 shows the LRA Very High FHSZ and all FHSZ in SRA within the Plan Area.

Figure 17 Fire Hazard Severity Zones



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Additional data provided by USGS, 2017 and CALFIRE, 2007.

Individual projects to be implemented under the proposed CAP may include construction of BESS structures at Metropolitan facilities, electrification at existing Metropolitan facilities, and replacement of existing infrastructure. Several existing Metropolitan facilities where proposed CAP projects may be implemented are located within or near LRA Very High FHSZs or SRA of Moderate FHSZ, High FHSZ, and Very High FHSZ. However, as described in Section 5.6, *Hazards and Hazardous Materials*, the proposed projects that may be implemented at these sites would be completed within existing Metropolitan facilities and would not interfere with an adopted emergency response plan or emergency evacuation plan. Should individual projects require temporary roadway or lane closures, Metropolitan's engineering project specifications package requires contractors to prepare a traffic control plan for each construction site in public roadways pursuant to the local and/or state traffic authority's requirements. Therefore, if proposed projects were to encroach upon public roadways, the traffic control plan would implement measures to minimize traffic flow disruption and maintain emergency access routes to the extent feasible during construction. As such, impacts related to impairment of an adopted emergency response or emergency evacuation plan would be less than significant and no mitigation would be required.

Individual projects proposed under the CAP do not include the construction of housing or a substantial increase in total number of employees. Temporary construction employees would be anticipated to be sourced locally or regionally. Therefore, the proposed program would not introduce new permanent residents or permanent employees to sites in the Plan Area. Because there would be no new occupants in the Plan Area as a result of the CAP, the proposed program would not expose project occupants to pollutant concentrations resulting from wildfire. Accordingly, there would be no impact.

Construction of individual projects under the proposed program, including those related to installation of BESS facilities or removal of natural gas infrastructure at existing facilities, would involve the use of construction equipment powered by internal combustion engines. Use of heavy-duty equipment during construction of individual projects under the proposed program may produce sparks with the potential to ignite vegetation. However, California PRC Section 4442 mandates the use of spark arresters, which prevent the emission of flammable debris from exhaust on earth-moving and portable construction equipment with internal combustion engines operating on any forest-covered, brush-covered, or grass-covered land. Furthermore, PRC Sections 4427 and 4431 specify standards for conducting construction activities on days when a burning permit is required (excessive smog or high fire danger), and PRC Section 4428 requires construction contractors to maintain fire suppression equipment during the highest fire danger period (April 1 to December 1) when operating on or near any forest-covered, brush-covered, or grass-covered land. Furthermore, Metropolitan's standard specifications for construction projects require gasoline-powered or diesel-powered machinery used during construction to be equipped with standard exhaust controls and muffling devices that will act as spark arrestors. The specifications also require fire containment and extinguishing equipment to be located on site and remain accessible during construction activities. Construction workers must be trained in the use of fire suppression equipment. Therefore, with compliance with applicable PRC provisions and Metropolitan's standard specifications, construction-related activities for projects implemented under the CAP would not exacerbate wildfire risk. This impact would be less than significant, and no mitigation would be required.

Operation and maintenance of the individual projects constructed under the proposed program would not exacerbate fire risk, as the purpose of maintenance activities is to ensure the proper operation of installed facilities. This includes evaluating and ensuring that equipment is in proper working condition, with a low risk of creating sparks that could start a wildfire.

Projects implemented under the proposed program would be subject to the requirements of the California Fire Code. Chapter 49 of the California Fire Code includes requirements for projects in Wildland-Urban Interface Fire Areas, including hazardous vegetation and fuel management for buildings and structures in LRA Very High FHSZ or SRA. Some jurisdictions have amended the California Fire Code to adopt more stringent fire-reduction measures. For example, Orange County Fire Authority requires all new buildings in wildfire risk areas to submit a fuel modification plan for approval prior to construction.

Chapter 12 of the California Fire Code includes standards for construction of energy systems, including BESS facilities. Such requirements include minimum separation distances between BESS facilities and buildings or combustible materials and preparation of hazard mitigation analyses at the request of the local fire code official. Compliance with these regulatory requirements would substantially reduce wildfire risk associated with individual projects under the proposed program. This impact would be less than significant, and no mitigation would be required.

As discussed above, construction of individual projects under the proposed CAP would be required to adhere to existing regulations requiring the use of spark arresters on equipment with internal combustion engines, maintenance of fire suppression equipment, and construction standards for days when a burning permit is required. Consequently, construction of individual projects under the proposed program would not be expected to substantially increase wildfire risk, and therefore would not increase exposure of people or structures to post-fire slope instability, landslides, or downstream flooding. This impact would be less than significant, and no mitigation would be required.

Individual projects implemented under the proposed program would not substantially affect slopes, soil stability, or the drainage of sites in the Plan Area, as most would be located at existing Metropolitan facilities which are heavily graded and developed. Individual projects requiring substantial changes to site drainage patterns would be subject to applicable regulations of the SWRCB and RWQCB related to post-construction drainage patterns and stormwater retention, reducing the potential for downstream flooding impacts or drainage changes. Compliance with the California Building Code and implementation of the recommendations of site-specific geotechnical evaluations would reduce risks to people or structures associated with flooding or landslides resulting from post-fire runoff, slope instability, or drainage changes. Therefore, post-construction impacts would be less than significant, and no mitigation would be required.

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6 Other Required CEQA Discussion

This section discusses other topics for which CEQA requires analysis in addition to the specific resource areas discussed in Chapter 4, *Environmental Impact Analysis*. CEQA requires an EIR to evaluate a project's foreseeable effects in relationship to other broader changes that may be occurring in the environment (*State CEQA Guidelines* Section 15126; PRC Section 21002.1). Accordingly, this chapter includes a discussion of the other CEQA-mandated analyses, including the following:

- Section 6.1, Significant and Unavoidable Environmental Impacts
- Section 6.2, Significant and Irreversible Environmental Impacts
- Section 6.3, Growth Inducement

6.1 Significant and Unavoidable Environmental Impacts

State CEQA Guidelines Sections 15126(b) and 15126.2(c) require an EIR to describe any significant impacts, including those that can be mitigated but not to a less-than-significant level, the implications of any impacts that cannot be avoided and reasons why the project is being proposed, despite these effects.

Due to the lack of project-specific details about the individual projects proposed under the CAP, three resource areas are identified that may have the potential for significant and unavoidable impacts. Implementation of mitigation measures would reduce environmental impacts to the extent feasible; however, due to the lack of project-specific details about the individual projects proposed under the CAP, it is unknown at this time whether the impact can be reduced to less than significant. Therefore, a significant an unavoidable impact has been assumed. Table 37 lists the potential significant and unavoidable impacts, as well as the mitigation measures proposed for each impact (see Section 4.1 *Air Quality,* Section 4.3 *Cultural Resources,* and Section 4.4, *Noise*, for further discussion of each resource area). As proposed projects are implemented under the CAP and project-specific details become available, subsequent CEQA analysis will be conducted at the project level to determine the impact significance level for each resource area.

Table 37 Significant and Unavoidable Impacts and Mitigation Measures

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
AQ-A: Would the proposed program conflict with or obstruct implementation of the applicable air quality plan?	Significant	AQ-1: Construction Air Quality Assessment AQ-2: Implement Emissions Reduction Measures	Significant and unavoidable
AQ-B: Would the proposed program result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	Significant	AQ-1 and AQ-2	Significant and unavoidable
CUL-A: Would the proposed program cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	Significant	CUL-1(a): Built Environment Investigation CUL-1(b): Built Environment Documentation Program CUL-3: Previously Unidentified Resources Encountered During Construction.	Significant and unavoidable
CUL-B: Would the proposed program cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?	Significant	CUL-2(a): Phase 1 Archaeological Resource Investigation CUL-2(b): Extended Phase 1 Investigation CUL-2(c): Avoidance of Archaeological Resources CUL-2(d): Phase 2 Archaeological Resources Investigation and Evaluation CUL-2(e): Phase 3 Archaeological Data Recovery Program CUL-2(f): Processing and Curation of Archaeological Materials CUL-2(g): Cultural Resources Monitoring CUL-3: Previously Unidentified Resources Encountered During Construction	Significant and unavoidable
NOI-A: Would the proposed program result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Significant	NOI-1: Locate Excavation Sites Away from Noise-Sensitive Receivers, Where Feasible NOI-2(a): Conduct Project-Level Noise Studies for Construction Activities Where Noise-Sensitive Receptors are Present NOI-2(b): Implement Noise Reduction Measures NOI-2(c): Conduct Project-Level Noise Studies for Post-Construction Activities Where Noise Sensitive Receivers are Present	Significant and unavoidable
NOI-B: Would the proposed program result in the generation of excessive groundborne noise levels?	Significant	NOI-3(a): Locate Excavation Sites Away from Vibration-Sensitive Receivers, Where Feasible NOI-3(b): Conduct Project-Level Vibration Analysis for Construction Activities Where Vibration-Sensitive Receivers are Present	Significant and unavoidable

6.1.1 Significant and Irreversible Environmental Impacts

Pursuant to Section 15126.2(d) of the *State CEQA Guidelines*, an EIR must consider any significant irreversible environmental changes that would be caused by the proposed program should it be implemented. Specifically, Section 15126.2(d) of the *CEQA Guidelines* describes significant irreversible environmental changes as follows:

> Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as a highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified (14 CCR 15126.2[d]).

Determining whether the proposed program may result in significant and irreversible effects requires a determination of whether key resources would be degraded or destroyed in such a way that there would be little possibility of restoring them.

The proposed program does not include individual projects that would result in irreversible damage to the environment through the commitment of resources or environmental accidents. The proposed CAP would reduce Metropolitan's GHG emissions by implementing emissions reduction measures such as energy-efficient retrofits, installation of BESS facilities at existing Metropolitan treatment and pumping plants, fleet conversion, and waste reduction. By reducing GHG emissions, the proposed CAP would also provide a number of co-benefits, such as reduced energy consumption, criteria pollutant emissions, water use, and demand for solid waste facilities, that would improve the environment within the Plan Area.

As discussed throughout Chapter 4, *Environmental Impact Analysis*, several of the individual projects to be implemented under the proposed CAP would involve construction. While construction activities would require the consumption of natural resources and construction materials, such as petroleum, the use of construction materials and nonrenewable resources would not be unusual or extraordinary and would not negatively impact the availability of these resources. Furthermore, the commitment of these resources to temporary construction activities would not negate the long-term benefits of the proposed CAP associated with reductions in the use of nonrenewable resources.

As discussed throughout the PEIR and specifically in Chapter 5, *Effects Found Not to be Significant*, the proposed CAP does not include any changes that would alter the planned population or employment growth anticipated under applicable regional plans within the Plan Area. The CAP would not directly or indirectly increase population or commit future generations to similar uses within the Plan Area as it does not propose new housing, employment, or the expansion of water supply infrastructure to new areas where they do not already exist. Given the small amounts of hazardous substances used during construction activities and the federal, state, and local regulations governing the use of such substances and the minimal use of such materials during the operation of projects implemented under the proposed program, the proposed program would not damage the environment or pose a risk to public health. Overall, the proposed CAP would result in the conservation of energy and nonrenewable resources within the Plan Area by improving energy-efficiency of buildings and operations (CAP Strategy 5), reducing petroleum use by improving vehicle and equipment efficiencies (CAP measures EC-3 and FL-4), and conserving water (CAP Strategy 8). Therefore, the proposed CAP does not include any measures that would create a wasteful commitment of energy or nonrenewable resources or result in an environmental accident that would cause significant and irreversible impacts.

6.1.2 Growth Inducement

Section 15126.2(e) of the *State CEQA Guidelines* requires a discussion of a proposed project's potential to foster economic or population growth, including ways in which a project could remove an obstacle to growth. Growth itself does not necessarily create significant physical changes to the environment. However, depending upon the type, magnitude, and location of growth, it can result in significant adverse environmental effects. Generally, a project may be considered growth-inducing if it results in one or more of the conditions identified below:

- Induces population growth;
- Induces economic expansion;
- Establishes a precedent-setting action (e.g., an innovation, a radical change in zoning or general plan designation);
- Results in development or encroachment in an isolated or adjacent area of open space (i.e., being distinct from "infill" development); or
- Removes an impediment to growth (e.g., the establishment of an essential public service or the provision of new access to an area).

A proposed project's growth-inducing potential is considered significant if project-induced growth could result in significant physical effects in one or more environmental resource areas.

6.1.3 Population Growth

The proposed program would focus on the reduction of GHG emissions resulting from Metropolitan's operations within the Plan Area. As discussed in Chapter 5, *Effects Found Not to be Significant*, the proposed CAP would not directly induce population growth because it does not include residential land uses or the construction of housing. Furthermore, the CAP would not indirectly induce population growth because it would not expand any existing infrastructure to serve new areas.

6.1.4 Economic Expansion

The proposed CAP would include measures that require construction and maintenance activities. Construction activities associated with individual projects would likely be performed by workers hired from the local region. Because construction workers would be expected to be drawn from the existing regional workforce, construction of individual projects would not be growth-inducing from a temporary employment standpoint. The proposed CAP includes GHG reduction measures that would result in changes to Metropolitan's existing and ongoing operations such as equipment fuel conversion (CAP Strategy 3), building energy and utility equipment efficiency improvements (CAP Strategy 5), BESS facilities (CAP measure E-4), carbon capture and sequestration projects (CAP measures CS-2 through and CS-3), and expansion of alternative transportation options for employees (CAP Strategy 6). These changes may result in new maintenance activities conducted by existing Metropolitan employees, which may result in the hiring of a limited number of new employees. However, program activities would not result in large increases in employment. Similar to construction-related impacts, new employees, if warranted for operation and maintenance of CAP projects, would be expected to be sourced from the regional workforce and are unlikely to result in substantial relocation of workers to the Plan Area. Therefore, the proposed program would not induce growth from an economic expansion.

6.1.5 Precedent-Setting Action

The proposed CAP does not include any General Plan or zoning amendments or create opportunities to expand existing water supplies. Rather, the CAP proposes measures that Metropolitan can undertake in order to improve the sustainability of its operations and reduce GHG emissions, including infrastructure upgrades and improvements at existing Metropolitan facilities in the Plan Area. As discussed above and in Chapter 5, *Effects Found Not to be Significant*, the CAP does not contain measures that would result in substantial population growth either directly or indirectly. As such, the proposed CAP would not set a precedent that would result in new growth-inducing impacts in the area.

6.1.6 Development of Open Space/Vacant Land

Development of open space is considered growth-inducing when it occurs outside urban boundaries or in isolated locations instead of infill areas. The proposed CAP does not include new residential, commercial, or other development that would result in the development of open space or vacant land in isolated areas that could induce growth at the periphery of developed areas within the Plan Area. The CAP would involve implementation of carbon capture and sequestration projects on agricultural land in the Palo Verde Valley and Delta Islands pursuant to CAP measures CS-2 and CS-3; however, these efforts would involve implementation of regenerative agricultural practices (i.e., cover cropping), which would be substantially similar to existing land use occurring on these sites. As such, the proposed CAP would not involve development of open space or vacant land in the Plan Area.

6.1.7 Removal of an Impediment to Growth

The proposed CAP includes improvements to Metropolitan's operations that would reduce GHG emissions and does not include any measures that would expand water supply infrastructure, public roadways, or other utilities to areas currently lacking these services. Any infrastructure improvements proposed under the CAP would be for the purpose of reducing GHG emissions and improving Metropolitan's environmental sustainability, rather than for the expansion of services to new areas. Accordingly, the proposed program would not remove existing obstacles to growth within the Plan Area.

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7 Alternatives

7.1 Introduction

During consideration of a project or program that could have a potentially significant effect to the environment, CEQA requires that alternatives that could avoid or lessen the project's significant effect(s) be considered (*State CEQA Guidelines,* Section 15126.6). This chapter presents potential alternatives to the proposed program and evaluates them as required by CEQA. The *State CEQA Guidelines* also require EIRs to identify the environmentally superior alternative from among the alternatives (including the proposed program). The environmentally superior alternative is identified in Section 7.5, *Identification of the Environmentally Superior Alternative*.

7.2 Summary of Program Objectives and Significant Impacts

7.2.1 Program Objectives

The objectives of the proposed program, the CAP, include the following:

- Identify and quantify emissions associated with Metropolitan operations to prepare a baseline GHG emissions inventory in order to track emissions reduction progress over time
- Adopt an emissions reduction target that is both consistent with existing state emissions reduction targets while preparing Metropolitan to meet future state targets
- Identify and quantify specific reduction actions and policies that Metropolitan may implement to achieve the goal of reducing GHG emissions from its construction and operational activities
- Provide a roadmap for future activities to achieve consistency with the CAP and use CEQA streamlining tools for analysis of GHG emissions pursuant to the requirements of CEQA Guidelines Section 15183.5

7.2.2 Significant Environmental Impacts

The proposed program would potentially result in the following significant impacts (or potentially significant impacts) that could not be reduced to less than significant levels with mitigation, as described in Chapter 6, *Other Required CEQA Discussion*.

- Conflict with or obstruct implementation of the applicable air quality plan (AQ-A)
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (AQ-B)

- Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5 (CUL-A)
- Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5 (CUL-B)
- Result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (NOI-A)
- Result in the generation of excessive groundborne vibration levels (NOI-B)

7.3 Alternatives Considered but Rejected

Section 15126.6(a) of the *State CEQA Guidelines* states that an EIR shall describe "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project," as well as provide an evaluation of "the comparative merits of the alternatives." Under Section 15126.6(a), an EIR does not need to consider alternatives that are not feasible, nor need it address every conceivable alternative to the project. Section 15126.6(f) of the *State CEQA Guidelines* states that the range of alternatives "is governed by the 'rule of reason' that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice." The focus is on informed decision-making and public participation rather than providing a set of alternatives simply to satisfy format.

As described below, two types of alternatives to the proposed program were considered—alternative locations and alternative methods—along with a No Program Alternative. Except for the No Program Alternative, all these potential alternatives have been rejected, as described below.

7.3.1 Alternative Locations

Metropolitan's proposed CAP is a programmatic approach to reduce GHG emissions within the Plan Area in accordance with state GHG emissions reduction targets. The proposed CAP accomplishes this by adopting strategies and measures that reduce GHG emissions. As described in Chapter 2, *Project Description*, these strategies and measures would be implemented at Metropolitan facilities and land holdings under Metropolitan's jurisdiction throughout the Plan Area. The proposed project locations have been selected at the most operationally feasible location or are proposed because they are located in areas where improvements can be made to existing Metropolitan operational facilities for which an alternative location does not exist. Constructing new facilities or acquiring property for other locations would not enable Metropolitan to improve the existing facilities or take advantage of existing infrastructure that would support the CAP measures and could create new impacts of its own. Additionally, alternative locations would not enable Metropolitan to create emissions reductions at existing facilities, which would conflict with the goal of reducing Metropolitan's operational GHG emissions. Therefore, an alternative site where the program could be implemented would not be appropriate because it would exclude land, facilities, and infrastructure under Metropolitan's control where emissions reduction measures could feasibly be implemented. As such, consideration of an alternative location has been eliminated from further analysis in this PEIR.

7.3.2 Alternative Methods

The proposed CAP includes GHG reduction measures, which would result in total mass GHG emissions reductions from direct and indirect GHG emissions related to Metropolitan operations. The categories of emissions reduction measures where most potentially significant environmental impacts would result are the Electricity (E) and Energy Efficiency (EE) categories (measures associated with producing renewable energy and transitioning existing uses to clean energy) and the Carbon Sequestration (CS) category (measures associated with sequestering carbon on Metropolitan-owned land). Metropolitan could consider varying degrees of implementation of each GHG reduction measure to reach its ultimate 2030 target and make progress toward the 2045 goal. However, the CAP that is proposed and evaluated throughout this PEIR has recommended the full spectrum of feasible GHG reduction measures at the levels that reductions can be feasibly estimated, attained, and substantiated. This PEIR has programmatically evaluated the potential environmental impacts of implementation of the suite of reduction measures based on the best available information regarding the technical and economic feasibility of those measures. Therefore, this PEIR appropriately evaluates the landscape of environmental impacts that could potentially occur with all reduction measures considered.

The purpose of an alternatives analysis is to identify alternatives that reduce or avoid the significant impacts of the project. As summarized above and evaluated throughout the PEIR, significant and unavoidable environmental impacts could occur in relation to air quality, cultural resources, and noise, depending on project-level designs. These significant and unavoidable impacts are typically related to construction of individual projects under the proposed CAP. As described in Chapter 2, *Project Description*, emissions reduction measures under the CAP are grouped into various emissions reduction strategies, which include phasing out natural gas combustion at facilities, improving energy efficiency, and incentivizing more sustainable commutes. While many individual emissions reduction measures may not result in physical impacts to the environment, most of these reduction strategies include at least some measures with the potential to result in construction-related impacts. Because construction-related impacts would occur across most of the emissions reduction strategies, an alternative that would reduce the construction-related impacts under one strategy, would likely require implementation of additional projects under another strategy in order to achieve the GHG reduction target, such that the overall magnitude and type of construction-related impacts would not change substantially. Within the context of CEQA, this would not offer an alternative that would reduce the impacts of the project.

While commenters may suggest that certain GHG reduction measures be pursued, funded, or supported to a greater degree than others, as described above, Metropolitan has proposed a CAP that based on its assessment of local conditions, regulatory requirements, and feasibility, provides a full spectrum of GHG reduction measures at levels that can be feasibly achieved and quantified based upon the information and technology available today. As described in *State CEQA Guidelines* Section 15126.6(a),

An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives.

The draft PEIR provides a reasonable range of alternatives for consideration by decisionmakers. Metropolitan has considered and evaluated the categories of alternatives that reduce or avoid the significant impacts of the project. As such, evaluation of additional combinations or levels of implementation of the GHG reduction measures is not required nor would it be meaningful to the analysis.

7.4 No Program Alternative

Under the No Program Alternative, the proposed CAP would not be adopted or implemented. As a result, the CAP's coordinated program of proposed GHG emission reduction measures and policies would not be adopted or implemented in a coordinated manner to achieve consistency with the statewide goals. This alternative would not provide a clear pathway for Metropolitan to meet and exceed the statewide 2030 GHG reduction goal identified in Senate Bill (SB) 32 or meet the 2045 carbon neutrality goal established by Executive Order (EO) B-55-18. Under CEQA, each of Metropolitan's capital improvement projects would still be required to implement GHG emission reduction strategies, but rather than relying on consistency with the CAP, each project would have to identify and implement GHG reductions specific to the individual project only.

7.4.1 Comparison of the Impacts of the No Program Alternative to the Proposed Program

Under the No Program Alternative, compliance with legislative requirements under CEQA would be achieved through individual project-level analysis for all Metropolitan projects subject to discretionary review. Because Metropolitan would still need to comply with applicable statewide GHG reduction requirements, local and statewide air quality regulations, and water conservation requirements, many of the individual projects identified under this alternative would still be built (e.g., E-4, BESS; FL-4, install ZEV infrastructure; CS-2 and CS-3, regenerative agriculture and carbon sequestration), thus many of the physical environmental impacts identified in this PEIR could still occur. Therefore, impacts under the No Program Alternative may be similar to those of the proposed program. However, with the No Program Alternative, Metropolitan would identify and reduce individual project emissions on a project-by-project basis, and forgo the opportunity to reduce emissions from all of its activities (e.g., operational and construction). Nevertheless, because emissions reduction efforts under the No Program Alternative would not be as aggressive as those occurring under the proposed CAP, the No Program Alternative may result in reduced physical impacts to some resource areas.

Table 38 Alternatives Impact Comparison Table

Environmental Resource Area	Proposed Program Impacts	No Program Alternative Impacts
Aesthetics	Less than significant	Similar, but reduced.
Agriculture and Forestry	No impact	Similar
Air quality	AQ-A: Significant and unavoidable AQ-B: Significant and unavoidable AQ-C: Less than significant AQ-D: Less than significant	Similar, but reduced.
Biological Resources	BIO-A: Less than significant with mitigation BIO-B: Less than significant with mitigation BIO-C: Less than significant with mitigation BIO-D: Less than significant BIO-E: Less than significant BIO-F: Less than significant	Similar, but reduced
Cultural Resources	CUL-A: Significant and unavoidable CUL-B: Significant and unavoidable CUL-C: Less than significant	Similar, but reduced
Energy	No impact	Similar
Geology and Soils	Less than significant	Similar, but reduced
Greenhouse Gas Emissions	No impact	Greater: GHG reductions for individual projects would be analyzed and implemented. However, this would forgo an opportunity to realize GHG emissions reductions for all of Metropolitan's emissions.
Hazards and Hazardous Materials	Less than significant	Similar, but reduced
Hydrology and Water Quality	Less than significant	Similar, but reduced
Land Use Planning	No impact	Similar, but reduced
Mineral Resources	No impact	Similar
Noise	NOI-A: Significant and unavoidable NOI-B: Significant and unavoidable NOI-C: Less than significant	Similar, but reduced
Population and Housing	No impact	Similar
Public Services	No impact	Similar
Recreation	Less than significant	Similar, but reduce
Transportation	Less than significant	Similar, but reduced
Tribal Cultural Resources	TCR-A: Less than significant TCR-B: Less than significant	Similar, but reduced
Utilities and Service Systems	Less than significant	Similar, but reduced
Wildfire	Less than significant	Similar, but reduced

7.5 Identification of the Environmentally Superior Alternative

7.5.1 Environmentally Superior Alternative

If an alternative is considered clearly superior to the proposed project relative to identified impacts, Section 15126.6 of the *State CEQA Guidelines* requires that alternative to be identified as the environmentally superior alternative. By statute, if the environmentally superior alternative is the No Project Alternative, an EIR must also identify an environmentally superior alternative among the other alternatives.

Two alternatives to the proposed program, other than the No Program Alternative, were considered; however, these alternatives were not further considered and analyzed for the reasons stated in Section 7.3, *Alternatives Considered but Rejected*.

Based on the analysis provided in Section 7.4, *No Program Alternative*, the No Program Alternative would have “similar” or “similar but reduced” environmental impacts as the proposed program with regard to: aesthetics, agriculture, air quality, biological resources, cultural resources, energy, geology and soils, hazards and hazardous materials, hydrology and water quality, land use planning, mineral resources, noise, population and housing, public services, recreation transportation, tribal cultural resources, utilities and service systems, and wildfire. The No Program Alternative would result in reduced impacts due to the smaller scope of this alternative, however, the No Program Alternative would not necessarily avoid any significant and unavoidable impacts, and beneficial impacts to GHG and Energy discussed in Chapter 5, *Effects Found Not to be Significant*, would not be realized to the same extent as under proposed CAP implementation. Individual projects could be implemented that would reduce GHG emissions for Metropolitan, but to the extent that the proposed CAP is a commitment by Metropolitan to reduce its emissions to carbon neutrality by 2045, the No Program Alternative would not meet the program objectives identified by Metropolitan. In particular, this alternative does not meet the objective of providing a mechanism for CEQA streamlining of GHG emissions analysis.

The proposed program would implement GHG emission reduction measures, which would advance compliance with statewide GHG reduction goals and provide specific measures that would reduce GHG emissions from natural gas use, fossil fuel consumption, electricity use, water use, wastewater generation, and other resource use modifications. The proposed program, therefore, is considered to be the environmentally superior alternative.

8 References and Preparers

8.1 References

8.1.1 Project Description

California, State of (California). 2019. *California's Fourth Climate Change Assessment Statewide Summary Report*. January. Available online: http://www.climateassessment.ca.gov/state/ (accessed February 2020).

Intergovernmental Panel on Climate Change (IPCC). 2007. S*ummary for Policymakers. In: Climate Change 2007: The Physical Science Basis*. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.

____. 2014. *Climate Change 2014: Mitigation of Climate Change*. Summary for Policymakers - Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

____. 2018. *Summary for Policymakers*. In: Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Available online: https://www.ipcc.ch/sr15/ (accessed February 2020)

Metropolitan Water District of Southern California (Metropolitan). 2021. Draft Climate Action Plan for the Metropolitan Water District of Southern California.

_____. 2016. *2015 Urban Water Management Plan.* June 2016. Available online: http://www.mwdh2o.com/PDF_About_Your_Water/2.4.2_Regional_Urban_Water_Management_Plan.pdf (accessed January 2020).

National Aeronautics and Space Administration. 2020. *Global Climate Change, Arctic Sea Ice Minimum.* Site last updated: February 12, 2020. Available online: https://climate.nasa.gov/vital-signs/arctic-sea-ice/ (accessed February 2020).

United States Environmental Protection Agency (U.S. EPA). 2018. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016. U.S. EPA #430-R-18-003*. April 2018. Available online: https://www.epa.gov/sites/production/files/2018-01/documents/2018_complete_report.pdf (accessed February 2020)

8.1.2 Environmental Setting

California Coastal Conservancy. 2020. Santa Ana River Conservancy Webpage. https://scc.ca.gov/projects/santa-ana-river-conservancy/ (accessed February 2020).

California Department of Finance (DOF). 2020. E-1 Population Estimates for Cities, Counties, and the State. http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-1/ (accessed February 2020).

California State Association of Counties. 2014. Square Mileage by County. https://www.counties.org/pod/square-mileage-county (accessed April 2020).

City of Stockton. 2015. Urban Water Management Plan. http://www.stocktongov.com/files/uwmp.pdf (accessed March 2020).

County of Los Angeles. 2015. General Plan. http://planning.lacounty.gov/assets/upl/project/gp_final-general-plan.pdf (accessed February 2020).

____. 2020a. County Statistics Webpage. https://lacounty.gov/government/geography-statistics/statistics/ (accessed February 2020).

____. 2020b. Facts about LA County Biota. http://planning.lacounty.gov/sea/facts (accessed February 2020).

County of Orange. 2005. General Plan 2005: Chapter II. https://www.ocgov.com/civicax/filebank/blobdload.aspx?blobid=8585 (accessed February 2020).

County of Riverside. 2015. General Plan: Multipurpose Open Space Element. https://planning.rctlma.org/Portals/14/genplan/general_Plan_2017/elements/OCT17/Ch05_MOSE_120815.pdf?ver=2017-10-11-102103-833 (accessed February 2020).

____. 2019. General Plan: Land Use Element. https://planning.rctlma.org/Portals/14/genplan/2019/elements/Ch03_Land%20Use_041619.pdf (accessed February 2020).

County of San Bernardino. 2007. 2006 General Plan Program Final Environmental Impact Report and Appendices. http://www.sbcounty.gov/Uploads/lus/GeneralPlan/FinalEIR2007.pdf (accessed February 2020).

____. 2019. Draft San Bernardino Countywide Plan Biological Resources Existing Conditions Report. http://countywideplan.com/wp-content/uploads/2019/06/D_BioReportOnly_Dudek.pdf (accessed August 2020)

County of San Diego. 2011a. San Diego County General Plan. https://www.sandiegocounty.gov/content/dam/sdc/pds/gpupdate/docs/GP/Cover-TOC-Vision.pdf (accessed March 2020).

____. 2011b. San Diego General Plan Final EIR. https://www.sandiegocounty.gov/content/sdc/pds/gpupdate/environmental.html (accessed March 2020).

County of Ventura. 2020. 2040 General Plan Update Background Report. https://vcrma.org/vc2040.org/images/Draft_EIR_-_Jan._2020/Draft_EIR_Apdx_B_2040_GPU_Bkgrd_Rpt_compressed.pdf (accessed March 2020).

Danskin, Wesley R. 2010. Hydrogeology of Coastal Drainage Basins of San Diego County. United States Geological Survey. https://ca.water.usgs.gov/sandiego/images/maps/homepage/Plate_1c_pp_size16X22_v3.pdf (accessed March 2020).

Federal Financial Institutions Examination Council. 2019. Geocoding/Mapping System. https://geomap.ffiec.gov/FFIECGeocMap/GeocodeMap1.aspx (accessed February 2020).

Griffith, G.E., Omernik, J.M., Smith, D.W., Cook, T.D., Tallyn, E., Moseley, K., and Johnson, C.B., 2016, Ecoregions of California (poster): U.S. Geological Survey Open-File Report 2016–1021, with map, scale 1:1,100,000, http://dx.doi.org/10.3133/ofr20161021 (accessed August 2020).

Metropolitan Water District of Southern California (Metropolitan). 2016. Board of Directors Water Planning Stewardship Committee: Options for leasing Metropolitan-owned lands in the Palo Verde valley. http://mwdh2o.granicus.com/MetaViewer.php?view_id=12&clip_id=5272&meta_id=118468 (accessed March 2020).

Mountains Recreation and Conservation Authority. 2020. The Los Angeles River. https://mrca.ca.gov/los-angeles-river/ (accessed February 2020).

San Diego Association of Governments (SANDAG). 2011. 2050 Regional Growth Forecast. https://www.sandag.org/uploads/2050RTP/F2050RTPTA2.pdf (accessed April 2020).

Southern California Association of Governments (SCAG). 2019. Connect SoCal: Demographics and Growth Forecast. https://www.connectsocal.org/Documents/Draft/dConnectSoCal_Demographics-And-Growth-Forecast.pdf (accessed April 2020).

United States Census Bureau. 2020. ACS Demographic and Housing Estimates. https://data.census.gov/cedsci/table?d=ACS%205-Year%20Estimates%20Data%20Profiles&table=DP05&tid=ACSDP5Y2018.DP05&g=0400000US06_1600000US0655422&hidePreview=false&vintage=2018&layer=VT_2018_040_00_PY_D1&cid=DP05_0001E (accessed February 2020).

United States Department of Agriculture (USDA). 2007. USDA Ecoregion Sections, California. https://databasin.org/datasets/81a3a809a2ae4c099f2e495c0b2ecc91 (accessed February 2020).

United States Department of Labor Statistics. 2019. Current Employment and Wages in California—Fourth Quarter 2018. https://www.bls.gov/regions/west/news-release/countyemploymentandwages_california.htm (accessed April 2020).

8.1.3 Air Quality

Antelope Valley Air Quality Management District (AVAQMD). 2016. *California Environmental Quality Act (CEQA) and Federal Conformity Guidelines*. August 2016. https://avaqmd.ca.gov/files/e5b34d385/AV%20CEQA%20Guides%202016.pdf (accessed February 2020).

____. 2017. *Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Area).* March 21, 2017. https://avaqmd.ca.gov/files/de07ac191/AVAQMD+2016+75ppb+Final+Ozone+Attainment+Plan.pdf (accessed February 2020).

Bay Area Air Quality Management District (BAAQMD). 2017a. *California Environmental Quality Act Air Quality Guidelines*. May 2017. https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en (accessed February 2020).

____. 2017b. *Spare the Air – Cool the Climate: A Blueprint for Clean Air and Climate Protection in the Bay Area*. April 19, 2017. https://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en (accessed February 2020).

California Air Pollution Control Officers Association. 2017. California Emissions Estimator Model User's Guide. Version 2016.3.2. November 2017.

California Air Resources Board (CARB). 2000. *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. October 2000. https://ww3.arb.ca.gov/diesel/documents/rrpfinal.pdf (accessed February 2020).

____. 2005. Air Quality and Land Use Handbook: A Community Health Perspective. https://ww3.arb.ca.gov/ch/handbook.pdf (accessed February 2020).

____. 2011. *Recommended Area Designations for the 2010 Federal Sulfur Dioxide (SO_2) Standards Staff Report* – Appendix 1 (Five Factor Analyses). June 2011. https://ww3.arb.ca.gov/desig/so2e1.pdf (accessed March 2020).

____. 2014. "California Air Basin Map." Last modified: March 14, 2014. https://www.arb.ca.gov/ei/maps/statemap/abmap.htm (accessed July 2021).

____. 2016. "Ambient Air Quality Standards." May 4, 2016. https://ww3.arb.ca.gov/research/aaqs/aaqs2.pdf (accessed February 2020).

____. 2019a. "Summaries of Historical Area Designations for State Standards – Ozone." July 2019. https://ww3.arb.ca.gov/desig/changes/ozone.pdf (accessed July 2021).

____. 2019b. "Summaries of Historical Area Designations for State Standards – Carbon Monoxide." July 2019. https://ww3.arb.ca.gov/desig/changes/co.pdf (accessed July 2021).

____. 2019c. "Summaries of Historical Area Designations for State Standards – Nitrogen Dioxide." July 2019. https://ww3.arb.ca.gov/desig/changes/no2.pdf (accessed July 2021).

____. 2019d. "Summaries of Historical Area Designations for State Standards – Sulfur Dioxide." July 2019. https://ww3.arb.ca.gov/desig/changes/so2.pdf (accessed July 2021).

____. 2019e. "Summaries of Historical Area Designations for State Standards – Lead." July 2019. https://ww3.arb.ca.gov/desig/changes/pb.pdf (accessed July 2021).

____. 2019f. "Summaries of Historical Area Designations for State Standards – PM_{10}." July 2019. https://ww3.arb.ca.gov/desig/changes/pm10.pdf (accessed July 2021).

____. 2019g. "Summaries of Historical Area Designations for State Standards – $PM_{2.5}$." July 2019. https://ww3.arb.ca.gov/desig/changes/pm25.pdf (accessed July 2021).

____. 2019h. "of Historical Area Designations for State Standards – Visibility Reducing Particles." July 2019. https://ww3.arb.ca.gov/desig/changes/vrp.pdf (accessed July 2021).

____. 2019i. "Summaries of Historical Area Designations for State Standards – Sulfates." July 2019. https://ww3.arb.ca.gov/desig/changes/so4.pdf (accessed July 2021).

____. 2019j. "Summaries of Historical Area Designations for State Standards – Hydrogen Sulfide." July 2019. https://ww3.arb.ca.gov/desig/changes/h2s.pdf (accessed July 2021).

____. 2019. "Top Four Summary: Select Pollutant, Years, & Area." https://www.arb.ca.gov/adam/topfour/topfour1.php (accessed February 2020).

_____. 2020. "Summary: Diesel Particulate Matter Health Impacts." https://www.arb.ca.gov/research/diesel/diesel-health_summ.htm (accessed February 2020).

California Department of Transportation. 2018. "Traffic Volumes: Annual Average Daily Traffic (AADT) – 2017." https://dot.ca.gov/programs/traffic-operations/census (accessed February 2020).

Eastern Kern Air Pollution Control District. 2017. 2017 Ozone Attainment Plan. July 27, 2017. https://www.arb.ca.gov/planning/sip/planarea/easternkern/easternkern.htm (accessed February 2020).

Imperial County Air Pollution Control District (ICAPCD). 2014. *Imperial County 2013 State Implementation plan for the 2006 24-Hour $PM_{2.5}$ Moderate Nonattainment Area*. December 2, 2014. https://www.co.imperial.ca.us/AirPollution/PlanningDocs/StatePlans/Final_PM25_SIP.pdf (accessed February 2020).

____. 2017a. Imperial County 2017 State Implementation Plan for the 2008 8-Hour Ozone Standard. https://apcd.imperialcounty.org/wp-content/uploads/2020/01/OzoneSIP.pdf (accessed February 2020).

____. 2017b. CEQA Air Quality Handbook. December 12, 2017. https://www.co.imperial.ca.us/AirPollution/PlanningDocs/CEQAHandbk.pdf (accessed February 2020).

____. 2018. *Imperial County 2018 Redesignation Request and Maintenance Plan for Particulate Matter Less than 10 Microns in Diameter* October 23, 2018. https://ww3.arb.ca.gov/planning/sip/planarea/imperial/sip.pdf (accessed February 2020).

Mojave Desert Air Quality Management District (MDAQMD). 2016. *California Environmental Quality Act (CEQA) and Federal Conformity Guidelines*. August 2016. https://www.mdaqmd.ca.gov/home/showdocument?id=192 (accessed February 2020).

____. 2017. Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Area). February 27, 2017 https://ww3.arb.ca.gov/planning/sip/planarea/wmdaqmp/2016sip_mdplan.pdf (accessed February 2020).

National Oceanic and Atmospheric Administration. 2020. "Subtropical Highs." https://www.ncdc.noaa.gov/monitoring-references/dyk/subtropical-highs (accessed March 2020).

Office of Environmental Health Hazard Assessment (OEHHA). Air Toxics Hot Spots Program Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments. March 6, 2015. http://www.oehha.ca.gov/air/hot_spots/hotspots2015.html (accessed February 2020).

San Diego Air Pollution Control District (SDAPCD). 2015. Fact Sheet: Smog in San Diego County. http://www.sdapcd.org/content/dam/sdc/apcd/PDF/Compliance/Fact%20Sheets/Fact%20Sheet-Smog%20in%20SD.pdf (accessed February 2020).

____. 2016a. *2008 Eight-Hour Ozone Attainment Plan for San Diego County*. December 2016. https://www.sdapcd.org/content/dam/sdc/apcd/PDF/Air%20Quality%20Planning/8-Hr-O3%20Attain%20Plan-08%20Std.pdf (accessed February 2020).

____. 2016b. *2016 Revision to the Regional Air Quality Strategy for San Diego County*. December 2016. https://www.sdapcd.org/content/dam/sdc/apcd/PDF/Air%20Quality%20Planning/2016%20RAQS.pdf (accessed February 2020).

____. 2019. Rule 20.2 - New Source Review (NSR)-Non-Major Stationary Sources. Adopted/Last amended June 26, 2019. https://www.sandiegocounty.gov/content/dam/sdc/apcd/PDF/Rules_and_Regulations/Permits/APCD_R20.2.pdf (accessed July 2021).

____. 2021. Rule 1210 - Toxic Air Contaminant Public Health Risks- Public Notification and Risk Reduction. Last Amended February 26, 2021. https://www.sandiegocounty.gov/content/dam/sdc/apcd/PDF/Rules_and_Regulations/Toxic_Air_Cotaminants/APCD_R1210.pdf (accessed July 2021).

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2015. *Guidance for Assessing and Mitigating Air Quality Impacts*. March 19, 2015. http://www.valleyair.org/transportation/GAMAQI_12-26-19.pdf (accessed February 2020).

____. 2016. *2016 Ozone Plan for 2008 8-Hour Ozone Standard*. June 16, 2016. http://valleyair.org/Air_Quality_Plans/Ozone-Plan-2016/Adopted-Plan.pdf (accessed February 2020).

____. 2018. *2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards*. November 15, 2018. http://valleyair.org/pmplans/documents/2018/pm-plan-adopted/2018-Plan-for-the-1997-2006-and-2012-PM2.5-Standards.pdf (accessed February 2020).

Shasta, County of. 2010. *Draft Environmental Impact Report, Panorama Planned Development*. Prepared by Enplan. Redding, CA. April 19, 2010.

South Coast Air Quality Management District (SCAQMD). 1993. *CEQA Air Quality Handbook*. April 1993.

____. 2003. *2003 Coachella Valley PM_{10} State Implementation Plan*. August 1, 2003. http://www.aqmd.gov/docs/default-source/clean-air-plans/pm10-plans/final-2003-coachella-valley-pm10-state-implementation-plan.pdf?sfvrsn=2 (accessed February 2020).

____. 2008. *Final Localized Significance Threshold Methodology*. July 2008. http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf (accessed February 2020).

____. 2009. Appendix C – Mass Rate LST Look-up Tables. Last modified: October 21, 2009. http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/appendix-c-mass-rate-lst-look-up-tables.pdf?sfvrsn=2 (accessed February 2020).

____. 2017. *Final 2016 Air Quality Management Plan*. March 2017. http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf?sfvrsn=15 (accessed February 2020).

____. 2019. *South Coast AQMD Air Quality Significance Thresholds. April 2019.* http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf (accessed February 2020).

United States Environmental Protection Agency (U.S. EPA). 2011. *Drinking Water Treatment Plan Residuals Management Technical Report*. September 2011. https://www.epa.gov/sites/production/files/2015-11/documents/dw-treatment-residuals-mgmt-tech-report-sept-2011.pdf (accessed February 2020).

____. 2014. *Policy Assessment for the Review of the Lead National Ambient Air Quality Standards.* May 2014. https://www3.epa.gov/ttn/naaqs/standards/pb/data/140501_pa_pb_fin.pdf (accessed February 2020).

____. 2016. "What is Ozone?" Last modified: July 1, 2016. https://www.epa.gov/ozone-pollution-and-your-patients-health/what-ozone (accessed February 2020).

____. 2018. "Ground-level Ozone Basics." Last modified: October 31, 2018. https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics (accessed February 2020).

____. 2019. "San Joaquin Valley." https://www.epa.gov/sanjoaquinvalley (accessed February 2020).

____. 2020a. "8-Hour Ozone (2015) Designated Area/State Information." January 31, 2020. https://www3.epa.gov/airquality/greenbook/jbtc.html (accessed February 2020).

____. 2020b. "Carbon Monoxide (1971) Designated Area/State Information." Last modified January 31, 2020. https://www3.epa.gov/airquality/greenbook/cbtc.html (accessed February 2020).

____. 2020c. "Nitrogen Dioxide (1971) Designated Area/State Information." Last modified January 31, 2020. https://www3.epa.gov/airquality/greenbook/nbtc.html (accessed February 2020).

____. 2020d. "Sulfur Dioxide (2010) Designated Area/State Information." Last modified January 31, 2020. https://www3.epa.gov/airquality/greenbook/nbtc.html (accessed February 2020).

____. 2020e. "Lead (2008) Designated Area/State Information." Last modified January 31, 2020. https://www3.epa.gov/airquality/greenbook/mbtc.html (accessed February 2020).

____. 2020f. "PM-10 (1987) Designated Area/State Information." Last modified January 31, 2020. https://www3.epa.gov/airquality/greenbook/pbtc.html (accessed February 2020).

____. 2020g. "PM-2.5 (2012) Designated Area/State Information." Last modified January 31, 2020. https://www3.epa.gov/airquality/greenbook/rbtc.html (accessed February 2020).

____. 2020h. "PM-2.5 (2006) Designated Area/State Information." Last modified January 31, 2020. https://www3.epa.gov/airquality/greenbook/rbtc.html (accessed February 2020).

Ventura County Air Pollution Control District (VCAPCD). 2003. Ventura County Air Quality Assessment Guidelines. October 2003. http://www.vcapcd.org/pubs/Planning/VCAQGuidelines.pdf (accessed February 2020).

____. 2016. Final 2016 Ventura County Air Quality Management Plan. http://www.vcapcd.org/pubs/Planning/AQMP/2016/Final/Final-2016-Ventura-County-AQMP.pdf (accessed February 2020).

8.1.4 Biological Resources

California Department of Fish and Wildlife (CDFW). 2019a. Special Animals List. August 2019.

_____. 2019b. California Natural Community Conservation Plans. April 2019.

_____. 2020a. California Natural Diversity Database (CNDDB), Rarefind 5 (online). Commercial Version. (accessed February 2020).

_____. 2020b. Special Vascular Plants, Bryophytes and Lichens List. January 2020.

_____. 2020c. Biogeographic Information and Observation System (BIOS). https://www.wildlife.ca.gov/Data/BIOS (accessed February 2020).

California Native Plant Society (CNPS), Rare Plant Program. 2020. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). http://www.rareplants.cnps.org (accessed February 2020).

LANDFIRE. 2020. Landscape Fire and Resource Management Planning Tool. https://www.landfire.gov/vegetation.php (accessed February 2020).

United States National Vegetation Classification (USNVC). 2020. Hierarchy Explorer. http://usnvc.org/ (accessed February 2020).

United States Fish and Wildlife Service (USFWS). 2020a. National Wetlands Inventory. http://www.fws.gov/wetlands/ (accessed February 2020).

_____. 2020b. Information, Planning and Conservation System. http://ecos.fws.gov/ipac/ (accessed February 2020.

_____. 2020c. Critical Habitat Portal. http://criticalhabitat.fws.gov (accessed February 2020).

United States Geologic Survey (USGS). 2018. Science in Your Watershed. February 15, 2018. https://water.usgs.gov/ (accessed February 2020).

8.1.5 Cultural Resources

Chasteen et al. 2016. Cultural Resource Treatment Plan for the Weymouth Water Treatment Plant Historic District, City of La Verne, Los Angeles County, California.

8.1.6 Noise

California Department of Transportation (Caltrans). 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. (CT-HWANP-RT-13-069.25.2) September.

____. 2020. Transportation and Construction Vibration Guidance Manual (CT-HWANP-RT-20-365.01.01). April.

Crocker, Malcolm J. Crocker (Editor). 2007. Handbook of Noise and Vibration Control, ISBN: 978-0-471-39599-7, Wiley-VCH, October.

Federal Highway Administration (FHWA). 2006. Construction Noise Handbook. U.S. Department of Transportation, Office of Natural and Human Environment. Washington, D.C.

____. 2011. Highway Traffic Noise: Analysis and Abatement Guidance (FHWA-HEP-10-025). https://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/revguidance.pdf (accessed February 2020).

Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment. FTA Report No. 0123. Washington, D.C. September 2018. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf (accessed February 2020).

Federal Aviation Administration. 2019. Summary of Performance and Financial Information. https://www.faa.gov/about/plans_reports/media/2019-FAA-PAR-Summary.pdf (accessed February 2020).

Kinsler, Lawrence E. and R. Frey, Austin and B. Coppens, Alan and V. Sanders, James. 1999. Fundamentals of Acoustics, 4th Edition. ISBN 0-471-84789-5. Wiley-VCH, December 1999.

Office of Planning and Research. 2017. General Plan Guidelines: 2017 Update – Appendix D: Noise Element Guidelines. http://opr.ca.gov/planning/general-plan/guidelines.html (accessed February 2020).

8.1.7 Effects Found Not to be Significant

Geology and Soils

California Geological Survey (CGS). 2002. California Geomorphic Provinces, Note 36.

Society of Vertebrate Paleontology (SVP). 2010. Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources. Society of Vertebrate Paleontology Impact Mitigation Guidelines Revision Committee.

California Air Pollution Control Officers Association (CAPCOA). 2017. CalEEMod Appendix E Technical Source Documentation. http://www.aqmd.gov/docs/default-source/caleemod/06_appendix-e2016-3-2.pdf?sfvrsn=4. Accessed March 2020.

Hazards and Hazardous Materials

Los Angeles County. 2015. Brackett Field Airport Land Use Compatibility Plan. https://planning.lacounty.gov/assets/upl/project/brackett_alucp_final.pdf (accessed May 2021).

Wildfire

California Department of Forestry and Fire Protection (CAL FIRE). 2007a. Fact Sheet: California's Fire Hazard Severity Zones. May 2007. https://www.sccgov.org/sites/dpd/DocsForms/Documents/Fire_Hazard_Zone_Fact_Sheet.pdf (accessed February 2020).

_____. 2007b. Fire Hazard Severity Zone Maps. https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/ (accessed February 2020).

_____. 2018. 2018 Strategic Fire Plan for California. August 22, 2018. https://osfm.fire.ca.gov/media/5590/2018-strategic-fire-plan-approved-08_22_18.pdf (accessed February 2020).

_____. 2020a. Thomas Fire. https://www.fire.ca.gov/incidents/2017/12/4/thomas-fire/ (accessed September 2020).

____. 2020b. Creek Fire. https://fire.ca.gov/incidents/2017/12/5/creek-fire/ (accessed September 2020).

____. 2020c. Incidents Overview. https://www.fire.ca.gov/incidents/ (accessed September 2020).

_____. 2021. Fire and Fuels Treatment. https://www.fire.ca.gov/programs/resource-management/resource-protection-improvement/landowner-assistance/forest-stewardship/fire-and-fuels-treatment/ (accessed July 2021).

California Public Utilities Commission (CPUC). 2020. Undergrounding Frequently Asked Questions. https://www.cpuc.ca.gov/General.aspx?id=6442465120 (accessed September 2020).

Calvino-Cancela, Maria, Maria L. Chas-Amil, Eduardo D. Garcia-Martinez, and Julia Touza. 2016. Wildfire risk associated with different vegetation types within and outside wildland-urban interfaces. Forest Ecology and Management. 372. 1-9. https://www.researchgate.net/publication/300084628_Wildfire_risk_associated_with_different_vegetation_types_within_and_outside_wildland-urban_interfaces (accessed March 2020).

National Oceanic and Atmospheric Administration. 2019. U.S. Wind Climatology. December 2019. https://www.ncdc.noaa.gov/societal-impacts/wind/v-comp/201912 (accessed February 2020).

National Park Service. 2017. Wildland Fire Behavior. Last updated February 16, 2017. https://www.nps.gov/articles/wildland-fire-behavior.htm (accessed February 2020).

United States Forest Service. 2003. An Introduction to Spark Arresters: Spark Arresters and the Prevention of Wildland Fires. https://www.fs.fed.us/eng/pubs/html/03511304/03511304.htm (accessed March 2020).

University of California. 2018. Field Operations Manual. Revised November 2018. https://www.ucop.edu/safety-and-loss-prevention/_files/field-research-safety/wildland-fire-safety.pdf (accessed February 2020).

Western Regional Climate Center (WRCC). 2018. PRISM Precipitation and Dew Point Climatology Maps. https://wrcc.dri.edu/Climate/prism_precip_maps.php (accessed February 2020).

8.2 Preparers

Metropolitan Water District of Southern California

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Appendix A

Notice of Preparation and Comment Letters

NOTICE OF PREPARATION AND SCOPING MEETING

Date: June 23, 2020

To: State Clearinghouse, State Responsible Agencies, State Trustee Agencies, Other Public Agencies, Interested Organizations

From: The Metropolitan Water District of Southern California

Subject: **Notice of Preparation of a Draft Program Environmental Impact Report for The Metropolitan Water District of Southern California Climate Action Plan**

The Metropolitan Water District of Southern California (Metropolitan) will be the Lead Agency under the California Environmental Quality Act (CEQA) and will prepare a Draft Program Environmental Impact Report (PEIR) for The Metropolitan Water District of Southern California Climate Action Plan (CAP) (proposed project). This Notice of Preparation (NOP) and Scoping Meeting is being sent to responsible, trustee, and other public agencies as part of the review process under CEQA for projects of statewide, regional, or areawide significance (Sections 21080.4 and 21080.9 of the Public Resources Code).

Metropolitan is requesting input from responsible, trustee, and other public agencies, as well as interested organizations and individuals, regarding the scope and content of the environmental information to be included in the Draft PEIR. If you are a responsible or trustee agency, you are requested to indicate your statutory responsibilities in connection with the proposed project.

The description and location of the proposed project and information on the potential environmental effects resulting from the proposed project are provided in this NOP. Due to the time limits mandated by state law (*State CEQA Guidelines* §15082 - Notice of Preparation and Determination of Scope of EIR), written comments must be sent at the earliest possible date, but not later than the end of the public review period, which begins June 23, 2020 and ends July 22, 2020.

Project Title: **The Metropolitan Water District of Southern California Climate Action Plan**

Applicant: **The Metropolitan Water District of Southern California**

OPPORTUNITY FOR PUBLIC REVIEW AND COMMENT

Copies of the NOP are available for public review at:

The Metropolitan Water District of Southern California
700 North Alameda Street
Los Angeles, California 90012

Additionally, a copy of the NOP is available online for public review at:

Metropolitan's website at: http://www.mwdh2o.com/CEQA

Written comments should be sent to the address shown below or via e-mail at EP@mwdh2o.com (reference "CAP PEIR" in the subject line) and should include the name, mailing address, telephone number, and email address, if available, of a contact person.

Ms. Malinda Stalvey, Senior Environmental Specialist
The Metropolitan Water District of Southern California
Environmental Planning Section
P.O. Box 54153
Los Angeles, California 90054-0153
(213) 217-5545

Please contact Malinda Stalvey via telephone or email at EP@mwdh2o.com to make arrangements for viewing or to receive a hard copy if you are not able to access the document online or view a copy at the location listed above.

All parties who have submitted their names and mailing addresses will be placed on the mailing list to receive notifications during the course of this CEQA environmental review process.

Scoping Meeting: Metropolitan will hold a virtual scoping meeting in conjunction with the NOP to present the proposed project and the PEIR process. The meeting will provide an opportunity for agency representatives and the public to assist the lead agency in determining the scope and content of the environmental analysis for the PEIR. The scoping meeting will be held online on July 15, 2020 at 10:00 a.m. To participate in the meeting, please register here:
https://us02web.zoom.us/webinar/register/WN_UohxhPynTW6jwvyl_bDUkw.
The public can submit written comments via e-mail at EP@mwdh2o.com (reference "CAP PEIR Scoping" in the subject line) or can provide oral comments during the meeting.

Signature: Jennifer Harriger Date: 6-16-2020

Jennifer Harriger
Manager, Environmental Planning Section

INTRODUCTION

The Metropolitan Water District of Southern California (Metropolitan) is a regional wholesaler that provides water for 26 member public agencies to deliver either directly or through their sub-agencies to nearly 19 million people, across a 5,200 square mile service area in six counties in Southern California. On average, Metropolitan moves more than 1.7 billion gallons of water daily through its distribution system, which includes an extensive water system including the Colorado River Aqueduct, 16 small hydroelectric facilities, nine reservoirs, 819 miles of large-scale pipes and five water treatment plants, four of which are among the 10 largest plants in the world. Metropolitan imports water from the California Department of Water Resources' State Water Project and the Colorado River to supplement local supplies. It also helps its member agencies develop water recycling, storage and other local resource programs to provide additional supplies and conservation programs to reduce regional demands.

PROJECT DESCRIPTION

Metropolitan is preparing a Climate Action Plan (CAP) to outline a strategy for reducing greenhouse gas (GHG) emissions associated with future construction, operation, and maintenance activities. The CAP is a comprehensive roadmap that analyzes historical GHG emissions, prepares a forecast of future GHG emissions, sets a GHG reduction target for reducing emissions consistent with applicable state policies, and identifies a suite of specific reduction actions that Metropolitan can choose from to achieve the adopted target consistent with Section 15183.5 of the State CEQA Guidelines. The CAP is a customized roadmap for making informed decisions and understanding where and how to achieve emissions reductions that conform to Metropolitan's mission/goals in a meaningful and cost-effective manner. While a CAP identifies potential projects that may be implemented to meet GHG reduction goals, no specific projects will be implemented without further CEQA review.

Emissions Inventory

Metropolitan's operations inherently result in GHG emissions. Understanding the processes that generate these emissions is essential to identifying strategies to reduce GHG emissions and achieve the identified GHG reduction target. Metropolitan's activities can be categorized into the following GHG generating sectors:

- **Water Conveyance and Treatment.** A majority of Metropolitan's emissions are a direct result of the energy consumed to pump, treat and deliver water throughout Metropolitan's extensive service area.
- **Buildings/Infrastructure.** Infrastructure including offices, facilities, control buildings, lighting, computers, air conditioners, and other equipment that is required to support the treatment and delivery of water.
- **Transportation.** This includes the transportation of employees and equipment to and from offices and worksites. Emissions stem from both Metropolitan's fleet vehicles and employee commute emissions.
- **Waste Disposal.** Waste falls into three categories: mixed solids waste, mixed recyclables, and organics. Metropolitan generates waste from various sources, ranging from employee lunches to office waste, which results in indirect GHG emissions as it decomposes in landfills.
- **Water Use.** Water sector GHG emissions by Metropolitan result from water use in facilities and irrigation.
- **Construction.** As Metropolitan's infrastructure ages, there is a continued need for construction of new facilities and infrastructure or rehabilitation of existing facilities and infrastructure. Construction activities result in direct GHG emissions from fuel combustion associated with construction equipment use and transportation of workers and materials.

The CAP will include an inventory of Metropolitan's emissions, including an estimate of emissions associated with Metropolitan's operations from 1990 through 2017. The inventory will describe methodologies used to calculate Scope 1, Scope 2, and Scope 3 emissions. Scope 1 emissions include those from direct fuel combustion, including natural gas, propane, welding gasses, and gasoline and diesel used to power Metropolitan's vehicle fleet. Scope 2 emissions include indirect GHG emissions associated with the purchase and consumption of electricity. Scope 3 emissions are indirect emissions resulting from employee commute, waste generation, water consumption in Metropolitan-owned buildings, and construction projects. The emissions inventory will also provide a forecast of future emissions based on current operations and construction of capital improvement projects.

GHG Reduction Target

The CAP will establish a GHG reduction target aligned with applicable state GHG reduction policies including Senate Bill 32, which establishes a statewide GHG reduction target of 40 percent below 1990 levels by the year 2030, and Executive Order B-55-18, which sets a statewide goal of carbon neutrality by 2045. Metropolitan will measure and track its emissions inventory using:

- **Per Capita Emissions Calculation.** Per capita emissions uses Metropolitan's calculated mass emissions and divides by the service population.
- **Carbon Budget Tracking**. Sets a carbon budget that is incrementally reduced over time to reach the adopted target.

In addition to establishing a reduction target, the CAP will provide a detailed analysis of the emissions reductions necessary for Metropolitan to achieve its target based on the emissions inventory and forecast described above.

Reduction Measures

The CAP will identify a suite of GHG emissions reduction measures that can be implemented to achieve the adopted emissions reduction target. At this time, GHG emission reduction measures are anticipated to span the following categories:

- Energy Use
- Waste
- Transportation
- Reduce Downstream Emissions
- Colorado River Aqueduct Pumping
- Off-road Construction
- Water Conservation
- Carbon Sequestration
- Conventional Treatment Plants
- Advanced Water Treatment Facilities
- New Pump Specifications
- General Engineering

It is anticipated that a majority of GHG reduction measures will be administrative in nature and, consequently, will not result in physical impacts to the environment. Nevertheless, all potential GHG reduction measures will be evaluated in the Draft PEIR.

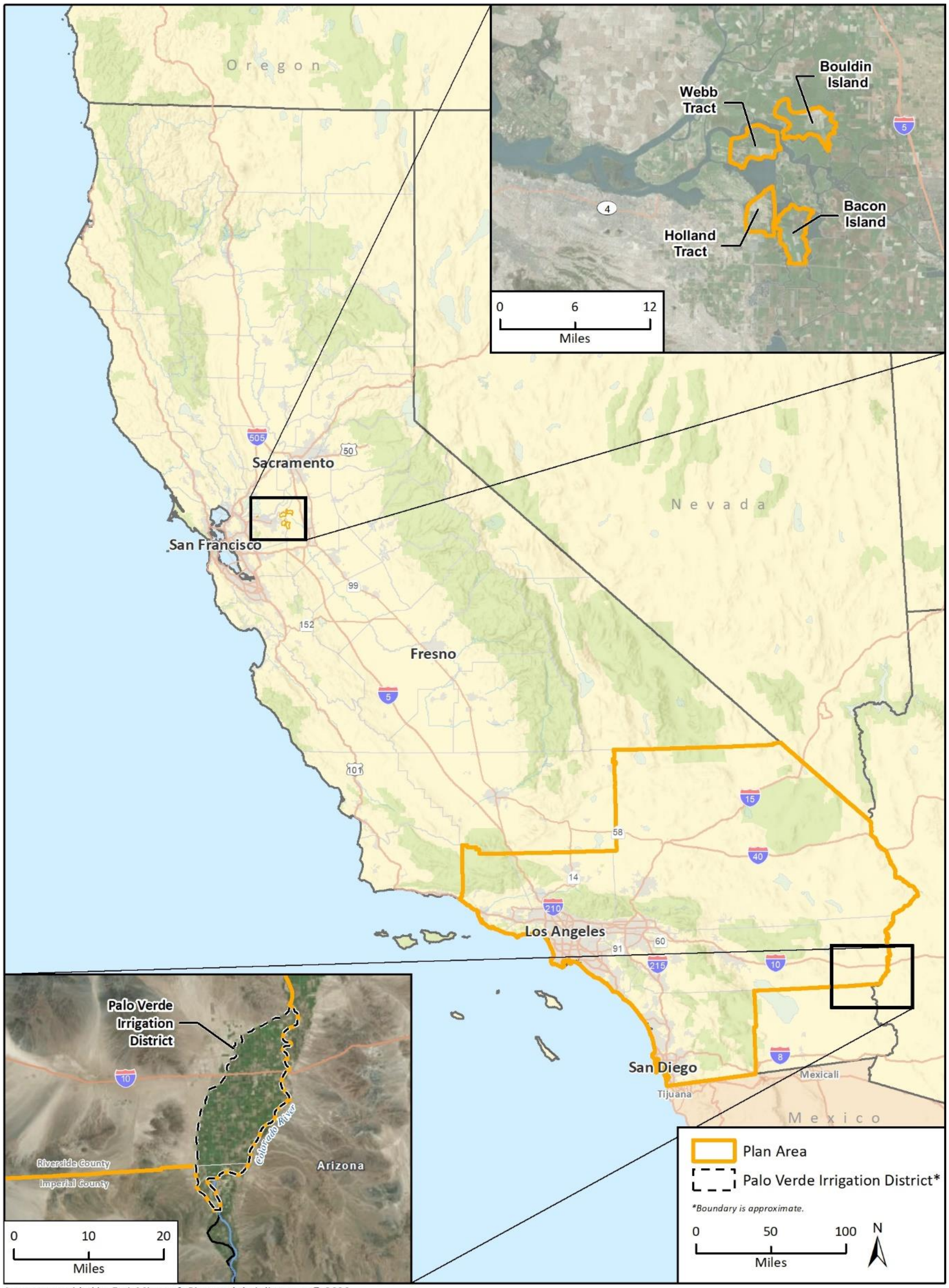
PROJECT LOCATION

The CAP will include reduction measures to reduce GHG emissions from Metropolitan's construction, operation, and maintenance activities. It is anticipated that most reduction measures would be implemented throughout a six-county Southern California region comprised of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. These counties include all of Metropolitan's service area and most of its infrastructure facilities. The CAP may also involve implementation of GHG emissions reduction measures or programs at Metropolitan land holdings in Imperial County, specifically within the Palo Verde Irrigation District; as well as land holdings in San Joaquin and Contra Costa Counties, specifically on lands commonly known as Bacon Island, Bouldin Island, Holland Tract, and Webb Tract in the Sacramento-San Joaquin Delta region. Figure 1 shows the project location.

POTENTIAL ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

The Draft PEIR will include an analysis of all required impact areas, as well as feasible mitigation measures and a reasonable range of alternatives to avoid or reduce potentially significant impacts, if any. Environmental resource areas where it is determined that the proposed project would result in a less than significant impact will be summarized in an "Effects Found to be Less than Significant" section of the Draft PEIR.

Figure 1 Project Location



Imagery provided by Esri, Microsoft Bing, and their licensors © 2020.
Additional data provided by USGS, 2017.

STATE OF CALIFORNIA Gavin Newsom, Governor

NATIVE AMERICAN HERITAGE COMMISSION

NAHC HEADQUARTERS
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June 23, 2020

Malinda Stalvey
The Metropolitan Water District of Southern California
P.O. Box 54153
Los Angeles, CA 90054-0153

Re: 2020060450, The Metropolitan Water District of Southern California Climate Action Plan Project, Contra Costa, Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Joaquin, and Ventura Counties

Dear Ms. Stalvey:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

- **a.** A brief description of the project.
- **b.** The lead agency contact information.
- **c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
- **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

- **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

- **a.** Alternatives to the project.
- **b.** Recommended mitigation measures.
- **c.** Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

- **a.** Type of environmental review necessary.
- **b.** Significance of the tribal cultural resources.
- **c.** Significance of the project's impacts on tribal cultural resources.
- **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

- **a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.
- **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

a. Avoidance and preservation of the resources in place, including, but not limited to:

i. Planning and construction to avoid the resources and protect the cultural and natural context.

ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

i. Protecting the cultural character and integrity of the resource.

ii. Protecting the traditional use of the resource.

iii. Protecting the confidentiality of the resource.

c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).

e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).

f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.

b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
- **a.** The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
- **b.** Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
- **a.** If part or all of the APE has been previously surveyed for cultural resources.
- **b.** If any known cultural resources have already been recorded on or adjacent to the APE.
- **c.** If the probability is low, moderate, or high that cultural resources are located in the APE.
- **d.** If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
- **a.** The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.

b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:

a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.

b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.

a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.

b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.

c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Andrew.Green@nahc.ca.gov.

Sincerely,

Andrew Green

Andrew Green
Cultural Resources Analyst

cc: State Clearinghouse

From:	Saunders, Joseph@CHP
To:	state.clearinghouse@opr.ca.gov; Environmental Planning Team - EPT
Cc:	Enciso, Blanca@CHP
Subject:	RE: 063-BE - Environmental Document Review - SCH# 2020060450 - Due to Lead Agency by 07/16/2020
Date:	Monday, July 13, 2020 11:17:50 AM
Attachments:	SCH 2020060450 Southern.pdf Area-Section EIR RESPONSE CHECKLIST.DOCX

Good Morning,

No impact to CHP Southern Division local Area Operations and/or Public Safety by SCH 2020060450 due to the SPS analyst listed on the Environmental Document review and response memorandum. The Project locations are not located within our jurisdiction.

Thank you,

Joseph Saunders, Sergeant

Southern Division
Staff Services
411 N. Central Avenue, suite 410
Glendale, CA 91203
(818) 240-8200
(818) 240-1496 (fax)
Email: jcsaunders@chp.ca.gov

From: Enciso, Blanca@CHP
Sent: Friday, July 3, 2020 4:39 PM
To: Hammond, Melissa@CHP <MEHammond@chp.ca.gov>
Subject: RE: 063-BE - Environmental Document Review - SCH# 2020060450 - Due to Lead Agency by 07/16/2020

Good afternoon,

Special Projects Section (SPS) recently received the referenced Notice of Environmental Impact document from the State Clearinghouse (SCH) outlined in the following Web site:

https://ceqanet.opr.ca.gov/2020060450/2

Due to the project’s geographical proximity to the Southern Division, please use the attached checklist to assess its potential impact to local Area/Section operations and public safety.

Please feel free to e-mail me if you have any questions.

Thank you!

Kind Regards,

Blanca Enciso
Special Projects Section- 063
Transportation Planning Unit
California Highway Patrol
Office: (916) 843-3365

Memorandum

Date: July 3, 2020

To: Southern Division

From: **DEPARTMENT OF CALIFORNIA HIGHWAY PATROL**
Special Projects Section

File No.: 063.A10212.A18109.Nop.Doc

Subject: ENVIRONMENTAL DOCUMENT REVIEW AND RESPONSE
SCH#2020060450

Special Projects Section (SPS) recently received the referenced "Notice of Preparation" environmental impact document from the State Clearinghouse (SCH).

Please use the attached checklist to assess its potential impact to local operations and public safety. Due to the project's geographical proximity to multiple divisions, SPS will coordinate the response. If it is determined that departmental input is advisable, your written comments referencing the above SCH number must be sent to SPS no later than **July 16, 2020**. For reference, additional information can be found in General Order 41.2, Environmental Impact Documents.

Please e-mail a copy of Division's response to Associate Governmental Program Analyst Blanca Enciso at blanca.enciso@ca.gov. For questions or concerns, please contact Ms. Enciso at (916) 843-3370.

L. NARVAEZ, SSM III
Commander

Attachments: Checklist
Project File

NOTICE OF PREPARATION AND SCOPING MEETING

Date: June 23, 2020

To: State Clearinghouse, State Responsible Agencies, State Trustee Agencies, Other Public Agencies, Interested Organizations

From: The Metropolitan Water District of Southern California

Subject: **Notice of Preparation of a Draft Program Environmental Impact Report for The Metropolitan Water District of Southern California Climate Action Plan**

The Metropolitan Water District of Southern California (Metropolitan) will be the Lead Agency under the California Environmental Quality Act (CEQA) and will prepare a Draft Program Environmental Impact Report (PEIR) for The Metropolitan Water District of Southern California Climate Action Plan (CAP) (proposed project). This Notice of Preparation (NOP) and Scoping Meeting is being sent to responsible, trustee, and other public agencies as part of the review process under CEQA for projects of statewide, regional, or areawide significance (Sections 21080.4 and 21080.9 of the Public Resources Code).

Metropolitan is requesting input from responsible, trustee, and other public agencies, as well as interested organizations and individuals, regarding the scope and content of the environmental information to be included in the Draft PEIR. If you are a responsible or trustee agency, you are requested to indicate your statutory responsibilities in connection with the proposed project.

The description and location of the proposed project and information on the potential environmental effects resulting from the proposed project are provided in this NOP. Due to the time limits mandated by state law (*State CEQA Guidelines* §15082 - Notice of Preparation and Determination of Scope of EIR), written comments must be sent at the earliest possible date, but not later than the end of the public review period, which begins June 23, 2020 and ends July 22, 2020.

Project Title: The Metropolitan Water District of Southern California Climate Action Plan

Applicant: The Metropolitan Water District of Southern California

OPPORTUNITY FOR PUBLIC REVIEW AND COMMENT

Copies of the NOP are available for public review at:

The Metropolitan Water District of Southern California
700 North Alameda Street
Los Angeles, California 90012

Additionally, a copy of the NOP is available online for public review at:

Metropolitan's website at: http://www.mwdh2o.com/CEQA

Written comments should be sent to the address shown below or via e-mail at EP@mwdh2o.com (reference "CAP PEIR" in the subject line) and should include the name, mailing address, telephone number, and email address, if available, of a contact person.

Ms. Malinda Stalvey, Senior Environmental Specialist
The Metropolitan Water District of Southern California
Environmental Planning Section
P.O. Box 54153
Los Angeles, California 90054-0153
(213) 217-5545

Please contact Malinda Stalvey via telephone or email at EP@mwdh2o.com to make arrangements for viewing or to receive a hard copy if you are not able to access the document online or view a copy at the location listed above.

All parties who have submitted their names and mailing addresses will be placed on the mailing list to receive notifications during the course of this CEQA environmental review process.

Scoping Meeting: Metropolitan will hold a virtual scoping meeting in conjunction with the NOP to present the proposed project and the PEIR process. The meeting will provide an opportunity for agency representatives and the public to assist the lead agency in determining the scope and content of the environmental analysis for the PEIR. The scoping meeting will be held online on July 15, 2020 at 10:00 a.m. To participate in the meeting, please register here:
https://us02web.zoom.us/webinar/register/WN_UohxhPynTW6jwvyl_bDUkw.
The public can submit written comments via e-mail at EP@mwdh2o.com (reference "CAP PEIR Scoping" in the subject line) or can provide oral comments during the meeting.

Signature: Jennifer Harriger   Date: 6-16-2020

Jennifer Harriger
Manager, Environmental Planning Section

INTRODUCTION

The Metropolitan Water District of Southern California (Metropolitan) is a regional wholesaler that provides water for 26 member public agencies to deliver either directly or through their sub-agencies to nearly 19 million people, across a 5,200 square mile service area in six counties in Southern California. On average, Metropolitan moves more than 1.7 billion gallons of water daily through its distribution system, which includes an extensive water system including the Colorado River Aqueduct, 16 small hydroelectric facilities, nine reservoirs, 819 miles of large-scale pipes and five water treatment plants, four of which are among the 10 largest plants in the world. Metropolitan imports water from the California Department of Water Resources' State Water Project and the Colorado River to supplement local supplies. It also helps its member agencies develop water recycling, storage and other local resource programs to provide additional supplies and conservation programs to reduce regional demands.

PROJECT DESCRIPTION

Metropolitan is preparing a Climate Action Plan (CAP) to outline a strategy for reducing greenhouse gas (GHG) emissions associated with future construction, operation, and maintenance activities. The CAP is a comprehensive roadmap that analyzes historical GHG emissions, prepares a forecast of future GHG emissions, sets a GHG reduction target for reducing emissions consistent with applicable state policies, and identifies a suite of specific reduction actions that Metropolitan can choose from to achieve the adopted target consistent with Section 15183.5 of the State CEQA Guidelines. The CAP is a customized roadmap for making informed decisions and understanding where and how to achieve emissions reductions that conform to Metropolitan's mission/goals in a meaningful and cost-effective manner. While a CAP identifies potential projects that may be implemented to meet GHG reduction goals, no specific projects will be implemented without further CEQA review.

Emissions Inventory

Metropolitan's operations inherently result in GHG emissions. Understanding the processes that generate these emissions is essential to identifying strategies to reduce GHG emissions and achieve the identified GHG reduction target. Metropolitan's activities can be categorized into the following GHG generating sectors:

- **Water Conveyance and Treatment.** A majority of Metropolitan's emissions are a direct result of the energy consumed to pump, treat and deliver water throughout Metropolitan's extensive service area.
- **Buildings/Infrastructure.** Infrastructure including offices, facilities, control buildings, lighting, computers, air conditioners, and other equipment that is required to support the treatment and delivery of water.
- **Transportation.** This includes the transportation of employees and equipment to and from offices and worksites. Emissions stem from both Metropolitan's fleet vehicles and employee commute emissions.
- **Waste Disposal.** Waste falls into three categories: mixed solids waste, mixed recyclables, and organics. Metropolitan generates waste from various sources, ranging from employee lunches to office waste, which results in indirect GHG emissions as it decomposes in landfills.
- **Water Use.** Water sector GHG emissions by Metropolitan result from water use in facilities and irrigation.
- **Construction.** As Metropolitan's infrastructure ages, there is a continued need for construction of new facilities and infrastructure or rehabilitation of existing facilities and infrastructure. Construction activities result in direct GHG emissions from fuel combustion associated with construction equipment use and transportation of workers and materials.

The CAP will include an inventory of Metropolitan's emissions, including an estimate of emissions associated with Metropolitan's operations from 1990 through 2017. The inventory will describe methodologies used to calculate Scope 1, Scope 2, and Scope 3 emissions. Scope 1 emissions include those from direct fuel combustion, including natural gas, propane, welding gasses, and gasoline and diesel used to power Metropolitan's vehicle fleet. Scope 2 emissions include indirect GHG emissions associated with the purchase and consumption of electricity. Scope 3 emissions are indirect emissions resulting from employee commute, waste generation, water consumption in Metropolitan-owned buildings, and construction projects. The emissions inventory will also provide a forecast of future emissions based on current operations and construction of capital improvement projects.

GHG Reduction Target

The CAP will establish a GHG reduction target aligned with applicable state GHG reduction policies including Senate Bill 32, which establishes a statewide GHG reduction target of 40 percent below 1990 levels by the year 2030, and Executive Order B-55-18, which sets a statewide goal of carbon neutrality by 2045. Metropolitan will measure and track its emissions inventory using:

- **Per Capita Emissions Calculation.** Per capita emissions uses Metropolitan's calculated mass emissions and divides by the service population.
- **Carbon Budget Tracking.** Sets a carbon budget that is incrementally reduced over time to reach the adopted target.

In addition to establishing a reduction target, the CAP will provide a detailed analysis of the emissions reductions necessary for Metropolitan to achieve its target based on the emissions inventory and forecast described above.

Reduction Measures

The CAP will identify a suite of GHG emissions reduction measures that can be implemented to achieve the adopted emissions reduction target. At this time, GHG emission reduction measures are anticipated to span the following categories:

- Energy Use
- Waste
- Transportation
- Reduce Downstream Emissions
- Colorado River Aqueduct Pumping
- Off-road Construction
- Water Conservation
- Carbon Sequestration
- Conventional Treatment Plants
- Advanced Water Treatment Facilities
- New Pump Specifications
- General Engineering

It is anticipated that a majority of GHG reduction measures will be administrative in nature and, consequently, will not result in physical impacts to the environment. Nevertheless, all potential GHG reduction measures will be evaluated in the Draft PEIR.

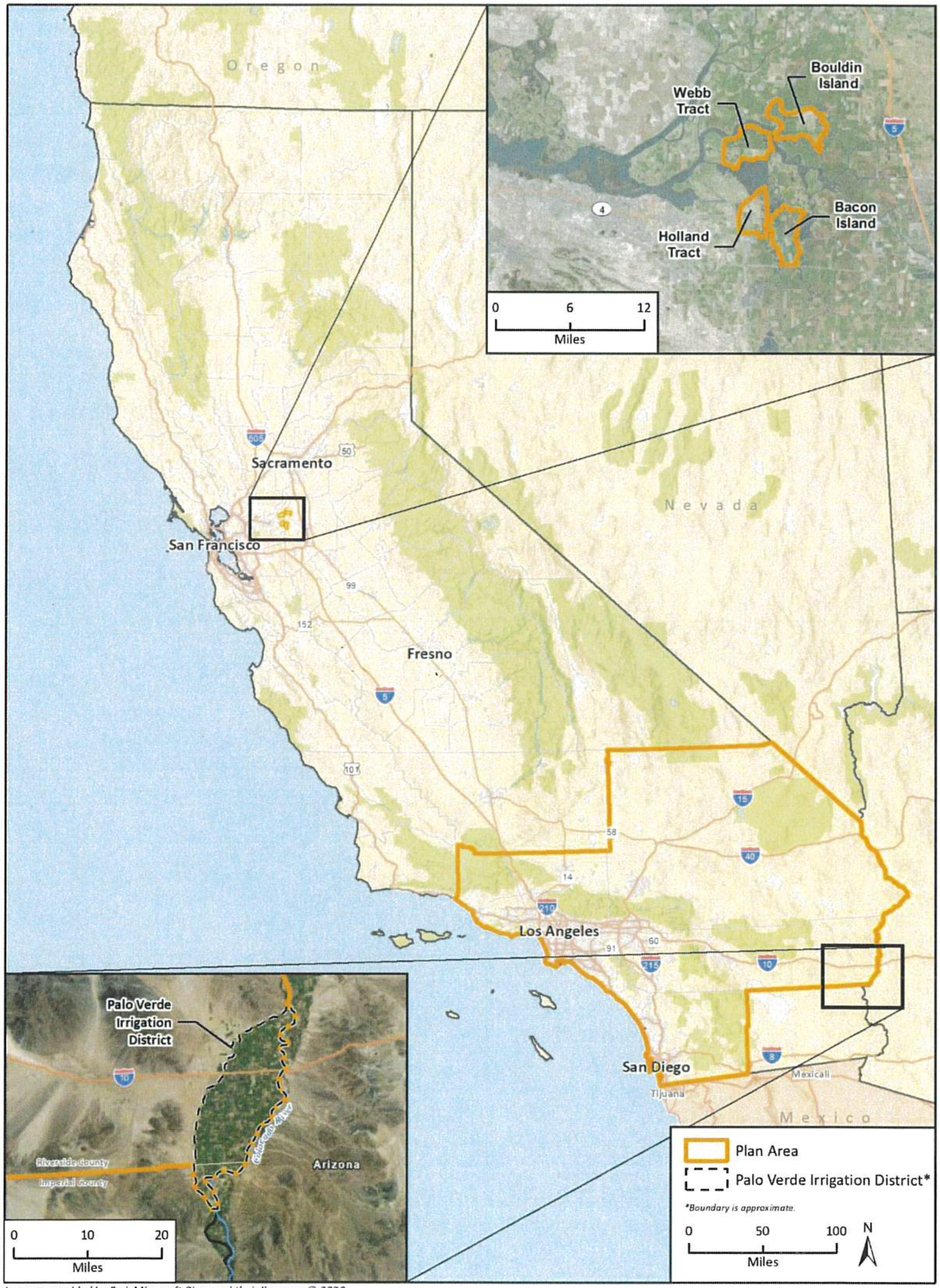
PROJECT LOCATION

The CAP will include reduction measures to reduce GHG emissions from Metropolitan's construction, operation, and maintenance activities. It is anticipated that most reduction measures would be implemented throughout a six-county Southern California region comprised of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. These counties include all of Metropolitan's service area and most of its infrastructure facilities. The CAP may also involve implementation of GHG emissions reduction measures or programs at Metropolitan land holdings in Imperial County, specifically within the Palo Verde Irrigation District; as well as land holdings in San Joaquin and Contra Costa Counties, specifically on lands commonly known as Bacon Island, Bouldin Island, Holland Tract, and Webb Tract in the Sacramento-San Joaquin Delta region. Figure 1 shows the project location.

POTENTIAL ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

The Draft PEIR will include an analysis of all required impact areas, as well as feasible mitigation measures and a reasonable range of alternatives to avoid or reduce potentially significant impacts, if any. Environmental resource areas where it is determined that the proposed project would result in a less than significant impact will be summarized in an "Effects Found to be Less than Significant" section of the Draft PEIR.

Figure 1 Project Location



Imagery provided by Esri, Microsoft Bing, and their licensors © 2020.
Additional data provided by USGS, 2017.

Print From

Summary Form for Electronic Document Submittal

Form F

Lead agencies may include 15 hardcopies of this document when submitting electronic copies of Environmental Impact Reports, Negative Declarations, Mitigated Negative Declarations, or Notices of Preparation to the State Clearinghouse (SCH). The SCH also accepts other summaries, such as EIR Executive Summaries prepared pursuant to CEQA Guidelines Section 15123. Please include one copy of the Notice of Completion Form (NOC) with your submission and attach the summary to each electronic copy of the document.

SCH #: ______________________

Project Title: The Metropolitan Water District of Southern California Climate Action Plan (CAP)

Lead Agency: The Metropolitan Water District of Southern California

Contact Name: Malinda Stalvey

Email: mstalvey@mwdh2o.com Phone Number: (213) 217-5545

Project Location: Multiple counties

City *County*

Project Description (Proposed actions, location, and/or consequences).

Metropolitan is preparing a Program EIR for a Climate Action Plan (CAP) that will outline a strategy for reducing greenhouse gas (GHG) emissions associated with future construction, operation, and maintenance activities. The CAP is a roadmap that analyzes historical and forecasts future GHG emissions; sets a GHG reduction target for reducing emissions consistent with state policies; and identifies a suite of reduction actions that Metropolitan can choose from to achieve the adopted target consistent with Section 15183.5 of the CEQA Guidelines. The CAP is a customized roadmap for making informed decisions and understanding where and how to achieve emissions reductions that conform to Metropolitan's mission/goals in a meaningful and cost-effective manner. While a CAP identifies potential projects that may be implemented to meet GHG reduction goals, no specific projects will be implemented without further CEQA review.

See attached for additional description of proposed actions and location.

Identify the project's significant or potentially significant effects and briefly describe any proposed mitigation measures that would reduce or avoid that effect.

See attached for potentially significant effects that could occur and potential mitigation measures under consideration for each issue area.

If applicable, describe any of the project's areas of controversy known to the Lead Agency, including issues raised by agencies and the public.

There are no areas of known controversy for the proposed project.

Provide a list of the responsible or trustee agencies for the project.

Summary Form for Electronic Document Submittal - Attachment

Project Description (Proposed actions, location, and/or consequences) *(continued)*

It is anticipated that most reduction measures would be implemented throughout a six-county Southern California region comprised of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. These counties include all of Metropolitan's service area and most of its infrastructure facilities. The CAP may also involve implementation of GHG reduction measures or programs at Metropolitan land holdings in Imperial County, specifically within the Palo Verde Irrigation District, as well as land holdings in San Joaquin and Contra Costa counties, specifically on lands commonly known Bacon Island, Bouldin Island, Holland Tract, and Webb Tract in the Sacramento-San Joaquin Delta region.

Identify the project's significant or potentially significant effects and briefly describe any proposed mitigation measures that would reduce or avoid that effect. *(continued)*

Potentially significant effects could occur in the below listed areas. Potential mitigation measures under consideration are also listed for each issue area.

- Aesthetics - Light spillover reduction, design modifications, vegetation replacement, geologic formation avoidance
- Agriculture and Forestry Resources - Avoidance of farmland and Williamson Act contracted land, mitigation
- Air Quality - Construction fugitive dust control, odor minimization plans, health risk assessment
- Biological Resources - Biological resources assessment, worker environmental awareness program, wetland restoration
- Cultural Resources - Historical resource implementation program, archaeological resources investigation
- Hazards and Hazardous Materials - Prepare Phase I and II Environmental Site Assessments
- Land Use and Planning - Coordinate with jurisdictions, maintain access to community facilities during construction
- Mineral Resources - Mineral resources surveys
- Noise - Project-level noise and vibration analyses, construction and staging avoidance of sensitive receptors
- Paleontological Resources - Paleontological resources studies and construction monitoring, salvage of fossils
- Transportation - Construction transportation management plans at project level
- Tribal Cultural Resources – To be determined based on results of tribal outreach
- Utilities and Service Systems – Construction and operational water and energy conservation measures
- Wildfire - Construction traffic management plan to maintain emergency access, spark arresters, avoidance of landslide-susceptible areas and slopes hillsides for new structures

ENVIRONMENTAL IMPACT REPORT
EVALUATION/RESPONSE CHECKLIST
FOR AREA/SECTION

Reference: General Order 41.2

	Action	Reference GO 41.2
☐	Review memorandum for the due date(s).	
☐	Determine if the proposed project might impact local operations and/or public safety. Examples include: housing developments, large commercial projects, large recreational developments or expansions, landfill or quarry operations, hazardous materials storage and/or dump sites, highway construction/improvement projects, new schools, airport improvements, annexations/incorporations, off-highway vehicle facilities, and Indian gaming facilities.	Page 5
☐	Review environmental impact documents to identify issues or concerns with possible impact to departmental operations (i.e., increased response times, enforcement, emergency services, service calls, telecommunications, public safety).	
	Responses	
☐	**<u>If comments are advisable</u>:**	
☐	Correspondence should focus primarily on traffic safety, congestion, or other impacts to the CHP's mission; however, **Areas shall not indicate to the lead agency that additional personnel, facilities, vehicles, etc., are a means to mitigate departmental service issues**.	Page 7
☐	Ensure the State Clearinghouse number (SCH#) is included in all correspondence.	
☐	Comments shall be provided directly to the lead agency and emailed to State Clearinghouse at state.clearinghouse@opr.ca.gov no later than the designated due date. Provide a copy to Special Projects Section (SPS) via electronic mail (e-mail).	
	For project tracking purposes, SPS must be notified of Area/Section's assessment of the project. After mailing your comments to the SCH or lead agency, send a scanned copy via e-mail to SPS.	
☐	<u>If no impact is determined</u>:	
☐	Via e-mail, please respond "no impact to ________________ Area's local operations and/or public safety by SCH# ___________ was identified," by the designated SCH due date to the SPS analyst listed on the Environmental Document Review and Response memorandum. Ensure the SCH# is included.	

Mojave Desert Air Quality Management District
Brad Poiriez, *Executive Director*
14306 Park Avenue, Victorville, CA 92392-2310
760.245.1661 • Fax 760.245.2022
www.MDAQMD.ca.gov • @MDAQMD

June 23, 2020

Ms. Malinda Stalvey, Senior Environmental Specialist
The Metropolitan Water District of Southern California
Environmental Planning Section
P.O. Box 54153
Los Angeles, CA 90054-0153

Project: Notice of Preparation of a Draft Program Environmental Impact Report for The Metropolitan Water District of Southern California Climate Action Plan

Dear Ms. Stalvey:

The Mojave Desert Air Quality Management District (District) has received a Notice of Preparation and Scoping Meeting for The Metropolitan Water District (MWD) of Southern California Climate Action Plan (CAP). MWD is requesting input regarding the scope and content of environmental information to be included in the Draft PEIR.

The District has reviewed the Notice of Preparation and Scoping Meeting Notice. The District recommends the Draft PEIR should analyze potential short-term and long-term air quality impacts associated with the proposed plan, and recommends the use of URBEMIS or CalEEMod as the appropriate computer model to be used to estimate associated emissions. District California Environmental Quality Act (CEQA) significance thresholds can be found in the "MDAQMD CEQA and Federal Conformity Guidelines" (available for download at the MDAQMD website https://www.mdaqmd.ca.gov/rules/overview).

Thank you for the opportunity to review this planning document. If you have any questions regarding this letter, please contact me at (760) 245-1661, extension 6726, or Tracy Walters at extension 6122.

Sincerely,

Alan J. De Salvio
Deputy Director – Mojave Desert Operations

AJD/tw MWD DPEIR CAP NOP and Scoping Meeting.doc

July 21, 2020

Malinda Stalvey
The Metropolitan Water District of Southern California
Environmental Planning Section
P.O. Box 54153
Los Angeles, California 90054-0153

Project: The Metropolitan Water District of Southern California Climate Action Plan Notice of Preparation

District CEQA Reference No: 20200538

Dear Ms. Stalvey,

The San Joaquin Valley Unified Air Pollution Control District (District) has reviewed the project referenced above from the Metropolitan Water District of Southern California consisting of a Climate Action Plan (CAP) to outline a strategy for reducing greenhouse gas (GHG) emissions associated with future construction, operation, and maintenance activities (Project). The Project is located at Bacon Island, Bouldin Island, Holland Tract, and Webb Tract in the Sacramento-San Joaquin Delta Region. The District offers the following comments:

<u>Project Description</u>

The Metropolitan Water District of Southern California is proposing in the CAP a comprehensive roadmap that analyzes historical GHG emissions, prepares a forecast of future GHG emissions, sets a GHG reduction target for reducing emissions consistent with applicable state policies, and identifies a suite of specific reduction actions that Metropolitan can chose from to achieve the adopted target consistent with Section 15183.5 of the State CEQA Guidelines.

The District offers the following comments:

1) Project Related Emissions

The District recommends that a more detailed preliminary review of the Project be conducted. The additional environmental review of the Project's potential impact on air quality should consider the following items:

1a) Recommended Model: Project related criteria pollutant emissions from construction and operation non-permitted (limited to equipment not subject to District permits) should be identified and quantified. Emissions analysis should be performed using CalEEMod (California Emission Estimator Model), which uses the most recent approved version of relevant Air Resources Board (ARB) emissions models and emission factors. CalEEMod is available to the public and can be downloaded from the CalEEMod website at: www.caleemod.com.

1b) Project Related Construction Emissions: Construction emissions are short-term emissions and should be evaluated separately from operational emissions. Equipment exhaust, as well as fugitive dust emissions should be quantified.

For reference, the District's annual criteria thresholds of significance for construction are: 100 tons per year of carbon monoxide (CO), 10 tons per year of oxides of nitrogen (NOx), 10 tons per year of reactive organic gases (ROG), 27 tons per year of oxides of sulfur (SOx), 15 tons per year of particulate matter of 10 microns or less in size (PM10), or 15 tons per year of particulate matter of 2.5 microns or less in size (PM2.5).

1c) Project Related Operational Emissions – Cleanest Available Truck: Permitted (stationary sources) and non-permitted (mobile sources) sources should be analyzed separately. For reference, the District's annual criteria thresholds of significance for operational emissions are listed above.

The San Joaquin Valley will not be able to attain stringent health-based federal air quality standards without significant reductions in emissions from heavy-heavy duty (HHD) Trucks, the single largest source of NOx emissions in the San Joaquin Valley. The District recently adopted the 2018 PM2.5 Plan which includes significant new reductions from HHD Trucks, including emissions reductions by 2023 through the implementation of the California Air Resources Board (CARB) Statewide Truck and Bus Regulation, which requires truck fleets operating in California to meet the 2010 0.2 g/bhp-hr NOx standard by 2023. Additionally, to meet the federal air quality standards by the 2020 to 2024 attainment deadlines, the District's Plan relies on a significant and immediate transition of heavy duty truck fleets to zero or near-zero emissions technologies, including the near-zero truck standard of 0.02 g/bhp-hr NOx established by the California Air Resources Board.

For development projects which typically generate a high volume of heavy duty truck traffic (e.g. "high-cube" warehouse or distribution center), there are heavy duty trucks traveling to-and-from from the project location at longer trip length distances for potential distribution. To reduce impacts from operational mobile source emissions, the District recommends that the following mitigation measures be considered for inclusion in the EIR.

- Advise fleets associated with Project operational activities to utilize the cleanest available HHD truck technologies, including zero and near-zero (0.02 g/bhp-hr NOx) technologies as feasible.

- Advise all on-site service equipment (cargo handling, yard hostlers, forklifts, pallet jacks, etc.) to utilize zero-emissions technologies as feasible.

- Advise fleets associated with future development projects to be subject to the best practices (i.e. eliminating unnecessary idling).

In addition, the District recommends that the mitigation measures be included to reduce project related operational impacts through incorporation of design elements, for example, increased energy efficiency, reducing vehicle miles traveled, etc. More information on mitigation measures can be found on the District's website at http://www.valleyair.org/transportation/Mitigation-Measures.pdf.

1d) Project Related Operational Emissions – Truck Routing

Truck routing involves the path/roads heavy-duty trucks take to and from their destination. The air emissions from heavy-duty trucks can impact residential communities and sensitive receptors.

The District recommends the EIR evaluate heavy-duty truck routing patterns to help limit emission exposure to residential communities and sensitive receptors. More specifically, this measure would assess current truck routes, in consideration of the number and type of each vehicle, destination/origin of each vehicular trip, time of day/week analysis, vehicle miles traveled and emissions. The truck routing study would also identify alternative truck routes and their impacts on VMT, GHG emissions, and air quality.

2) District Rules and Regulations

The District issues permits for many types of air pollution sources and regulates some activities not requiring permits. A project subject to District rules and regulation would reduce its impacts on air quality through compliance with regulatory requirements. In general, a regulation is a collection of rules, each of which deals with a specific topic. Here are a couple of example, Regulation II (Permits) deals with permitting emission sources and includes rules such as District permit requirements (Rule 2010), New and Modified Stationary Source Review (Rule 2201), and implementation of Emission Reduction Credit Banking (Rule 2301).

The list of rules below is neither exhaustive nor exclusive. Current District rules can be found online at: www.valleyair.org/rules/1ruleslist.htm. To identify other District rules or regulations that apply to this Project or to obtain information about District permit requirements, the applicant is strongly encouraged to contact the District's Small Business Assistance (SBA) Office at (209) 557-6446.

2a) District Rules 2010 and 2201 - Air Quality Permitting for Stationary Sources

Stationary Source emissions include any building, structure, facility, or installation which emits or may emit any affected pollutant directly or as a fugitive emission. District Rule 2010 requires operators of emission sources to obtain an Authority to Construct (ATC) and Permit to Operate (PTO) from the District. District Rule 2201 requires that new and modified stationary sources of emissions mitigate their emissions using best available control technology (BACT).

This future developments may be subject to District Rule 2010 (Permits Required) and Rule 2201 (New and Modified Stationary Source Review) and will 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 (SBA) Office at (209) 557-6446.

2b) District Rule 9510 (Indirect Source Review)

The purpose of District Rule 9510 is to reduce the growth in both NOx and PM10 emissions associated with development and transportation projects from mobile and area sources associated with construction and operation of development projects. The rule encourages clean air design elements to be incorporated into development projects. In case the proposed development project clean air design elements are insufficient to meet the targeted emission reductions, the rule requires developers to pay a fee used to fund projects to achieve off-site emissions reductions.

Accordingly, future development projects within the Project would be subject to District Rule 9510 if:

(1) Upon full build-out, the project would receive a project-level discretionary approval from a public agency and would equal or exceed any one of the following applicability thresholds:

- 50 dwelling units
- 2,000 square feet of commercial space;
- 25,000 square feet of light industrial space;
- 100,000 square feet of heavy industrial space;
- 20,000 square feet of medical office space;
- 39,000 square feet of general office space; or
- 9,000 square feet of educational space; or
- 10,000 square feet of government space; or
- 20,000 square feet of recreational space; or
- 9,000 square feet of space not identified above

(2) Or would equal or exceed any of the applicability thresholds in section 2.2 of the rule.

District Rule 9510 also applies to any transportation or transit development projects where construction exhaust emissions equal or exceed two (2.0) tons of NOx or two (2.0) tons of PM10.

In the case the future development project(s) are subject to District Rule 9510, an Air Impact Assessment (AIA) application is required and the District recommends that demonstration of compliance with District Rule 9510, before issuance of the first building permit, be made a condition of Project approval.

Information about how to comply with District Rule 9510 can be found online at: http://www.valleyair.org/ISR/ISRHome.htm.

The AIA application form can be found online at: http://www.valleyair.org/ISR/ISRFormsAndApplications.htm.

District staff is available to provide assistance with determining if future development projects will be subject to Rule 9510, and can be reached by phone at (559) 230-6000 or by email at ISR@valleyair.org.

2c) Other District Rules and Regulations

Future projects may also be subject to the following District rules: Regulation VIII, (Fugitive PM10 Prohibitions), Rule 4102 (Nuisance), Rule 4601 (Architectural Coatings), and Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations). In the event an existing building will be renovated, partially demolished or removed, the project may be subject to District Rule 4002 (National Emission Standards for Hazardous Air Pollutants).

If you have any questions or require further information, please contact Will Worthley by e-mail at will.worthley@valleyair.org or by phone at (559) 230-5925.

Sincerely,

For Arnaud Marjollet
Director of Permit Services

AM: ww

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 · www.aqmd.gov

SENT VIA E-MAIL: July 21, 2020
EP@mwdh2o.com
Malinda Stalvey, Senior Environmental Specialist
The Metropolitan Water District of Southern California
Environmental Planning Section
P.O. Box 54153
Los Angeles, CA 90054-0153

Notice of Preparation of a Draft Program Environmental Impact Report for The Metropolitan Water District of Southern California Climate Action Plan

South Coast Air Quality Management District (South Coast AQMD) staff appreciates the opportunity to comment on the above-mentioned document. South Coast AQMD staff's comments are recommendations regarding the analysis of potential air quality impacts from the Proposed Project that should be included in the Draft Program Environmental Impact Report (PEIR). Please send a copy of the Draft PEIR upon its completion and public release directly to South Coast AQMD at the address shown in the letterhead. Note that copies of the Draft PEIR that are submitted to the State Clearinghouse are not forwarded to South Coast AQMD. **In addition, please send with the Draft PEIR all appendices or technical documents related to the air quality, health risk, and greenhouse gas analyses and electronic versions of all air quality modeling and health risk assessment files[1]. These include emission calculation spreadsheets and modeling input and output files (not PDF files). Without all files and supporting documentation, South Coast AQMD staff will be unable to complete our review of the air quality analyses in a timely manner. Any delays in providing all supporting documentation will require additional time for review beyond the end of the comment period.**

CEQA Air Quality Analysis

South Coast AQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. South Coast AQMD staff recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analyses. Copies of the Handbook are available from the South Coast AQMD's Subscription Services Department by calling (909) 396-3720. More recent guidance developed since this Handbook was published is also available on South Coast AQMD's website at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/ceqa-air-quality-handbook-(1993). South Coast AQMD staff also recommends that the Lead Agency use the CalEEMod land use emissions software. This software has recently been updated to incorporate up-to-date state and locally approved emission factors and methodologies for estimating pollutant emissions from typical land use development. CalEEMod is the only software model maintained by the California Air Pollution Control Officers Association (CAPCOA) and replaces the now outdated URBEMIS. This model is available free of charge at: www.caleemod.com.

On March 3, 2017, the South Coast AQMD's Governing Board adopted the 2016 Air Quality Management Plan (2016 AQMP), which was later approved by the California Air Resources Board on March 23, 2017.

[1] Pursuant to the CEQA Guidelines Section 15174, the information contained in an EIR shall include summarized technical data, maps, plot plans, diagrams, and similar relevant information sufficient to permit full assessment of significant environmental impacts by reviewing agencies and members of the public. Placement of highly technical and specialized analysis and data in the body of an EIR should be avoided through inclusion of supporting information and analyses as appendices to the main body of the EIR. Appendices to the EIR may be prepared in volumes separate from the basic EIR document, but shall be readily available for public examination and shall be submitted to all clearinghouses which assist in public review.

Built upon the progress in implementing the 2007 and 2012 AQMPs, the 2016 AQMP provides a regional perspective on air quality and the challenges facing the South Coast Air Basin. The most significant air quality challenge in the Basin is to achieve an additional 45 percent reduction in nitrogen oxide (NOx) emissions in 2023 and an additional 55 percent NOx reduction beyond 2031 levels for ozone attainment. The 2016 AQMP is available on South Coast AQMD's website at: http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan.

South Coast AQMD staff recognizes that there are many factors Lead Agencies must consider when making local planning and land use decisions. To facilitate stronger collaboration between Lead Agencies and South Coast AQMD to reduce community exposure to source-specific and cumulative air pollution impacts, South Coast AQMD adopted the Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning in 2005[2]. This Guidance Document provides suggested policies that local governments can use in their General Plans or through local planning to prevent or reduce potential air pollution impacts and protect public health. South Coast AQMD staff recommends that the Lead Agency review this Guidance Document as a tool when making local planning and land use decisions. Additional guidance on siting incompatible land uses (such as placing homes near freeways or other polluting sources) can be found in the California Air Resources Board's *Air Quality and Land Use Handbook: A Community Health Perspective*, which can be found at: http://www.arb.ca.gov/ch/handbook.pdf. Guidance[3] on strategies to reduce air pollution exposure near high-volume roadways can be found at: https://www.arb.ca.gov/ch/rd_technical_advisory_final.PDF.

South Coast AQMD has developed both regional and localized significance thresholds. South Coast AQMD staff recommends that the Lead Agency quantify criteria pollutant emissions and compare the emissions to South Coast AQMD's CEQA regional pollutant emissions significance thresholds[4] and localized significance thresholds (LSTs)[5] to determine the Proposed Project's air quality impacts. The localized analysis can be conducted by either using the LST screening tables or performing dispersion modeling.

When specific development is reasonably foreseeable as result of the goals, policies, and guidelines in the Proposed Project, the Lead Agency should identify any potential adverse air quality impacts and sources of air pollution that could occur using its best efforts to find out and a good-faith effort at full disclosure in the EIR. The degree of specificity will correspond to the degree of specificity involved in the underlying activity which is described in the EIR (CEQA Guidelines Section 15146). When quantifying air quality emissions, emissions from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips, and hauling trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, such as sources that generate or attract vehicular trips, should be included in the analysis. Furthermore, emissions from the overlapping construction and operational activities should be combined and compared to South Coast AQMD's regional air quality CEQA *operational* thresholds to determine the level of significance.

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[2] South Coast AQMD. 2005. Accessed at: http://www.aqmd.gov/docs/default-source/planning/air-quality-guidance/complete-guidance-document.pdf.

[3] In April 2017, CARB published a technical advisory, *Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways: Technical Advisory*, to supplement CARB's Air Quality and Land Use Handbook: A Community Health Perspective. This technical advisory is intended to provide information on strategies to reduce exposures to traffic emissions near high-volume roadways to assist land use planning and decision-making in order to protect public health and promote equity and environmental justice. The technical advisory is available at: https://www.arb.ca.gov/ch/landuse.htm.

[4] South Coast AQMD's CEQA regional pollutant emissions significance thresholds can be found here: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf.

[5] Guidance for performing a localized air quality analysis can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds.

If the Proposed Project generates or attracts vehicular trips, especially heavy-duty diesel-fueled vehicles, it is recommended that the Lead Agency perform a mobile source health risk assessment[6]. An analysis of all toxic air contaminant impacts due to the use of equipment potentially generating such air pollutants should also be included.

Mitigation Measures

If the Proposed Project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized during project construction and operation to minimize or eliminate these impacts. Pursuant to CEQA Guidelines Section 15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed. Several resources are available to assist the Lead Agency with identifying possible mitigation measures for the Proposed Project, including:

- Chapter 11 "Mitigating the Impact of a Project" of South Coast AQMD's *CEQA Air Quality Handbook*
- South Coast AQMD's CEQA web pages available here: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies
- South Coast AQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook for controlling construction-related emissions and Rule 1403 – Asbestos Emissions from Demolition/Renovation Activities
- California Air Pollution Control Officers Association's (CAPCOA) *Quantifying Greenhouse Gas Mitigation Measures* available here: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

Permits

If implementation of the Proposed Project requires a permit from South Coast AQMD, South Coast AQMD should be identified as a Responsible Agency for the Proposed Project in the EIR. For more information on permits, please visit South Coast AQMD's webpage at: http://www.aqmd.gov/home/permits. Questions on permits can be directed to South Coast AQMD's Engineering and Permitting staff at (909) 396-3385.

Data Sources

South Coast AQMD rules and relevant air quality reports and data are available by calling South Coast AQMD's Public Information Center at (909) 396-2001 or at South Coast AQMD's website at: http://www.aqmd.gov.

South Coast AQMD staff is available to work with the Lead Agency to ensure that project air quality and health risk impacts are accurately evaluated and mitigated to the extent feasible. If you have any questions regarding this letter, please contact me at lsun@aqmd.gov.

Sincerely,

Lijin Sun

Lijin Sun, J.D.
Program Supervisor, CEQA IGR
Planning, Rule Development & Area Sources

LS
LAC200708-18
Control Number

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[6] Guidance for performing a mobile source health risk assessment ("*Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis*") can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mobile-source-toxics-analysis.

Ventura County
Air Pollution
Control District

669 County Square Dr
Ventura, California 93003

tel 805/645-1400
fax 805/645-1444
www.vcapcd.org

Dr. Laki Tisopulos
Air Pollution Control Officer

VENTURA COUNTY
AIR POLLUTION CONTROL DISTRICT
Memorandum

TO: Malinda Stalvey, Sr. Environmental Specialist DATE: July 20, 2020

FROM: Nicole Collazo, Air Quality Specialist

SUBJECT: Request for Review of Notice of Preparation of a Draft Environmental Impact Report for the Metropolitan Water District of Southern California Climate Action Plan (RMA 20-005)

Ventura County Air Pollution Control District (APCD) staff has reviewed the subject Notice of Preparation (NOP) for the draft environmental impact report (DEIR) of the Metropolitan Water District of Southern California's (Metropolitan) Climate Action Plan (CAP), outlining its strategy for reducing greenhouse gas emissions associated with future construction, operation and maintenance activities at the Metropolitan. The Project Location spans 6 Southern California counties, including Ventura County. The Lead Agency for the project is the Metropolitan Water District of Southern California.

General Comments

Air Quality Section- The air quality assessment should consider project consistency with the 2016 Air Quality Management Plan (AQMP) for emissions expected in the Ventura County region. The 2016 AQMP presents Ventura County's strategy (including related mandated elements) to attain the 2008 federal 8-hour ozone standard by 2020, as required by the federal Clean Air Act Amendments of 1990 and applicable U.S. EPA clean air regulations. The 2016 AQMP uses an updated 2012 emissions inventory as baseline for forecasting data, SCAG RTP 2016 data, and CARB's EMFAC2014 emission factors for mobile sources. The AQMP can be downloaded from our website at http://www.vcapcd.org/AQMP-2016.htm.

The Ventura County Air Quality Assessment Guidelines (AQAG) should also be used to evaluate all potential air quality impacts the proposed project will have in Ventura County. The AQAG are also downloadable from our website here: http://www.vcapcd.org/environmental-review.htm. Specifically, the air quality assessment should consider reactive organic compound, nitrogen oxide emissions and particulate matter from all project-related motor vehicles, sources not permitted with APCD, and construction equipment that may result from potential buildout, as appropriate to future development policies and implementation measures. We note that the AQAG has not been updated since 2003 and serves as a reference and is not required or mandated by the APCD (AQAG Page 1-1). Current air quality determinations follow the same process but using different tools (CalEEMod vs. URBEMIS, CO Hotspots analysis no longer required, etc.). The recommended list of mitigation measures in the AQAG are also limited and outdated. For example, the following template is currently being recommended by APCD as a Commenting Agency for projects that include construction equipment, reflecting state laws adopted since the AQAG was last updated in 2003:

Construction Equipment

Purpose: In order to ensure that ozone precursor and particulate emissions from diesel-powered mobile construction equipment are reduced to the greatest amount feasible.

Requirement: The Permittee shall comply with the provisions of all applicable California State Laws and APCD Rules and Regulations regarding portable construction equipment and construction vehicles.

Documentation: The project applicant shall ensure compliance with the following State Laws and APCD requirements:

- **I.** Construction equipment shall not have visible emissions greater than 20% opacity, as required by APCD Rule 50, Opacity.
- **II.** All portable diesel-powered equipment over 50 BHP shall be registered with the State's Portable Equipment Registration Program (PERP) or an APCD Portable Permit.
- **III.** Off-Road Heavy-Duty trucks shall comply with the California State Regulation for In-Use Off-Road Diesel Vehicles (Title 13, CCR §2449), the purpose of which is to reduce NO_x and diesel particulate matter exhaust emissions.
- **IV.** On-Road Heavy-Duty trucks shall comply with the California State Regulation for In-Use On-Road Diesel Vehicles (Title 13, CCR §2025), the purpose of which is to reduce NO_x and diesel particulate matter exhaust emissions.
- **V.** All commercial on-road and off-road diesel vehicles are subject to the idling limits of Title 13, CCR §2485, §2449(d)(3), respectively. Construction equipment shall not idle for more than five (5) consecutive minutes. The idling limit does not apply to: (1) idling when queuing; (2) idling to verify that the vehicle is in safe operating condition; (3) idling for testing, servicing, repairing or diagnostic purposes; (4) idling necessary to accomplish work for which the vehicle was designed (such as operating a crane); (5) idling required to bring the machine system to operating temperature, and (6) idling necessary to ensure safe operation of the vehicle. It is the Permittee's responsibility to have a written idling policy that is made available to operators of the vehicles and equipment and informs them that idling is limited to 5 consecutive minutes or less, except as exempted in subsection a. above.

The following are recommended measures for construction equipment and vehicles:

- **I.** Diesel powered equipment should be replaced by electric equipment whenever feasible.
- **II.** Maintain equipment engines in good condition and in proper tune as per manufacturer's specifications.
- **III.** Lengthen the construction period during smog season (May through October), to minimize the number of vehicles and equipment operating at the same time.
- **IV.** Use alternatively fueled construction equipment, such as compressed natural gas (CNG), liquefied natural gas (LNG), or electric, if feasible.
- **V.** Minimum Tier 3 diesel off-road equipment shall be used, or Tier 4 if commercially available.

GHG Section- Neither APCD nor the County has adopted a threshold of significance applicable to Greenhouse Gas (GHG) emissions from projects subject to the County's discretionary land use permitting authority. APCD published a report as a request by the Ventura County Air Pollution Control Board to report back on possible GHG thresholds options on November 8, 2011. The District will be looking into what GHG threshold is best suitable for Ventura County in the near future which will undergo a public review process. The County of Ventura is currently in the public review process of adopting a Climate Action Plan, to be included in their General Plan Update. For more information, including draft CAP and DEIR, please visit https://vc2040.org/review/documents.

The following are recommended guidance documents that may be used to address the impacts of climate change and greenhouse gases in Ventura County.

On May 2016, the CARB published a Mobile Source Strategy. In this report, ARB staff is outlining a mobile source strategy that simultaneously meets air quality standards, achieves GHG emission reduction targets, decreases toxics health risk, and reduces petroleum consumption from transportation emissions over the next fifteen years. These goals and targets include These include 1) Attaining federal health-based air quality standards for ozone in 2023 and 2031 in the South Coast and San Joaquin Valley, and fine particulate matter (PM2.5) standards in the next decade; 2) Achieving greenhouse gas (GHG) emission reduction targets of 40 percent below 1990 levels by 2030, with continued progress towards an 80 percent reduction by 2050; 3) Minimizing health risk from exposure to toxic air contaminants; 4) Reducing our petroleum use by up to 50 percent by 2030; and 5) Increasing energy efficiency and deriving 50 percent of our electricity from renewable sources by 2030. The report can be found here: https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.htm.

On November 2017, the California Air Resources Board published it latest Climate Change Scoping Plan. The Scoping Plan lays out a strategy for achieving California's 2030 Greenhouse Gas target and builds on the state's successes to date, proposing to strengthen major programs that have been a hallmark of success, while further integrating efforts to reduce both GHGs and air pollution. California's climate efforts will 1) Lower GHG emissions on a trajectory to avoid the worst impacts of climate change; 2) Support a clean energy economy which provides more opportunities for all Californians; 3) Provide a more equitable future with good jobs and less pollution for all communities; 4) Improve the health of all Californians by reducing air and water pollution and making it easier to bike and walk; and 5) Make California an even better place to live, work, and play by improving our natural and working lands. The 2017 Climate Change Scoping Plan can be accessed here https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf.

Finally, on December 2018, the Governor's Office of Planning and Research (OPR) published a Draft Technical Advisory. This document incorporates developments since the June 2008 Technical Advisory publication, including regulatory changes made to the regulations that implement CEQA (commonly known as the "CEQA Guidelines" in late 2018 by the California Natural Resources Agency (Agency). Although this document largely focuses on project-level analyses of greenhouse gas impacts, Section IV briefly addresses community-scale greenhouse gas reduction plans as one pathway to streamline CEQA analyses. This discussion draft is intended to address some common issues and topics that arise in greenhouse gas emissions analyses under CEQA but is not intended to address every single issue and topic. More information on the OPR's Technical Advisory can be found here http://opr.ca.gov/ceqa/technical-advisories.html.

The APCD would like to make the Metropolitan aware of its Incentives Program that are directed at reducing criteria pollutants by reducing the amount of nitrous oxides (NOx) generated from mobile sources. NOx when combined with reactive organic compounds (ROC or VOCs) can react with sunlight to create ground-level smog. The two types of programs, Incentives Program and Transportation Outreach Program, have a co-benefit in indirectly reducing GHG emissions as older, dirtier equipment and vehicles are traded in for newer engines that have stricter air quality emission standards or as Vehicle Miles Travelled (VMT) are reduced due to an increase in alternative modes of transportation, respectively. More information can be found online here on our District Incentive Programs and here on the Transportation Outreach Program. These existing programs may be included in the Metropolitan's CAP as the implementation programs, if the Metropolitan should qualify for funding. Some of these programs include Lower Emission School Bus Program, EV Charging Stations Funding and Funding Agricultural Replacement Measures for Emission Reductions (FARMER).

Environmental Justice- The AB 617 legislation sets out an ambitious implementation schedule for APCD. The California Air Resources Board (CARB) must set the overall direction of the program by October 1, 2018. This includes identifying impacted communities, establishing the criteria for air monitoring and local emissions reduction programs, and developing statewide strategies for reducing emissions. The local air districts also have specific roles and responsibilities. On April 27, 2018, the VCAPCD submitted to CARB a technical assessment to develop an initial list of candidate communities for Ventura County.

On July 31, 2018 the Ventura County Air Pollution Control Board approved the District staff's recommendation that the greater Oxnard/Port Hueneme area be the highest priority region in Ventura County for inclusion in CARB's Community Air Protection Program. District staff's recommendation is based on our assessment that we have not identified a single or multiple sources of significant air emissions that would lead us to identify a smaller region adjacent to these source(s). This is in part based on our review of our permitted sources in the area. The greater Oxnard/Port Hueneme area is also home to several agricultural operations and these operations generally utilize pesticides and diesel equipment. In addition, the Port of Hueneme and several warehouse type distribution centers are located in the area. Heavy-duty trucks associated with these goods movement facilities move throughout the area. In summary, we are looking at a diffuse inventory of air pollution sources in this area. This will likely require additional research including community level air monitoring in several locations to identify any sources of concern. In addition, by having a larger area, the VCAPCD will have flexibility to target our incentive funds within the area as we learn more about potential issues with air pollutant sources in and adjacent to the area.

As amended by Assembly Bill 617 (C. Garcia, Chapter 136, Statutes of 2017), Health and Safety Code section 40920.6(c) requires that on or before January 1, 2019, each local air district that is a nonattainment area for one or more air pollutants must adopt an expedited schedule for the implementation of BARCT by the earliest feasible date, but in any event not later than December 31, 2023.

District staff has created a BARCT rule development schedule to comply with this statutory requirement. CARB has identified four affected facilities that are subject to AB 617 BARCT requirements; the facilities are operated by Procter and Gamble, New Indy Container, California Resources (Santa Clara Valley Gas Plant), and Trinity ESC. District staff then evaluated which District rules are applicable to these facilities that may not meet BARCT requirements including Rule 74.23, *Stationary Gas Turbines*; Rule 74.15, *Boilers, Steam Generators and Process Heaters*; Rule 71.3, *Transfer of Reactive Organic Compound Liquids*; and Rule 74.10, *Components at Crude Oil and Natural Gas Production and Processing Facilities*.

Thank you for the opportunity to comment on the NOP and we look forward to reading Metropolitan's DEIR for the proposed project.

Should you have any questions, you may reach me at nicole@vcapcd.org.

Stanislaus County

CHIEF EXECUTIVE OFFICE

Jody L. Hayes
Chief Executive Officer

Patrice M. Dietrich
Assistant Executive Officer

Raul L. Mendez
Assistant Executive Officer

STANISLAUS COUNTY ENVIRONMENTAL REVIEW COMMITTEE

July 21, 2020

Ms. Malinda Stalvey, Senior Environmental Specialist
The Metropolitan Water District of Southern California
Environmental Planning Section
P.O. Box 54153
Los Angeles, CA 90054-0153

SUBJECT: ENVIRONMENTAL REFERRAL – THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA – THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA (METROPOLITAN) CLIMATE ACTION PLAN – NOTICE OF PREPARATION OF A DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT

Ms. Stalvey:

Thank you for the opportunity to review the above-referenced project.

The Stanislaus County Environmental Review Committee (ERC) has reviewed the subject project and has no comments at this time.

The ERC appreciates the opportunity to comment on this project.

Sincerely,

Patrice Cu

Patrick Cavanah
Sr. Management Consultant
Environmental Review Committee

PC:ss

cc: ERC Members

1010 10th Street, Ste. 6800, Modesto, CA 95354 Post Office Box 3404
Modesto, California 95353 Phone: 209.525.6333 Fax: 209.544.6226

From:	Ramon Salinas
To:	Environmental Planning Team - EPT
Cc:	Planning
Subject:	RE: Stanislaus County ERC Referral - Metropolitan Water District of Southern CA - NOP of a Draft PEIR and Scoping Meeting - Please respond by July 22, 2020
Date:	Tuesday, June 30, 2020 1:57:50 PM

Good Afternoon,

Public Works has no comments.

Thank you.

Ramon Salinas
Assistant Engineer
Stanislaus County Public Works
1010 10th Street, Suite 4204
Modesto, CA 95354
Phone: 209-525-7564
Cell: 209-278-5734
Fax: 209-525-6507
Email: salinasr@stancounty.com

From: Planning
Sent: Tuesday, June 23, 2020 8:33 AM
To: Kelly Covello <covellok@stancounty.com>; Sheryl Swartz <swartzs@stancounty.com>; Patrick Cavanah <cavanahp@stancounty.com>; Angela Freitas <ANGELA@stancounty.com>; Kristin Doud <Doudk@stancounty.com>; Miguel Galvez <GALVEZM@stancounty.com>; Milton O'Haire <miltono@stancounty.com>; Dan Bernaciak <danielb@stancounty.com>; Amit Sandhu <amits@stancounty.com>; Randy Crook <RCROOK@stanoes.com>; Matthew Jenkins <MJENKINS@stanoes.com>; Michael Ziman <zimanm@stancounty.com>; Cesar Acevedo <cacevedo@envres.org>; JAMI AGGERS <JAGGERS@envres.org>; Jennifer Marchy <jmarchy@envres.org>; RACHEL RIESS <rariess@envres.org>; JANIS MEIN <JMEIN@envres.org>; KIT MCCLURG <KMCCLURG@envres.org>; WALLACE LOW <WLOW@envres.org>; Ryan Barney <rabarney@envres.org>; WALEED YOSIF <WYOSIF@envres.org>; Walter Ward <wward@envres.org>; KARL QUINN <KQUINN@envres.org>; Lane Avilla <lavilla@envres.org>; Alexandria Fontana <afontana@envres.org>; MARY-KATE COOK <MKCOOK@envres.org>; Parminder Dhillon <pdhillon@envres.org>; Mandip Dhillon <mdhillon@envres.org>; Emily Grimes <egrimes@envres.org>; ALVIN LAL <ALAL@envres.org>; Gloria Romero <gromero@envres.org>; Michael Parker <mparker@stansheriff.com>; raduncan@ucanr.edu; Frederic Clark <CLARKF@stancounty.com>; Ramon Salinas <SALINASR@stancounty.com>; Lynnette Henson <hensonl@stancounty.com>; David Leamon <Leamond@stancounty.com>; Andrew Malizia <Maliziaa@stancounty.com>; Sara Lytle-Pinhey <pinheys@stancounty.com>; Erica Inacio <inacioe@stancounty.com>

Cc: Jennifer Akin <AKINJ@stancounty.com>; Angelica Duenas <DUENASA@stancounty.com>; Arcelia Garcia <garciaar@stancounty.com>
Subject: Stanislaus County ERC Referral - Metropolitan Water District of Southern CA - NOP of a Draft PEIR and Scoping Meeting - Please respond by July 22, 2020
Importance: High

Good Morning,

ERC-20. The Metropolitan Water District of Southern California - Notice of Preparation of a Draft PEIR for the Climate Action Plan and Scoping Meeting is attached for your review and comments.

Scoping Meeting: Will be held online on July 15, 2020 at 10:00 a.m.
To participate in the meeting, please register here:
https://us02web.zoom.us/webinar/register/WN_UohxhPynTW6jwvyl_bDUkw

Thank you,

Arcelia Garcia
Administrative Clerk III
Stanislaus County Planning & Community Development

July 22, 2020

Ms. Malinda Stalvey, Senior Environmental Specialist
The Metropolitan Water District of Southern California
Environmental Planning Section
P.O. Box 54153
Los Angeles, California 90054-0153

Subject: The Metropolitan Water District of Southern California Climate Action Plan

Dear Ms. Stalvey,

Thank you for the opportunity to review and comment on the subject document. Attached are the comments that we have received resulting from intra-county review of the subject document. Additional comments may have been sent directly to you by other County agencies.

Your proposed responses to these comments should be sent directly to the commenter, with a copy to Anthony Ciuffetelli, Ventura County Planning Division, L#1740, 800 S. Victoria Avenue, Ventura, CA 93009.

If you have any questions regarding any of the comments, please contact the appropriate respondent. Overall questions may be directed to Anthony Ciuffetelli at (805) 654-2443.

Sincerely,

Denice Thomas

Denice Thomas, AICP, Manager
Planning Programs Section

Attachments

County RMA Reference Number 20-005

PUBLIC VENTURA COUNTY WORKS

WATERSHED PROTECTION
WATERSHED PLANNING AND PERMITS DIVISION
800 South Victoria Avenue, Ventura, California 93009
Sergio Vargas, Deputy Director – (805) 650-4077

M E M O R A N D U M

DATE: July 21, 2020

TO: Anthony Ciuffetelli, RMA Planner
County of Ventura

FROM: Sergio Vargas, Deputy Director S.V.

SUBJECT: RMA20-005 Climate Action Plan NOP
Various Zones
Watershed Protection Project Number: WC2020-0027

Pursuant to your request dated June 24, 2020, this office has reviewed the submitted materials and provides the following comments.

PROJECT LOCATION:

Throughout a six-county Southern California region comprised of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties.

PROJECT DESCRIPTION:

Metropolitan is preparing a Climate Action Plan (CAP) to outline a strategy for reducing greenhouse gas (GHG) emissions associated with future construction, operation, and maintenance activities. The CAP is a comprehensive roadmap that analyzes historical GHG emissions, prepares a forecast of future GHG emissions, sets a GHG reduction target for reducing emissions consistent with applicable state policies, and identifies a suite of specific reduction actions that Metropolitan can choose from to achieve the adopted target consistent with Section 15183.5 of the State CEQA Guidelines. The CAP is a customized roadmap for making informed decisions and understanding where and how to achieve emissions reductions that conform to Metropolitan's mission/goals in a meaningful and cost-effective manner. While a CAP identifies potential projects that may be implemented to meet GHG reduction goals, no specific projects will be implemented without further CEQA review.

WATERSHED PROTECTION DISTRICT COMMENTS:

Flood Control Facilities / Watercourses – Ventura County Watershed Protection District

Activities Within Jurisdictional Channel Limits Will Require Watercourse/Encroachment Permits

To comply with the *Ventura County Watershed Protection District (WP) Ordinance*, and mitigate potential impacts, any activities proposed in, on, over, under, or across a jurisdictional channel or WP's Right of Way will require a permit. The applicant shall obtain the appropriate WP permit prior to obtaining a building permit or grading permit or prior to project start date if no grading or building permits are required. Prior to permit closure, Watershed Protection District staff shall inspect the project site to assure that construction was completed in accordance with the any approved plans and the Permit.

If you have any questions, please feel free to contact Sergio Vargas by email at Sergio.Vargas@ventura.org or by phone at (805) 640-4077.

END OF TEXT

Appendix B

Air Quality CalEEMod Data

Sample Met CAP Program Activity

Statewide , Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	5.00	Acre	5.00	217,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	54
Climate Zone	1			**Operational Year**	2022
Utility Company	Statewide Average				
CO2 Intensity (lb/MWhr)	1001.57	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Assumed 12-month construction schedule.

Land Use -

Construction Phase - Adjusted schedule to be one year.

Off-road Equipment - Use of equipment for eight hours per day.

Off-road Equipment - Use of all equipment for eight hours each day.

Off-road Equipment - Reduced default equipment list.

Off-road Equipment - Reduced default equipment list.

Off-road Equipment - Default equipment list.

Off-road Equipment - Reduced default equipment list.

Demolition - Assumed 20,000 square feet of demolition.

Grading - Assumed 1,000 CY import and 1,000 CY export.

Architectural Coating - Assumed 10,000 sf of painted area for interior and exterior.

Construction Off-road Equipment Mitigation - Assumed Tier 2 for all equipment

Trips and VMT - Added water truck trips.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	0.00	10,000.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	0.00	10,000.00
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
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tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	230.00	176.00
tblConstructionPhase	NumDays	8.00	16.00
tblGrading	MaterialExported	0.00	1,000.00
tblGrading	MaterialImported	0.00	1,000.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	UsageHours	6.00	8.00

tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.4589	2.5311	2.2245	4.8300e-003	0.1688	0.1154	0.2843	0.0615	0.1082	0.1697	0.0000	430.0560	430.0560	0.0769	0.0000	431.9790
Maximum	**0.4589**	**2.5311**	**2.2245**	**4.8300e-003**	**0.1688**	**0.1154**	**0.2843**	**0.0615**	**0.1082**	**0.1697**	**0.0000**	**430.0560**	**430.0560**	**0.0769**	**0.0000**	**431.9790**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.3116	2.0423	2.4154	4.8300e-003	0.1263	0.1015	0.2278	0.0414	0.1015	0.1428	0.0000	430.0556	430.0556	0.0769	0.0000	431.9787
Maximum	**0.3116**	**2.0423**	**2.4154**	**4.8300e-003**	**0.1263**	**0.1015**	**0.2278**	**0.0414**	**0.1015**	**0.1428**	**0.0000**	**430.0556**	**430.0556**	**0.0769**	**0.0000**	**431.9787**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**32.10**	**19.31**	**-8.58**	**0.00**	**25.22**	**12.04**	**19.87**	**32.81**	**6.20**	**15.85**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	1-1-2021	3-31-2021	0.7098	0.4719
2	4-1-2021	6-30-2021	0.8154	0.6583
3	7-1-2021	9-30-2021	0.8244	0.6656
		Highest	0.8244	0.6656

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0217	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0217**	**0.0000**	**5.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**1.0000e-004**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0217	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0217**	**0.0000**	**5.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**1.0000e-004**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2021	1/28/2021	5	20	
2	Site Preparation	Site Preparation	1/29/2021	2/4/2021	5	5	
3	Grading	Grading	2/5/2021	2/26/2021	5	16	
4	Construction/Installation	Building Construction	3/1/2021	11/1/2021	5	176	
5	Paving	Paving	11/2/2021	11/25/2021	5	18	
6	Architectural Coating	Architectural Coating	11/26/2021	12/21/2021	5	18	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 8

Acres of Paving: 5

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 10,000; Non-Residential Outdoor: 10,000; Striped Parking Area: 13,068 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	1	8.00	158	0.38
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Construction/Installation	Cranes	1	8.00	231	0.29
Construction/Installation	Forklifts	3	8.00	89	0.20
Construction/Installation	Generator Sets	1	8.00	84	0.74
Construction/Installation	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Construction/Installation	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	8.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	3	8.00	0.00	91.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	4.00	250.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Construction/Installation	9	91.00	36.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					9.8400e-003	0.0000	9.8400e-003	1.4900e-003	0.0000	1.4900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0166	0.1616	0.1098	2.0000e-004		8.1000e-003	8.1000e-003		7.5900e-003	7.5900e-003	0.0000	17.4198	17.4198	4.2100e-003	0.0000	17.5250
Total	**0.0166**	**0.1616**	**0.1098**	**2.0000e-004**	**9.8400e-003**	**8.1000e-003**	**0.0179**	**1.4900e-003**	**7.5900e-003**	**9.0800e-003**	**0.0000**	**17.4198**	**17.4198**	**4.2100e-003**	**0.0000**	**17.5250**

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.3000e-004	0.0116	2.1800e-003	4.0000e-005	7.7000e-004	4.0000e-005	8.1000e-004	2.1000e-004	4.0000e-005	2.5000e-004	0.0000	3.4114	3.4114	1.8000e-004	0.0000	3.4159
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8000e-004	2.0000e-004	2.1400e-003	1.0000e-005	6.4000e-004	0.0000	6.4000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5542	0.5542	2.0000e-005	0.0000	0.5545
Total	**6.1000e-004**	**0.0118**	**4.3200e-003**	**5.0000e-005**	**1.4100e-003**	**4.0000e-005**	**1.4500e-003**	**3.8000e-004**	**4.0000e-005**	**4.2000e-004**	**0.0000**	**3.9655**	**3.9655**	**2.0000e-004**	**0.0000**	**3.9704**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.4300e-003	0.0000	4.4300e-003	6.7000e-004	0.0000	6.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.6100e-003	0.0936	0.1231	2.0000e-004		4.7200e-003	4.7200e-003		4.7200e-003	4.7200e-003	0.0000	17.4198	17.4198	4.2100e-003	0.0000	17.5250
Total	**4.6100e-003**	**0.0936**	**0.1231**	**2.0000e-004**	**4.4300e-003**	**4.7200e-003**	**9.1500e-003**	**6.7000e-004**	**4.7200e-003**	**5.3900e-003**	**0.0000**	**17.4198**	**17.4198**	**4.2100e-003**	**0.0000**	**17.5250**

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.3000e-004	0.0116	2.1800e-003	4.0000e-005	7.7000e-004	4.0000e-005	8.1000e-004	2.1000e-004	4.0000e-005	2.5000e-004	0.0000	3.4114	3.4114	1.8000e-004	0.0000	3.4159
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8000e-004	2.0000e-004	2.1400e-003	1.0000e-005	6.4000e-004	0.0000	6.4000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5542	0.5542	2.0000e-005	0.0000	0.5545
Total	**6.1000e-004**	**0.0118**	**4.3200e-003**	**5.0000e-005**	**1.4100e-003**	**4.0000e-005**	**1.4500e-003**	**3.8000e-004**	**4.0000e-005**	**4.2000e-004**	**0.0000**	**3.9655**	**3.9655**	**2.0000e-004**	**0.0000**	**3.9704**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0151	0.0000	0.0151	8.2800e-003	0.0000	8.2800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.5500e-003	0.0369	0.0214	4.0000e-005		1.8900e-003	1.8900e-003		1.7400e-003	1.7400e-003	0.0000	3.2413	3.2413	1.0500e-003	0.0000	3.2675
Total	**3.5500e-003**	**0.0369**	**0.0214**	**4.0000e-005**	**0.0151**	**1.8900e-003**	**0.0170**	**8.2800e-003**	**1.7400e-003**	**0.0100**	**0.0000**	**3.2413**	**3.2413**	**1.0500e-003**	**0.0000**	**3.2675**

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-005	1.0300e-003	2.4000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.2621	0.2621	1.0000e-005	0.0000	0.2625
Worker	7.0000e-005	5.0000e-005	5.4000e-004	0.0000	1.6000e-004	0.0000	1.6000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1385	0.1385	0.0000	0.0000	0.1386
Total	**1.0000e-004**	**1.0800e-003**	**7.8000e-004**	**0.0000**	**2.3000e-004**	**0.0000**	**2.3000e-004**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**0.0000**	**0.4007**	**0.4007**	**1.0000e-005**	**0.0000**	**0.4012**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					6.7700e-003	0.0000	6.7700e-003	3.7200e-003	0.0000	3.7200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.0000e-004	0.0188	0.0230	4.0000e-005		9.9000e-004	9.9000e-004		9.9000e-004	9.9000e-004	0.0000	3.2413	3.2413	1.0500e-003	0.0000	3.2675
Total	**9.0000e-004**	**0.0188**	**0.0230**	**4.0000e-005**	**6.7700e-003**	**9.9000e-004**	**7.7600e-003**	**3.7200e-003**	**9.9000e-004**	**4.7100e-003**	**0.0000**	**3.2413**	**3.2413**	**1.0500e-003**	**0.0000**	**3.2675**

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-005	1.0300e-003	2.4000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.2621	0.2621	1.0000e-005	0.0000	0.2625
Worker	7.0000e-005	5.0000e-005	5.4000e-004	0.0000	1.6000e-004	0.0000	1.6000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1385	0.1385	0.0000	0.0000	0.1386
Total	**1.0000e-004**	**1.0800e-003**	**7.8000e-004**	**0.0000**	**2.3000e-004**	**0.0000**	**2.3000e-004**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**0.0000**	**0.4007**	**0.4007**	**1.0000e-005**	**0.0000**	**0.4012**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0525	0.0000	0.0525	0.0270	0.0000	0.0270	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0138	0.1524	0.0726	1.6000e-004		6.6000e-003	6.6000e-003		6.0700e-003	6.0700e-003	0.0000	14.2916	14.2916	4.6200e-003	0.0000	14.4072
Total	**0.0138**	**0.1524**	**0.0726**	**1.6000e-004**	**0.0525**	**6.6000e-003**	**0.0591**	**0.0270**	**6.0700e-003**	**0.0330**	**0.0000**	**14.2916**	**14.2916**	**4.6200e-003**	**0.0000**	**14.4072**

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.1000e-004	0.0320	5.9800e-003	1.0000e-004	2.1300e-003	1.0000e-004	2.2300e-003	5.8000e-004	1.0000e-004	6.8000e-004	0.0000	9.3719	9.3719	4.9000e-004	0.0000	9.3842
Vendor	1.0000e-004	3.3000e-003	7.6000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.2000e-004	6.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.8389	0.8389	5.0000e-005	0.0000	0.8400
Worker	2.3000e-004	1.6000e-004	1.7200e-003	0.0000	5.1000e-004	0.0000	5.1000e-004	1.4000e-004	0.0000	1.4000e-004	0.0000	0.4433	0.4433	1.0000e-005	0.0000	0.4436
Total	**1.2400e-003**	**0.0354**	**8.4600e-003**	**1.1000e-004**	**2.8500e-003**	**1.1000e-004**	**2.9600e-003**	**7.8000e-004**	**1.1000e-004**	**8.9000e-004**	**0.0000**	**10.6541**	**10.6541**	**5.5000e-004**	**0.0000**	**10.6679**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0236	0.0000	0.0236	0.0121	0.0000	0.0121	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.9900e-003	0.0771	0.0957	1.6000e-004		3.1300e-003	3.1300e-003		3.1300e-003	3.1300e-003	0.0000	14.2916	14.2916	4.6200e-003	0.0000	14.4072
Total	**3.9900e-003**	**0.0771**	**0.0957**	**1.6000e-004**	**0.0236**	**3.1300e-003**	**0.0268**	**0.0121**	**3.1300e-003**	**0.0153**	**0.0000**	**14.2916**	**14.2916**	**4.6200e-003**	**0.0000**	**14.4072**

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.1000e-004	0.0320	5.9800e-003	1.0000e-004	2.1300e-003	1.0000e-004	2.2300e-003	5.8000e-004	1.0000e-004	6.8000e-004	0.0000	9.3719	9.3719	4.9000e-004	0.0000	9.3842
Vendor	1.0000e-004	3.3000e-003	7.6000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.2000e-004	6.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.8389	0.8389	5.0000e-005	0.0000	0.8400
Worker	2.3000e-004	1.6000e-004	1.7200e-003	0.0000	5.1000e-004	0.0000	5.1000e-004	1.4000e-004	0.0000	1.4000e-004	0.0000	0.4433	0.4433	1.0000e-005	0.0000	0.4436
Total	**1.2400e-003**	**0.0354**	**8.4600e-003**	**1.1000e-004**	**2.8500e-003**	**1.1000e-004**	**2.9600e-003**	**7.8000e-004**	**1.1000e-004**	**8.9000e-004**	**0.0000**	**10.6541**	**10.6541**	**5.5000e-004**	**0.0000**	**10.6679**

3.5 Construction/Installation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1780	1.6499	1.5550	2.5300e-003		0.0902	0.0902		0.0847	0.0847	0.0000	218.4246	218.4246	0.0539	0.0000	219.7719
Total	**0.1780**	**1.6499**	**1.5550**	**2.5300e-003**		**0.0902**	**0.0902**		**0.0847**	**0.0847**	**0.0000**	**218.4246**	**218.4246**	**0.0539**	**0.0000**	**219.7719**

3.5 Construction/Installation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.9100e-003	0.3263	0.0757	8.7000e-004	0.0209	7.6000e-004	0.0217	6.0400e-003	7.2000e-004	6.7600e-003	0.0000	83.0458	83.0458	4.7200e-003	0.0000	83.1638
Worker	0.0285	0.0202	0.2147	6.1000e-004	0.0637	4.7000e-004	0.0641	0.0169	4.3000e-004	0.0174	0.0000	55.4703	55.4703	1.5700e-003	0.0000	55.5095
Total	**0.0384**	**0.3465**	**0.2904**	**1.4800e-003**	**0.0846**	**1.2300e-003**	**0.0858**	**0.0230**	**1.1500e-003**	**0.0241**	**0.0000**	**138.5161**	**138.5161**	**6.2900e-003**	**0.0000**	**138.6732**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0634	1.3393	1.6840	2.5300e-003		0.0847	0.0847		0.0847	0.0847	0.0000	218.4243	218.4243	0.0539	0.0000	219.7717
Total	**0.0634**	**1.3393**	**1.6840**	**2.5300e-003**		**0.0847**	**0.0847**		**0.0847**	**0.0847**	**0.0000**	**218.4243**	**218.4243**	**0.0539**	**0.0000**	**219.7717**

3.5 Construction/Installation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.9100e-003	0.3263	0.0757	8.7000e-004	0.0209	7.6000e-004	0.0217	6.0400e-003	7.2000e-004	6.7600e-003	0.0000	83.0458	83.0458	4.7200e-003	0.0000	83.1638
Worker	0.0285	0.0202	0.2147	6.1000e-004	0.0637	4.7000e-004	0.0641	0.0169	4.3000e-004	0.0174	0.0000	55.4703	55.4703	1.5700e-003	0.0000	55.5095
Total	**0.0384**	**0.3465**	**0.2904**	**1.4800e-003**	**0.0846**	**1.2300e-003**	**0.0858**	**0.0230**	**1.1500e-003**	**0.0241**	**0.0000**	**138.5161**	**138.5161**	**6.2900e-003**	**0.0000**	**138.6732**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0113	0.1163	0.1319	2.1000e-004		6.1000e-003	6.1000e-003		5.6100e-003	5.6100e-003	0.0000	18.0211	18.0211	5.8300e-003	0.0000	18.1668
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0113**	**0.1163**	**0.1319**	**2.1000e-004**		**6.1000e-003**	**6.1000e-003**		**5.6100e-003**	**5.6100e-003**	**0.0000**	**18.0211**	**18.0211**	**5.8300e-003**	**0.0000**	**18.1668**

3.6 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.4000e-004	3.6200e-003	1.0000e-005	1.0700e-003	1.0000e-005	1.0800e-003	2.9000e-004	1.0000e-005	2.9000e-004	0.0000	0.9351	0.9351	3.0000e-005	0.0000	0.9358
Total	**4.8000e-004**	**3.4000e-004**	**3.6200e-003**	**1.0000e-005**	**1.0700e-003**	**1.0000e-005**	**1.0800e-003**	**2.9000e-004**	**1.0000e-005**	**2.9000e-004**	**0.0000**	**0.9351**	**0.9351**	**3.0000e-005**	**0.0000**	**0.9358**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.0500e-003	0.1017	0.1557	2.1000e-004		5.4800e-003	5.4800e-003		5.4800e-003	5.4800e-003	0.0000	18.0211	18.0211	5.8300e-003	0.0000	18.1668
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.0500e-003**	**0.1017**	**0.1557**	**2.1000e-004**		**5.4800e-003**	**5.4800e-003**		**5.4800e-003**	**5.4800e-003**	**0.0000**	**18.0211**	**18.0211**	**5.8300e-003**	**0.0000**	**18.1668**

3.6 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.4000e-004	3.6200e-003	1.0000e-005	1.0700e-003	1.0000e-005	1.0800e-003	2.9000e-004	1.0000e-005	2.9000e-004	0.0000	0.9351	0.9351	3.0000e-005	0.0000	0.9358
Total	**4.8000e-004**	**3.4000e-004**	**3.6200e-003**	**1.0000e-005**	**1.0700e-003**	**1.0000e-005**	**1.0800e-003**	**2.9000e-004**	**1.0000e-005**	**2.9000e-004**	**0.0000**	**0.9351**	**0.9351**	**3.0000e-005**	**0.0000**	**0.9358**

3.7 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1916					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.6300e-003	0.0183	0.0218	4.0000e-005		1.1300e-003	1.1300e-003		1.1300e-003	1.1300e-003	0.0000	3.0639	3.0639	2.1000e-004	0.0000	3.0692
Total	**0.1942**	**0.0183**	**0.0218**	**4.0000e-005**		**1.1300e-003**	**1.1300e-003**		**1.1300e-003**	**1.1300e-003**	**0.0000**	**3.0639**	**3.0639**	**2.1000e-004**	**0.0000**	**3.0692**

3.7 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.8000e-004	4.1000e-004	4.3400e-003	1.0000e-005	1.2900e-003	1.0000e-005	1.3000e-003	3.4000e-004	1.0000e-005	3.5000e-004	0.0000	1.1222	1.1222	3.0000e-005	0.0000	1.1229
Total	**5.8000e-004**	**4.1000e-004**	**4.3400e-003**	**1.0000e-005**	**1.2900e-003**	**1.0000e-005**	**1.3000e-003**	**3.4000e-004**	**1.0000e-005**	**3.5000e-004**	**0.0000**	**1.1222**	**1.1222**	**3.0000e-005**	**0.0000**	**1.1229**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1916					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.1000e-004	0.0163	0.0220	4.0000e-005		1.1400e-003	1.1400e-003		1.1400e-003	1.1400e-003	0.0000	3.0639	3.0639	2.1000e-004	0.0000	3.0692
Total	**0.1923**	**0.0163**	**0.0220**	**4.0000e-005**		**1.1400e-003**	**1.1400e-003**		**1.1400e-003**	**1.1400e-003**	**0.0000**	**3.0639**	**3.0639**	**2.1000e-004**	**0.0000**	**3.0692**

3.7 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.8000e-004	4.1000e-004	4.3400e-003	1.0000e-005	1.2900e-003	1.0000e-005	1.3000e-003	3.4000e-004	1.0000e-005	3.5000e-004	0.0000	1.1222	1.1222	3.0000e-005	0.0000	1.1229
Total	**5.8000e-004**	**4.1000e-004**	**4.3400e-003**	**1.0000e-005**	**1.2900e-003**	**1.0000e-005**	**1.3000e-003**	**3.4000e-004**	**1.0000e-005**	**3.5000e-004**	**0.0000**	**1.1222**	**1.1222**	**3.0000e-005**	**0.0000**	**1.1229**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.552843	0.039396	0.193030	0.116235	0.017695	0.005634	0.019549	0.044452	0.002104	0.001859	0.005467	0.000816	0.000920

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0217	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-004
Unmitigated	0.0217	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	7.5700e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0141					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-004
Total	**0.0217**	**0.0000**	**5.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**1.0000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	7.5700e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0141					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-004
Total	**0.0217**	**0.0000**	**5.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**1.0000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Sample Met CAP Program Activity

Statewide , Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	5.00	Acre	5.00	217,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	54
Climate Zone	1			**Operational Year**	2022
Utility Company	Statewide Average				
CO2 Intensity (lb/MWhr)	1001.57	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Assumed 12-month construction schedule.

Land Use -

Construction Phase - Adjusted schedule to be one year.

Off-road Equipment - Use of equipment for eight hours per day.

Off-road Equipment - Use of all equipment for eight hours each day.

Off-road Equipment - Reduced default equipment list.

Off-road Equipment - Reduced default equipment list.

Off-road Equipment - Default equipment list.

Off-road Equipment - Reduced default equipment list.

Demolition - Assumed 20,000 square feet of demolition.

Grading - Assumed 1,000 CY import and 1,000 CY export.

Architectural Coating - Assumed 10,000 sf of painted area for interior and exterior.

Construction Off-road Equipment Mitigation - Assumed Tier 2 for all equipment

Trips and VMT - Added water truck trips.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	0.00	10,000.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	0.00	10,000.00
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	230.00	176.00
tblConstructionPhase	NumDays	8.00	16.00
tblGrading	MaterialExported	0.00	1,000.00
tblGrading	MaterialImported	0.00	1,000.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	UsageHours	6.00	8.00

tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	21.6498	23.4482	21.0115	0.0453	6.9326	1.0392	7.7715	3.4698	0.9758	4.2420	0.0000	4,440.4073	4,440.4073	0.7567	0.0000	4,459.3237
Maximum	**21.6498**	**23.4482**	**21.0115**	**0.0453**	**6.9326**	**1.0392**	**7.7715**	**3.4698**	**0.9758**	**4.2420**	**0.0000**	**4,440.4073**	**4,440.4073**	**0.7567**	**0.0000**	**4,459.3237**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	21.4372	19.1273	22.4769	0.0453	3.3210	0.9762	3.7263	1.6165	0.9754	2.0211	0.0000	4,440.4073	4,440.4073	0.7567	0.0000	4,459.3237
Maximum	**21.4372**	**19.1273**	**22.4769**	**0.0453**	**3.3210**	**0.9762**	**3.7263**	**1.6165**	**0.9754**	**2.0211**	**0.0000**	**4,440.4073**	**4,440.4073**	**0.7567**	**0.0000**	**4,459.3237**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.98**	**18.43**	**-6.97**	**0.00**	**52.10**	**6.06**	**52.05**	**53.41**	**0.04**	**52.36**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.1187	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1187**	**0.0000**	**5.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.0900e-003**	**1.0900e-003**	**0.0000**	**0.0000**	**1.1700e-003**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.1187	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1187**	**0.0000**	**5.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**1.0900e-003**	**1.0900e-003**	**0.0000**	**0.0000**	**1.1700e-003**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2021	1/28/2021	5	20	
2	Site Preparation	Site Preparation	1/29/2021	2/4/2021	5	5	
3	Grading	Grading	2/5/2021	2/26/2021	5	16	
4	Construction/Installation	Building Construction	3/1/2021	11/1/2021	5	176	
5	Paving	Paving	11/2/2021	11/25/2021	5	18	
6	Architectural Coating	Architectural Coating	11/26/2021	12/21/2021	5	18	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 8

Acres of Paving: 5

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 10,000; Non-Residential Outdoor: 10,000; Striped Parking Area: 13,068 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	1	8.00	158	0.38
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Construction/Installation	Cranes	1	8.00	231	0.29
Construction/Installation	Forklifts	3	8.00	89	0.20
Construction/Installation	Generator Sets	1	8.00	84	0.74
Construction/Installation	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Construction/Installation	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	8.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	3	8.00	0.00	91.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	4.00	250.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Construction/Installation	9	91.00	36.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.9844	0.0000	0.9844	0.1490	0.0000	0.1490			0.0000			0.0000
Off-Road	1.6604	16.1626	10.9836	0.0200		0.8100	0.8100		0.7591	0.7591		1,920.2088	1,920.2088	0.4638		1,931.8031
Total	**1.6604**	**16.1626**	**10.9836**	**0.0200**	**0.9844**	**0.8100**	**1.7944**	**0.1490**	**0.7591**	**0.9081**		**1,920.2088**	**1,920.2088**	**0.4638**		**1,931.8031**

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0337	1.1561	0.2293	3.4900e-003	0.0796	3.7400e-003	0.0833	0.0218	3.5800e-003	0.0254		371.4752	371.4752	0.0205		371.9881
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0313	0.0209	0.2125	6.0000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.3000e-004	0.0179		60.0129	60.0129	1.7000e-003		60.0554
Total	**0.0650**	**1.1770**	**0.4418**	**4.0900e-003**	**0.1453**	**4.2100e-003**	**0.1495**	**0.0393**	**4.0100e-003**	**0.0433**		**431.4881**	**431.4881**	**0.0222**		**432.0435**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4430	0.0000	0.4430	0.0671	0.0000	0.0671			0.0000			0.0000
Off-Road	0.4613	9.3569	12.3072	0.0200		0.4722	0.4722		0.4722	0.4722	0.0000	1,920.2088	1,920.2088	0.4638		1,931.8030
Total	**0.4613**	**9.3569**	**12.3072**	**0.0200**	**0.4430**	**0.4722**	**0.9151**	**0.0671**	**0.4722**	**0.5392**	**0.0000**	**1,920.2088**	**1,920.2088**	**0.4638**		**1,931.8030**

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0337	1.1561	0.2293	3.4900e-003	0.0796	3.7400e-003	0.0833	0.0218	3.5800e-003	0.0254		371.4752	371.4752	0.0205		371.9881
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0313	0.0209	0.2125	6.0000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.3000e-004	0.0179		60.0129	60.0129	1.7000e-003		60.0554
Total	**0.0650**	**1.1770**	**0.4418**	**4.0900e-003**	**0.1453**	**4.2100e-003**	**0.1495**	**0.0393**	**4.0100e-003**	**0.0433**		**431.4881**	**431.4881**	**0.0222**		**432.0435**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	1.4209	14.7629	8.5583	0.0147		0.7560	0.7560		0.6955	0.6955		1,429.1523	1,429.1523	0.4622		1,440.7078
Total	**1.4209**	**14.7629**	**8.5583**	**0.0147**	**6.0221**	**0.7560**	**6.7781**	**3.3102**	**0.6955**	**4.0058**		**1,429.1523**	**1,429.1523**	**0.4622**		**1,440.7078**

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0130	0.4079	0.1027	1.0700e-003	0.0271	9.8000e-004	0.0281	7.8000e-003	9.3000e-004	8.7300e-003		113.5241	113.5241	6.9100e-003		113.6969
Worker	0.0313	0.0209	0.2125	6.0000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.3000e-004	0.0179		60.0129	60.0129	1.7000e-003		60.0554
Total	**0.0442**	**0.4288**	**0.3151**	**1.6700e-003**	**0.0928**	**1.4500e-003**	**0.0943**	**0.0252**	**1.3600e-003**	**0.0266**		**173.5370**	**173.5370**	**8.6100e-003**		**173.7523**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7099	0.0000	2.7099	1.4896	0.0000	1.4896			0.0000			0.0000
Off-Road	0.3610	7.5115	9.2147	0.0147		0.3964	0.3964		0.3964	0.3964	0.0000	1,429.1523	1,429.1523	0.4622		1,440.7078
Total	**0.3610**	**7.5115**	**9.2147**	**0.0147**	**2.7099**	**0.3964**	**3.1064**	**1.4896**	**0.3964**	**1.8860**	**0.0000**	**1,429.1523**	**1,429.1523**	**0.4622**		**1,440.7078**

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0130	0.4079	0.1027	1.0700e-003	0.0271	9.8000e-004	0.0281	7.8000e-003	9.3000e-004	8.7300e-003		113.5241	113.5241	6.9100e-003		113.6969
Worker	0.0313	0.0209	0.2125	6.0000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.3000e-004	0.0179		60.0129	60.0129	1.7000e-003		60.0554
Total	**0.0442**	**0.4288**	**0.3151**	**1.6700e-003**	**0.0928**	**1.4500e-003**	**0.0943**	**0.0252**	**1.3600e-003**	**0.0266**		**173.5370**	**173.5370**	**8.6100e-003**		**173.7523**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5665	0.0000	6.5665	3.3696	0.0000	3.3696			0.0000			0.0000
Off-Road	1.7285	19.0493	9.0768	0.0203		0.8246	0.8246		0.7586	0.7586		1,969.2283	1,969.2283	0.6369		1,985.1505
Total	**1.7285**	**19.0493**	**9.0768**	**0.0203**	**6.5665**	**0.8246**	**7.3911**	**3.3696**	**0.7586**	**4.1282**		**1,969.2283**	**1,969.2283**	**0.6369**		**1,985.1505**

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1158	3.9702	0.7874	0.0120	0.2733	0.0128	0.2862	0.0749	0.0123	0.0872		1,275.6703	1,275.6703	0.0705		1,277.4317
Vendor	0.0130	0.4079	0.1027	1.0700e-003	0.0271	9.8000e-004	0.0281	7.8000e-003	9.3000e-004	8.7300e-003		113.5241	113.5241	6.9100e-003		113.6969
Worker	0.0313	0.0209	0.2125	6.0000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.3000e-004	0.0179		60.0129	60.0129	1.7000e-003		60.0554
Total	**0.1600**	**4.3990**	**1.1026**	**0.0137**	**0.3661**	**0.0143**	**0.3804**	**0.1002**	**0.0137**	**0.1138**		**1,449.2073**	**1,449.2073**	**0.0791**		**1,451.1840**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9549	0.0000	2.9549	1.5163	0.0000	1.5163			0.0000			0.0000
Off-Road	0.4984	9.6366	11.9644	0.0203		0.3909	0.3909		0.3909	0.3909	0.0000	1,969.2283	1,969.2283	0.6369		1,985.1505
Total	**0.4984**	**9.6366**	**11.9644**	**0.0203**	**2.9549**	**0.3909**	**3.3459**	**1.5163**	**0.3909**	**1.9073**	**0.0000**	**1,969.2283**	**1,969.2283**	**0.6369**		**1,985.1505**

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1158	3.9702	0.7874	0.0120	0.2733	0.0128	0.2862	0.0749	0.0123	0.0872		1,275.670 3	1,275.670 3	0.0705		1,277.431 7
Vendor	0.0130	0.4079	0.1027	1.0700e-003	0.0271	9.8000e-004	0.0281	7.8000e-003	9.3000e-004	8.7300e-003		113.5241	113.5241	6.9100e-003		113.6969
Worker	0.0313	0.0209	0.2125	6.0000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.3000e-004	0.0179		60.0129	60.0129	1.7000e-003		60.0554
Total	**0.1600**	**4.3990**	**1.1026**	**0.0137**	**0.3661**	**0.0143**	**0.3804**	**0.1002**	**0.0137**	**0.1138**		**1,449.207 3**	**1,449.207 3**	**0.0791**		**1,451.184 0**

3.5 Construction/Installation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0228	18.7492	17.6706	0.0288		1.0251	1.0251		0.9625	0.9625		2,736.043 8	2,736.043 8	0.6751		2,752.921 2
Total	**2.0228**	**18.7492**	**17.6706**	**0.0288**		**1.0251**	**1.0251**		**0.9625**	**0.9625**		**2,736.043 8**	**2,736.043 8**	**0.6751**		**2,752.921 2**

3.5 Construction/Installation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1165	3.6711	0.9242	9.6700e-003	0.2438	8.7900e-003	0.2526	0.0702	8.4000e-003	0.0786		1,021.7170	1,021.7170	0.0622		1,023.2720
Worker	0.3559	0.2371	2.4166	6.8500e-003	0.7475	5.3000e-003	0.7528	0.1983	4.8800e-003	0.2032		682.6466	682.6466	0.0194		683.1305
Total	**0.4724**	**3.9082**	**3.3409**	**0.0165**	**0.9914**	**0.0141**	**1.0055**	**0.2685**	**0.0133**	**0.2818**		**1,704.3635**	**1,704.3635**	**0.0816**		**1,706.4025**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7201	15.2191	19.1360	0.0288		0.9621	0.9621		0.9621	0.9621	0.0000	2,736.0438	2,736.0438	0.6751		2,752.9212
Total	**0.7201**	**15.2191**	**19.1360**	**0.0288**		**0.9621**	**0.9621**		**0.9621**	**0.9621**	**0.0000**	**2,736.0438**	**2,736.0438**	**0.6751**		**2,752.9212**

3.5 Construction/Installation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1165	3.6711	0.9242	9.6700e-003	0.2438	8.7900e-003	0.2526	0.0702	8.4000e-003	0.0786		1,021.717 0	1,021.717 0	0.0622		1,023.272 0
Worker	0.3559	0.2371	2.4166	6.8500e-003	0.7475	5.3000e-003	0.7528	0.1983	4.8800e-003	0.2032		682.6466	682.6466	0.0194		683.1305
Total	**0.4724**	**3.9082**	**3.3409**	**0.0165**	**0.9914**	**0.0141**	**1.0055**	**0.2685**	**0.0133**	**0.2818**		**1,704.363 5**	**1,704.363 5**	**0.0816**		**1,706.402 5**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2556	12.9191	14.6532	0.0228		0.6777	0.6777		0.6235	0.6235		2,207.210 9	2,207.210 9	0.7139		2,225.057 3
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2556**	**12.9191**	**14.6532**	**0.0228**		**0.6777**	**0.6777**		**0.6235**	**0.6235**		**2,207.210 9**	**2,207.210 9**	**0.7139**		**2,225.057 3**

3.6 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0587	0.0391	0.3984	1.1300e-003	0.1232	8.7000e-004	0.1241	0.0327	8.0000e-004	0.0335		112.5242	112.5242	3.1900e-003		112.6039
Total	**0.0587**	**0.0391**	**0.3984**	**1.1300e-003**	**0.1232**	**8.7000e-004**	**0.1241**	**0.0327**	**8.0000e-004**	**0.0335**		**112.5242**	**112.5242**	**3.1900e-003**		**112.6039**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5609	11.2952	17.2957	0.0228		0.6093	0.6093		0.6093	0.6093	0.0000	2,207.2109	2,207.2109	0.7139		2,225.0573
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.5609**	**11.2952**	**17.2957**	**0.0228**		**0.6093**	**0.6093**		**0.6093**	**0.6093**	**0.0000**	**2,207.2109**	**2,207.2109**	**0.7139**		**2,225.0573**

3.6 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0587	0.0391	0.3984	1.1300e-003	0.1232	8.7000e-004	0.1241	0.0327	8.0000e-004	0.0335		112.5242	112.5242	3.1900e-003		112.6039
Total	**0.0587**	**0.0391**	**0.3984**	**1.1300e-003**	**0.1232**	**8.7000e-004**	**0.1241**	**0.0327**	**8.0000e-004**	**0.0335**		**112.5242**	**112.5242**	**3.1900e-003**		**112.6039**

3.7 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	21.2875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2919	2.0358	2.4234	3.9600e-003		0.1255	0.1255		0.1255	0.1255		375.2641	375.2641	0.0258		375.9079
Total	**21.5794**	**2.0358**	**2.4234**	**3.9600e-003**		**0.1255**	**0.1255**		**0.1255**	**0.1255**		**375.2641**	**375.2641**	**0.0258**		**375.9079**

3.7 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0704	0.0469	0.4780	1.3600e-003	0.1479	1.0500e-003	0.1489	0.0392	9.7000e-004	0.0402		135.0290	135.0290	3.8300e-003		135.1247
Total	**0.0704**	**0.0469**	**0.4780**	**1.3600e-003**	**0.1479**	**1.0500e-003**	**0.1489**	**0.0392**	**9.7000e-004**	**0.0402**		**135.0290**	**135.0290**	**3.8300e-003**		**135.1247**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	21.2875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0792	1.8093	2.4432	3.9600e-003		0.1268	0.1268		0.1268	0.1268	0.0000	375.2641	375.2641	0.0258		375.9079
Total	**21.3668**	**1.8093**	**2.4432**	**3.9600e-003**		**0.1268**	**0.1268**		**0.1268**	**0.1268**	**0.0000**	**375.2641**	**375.2641**	**0.0258**		**375.9079**

3.7 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0704	0.0469	0.4780	1.3600e-003	0.1479	1.0500e-003	0.1489	0.0392	9.7000e-004	0.0402		135.0290	135.0290	3.8300e-003		135.1247
Total	**0.0704**	**0.0469**	**0.4780**	**1.3600e-003**	**0.1479**	**1.0500e-003**	**0.1489**	**0.0392**	**9.7000e-004**	**0.0402**		**135.0290**	**135.0290**	**3.8300e-003**		**135.1247**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.552843	0.039396	0.193030	0.116235	0.017695	0.005634	0.019549	0.044452	0.002104	0.001859	0.005467	0.000816	0.000920

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.1187	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003
Unmitigated	0.1187	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0415					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0771					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003
Total	**0.1187**	**0.0000**	**5.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.0900e-003**	**1.0900e-003**	**0.0000**		**1.1700e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0415					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0771					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		1.0900e-003	1.0900e-003	0.0000		1.1700e-003
Total	**0.1187**	**0.0000**	**5.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**1.0900e-003**	**1.0900e-003**	**0.0000**		**1.1700e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

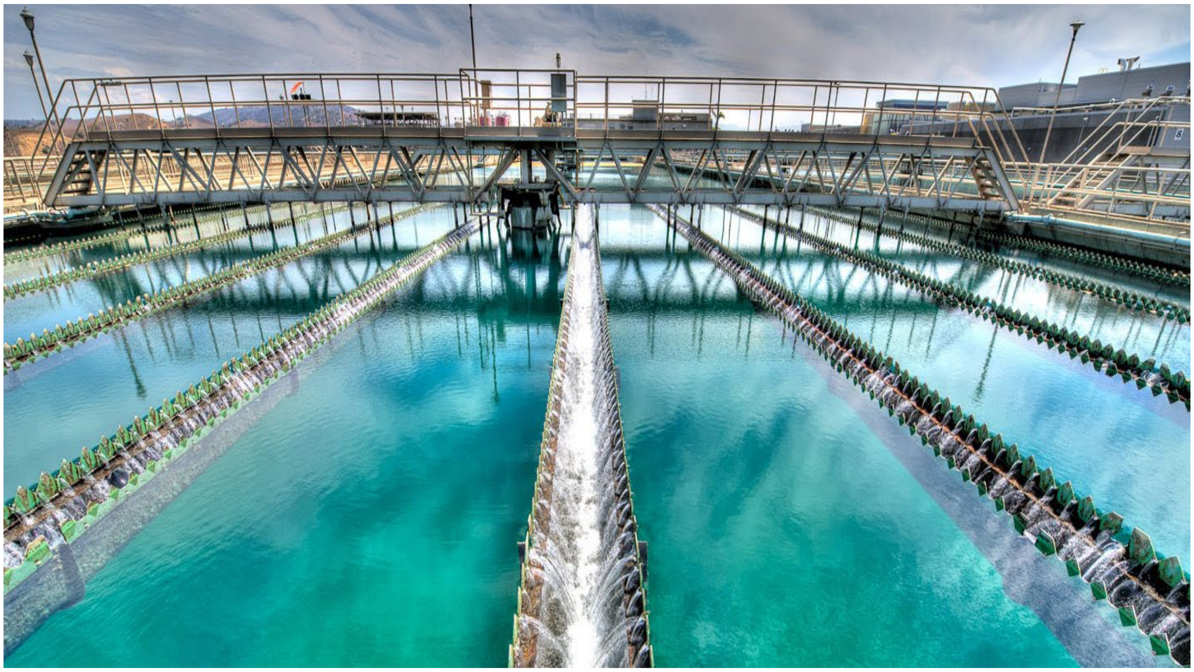
User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix C

Biological Resources Existing Conditions



Climate Action Plan
Program Environmental Impact Report

Biological Resources Existing Conditions

prepared by

The Metropolitan Water District of Southern California
700 North Alameda Street
Los Angeles, California 90012

prepared with the assistance of

Rincon Consultants, Inc.
250 East 1st Street, Suite 1400
Los Angeles, California 90012

October 2021

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
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Tables

Figures

1 Biological Resources Existing Conditions

The Plan Area includes all of Metropolitan's service area and spans approximately 38,280 square miles, including the following six counties: Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties, as well as the portion of Palo Verde Valley in Imperial County and Bacon Island, Bouldin Island, Holland Tract, and Webb Tract, in the Sacramento-San Joaquin Delta region (San Joaquin County and Contra Costa County). It is anticipated that construction of planned projects would occur at Metropolitan facilities or within Metropolitan rights-of-way. Specifically, the following Metropolitan locations have been identified as potential project sites for projects that would be implemented under the CAP: Robert B. Diemer (Diemer) Water Treatment Plant (WTP) (Orange County), Joseph Jensen (Jensen) WTP (Los Angeles County), Robert A. Skinner (Skinner) WTP (Riverside County), F.E. Weymouth WTP (Los Angeles County), Metropolitan-owned agricultural land at southwest corner of 35th Avenue and Keim Boulevard (Riverside County), and Webb Tract, Holland Tract, Bouldin Island, and Bacon Island in the Bay Delta (San Joaquin/Contra Costa Counties). However, because the precise locations of all planned projects that may be implemented under the CAP are not known at this time, this section includes a discussion of sensitive biological resources, including habitat classifications, drainages and wetlands, sensitive natural communities, special status plants and wildlife, and wildlife movement corridors that are known to occur in the Plan Area.

1.1 Habitat Classifications

Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties; Palo Verde Valley in Imperial County; and the Sacramento-San Joaquin Delta region contain a wide diversity of tree (hardwood and coniferous forest, oak woodland, riparian woodland), shrub (chaparral, coastal scrub, creosote bush scrub), and herbaceous (grassland, wetlands) habitat types. Vegetation communities are important biological resources because they provide habitat for special status plants and wildlife and provide wildlife movement corridors. The following 12 habitat classification are mapped within the Plan Area using the LANDFIRE (2020) Landscape Fire and Resource Management Planning Tools (Table 1; Figure 1 through Figure 8): Agricultural, Conifer, Conifer-Hardwood, Developed, Exotic Herbaceous, Exotic Tree-Shrub, Grassland, Hardwood, Open Water, Riparian, Shrubland, and Sparsely Vegetated.

LANDFIRE is a shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior. It provides landscape-scale geo-spatial products. A description of each of these habitat classifications is provided below as adapted from the U.S. National Vegetation Classification (USNVC) (2020) system.

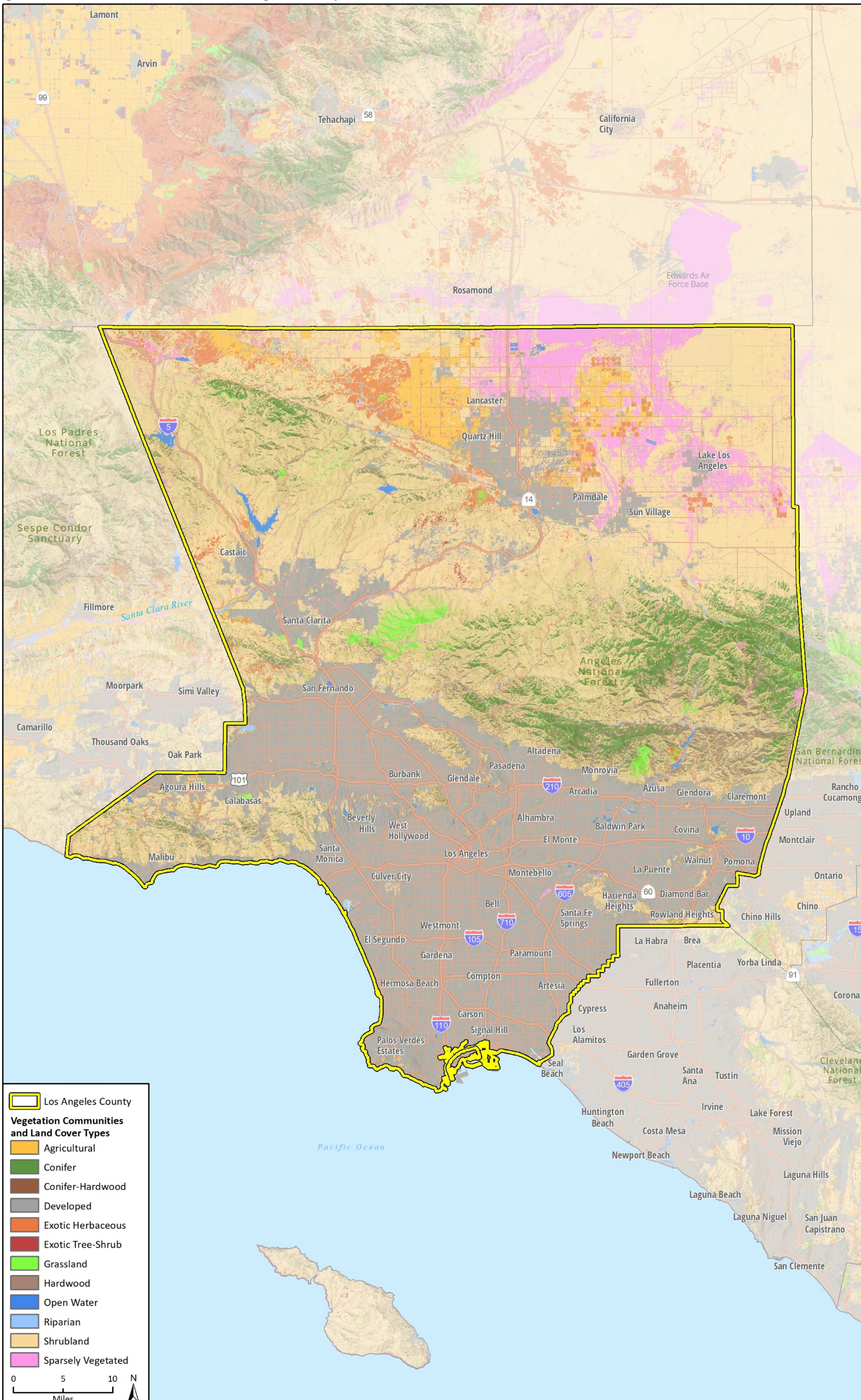
Due to the large scale of the Plan Area and the level at which habitats are mapped using the LANDFIRE/USNVC classification system, habitat classifications are generalized and site-specific variation is likely present. Further, the LANDFIRE classification system maps habitats from a broad perspective, and in many areas two or more habitats may converge with one another.[1] Table 1 provides the percentage of each habitat type within each county in the Plan Area.

[1] Vernal pools, wetlands and drainages are discussed separately in subsection *Drainages and Wetlands* utilizing sources of information that better capture aquatic and wetland habitats that are of smaller scale in the landscape such as the National Wetlands Inventory.

Table 1 Habitat Communities by County/Region

Habitat	Los Angeles Acres	Los Angeles % of Total	Orange Acres	Orange % of Total	Riverside Acres	Riverside % of Total	San Bernardino Acres	San Bernardino % of Total	San Diego Acres	San Diego % of Total	Ventura Acres	Ventura % of Total	Sacramento-San Joaquin Delta Region Acres	Sacramento-San Joaquin Delta Region % of Total	Palo Verde Valley Acres	Palo Verde Valley % of Total	Total
Agricultural	60,854	2.41%	2,322	0.45%	209,432	4.48%	21,445	0.17%	43,040	1.59%	91,859	7.79%	18,784	87.95%	94,999	87.50%	**428,952**
Conifer	129,271	5.11%	8,658	1.69%	84,174	1.80%	192,615	1.50%	65,848	2.43%	98,730	8.38%	0	0%	106	0.10%	**579,297**
Conifer-Hardwood	1,392	0.06%	0	0.00%	429	0.01%	777	0.01%	817	0.03%	550	0.05%	0	0%	0	0%	**3,965**
Developed	964,135	38.12%	332,992	65.13%	587,948	12.58%	585,962	4.55%	604,881	22.31%	180,302	15.30%	227	1.06%	9,982	9.19%	**3,256,220**
Exotic Herbaceous	63,817	2.52%	9,324	1.82%	73,667	1.58%	92,817	0.72%	92,006	3.39%	32,262	2.74%	119	0.56&	44	0.04%	**363,894**
Exotic Tree-Shrub	7,709	0.30%	2,956	0.58%	24,167	0.52%	5,460	0.04%	26,203	0.97%	9,371	0.80%	180	0.84%	581	0.54%	**75,866**
Grassland	24,281	0.96%	4,953	0.97%	25,800	0.55%	45,100	0.35%	27,118	1.00%	16,386	1.39%	10	0.04%	7	0.01%	**143,639**
Hardwood	79,324	3.14%	19,870	3.89%	42,273	0.90%	48,274	0.38%	123,334	4.55%	68,107	5.78%	3	001%	0	0%	**381,184**
Open Water	8,778	0.35%	2,790	0.55%	62,363	1.33%	20,667	0.16%	8,551	0.32%	4,474	0.38%	561	2.63%	1,948	1.79%	**107,624**
Riparian	10,084	0.40%	4,755	0.93%	21,302	0.46%	12,219	0.09%	49,254	1.82%	12,742	1.08%	1,370	6.41%	219	0.20%	**110,355**
Shrubland	1,052,227	41.61%	121,503	23.77%	2,509,347	53.70%	8,895,942	69.14%	1,320,776	48.72%	636,745	54.03%	0	0%	658	0.60%	**14,536,540**
Sparsely Vegetated	127,048	5.02%	1,119	0.22%	1,032,051	22.09%	2,944,497	22.89%	349,224	12.88%	26,928	2.29%	1	0.004%	28	0.03%	**4,480,867**
Total	**2,528,920**	**100.00%**	**511,244**	**100.00%**	**4,672,955**	**100.00%**	**12,865,776**	**100.00%**	**2,711,051**	**100.00%**	**1,178,458**	**100.00%**	**21,358**	**100.00%**	**108,572**	**100.00%**	**24,468,404**

Figure 1 Habitat Classifications in Los Angeles County



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Additional data provided by USGS LANDFIRE, 2019.

Figure 2 Habitat Classifications in Orange County

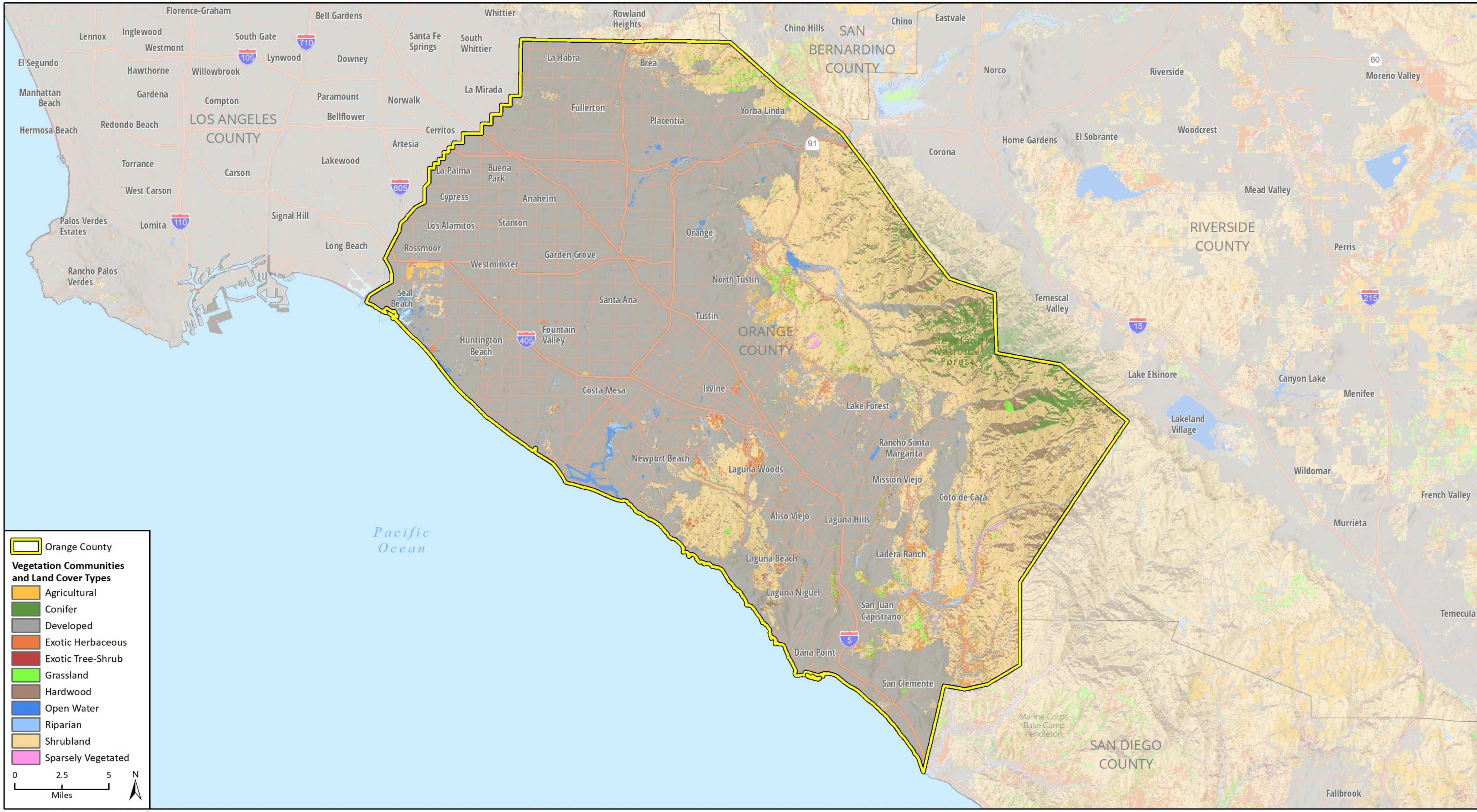

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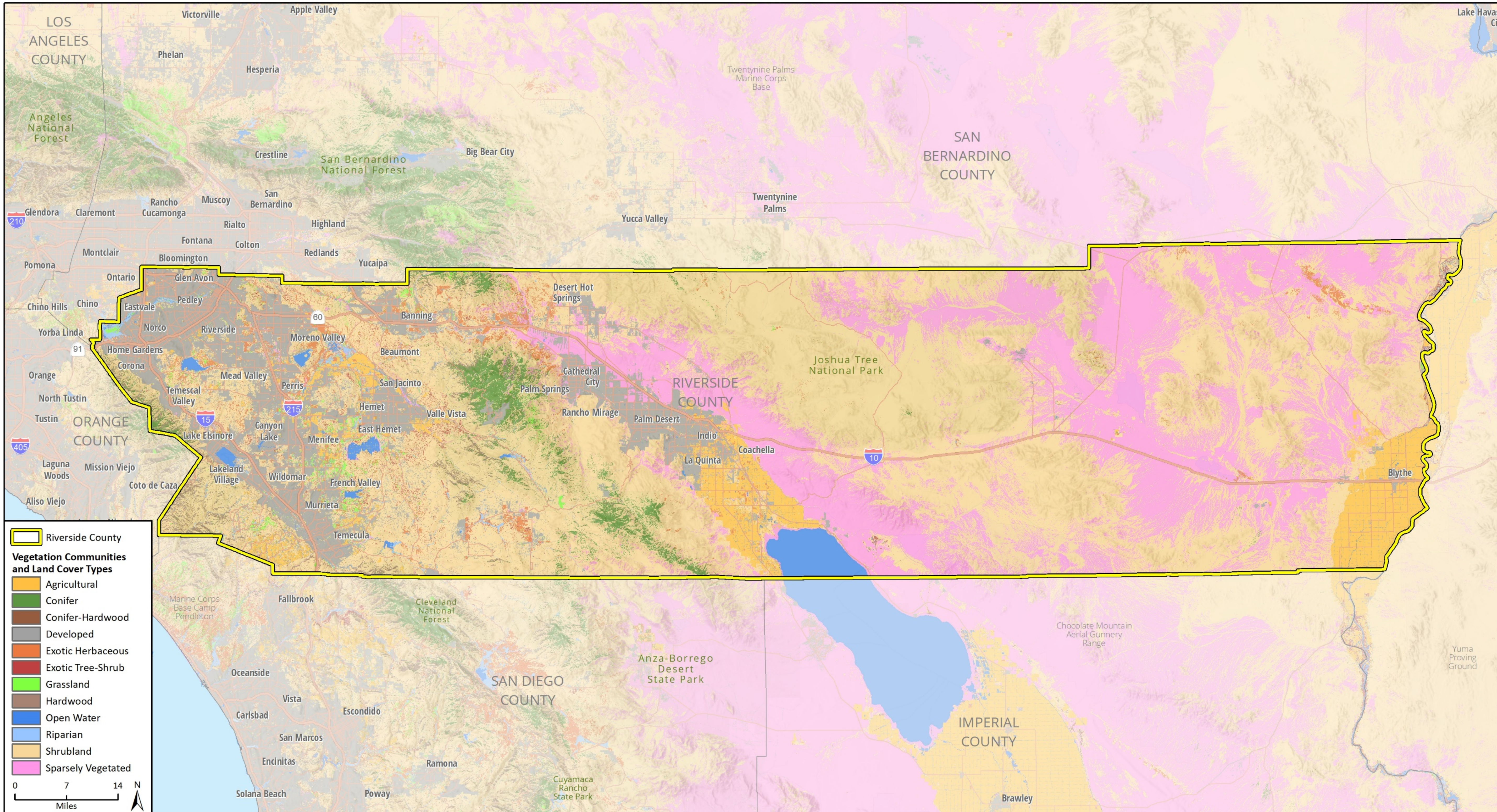
Figure 3 Habitat Classifications in Riverside County



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Additional data provided by USGS LANDFIRE, 2019.

Figure 4 Habitat Classifications in San Bernardino County

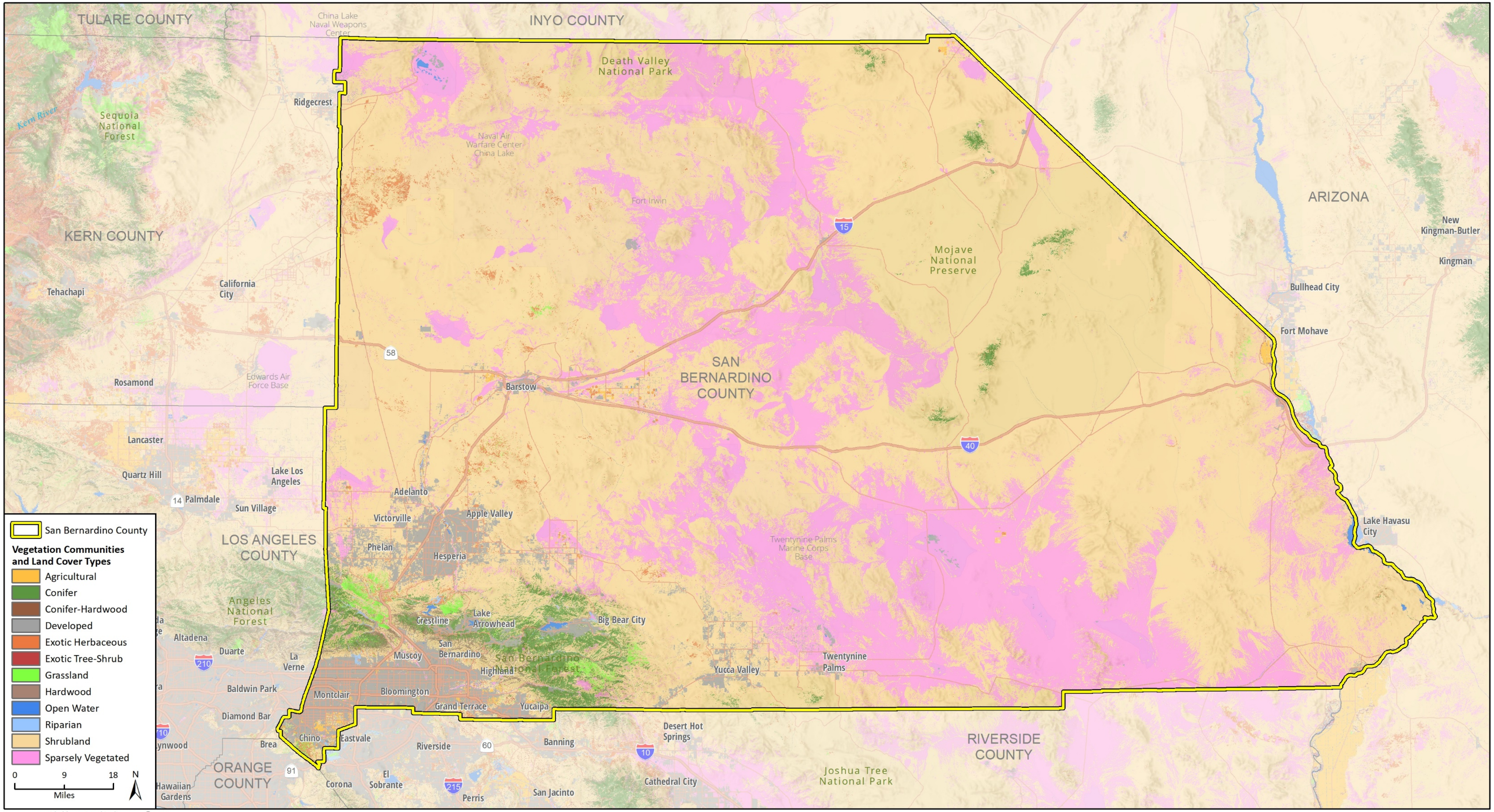

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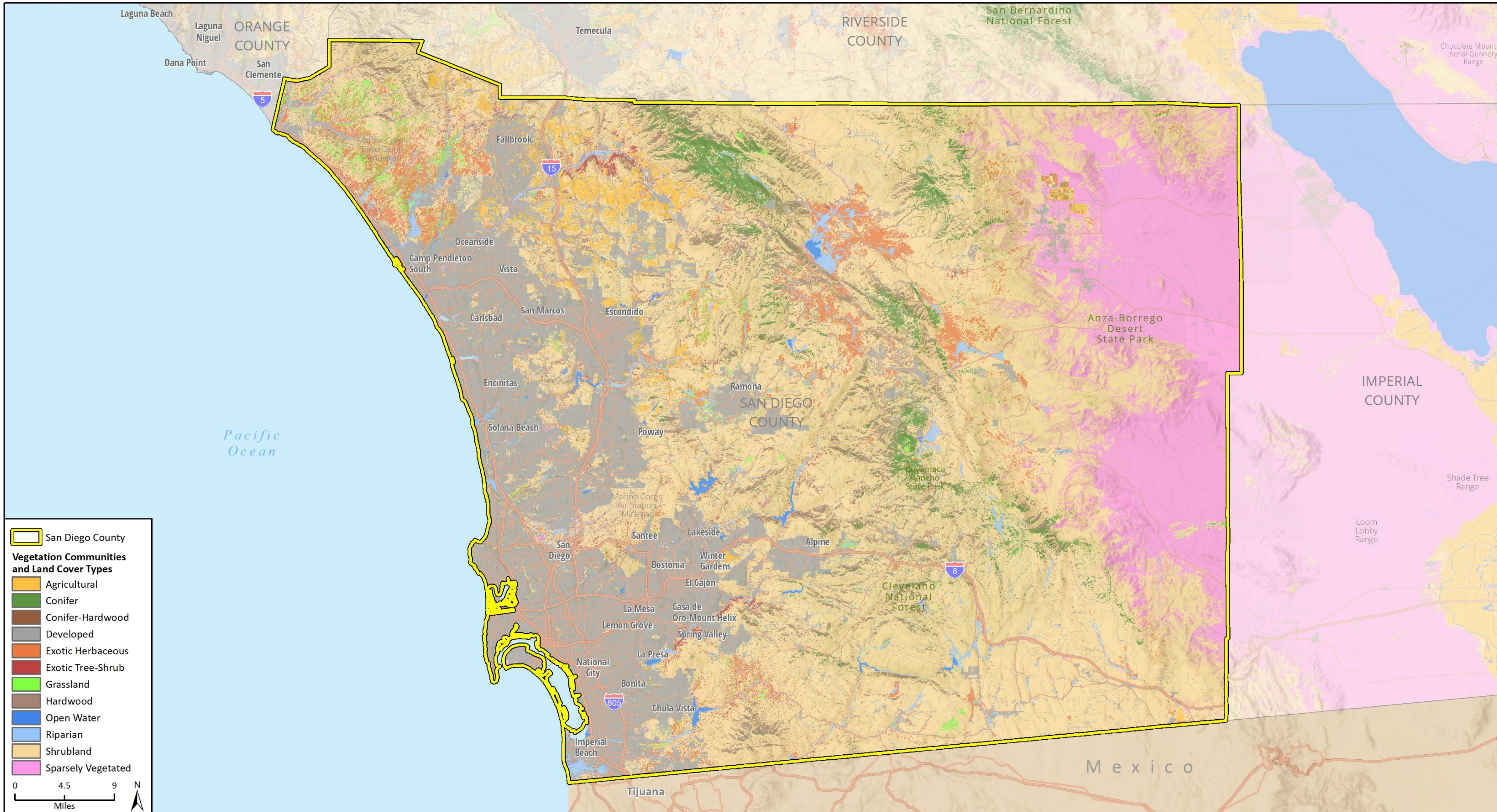
Figure 5 Habitat Classification in San Diego County



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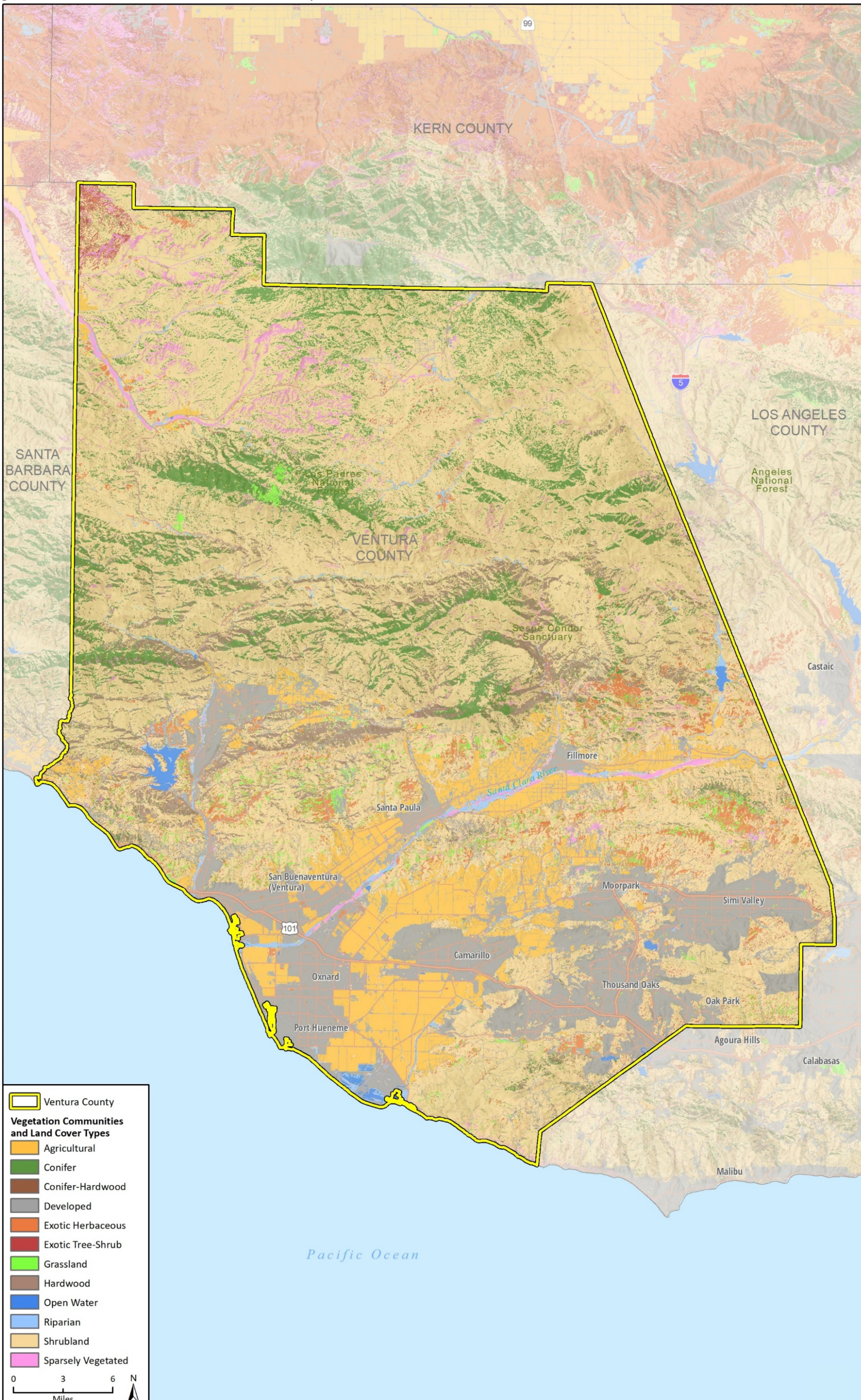
Additional data provided by USGS LANDFIRE, 2019.

Figure 6 Habitat Classifications in Ventura County



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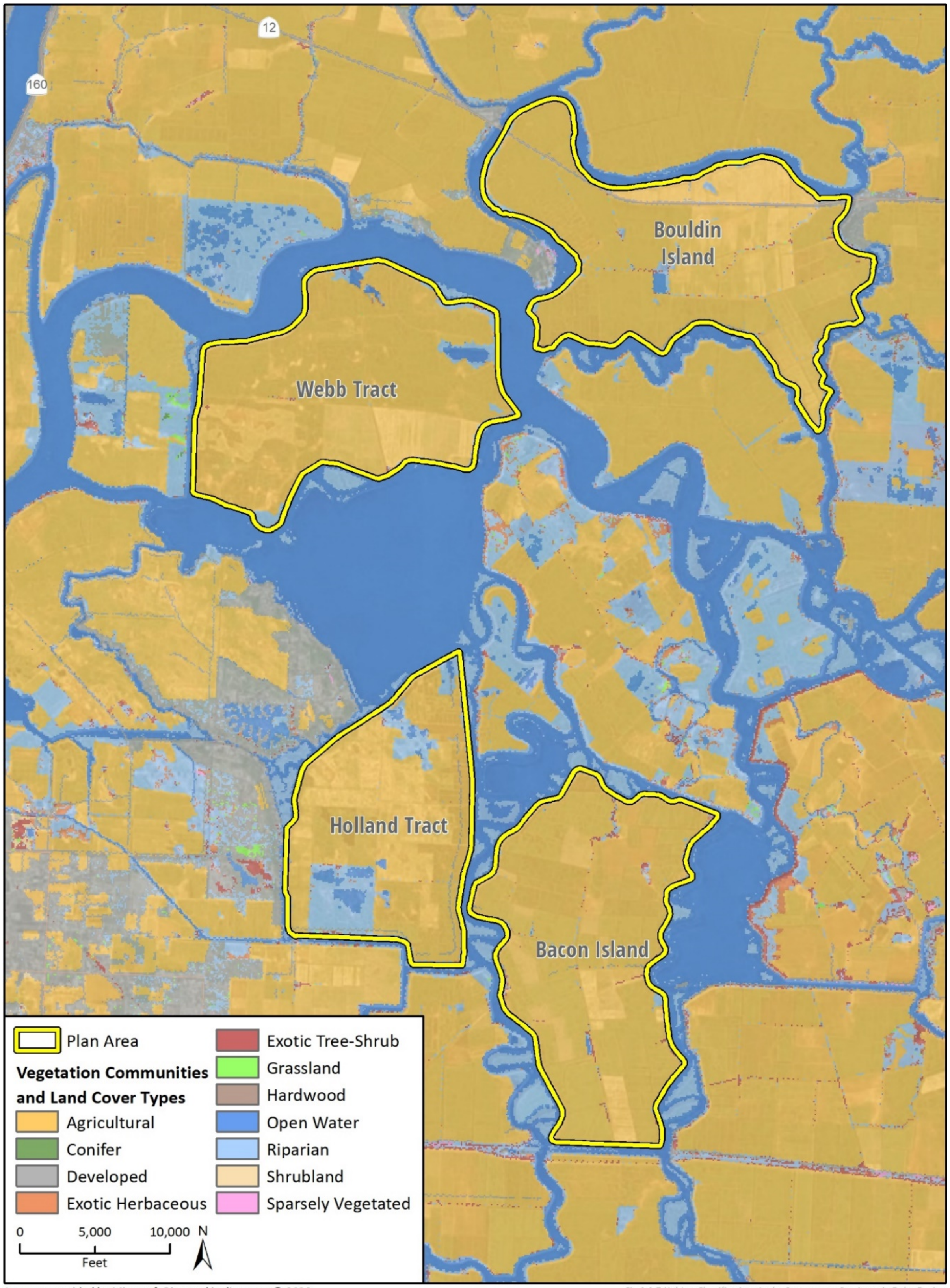
Additional data provided by USGS LANDFIRE, 2019.

Figure 7 Habitat Classifications in the Sacramento-San Joaquin Delta Region



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Additional data provided by USGS LANDFIRE, 2019.

Figure 8 Habitat Classifications in the Palo Verde Valley

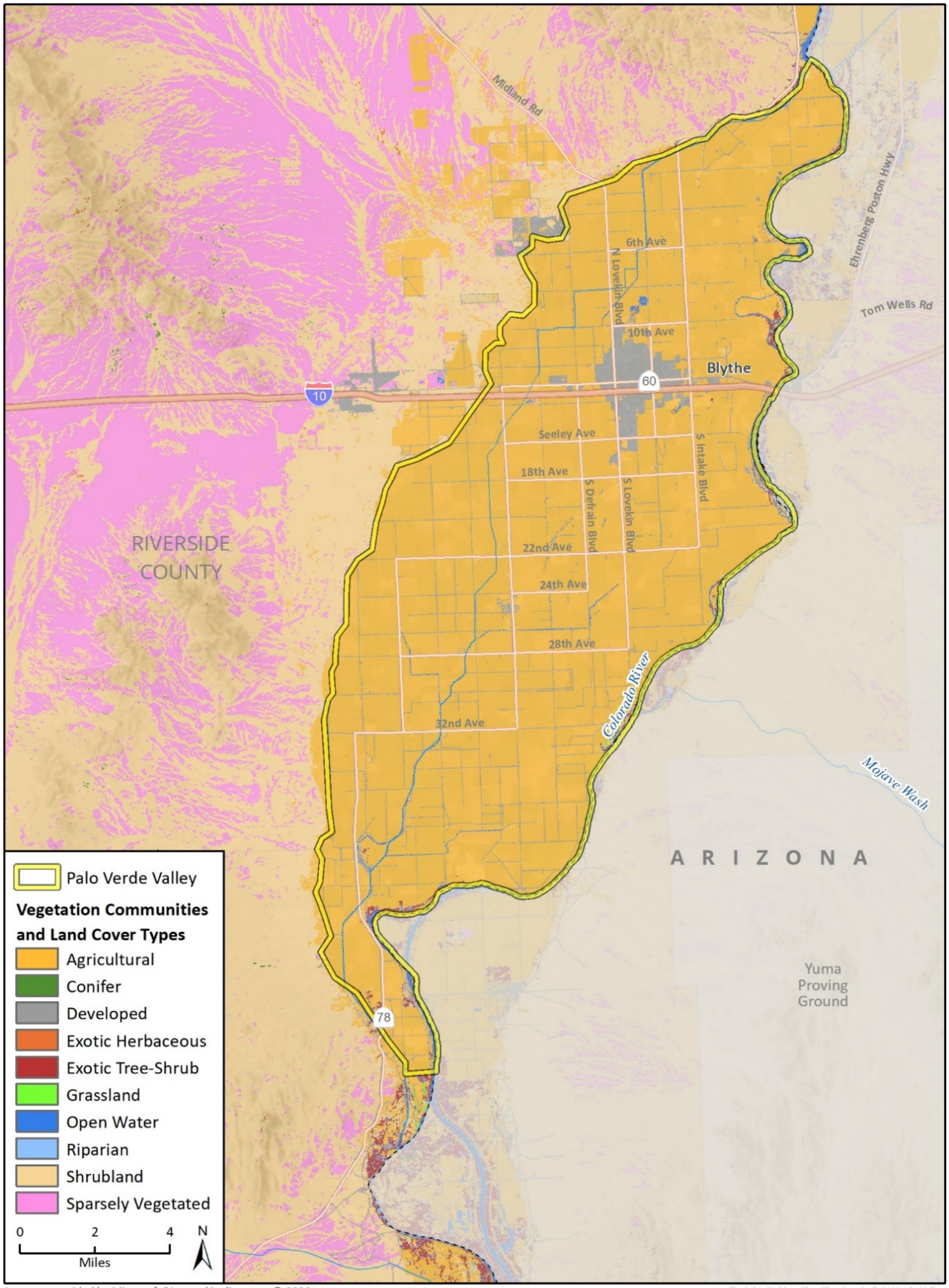

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Fig 4.4-x Habitat Classifications in Palo Verde Valley

Agricultural

This classification includes agricultural vegetation, including row crops, planted grain crops, pastures, hayfields, horticultural crops (such as commercial flower operations), fallow fields and early-successional weed fields, and wetland rice and taro crop fields. Large areas of agricultural land occur surrounding the cities of Palmdale and Lancaster in Los Angeles County; east of the city of Indio and near Blythe in Riverside County; near the city of Fallbrook in San Diego County; surrounding developed areas in much of Ventura County; and encompasses the majority of terrestrial landcover in the Sacramento-San Joaquin Delta region and the Palo Verde Valley.

Conifer

This classification consists of coniferous forests and woodlands below about 2,450 meters (8,000 feet) above mean sea level, primarily found along the immediate coast or within the coastal ranges. Dominant species in this classification include cypress (*Hesperocyparis* sp.) and pines (*Pinus* sp.), with limited oaks (*Quercus* sp.) and other hardwoods. Large areas of conifer habitats occur in the San Gabriel Mountains in Los Angeles County; in the Santa Ana Mountains in Orange County; in the San Jacinto and San Bernardino Mountains in Riverside County; in the San Bernardino and San Gabriel Mountains in San Bernardino County; in the Palomar and Cuyamaca Mountains in San Diego County; and in the Santa Ynez and San Rafael Mountains in Ventura County.

Conifer-Hardwood

This forest classification is characterized by a mix of coniferous and broad-leaved evergreen trees. Species in this classification include pines, oaks, beech (*Chrysolepis* sp.), Douglas fir (*Pseudotsuga* sp.), and bays (*Umbellularia* sp.). Conifer-hardwood habitats generally serve as the transition between conifer and hardwood habitats and do not represent a large portion of the habitats of any county or region.

Developed

Developed areas include a mixture of some constructed materials and vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent to 100 percent of the total cover. These areas include commercial/industrial, apartment complexes, row houses, single-family housing units, large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes. As shown in the LANDFIRE figures, large areas of developed land occur in metropolitan (metro) Los Angeles, the San Fernando Valley, the San Gabriel Valley, and Palmdale in Los Angeles County; across much of Orange County; in metro Riverside and Palm Springs in Riverside County; in metro San Bernardino and Victorville in San Bernardino County; in metro San Diego from Oceanside to the Mexican border in San Diego County; in metro Ventura, Oxnard, and the Conejo Valley in Ventura County; and in and around Blythe in southeastern Riverside County.

Exotic Herbaceous

This classification occurs in temperate areas throughout western North America and is comprised of disturbed upland grasslands, meadows and shrublands dominated by non-native and generalist native species. Large areas of exotic herbaceous habitats occur near the cities of Palmdale and Lancaster in Los Angeles County; near Laguna Woods and scattered throughout south Orange County; between Banning and Desert Hot Springs in Riverside County; in Marine Corps Base Camp Pendleton and near San Ysabel in San Diego County; and near Fillmore in Ventura County. Large areas of exotic herbaceous habitats are mainly absent from San Bernardino County. Exotic herbaceous habitats are mostly found along the edges of other habitats in the Sacramento-San Joaquin Delta region but do not occur in large expanses.

Exotic Tree-shrub

This classification is generally found on mountainsides in California. Stands are typically 5-50 meters (16 to 164 feet) tall and can have an open canopy to dense tree canopy (greater than 10 percent tree cover) that is strongly dominated (greater than 90 percent relative cover) by exotic tree species such as gum (*Eucalyptus* sp.). Large areas of exotic tree-shrub habitats occur surrounding the San Luis Rey River in San Diego County and on the side of the San Rafael Mountains near Pine Mountain Club.

Grassland

This classification includes native perennial grasslands, native annual grasslands and native annual forb meadows. Species in this classification include grasses (*Bromus* sp. and *Festuca* sp.), fiddleneck (*Amsinckia* sp.) and poppies (*Eschscholzia* sp.). Large areas of grassland habitats occur near Santa Clarita and along the foothills of the San Gabriel Mountains in Los Angeles County; the foothills of the Santa Ana Mountains in Orange County; scattered throughout southern Riverside County; in the foothills of the San Bernardino Mountains in San Bernardino County; in Marine Corps Base Camp Pendleton in San Diego County; and within the San Rafael Mountains in Ventura County.

Hardwood

This classification consists of oak and other broadleaf woodlands which are primarily dominated by various oak species. Large areas of hardwood habitats occur along the foothills of the San Gabriel Mountains in Los Angeles County; along the foothills of the Palomar and Cuyamaca Mountain Ranges in San Diego County; and along the foothills of the Santa Ynez Mountains in Ventura County.

Open Water

This classification includes areas of open water, generally with less than 25 percent cover of vegetation or soil. Large areas of open water within the Plan Area include Castaic Lake in Los Angeles County; Newport Back Bay and Irvine Lake in Orange County; Lake Matthews, Lake Elsinore, Perris Reservoir, Diamond Valley Lake, the Salton Sea, and the Colorado River in Riverside County; Big Bear Lake, Lake Havasu, and the Colorado River in San Bernardino County; Lake Henshaw and the San Vincente Reservoir in San Diego County; Lake Casitas in Ventura County; and the Sacramento-San Joaquin Delta in the Sacramento-San Joaquin Delta region.

Riparian

This classification consists of riparian, floodplain, seep, and oasis habitats dominated by trees. Riparian habitats are dependent on a water source such as a river, stream, lake, or pond. Dominant species in this classification include sycamore (*Platanus* sp.), cottonwoods (*Populus* sp.), and willows (*Salix* spp.). Riparian habitats are considered rare and, as such, do not represent a large portion of the Plan Area. Riparian habitat is found along the edges of Bacon Island, Bouldin Island, Holland Tract and Webb Tract in the Sacramento-San Joaquin Delta region.

Shrubland

This classification is dominated by a variety of native scrub or chaparral habitats but may also include annual and perennial native and non-native grass and herb vegetation endemic to the Mediterranean climate zone of California. Shrubland habitats make up one of the largest habitat classifications. Large areas of shrubland habitats can be found throughout the Plan Area.

Sparsely Vegetated

This classification includes open deserts and other regions where vegetation is very sparse. It is characterized by areas where the ground layer consists of sand, stony desert pavements, or salt crust (bare rock, often with nonvascular mats is placed in lithomorphic vegetation). Sparsely vegetated habitats are mainly limited to the desert regions of Los Angeles, Riverside, San Bernardino, and San Diego Counties.

1.2 Drainages and Wetlands

Watersheds and Drainages

The Plan Area contains seven primary watersheds: the Los Angeles River, Santa Ana River, Santa Margarita River, Whitewater River, Laguna-San Diego Coastal, Ventura-San Gabriel Coastal, and San Joaquin. Many rivers, creeks and tributaries are associated with each of these watersheds. The National Wetlands Inventory (USFWS 2020a) provides an overview of the drainages within the Plan Area (Figure 9 through Figure 16). Certain drainages and wetlands are regulated by the California Department of Fish and Wildlife (CDFW), U.S. Army Corps of Engineers (USACE), and the Regional Water Quality Control Boards (RWQCB).[2] The drainages within these watersheds are of biological importance as they may provide valuable foraging habitat, breeding habitat and movement habitat for a wide variety of animal species, including sensitive species such as steelhead (*Oncorhynchus mykiss*) and California red-legged frog (*Rana draytonii*). Many of these rivers and their tributaries are also federally designated critical habitat for salmonid species. The seven primary watersheds found within the Plan Area are described by county/region below (United States Geological Survey [USGS] 2018):

Los Angeles County

Los Angeles County contains one primary watershed, the Los Angeles River watershed, which conveys water from the Santa Monica Mountains through the Los Angeles River out to the Pacific Ocean and from the San Gabriel Mountains through the San Gabriel River to the Los Angeles River and out to the Pacific Ocean.

Orange County

Orange County contains one primary watershed, the Santa Ana River watershed, which conveys water from the San Bernardino Mountains in San Bernardino County through the Santa Ana River out to the Pacific Ocean. Other major waterways in the watershed include San Diego Creek, San Juan Creek, Aliso Creek, and Arroyo Trabuco.

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[2] Section 4.2.3 discusses the regulatory framework in more detail.

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Figure 9 National Wetlands Inventory, Los Angeles County

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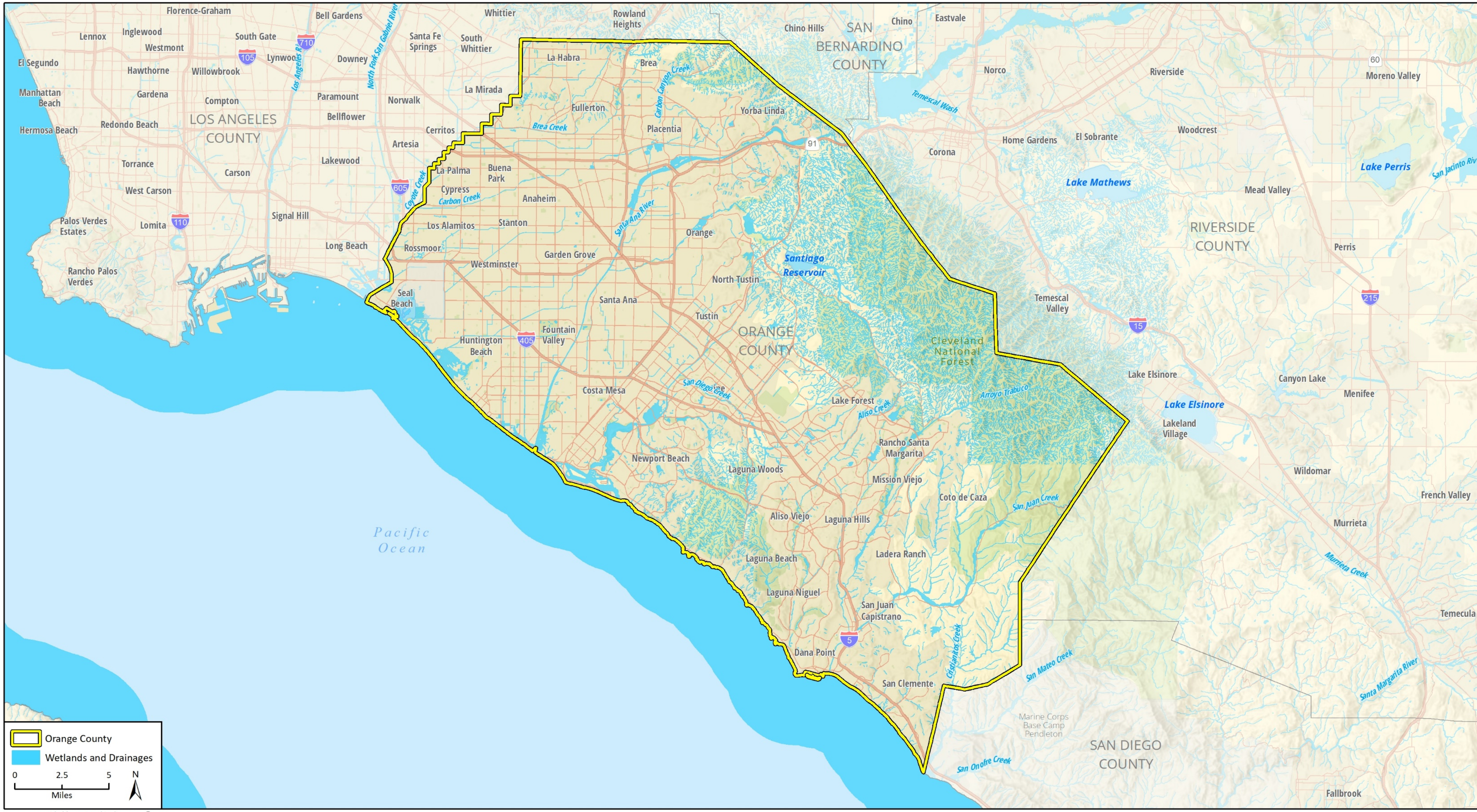
Additional data provided by USFWS, 2019.

Figure 10 National Wetlands Inventory, Orange County



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Additional data provided by USFWS, 2019.

FigX Orange County NWI_11x17

Figure 11 National Wetlands Inventory, Riverside County

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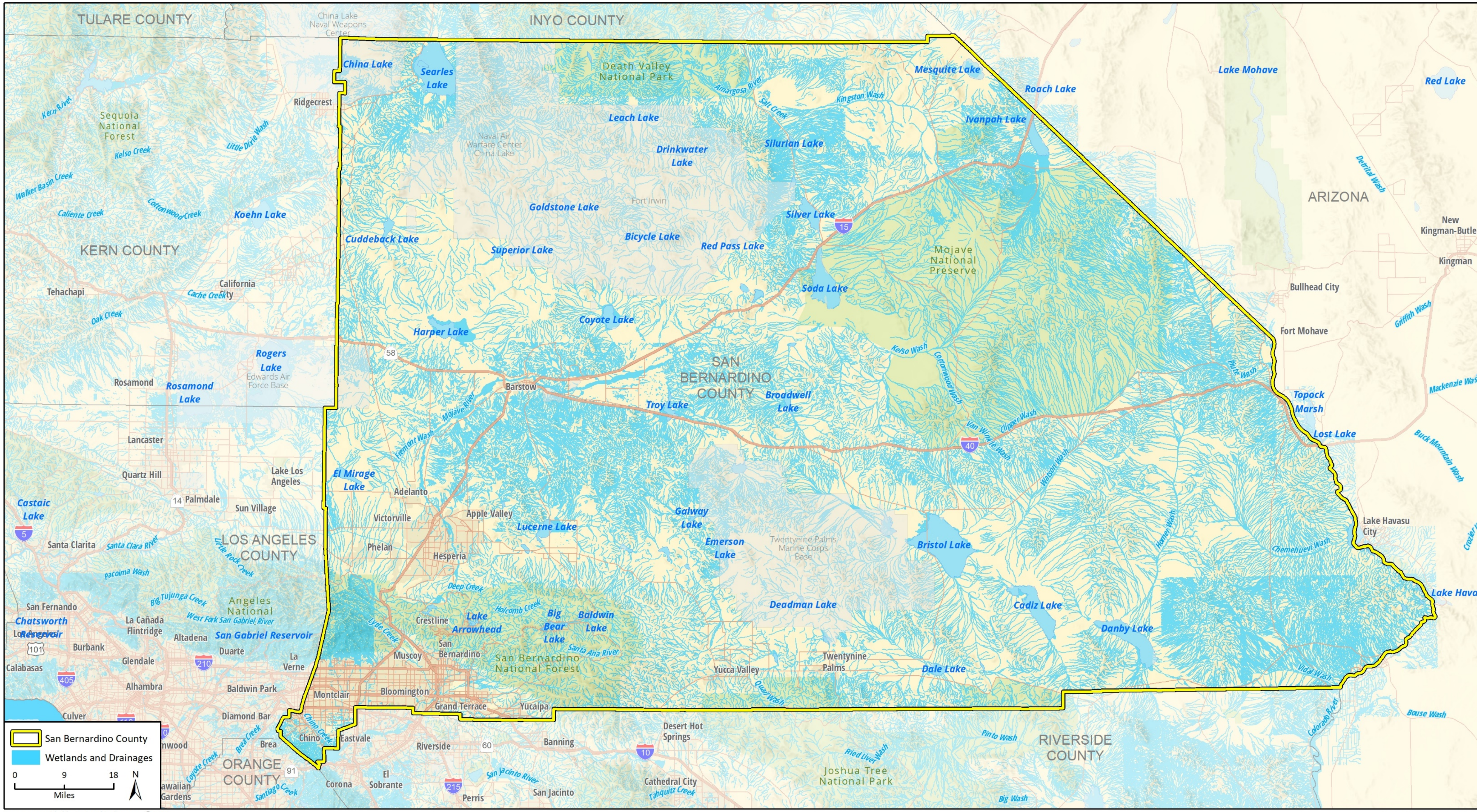
Figure 12 National Wetlands Inventory, San Bernardino County



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Additional data provided by USFWS, 2019.

Figure 13 National Wetlands Inventory, San Diego County

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Additional data provided by USFWS, 2019.

FigX San Diego County NWI_11x17

Figure 14 National Wetlands Inventory, Ventura County

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Figure 15 National Wetlands Inventory, Sacramento-San Joaquin Delta Region

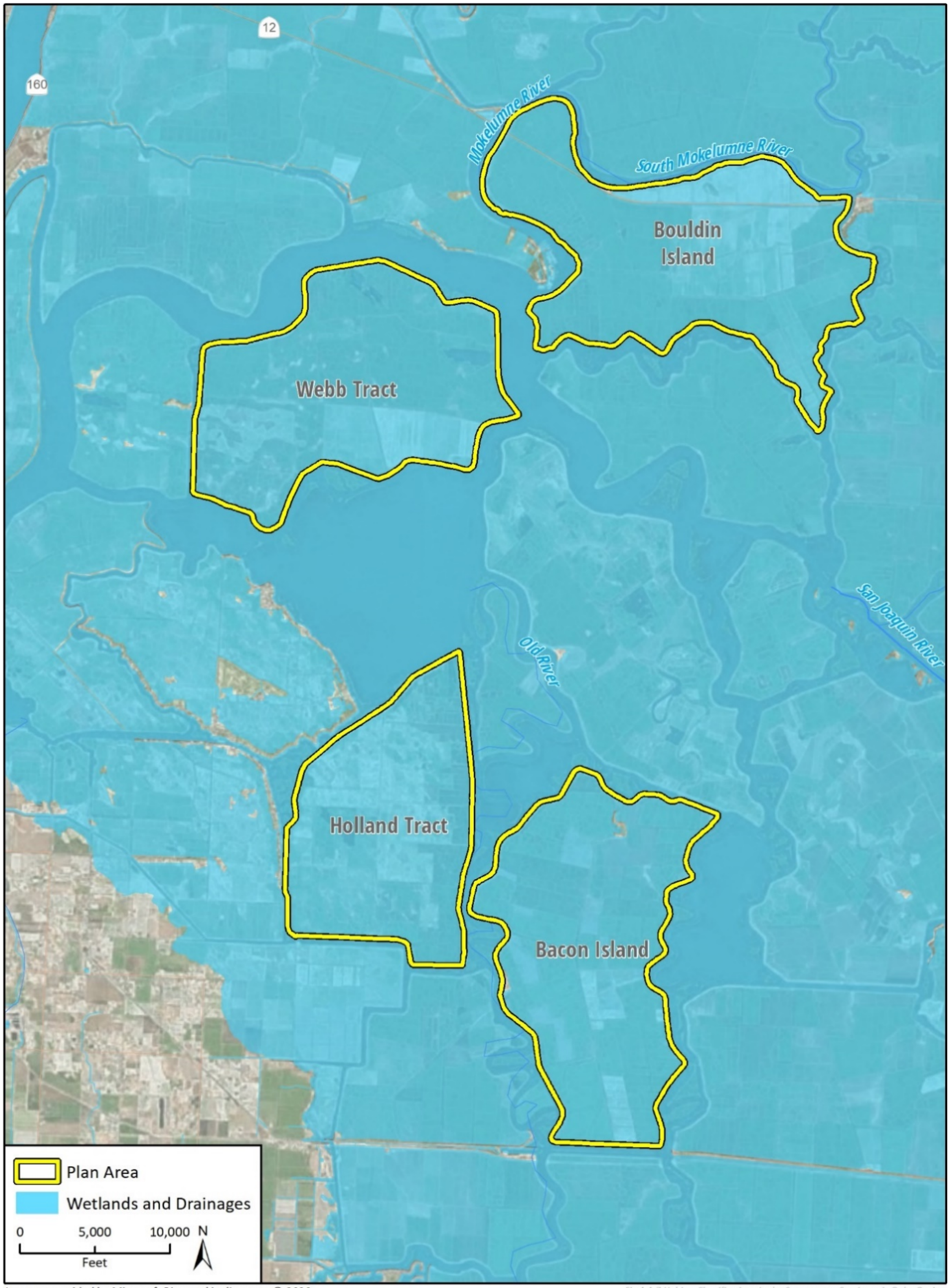

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Fig 4.4-7 Habitat Classifications in the Sacramento-San Joaquin Delta Region

Figure 16 National Wetlands Inventory, Palo Verde Valley

Riverside County

Riverside County contains three primary watersheds: the Santa Ana River, Santa Margarita River, and Whitewater River watersheds. The Santa Ana watershed conveys water from the San Bernardino Mountains through the Santa Ana River out to the Pacific Ocean and from the San Jacinto Mountains through the San Jacinto River to the Santa Ana River and out to the Pacific Ocean. The Santa Margarita watershed conveys water from the Santa Margarita Mountains through the Santa Margarita River from Riverside County into San Diego County. The Whitewater watershed conveys water from the San Bernardino Mountains through the Whitewater River to the Salton Sea and Sonoran Desert. Additionally, the eastern boundary of the County is the Colorado River, which originates in Colorado, travels through Utah, Arizona, and Nevada; travels along California’s southeastern border; and ends in the Gulf of California in Mexico.

San Bernardino County

San Bernardino County contains one primary watershed, the Santa Ana River watershed, which conveys water from the San Bernardino Mountains through the Santa Ana River out to the Pacific Ocean. Other major waterways in the watershed include the Mojave River, Amargosa River, and Lytle Creek. The Colorado River is also located along a portion of the eastern boundary of San Bernardino County.

San Diego County

San Diego County contains one primary watershed, the Laguna-San Diego Coastal watershed, which conveys water from the Julian, Laguna, and Cuyamaca Mountains through the Santa Margarita River, San Luis Rey River, San Dieguito River, Poway Creek, Chollas Creek, and the Tijuana River out to the Pacific Ocean.

Ventura County

Ventura County contains one primary watershed, the Ventura-San Gabriel Coastal watershed, which conveys water from the Santa Monica, Santa Susana, Santa Ynez, and San Emigdio Mountains through the Ventura River, Santa Clara River, and Calleguas Creek out to the Pacific Ocean.

Sacramento-San Joaquin Delta Region

The Sacramento-San Joaquin Delta region contains one primary watershed, the San Joaquin watershed, which conveys water from the Eastern Sierra Nevada mountain range to the San Joaquin Valley floor and out to the Sacramento-San Joaquin Delta via the Sacramento and San Joaquin Rivers.

Palo Verde Valley

The Palo Verde Valley contains one primary watershed, the Lower Colorado watershed, which conveys water to the Colorado River toward the Gulf of California. The Colorado River is also located along the eastern boundary of Palo Verde Valley.

Wetlands and Aquatic Habitats

Wetlands are important biological resources both because of their rarity and because they provide a variety of ecosystem services. Several types of wetlands exist throughout the Plan Area as described in more detail below. The classifications below are used by the National Wetland Inventory (USFWS 2020a). For simplicity, the various wetland and aquatic habitats have been grouped together and are shown in blue on Figure 9 through Figure 16.

Vernal Pools

These seasonal wetlands are small depressions that fill with water during the winter, gradually drying during the spring and becoming completely dry in the summer. These pools are found in only a few places in the world outside of California. Vernal pool vegetation is adapted to the cycle of brief inundation followed by seasonal drying. Vernal pools are characterized by herbaceous plants that may begin their growth as aquatic or semi-aquatic plants and transition to a dry land environment as the pool dries, while other species germinate in the mud as the pool begins to dry. Most vernal pool plants are annual herbs, many of which are endemic to vernal pools.

Estuarine and Marine Deep-Water Wetlands

These deep-water wetlands are composed of the deep-water portion of estuarine or marine systems. Estuarine systems are composed of tidal habitats and adjacent tidal wetlands that are influenced by water runoff from and often semi-enclosed by land. They are located along low-energy coastlines (i.e., beaches and spits) and have variable salinity. Marine systems of this type are generally open ocean and occur along high energy coastlines with salinities exceeding 30 parts per thousand (ppt) and little or no dilution except outside the mouths of estuaries.

Estuarine and Marine Wetlands

These wetlands are composed of estuarine and marine systems as described above; however, they are not deep-water. These areas can be subtidal or intertidal with a variety of vegetated and non-vegetated bottoms. Beaches, bars and flats are also included as estuarine and marine wetlands.

Freshwater Emergent Wetlands

Freshwater emergent wetlands include all non-tidal waters dominated by emergent herbaceous plant species, mosses and/or lichens. Wetlands of this type are also low in salinity. The National Wetland Inventory also includes in this category wetlands that lack vegetation if they are less than 20 acres in size, do not have an active wave-formed or bedrock shoreline feature, and/or have a low water depth less than 6.6 feet. Freshwater emergent wetlands are characterized by erect, rooted herbaceous hydrophytes. Dominant vegetation is generally perennial monocots. All emergent wetlands are inundated or saturated frequently enough that the roots of the vegetation prosper in an anaerobic environment. The wetlands may vary in size from small clumps to vast areas covering several kilometers. The acreage of Freshwater Emergent Wetlands in California has decreased dramatically since the turn of the century due to drainage and conversion to other uses, primarily agriculture.

Freshwater Forested/Shrub Wetlands

These wetlands include non-tidal waters that are dominated by trees and shrubs, with emergent herbaceous plants, mosses and/or lichens. Freshwater forested/shrub wetlands are generally dominated by woody vegetation such as shrubs and trees. This wetland category can also include riparian habitats.

Freshwater Ponds

Freshwater ponds include non-tidal waters, typically less than 20 acres in size and typically with vegetative cover along the edges such as trees, shrubs, emergent herbaceous plants, mosses and/or lichens. Freshwater ponds can be man-made or natural and typically consist of an area of standing water with variable amounts of shoreline. These wetlands and deep-water habitats are dominated by plants that grow on or below the surface of the water.

Lakes

Lakes are lacustrine systems which include wetlands and deep-water habitats located in a topographic depression or dammed river channel. These areas tend to be greater than 20 acres. Vegetation cover within this habitat type is generally less than 30 percent and often occurs in the form of emergent or surface vegetation. Substrates are composed of at least 25 percent cover of particles smaller than stones.

Riverine

Riverine habitats are stream systems that include all wetlands and deep-water habitats contained in natural or artificial channels that contain periodically or continuously flowing water. This system may also form a connecting link between two bodies of standing water. Substrates generally consist of rock, cobble, gravel or sand.

1.3 Sensitive Natural Communities

The CDFW California Sensitive Natural Communities list identifies sensitive natural communities throughout California, based in part on global and state rarity ranks. According to the CDFW Vegetation Program, alliances with state ranks of S1-S3 are classified as imperiled and thus, potentially of special concern. Several natural communities considered sensitive by the CDFW occur within the six counties which comprise the Plan Area. The California Natural Diversity Database (CNDDB) lists 48 natural communities that occur with the Plan Area which are listed by county/region in Table 2 below (CDFW 2020a).

Because this analysis is programmatic and biological resources in this document are assessed at a general, county-wide scale, vegetation mapping and analysis at the alliance and association level has not been conducted; that level of analysis would be more appropriate at the project level.

Table 2 Sensitive Natural Communities by County/Region

Communities Considered Sensitive by the CDFW	Status	County/Region
Alkali Seep	S2.1	San Bernardino
Amargosa River	SNR	San Bernardino
Arizonan Woodland	S1.2	San Bernardino
California Walnut Woodland	S2.1	Los Angeles, Orange, San Bernardino, Ventura
Canyon Live Oak Ravine Forest	S3.3	Los Angeles, Orange, Riverside, San Bernardino, Ventura
Cismontane Alkali Marsh	S1.1	Ventura
Coastal and Valley Freshwater Marsh	S2.1	Riverside, San Bernardino, Ventura, Sacramento-San Joaquin Delta
Coastal Brackish Marsh	S2.1	San Diego
Crucifixion Thorn Woodland	S1.2	San Bernardino
Desert Fan Palm Oasis Woodland	S3.2	Riverside, San Bernardino, San Diego
Island Cherry Forest	S2.1	Los Angeles
Island Ironwood Forest	S2.1	Los Angeles
Mainland Cherry Forest	S1.1	Los Angeles
Maritime Succulent Scrub	S1.1	Los Angeles, San Diego, Ventura
Mesquite Bosque	S2.1	Riverside, San Bernardino, San Diego
Mojave Mixed Steppe	S2.2	San Bernardino, San Diego
Mojave Riparian Forest	S1.1	Los Angeles, San Bernardino, San Diego

Communities Considered Sensitive by the CDFW	Status	County/Region
Mojave Yucca Scrub and Steppe	S3.2	San Bernardino
Open Engelmann Oak Woodland	S2.2	Los Angeles
Pebble Plains	S1.1	San Bernardino
Riversidian Alluvial Fan Sage Scrub	S1.1	Los Angeles, Orange, Riverside, San Bernardino
San Diego Mesa Claypan Vernal Pool	S2.1	San Diego
San Diego Mesa Hardpan Vernal Pool	S2.1	San Diego
Sonoran Cottonwood Willow Riparian Forest	S1.1	Riverside, San Diego, Palo Verde Valley
Southern California Arroyo Chub/Santa Ana Sucker Stream	SNR	Los Angeles, Orange, Riverside, San Bernardino
Southern California Coastal Lagoon	SNR	Los Angeles, Ventura
Southern California Steelhead Stream	SNR	Los Angeles, Ventura
Southern California Threespine Stickleback Stream	SNR	Los Angeles, San Bernardino, Ventura
Southern Coast Live Oak Riparian Forest	S4	Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura
Southern Coastal Bluff Scrub	S1.1	Los Angeles, Ventura
Southern Coastal Salt Marsh	S2.1	Los Angeles, Orange, San Diego, Ventura
Southern Cottonwood Willow Riparian Forest	S3.2	Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura
Southern Dune Scrub	S1.1	Los Angeles, Orange, San Diego, Ventura
Southern Foredunes	S2.1	Los Angeles, Orange, San Diego, Ventura
Southern Interior Basalt Flow Vernal Pool	S1.2	Riverside
Southern Interior Cypress Forest	S2.1	Orange, Riverside, San Diego
Southern Maritime Chaparral	S1.1	San Diego
Southern Mixed Riparian Forest	S2.1	Los Angeles, Orange, Riverside, San Bernardino, Ventura
Southern Riparian Forest	S4	Los Angeles, Riverside, San Bernardino, San Diego, Ventura
Southern Riparian Scrub	S3.2	Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura
Southern Sycamore Alder Riparian Woodland	S4	Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura
Southern Willow Scrub	S2.1	Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura
Torrey Pine Forest	S1.1	San Diego
Transmontane Alkali Marsh	S2.1	San Bernardino
Valley Needlegrass Grassland	S3.1	Los Angeles, Orange, Riverside, San Diego, Ventura
Valley Oak Woodland	S2.1	Los Angeles, Ventura
Walnut Forest	S1.1	Los Angeles, Ventura
Wildflower Field	S2.2	Los Angeles

Sources: CNDDB (CDFW 2020a)

1.4 Special Status Plants and Animals

For the purpose of this analysis, special status species are those plants and animals listed, proposed for listing, or candidates for listing as threatened or endangered by the United States Fish and Wildlife Service (USFWS) under the federal Endangered Species Act (FESA); those listed or proposed for listing as rare, threatened, or endangered by the CDFW under the California Endangered Species Act (CESA); and animals designated as "Species of Special Concern," "Fully Protected," or "Watch List" by the CDFW. The CNDDB also provides records of other special animals that CDFW is tracking but are not currently designated a special status, including NatureServe Element Rankings which include a global and state rank (CDFW 2019a). The global rank provides a status over a species' entire distribution, and the state rank provides a status across California. Due to the programmatic nature of the CAP, a precise, project-level analysis of the specific impacts associated with individual activities is not possible, thus, these species were also included as "special status" considering the CDFW is currently collecting data and tracking these species and therefore there is potential for their status to be elevated in the future.

The NatureServe Element Rankings are defined as:

- GX: Presumed Extinct – Not located despite intensive searches and virtually no likelihood of rediscovery.
- GH: Possibly Extinct – Known from only historical occurrences but still some hope of rediscovery. Examples of evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species has been searched for unsuccessfully, but not thoroughly enough to presume that it is extinct throughout its range.
- G1: Critically Imperiled – At very high risk of extinction due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.
- G2: Imperiled – At high risk of extinction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
- G3: Vulnerable – At moderate risk of extinction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
- G4: Apparently Secure – At fairly low risk of extinction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
- G5: Secure – At very low risk of extinction due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.
- GNR: Unranked – Global rank not yet assessed.
- SX: Presumed Extirpated – Species is believed to be extirpated from the state Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
- SH: Possibly Extirpated – Known from only historical records but still some hope of rediscovery. There is evidence that the species may no longer be present in the state, but not enough to state this with certainty. Examples of such evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species has been searched for

unsuccessfully, but not thoroughly enough to presume that it is no longer present in the jurisdiction.

- S1: Critically Imperiled – At very high risk of extirpation in the state due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.
- S2: Imperiled – At high risk of extirpation in the state due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
- S3: Vulnerable – At moderate risk of extirpation in the state due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
- S4: Apparently Secure – At a fairly low risk of extirpation in the state due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
- S5: Secure – At very low or no risk of extirpation in the state due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.
- SNR: Unranked – State rank not yet assessed.

Additional NatureServe Element rank qualifiers:

- Taxa which are subspecies receive a taxon rank (T-rank) in addition to the G-rank. Whereas the G-rank reflects the condition of the entire species, the T-rank reflects the global status of just the subspecies. For example, the Point Reyes mountain beaver, *Aplodontia rufa* ssp. *phaea*, is ranked G5T2. The G-rank refers to the whole species, i.e., *Aplodontia rufa*; the T-rank refers only to the global condition of ssp. *phaea*.
- C = Captive or Cultivated Only — taxon at present is presumed or possibly extinct or eliminated in the wild across their entire native range but is extant in cultivation, in captivity, as a naturalized population (or populations) outside their native range, or as a reintroduced population not yet established. The "C" modifier is only used at a global level and not at a state level. Possible ranks are GXC or GHC.
- Q = Questionable taxonomy that may reduce conservation priority — Distinctiveness of this entity as a taxon at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon in another taxon, with the resulting taxon having a lower-priority (numerically higher) conservation status rank. The "Q" modifier is only used at the global level, not at the state level.

Uncertainty about the status of an element is expressed in two major ways:

- By expressing the ranks as a range of values: e.g., S2S3 indicates the rank is somewhere between S2 and S3.
- By adding a "?" to the rank: e.g., S2?; this represents more certainty than S2S3, but less certainty than S2.

Other considerations used when ranking a species include the pattern of distribution of the element on the landscape, fragmentation of the population, and historical extent as compared to its modern range. It is important to take an overall view when ranking sensitive elements rather than simply counting element occurrences

Additionally, special status plants with California Rare Plant Rank (CRPR) designations of 1 through 4 were included. CDFW standards state that plants with a CRPR 1A, 1B, 2A and 2B may meet definitions of rare or endangered under CEQA Sections 15380 (b) and (d) (CDFW 2020b). By California Native Plant Society (CNPS) standards, the plants of CRPR Ranks 1A, 1B, 2A and 2B meet the definitions of Sections 2062 and 2067 (CESA) of the California Fish and Game Code (CFGC), and are eligible for state listing, thus should be considered under CEQA Section 15380. In general, CNPS Rank 3 plants (plants about which more information is needed) and Rank 4 plants (plants of limited distribution) may not warrant consideration under CEQA Section 15380. However, at the discretion of various jurisdictions, these plants may be included on special status plant lists where they would be required to be addressed under CEQA Section 15380. Factors such as regional rarity versus. statewide rarity should be considered in determining whether cumulative impacts to a Rank 4 plant are significant even if individual program activity impacts are not. Due to the programmatic nature of the CAP, a precise, project-level analysis of the specific impacts associated with individual program activities is not possible, thus, the evaluation of Rank 3 and 4 species in context of type localities, unique vegetation types and local designation of special status would need to be completed on a case-by-case basis and requires site-specific knowledge of the vegetation type in which the plant occurs on a given site. To provide a conservative analysis, all plants with a CRPR rank are included.

Plants with a CRPR of 1, 2, 3 and 4 are defined as:

- CRPR 1A = Plants presumed extinct in California;
- CRPR 1B.1 = Rare or endangered in California and elsewhere; seriously endangered in California (over 80 percent of occurrences threatened/high degree and immediacy of threat);
- CRPR 1B.2 = Rare or endangered in California and elsewhere; fairly endangered in California (20-80 percent occurrences threatened);
- CRPR 1B.3 = Rare or endangered in California and elsewhere, not very endangered in California (<20 percent of occurrences threatened or no current threats known);
- CRPR 2 = Rare, threatened or endangered in California, but more common elsewhere;
- CRPR 3 = Plants needing more information (most are species that are taxonomically unresolved; some species on this list meet the definitions of rarity under CNPS and CESA);
- CRPR 4.1 = Plants of limited distribution (watch list), seriously endangered in California;
- CRPR 4.2 = Plants of limited distribution (watch list), fairly endangered in California (20-80 percent occurrences threatened); and
- CRPR 4.3 = Plants of limited distribution (watch list), not very endangered in California.

Species of Special Concern (SSC) is a category used by the CDFW for those species which are considered indicators of regional habitat changes or may be potential future protected species. Species of Special Concern do not have any special legal status except that which may be afforded by the CFGC (e.g., nesting birds). The SSC category is intended by the CDFW for use as a management tool to include these species into special consideration when decisions are made concerning the development of natural lands, and these species are considered special status as described under the CEQA Appendix G questions.

Queries of the USFWS Information, Planning and Conservation (IPaC) species database (USFWS 2020b), CNDDB (CDFW 2020a) and CNPS Online Inventory of Rare and Endangered Plants of California (CNPS 2020) were conducted to obtain comprehensive information regarding state and federally listed species considered to have potential to occur within Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties; the Palo Verde Valley in Imperial County; and the Sacramento-San Joaquin Delta region.

The Plan Area is home to several species protected by federal and state agencies. Special status animal species can be found in a variety of habitats these counties host. The CNDDB, CNPS, and USFWS IPaC together list 1,148 special status plant and animal species that have been identified within Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties; the Palo Verde Valley in Imperial County; and the Sacramento-San Joaquin Delta region. The status and habitat requirements of those species are presented in Appendix D.

Critical habitats are specific geographic area(s) designated by the USFWS as essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat may include areas not currently occupied by the species but potentially needed for its recovery. Federally designated critical habitat for 54 species occurs within the Plan Area (Table 3; Figure 17 through Figure 24). Table 3 includes the critical habitat available for species in each County/Region in the Plan Area. The equals sign , “=” denotes the former accepted name for the species.

Table 3 Federally Designated Critical Habitat by County/Region

Critical Habitat	County/Region
Arroyo (=arroyo southwestern) toad (*Anaxyrus californicus*)	Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura
Ash-grey paintbrush (*Castilleja cinerea*)	San Bernardino
Bear Valley sandwort (*Arenaria ursina*)	San Bernardino
Bonytail (*Gila elegans)*	San Bernardino
Braunton’s milk-vetch (*Astragalus brauntonii)*	Los Angeles, Orange, Ventura
California condor (*Gymnogyps californianus*)	Los Angeles, Ventura
California red-legged frog (*Rana draytonii*)	Los Angeles, Ventura
California taraxacum (*Taraxacum californicum*)	San Bernardino
Casey’s june beetle (*Dinacoma caseyi*)	Riverside
Chinook Salmon (*Oncorhynchus tshawytscha*)	Sacramento-San Joaquin Delta
Coachella Valley fringe-toed lizard (*Uma inornata*)	Riverside
Coachella Valley milk-vetch (*Astragalus lentiginosus* var. *coachellae*)	Riverside
Coastal California gnatcatcher (*Polioptila californica californica*)	Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura
Conservancy fairy shrimp (*Branchinecta conservatio*)	Ventura
Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*)	San Bernardino
Cushenbury milk-vetch (*Astragalus albens*)	San Bernardino
Cushenbury oxytheca (*Oxytheca parishii* var. *goodmaniana*)	San Diego
Delta smelt (*Hypomesus transpacificus*)	Sacramento-San Joaquin Delta
Desert tortoise (*Gopherus agasazzi*)	Los Angeles, Riverside, San Bernardino
Green sturgeon (*Acipenser medirostris*), Southern DPS	Sacramento-San Joaquin Delta
Laguna Mountains skipper (*Pyrgus ruralis lagunae*)	San Diego
Lane Mountain milk-vetch (*Astragalus jaegerianus*)	San Bernardino
Least Bell’s vireo (*Vireo bellii pusillus*)	Los Angeles, Riverside, San Bernardino, San Diego, Ventura
Lyon’s pentachaeta (*Pentachaeta lyonii*)	Los Angeles, Ventura

Critical Habitat	County/Region
Mexican flannelbush (*Fremontodendron mexicanum*)	San Diego
Mountain yellow-legged frog (*Rana muscosa*)	Los Angeles, Riverside, San Bernardino
Munz's onion (*Allium munzii*)	Riverside
Nevin's barberry (*Berberis nevinii*)	Riverside
Otay tarplant (*Deinandra* (=*Hemizonia*) *conjugens*)	San Diego
Palos Verde blue butterfly (*Glaucopsyche lygdamus palosverdesensis*)	Los Angeles
Parish's daisy (*Erigeron parishii*)	San Bernardino
Peninsular bighorn sheep (*Ovis canadensis nelsoni*)	Riverside, San Diego
Quino checkerspot butterfly (*Euphydryas editha quino* (=*E. e. wrighti*))	Riverside, San Diego
Razorback sucker (*Xyrauchen texanus*)	Riverside, San Bernardino, Palo Verde Valley
Riverside fairy shrimp (*Streptocephalus woottoni*)	Orange, San Diego, Ventura
San Bernardino bluegrass (*Poa atropurpurea*)	San Bernardino, San Diego
San Bernardino Merriam's kangaroo rat (*Dipodomys merriami parvus*)	Riverside
San Bernardino Mountains bladderpod (*Lesquerella kingii* ssp. *bernardina*)	San Bernardino
Santa Ana sucker (*Catostomus santaanae*)	Los Angeles, Orange, Riverside, San Bernardino
San Diego ambrosia (*Ambrosia pumila*)	Riverside, San Diego
San Diego fairy shirmp (*Branchinecta sandiegonensis*)	Orange, San Diego
San Diego thornmint (*Acanthomintha ilicifolia*)	San Diego
Southern mountain wild-buckwheat (*Eriogonum kennedyi* var. *austromontanum*)	San Bernardino
Southwestern willow flycatcher (*Empidonax traillii extimus*)	Los Angeles, Riverside, San Bernardino, San Diego, Ventura
Spreading navarretia (*Navarretia fossalis*)	Los Angeles, Riverside, San Diego
Steelhead (*Oncorhynchus mykiss irideus*)	Los Angeles, Orange, San Diego, Ventura, Sacramento-San Joaquin Delta
Thread-leaved brodiaea (*Brodiaea filifolia*)	Los Angeles, Orange, Riverside, San Bernardino, San Diego
Tidewater goby (*Eucyclogobius newberryi*)	Los Angeles, Orange, San Diego, Ventura
Vail Lake ceanothus (*Ceanothus ophiochilus*)	Riverside
Ventura Marsh milk-vetch (*Astragalus pycnostachyus* var. *lanosissimus*)	Ventura
Vernal pool fairy shrimp (*Branchinecta lynchi*)	Ventura
Western snowy plover (*Charadrius alexandrinus nivosus*)	Los Angeles, Orange, San Diego, Ventura
Willowy monardella (*Monardella viminea*)	San Diego
Yellow-billed cuckoo (*Coccyzus americanus*)	Riverside, San Bernardino, Palo Verde Valley

Sources: USFWS IPaC (2020b)

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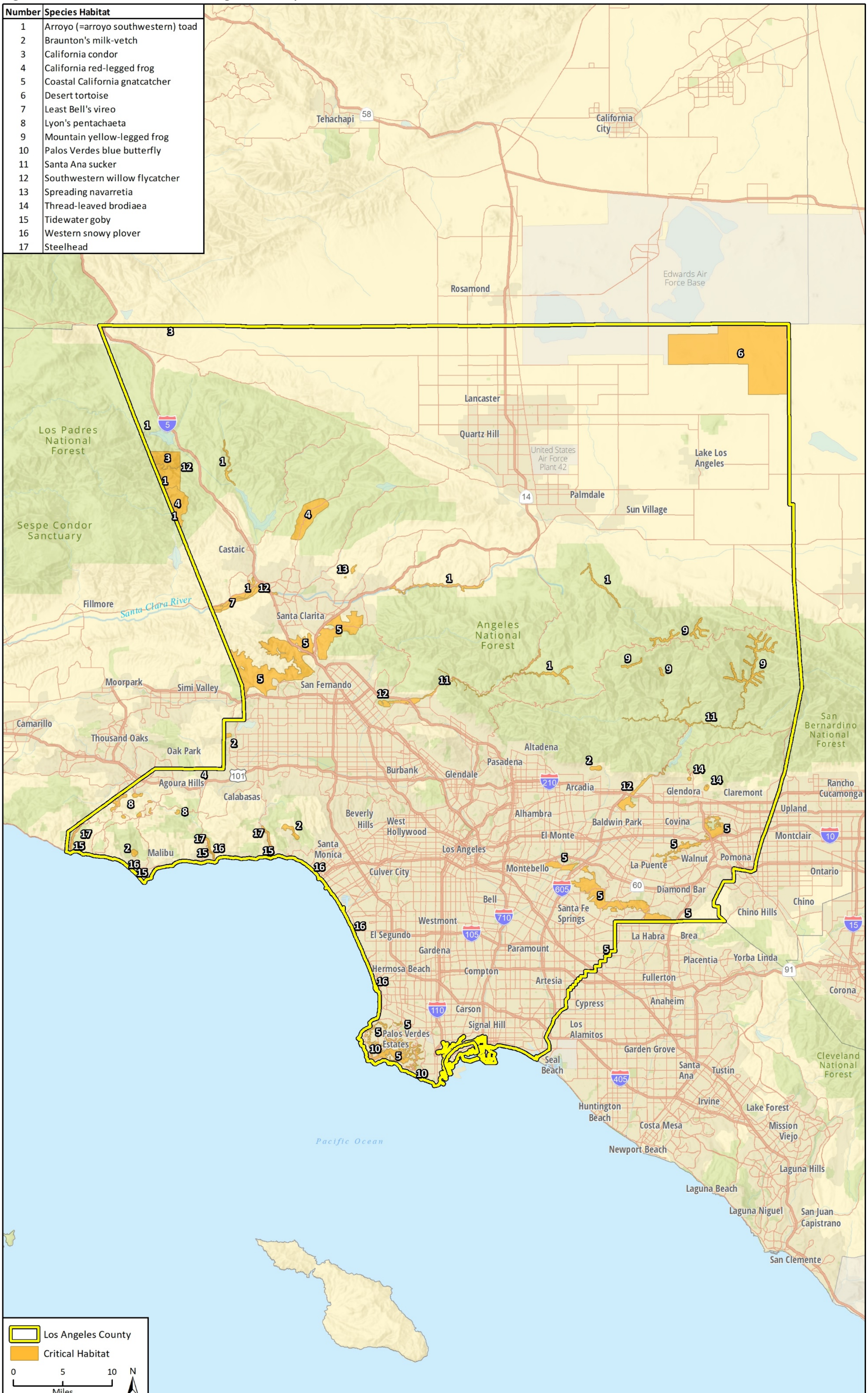
Figure 17 Critical Habitat in Los Angeles County



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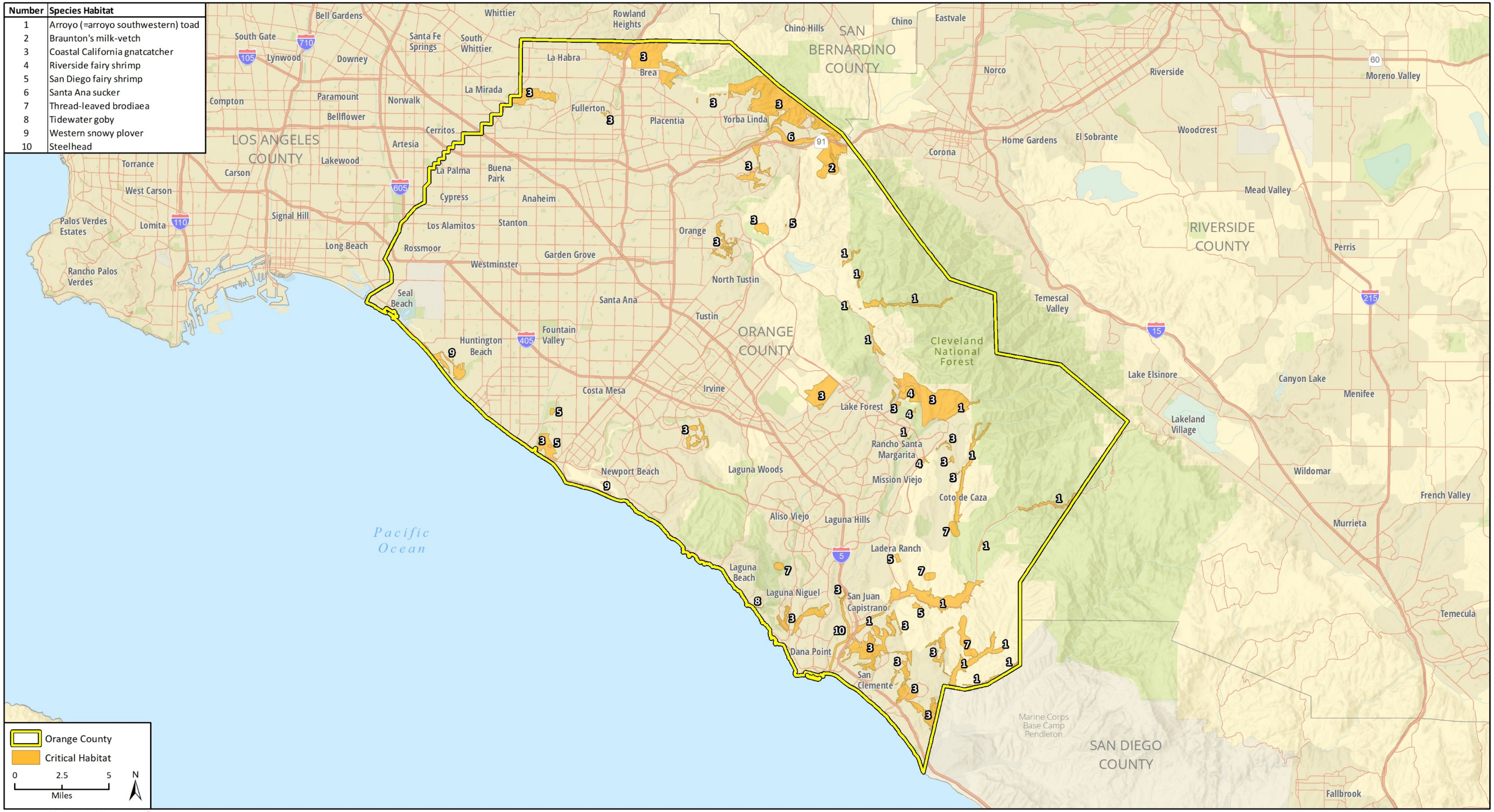
Additional data provided by USFWS, 2019 and NOAA, 2020.

Figure 18 Critical Habitat in Orange County



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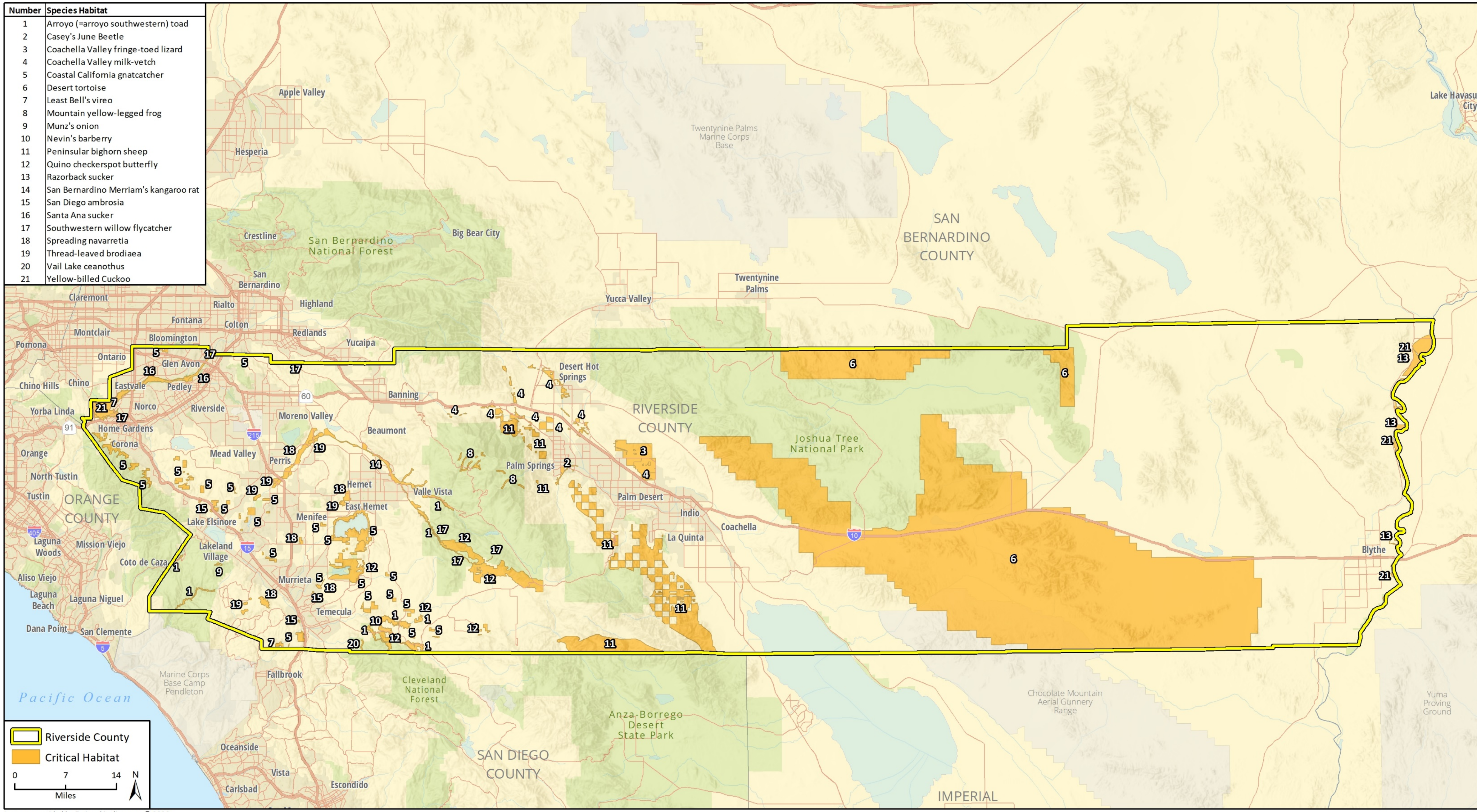
Additional data provided by USFWS, 2019 and NOAA, 2020.

Figure 19 Critical Habitat in Riverside County



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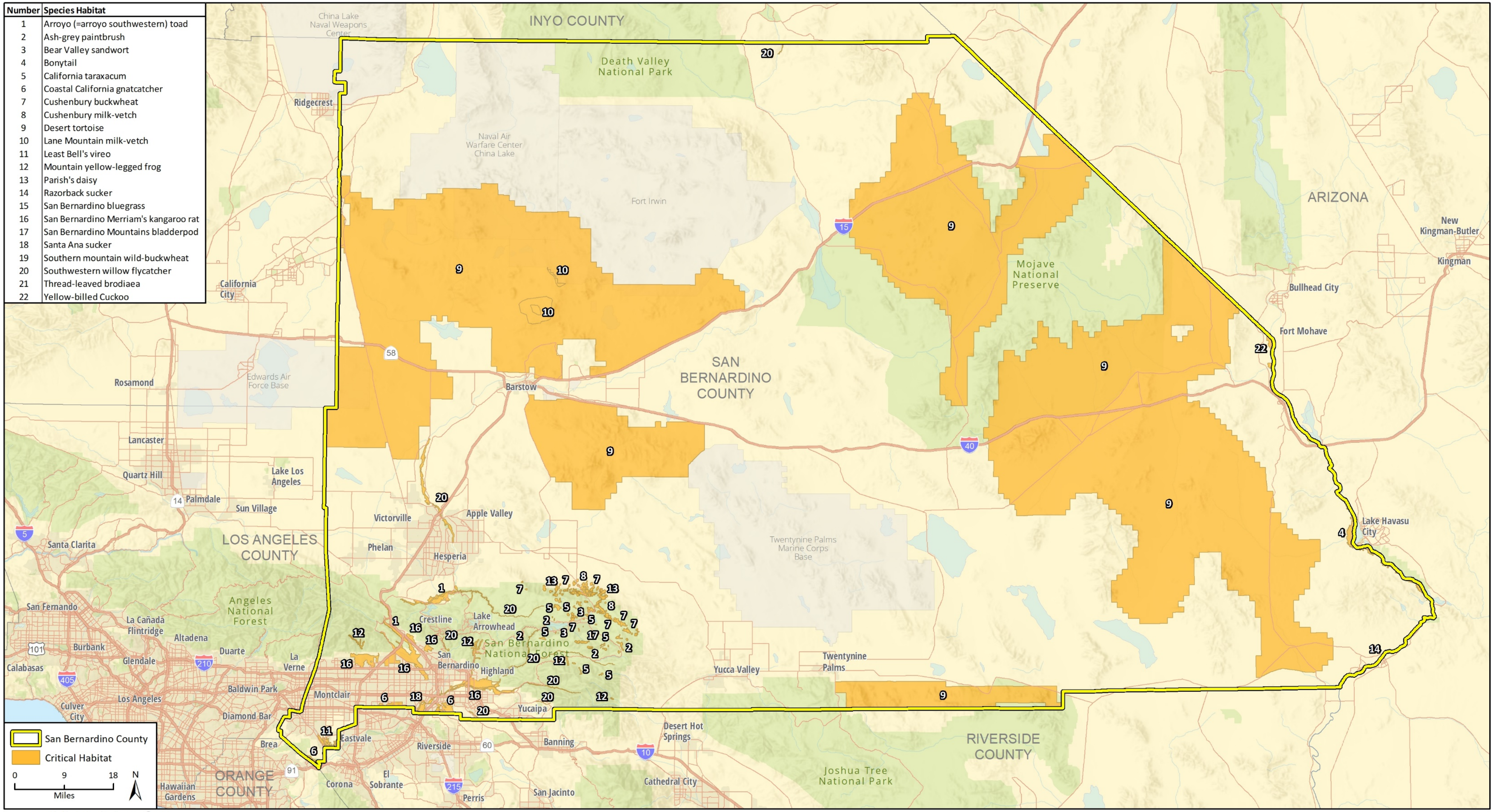
Additional data provided by USFWS, 2019.

Figure 20 Critical Habitat in San Bernardino County



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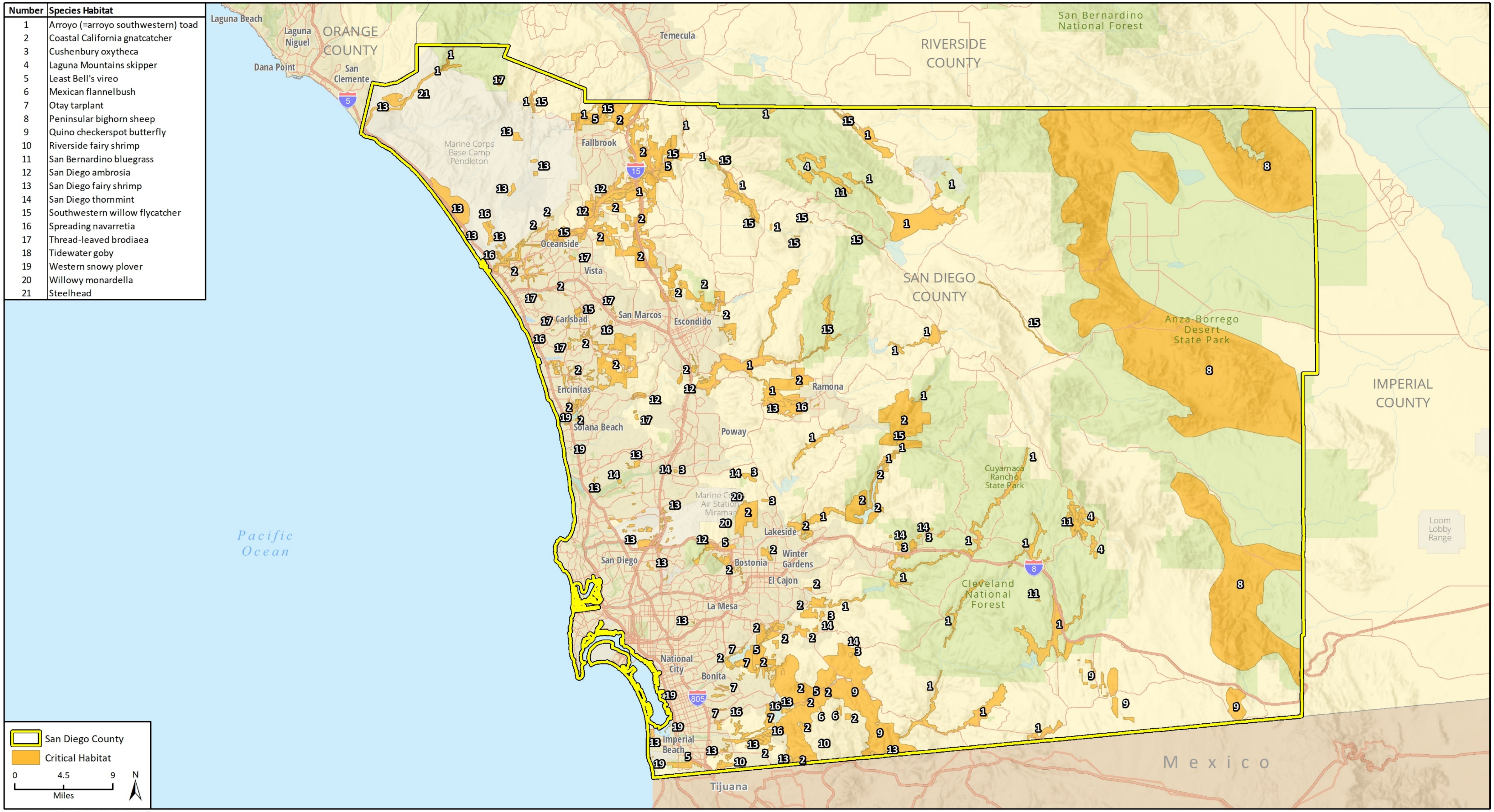
Additional data provided by USFWS, 2019.

FigX San Bernardino County Critical Habitat_11x17

Figure 21 Critical Habitat in San Diego County



Number	Species Habitat
1	Arroyo (=arroyo southwestern) toad
2	Coastal California gnatcatcher
3	Cushenbury oxytheca
4	Laguna Mountains skipper
5	Least Bell's vireo
6	Mexican flannelbush
7	Otay tarplant
8	Peninsular bighorn sheep
9	Quino checkerspot butterfly
10	Riverside fairy shrimp
11	San Bernardino bluegrass
12	San Diego ambrosia
13	San Diego fairy shrimp
14	San Diego thornmint
15	Southwestern willow flycatcher
16	Spreading navarretia
17	Thread-leaved brodiaea
18	Tidewater goby
19	Western snowy plover
20	Willowy monardella
21	Steelhead

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Additional data provided by USFWS, 2019 and NOAA, 2020.

Figure 22 Critical Habitat in Ventura County

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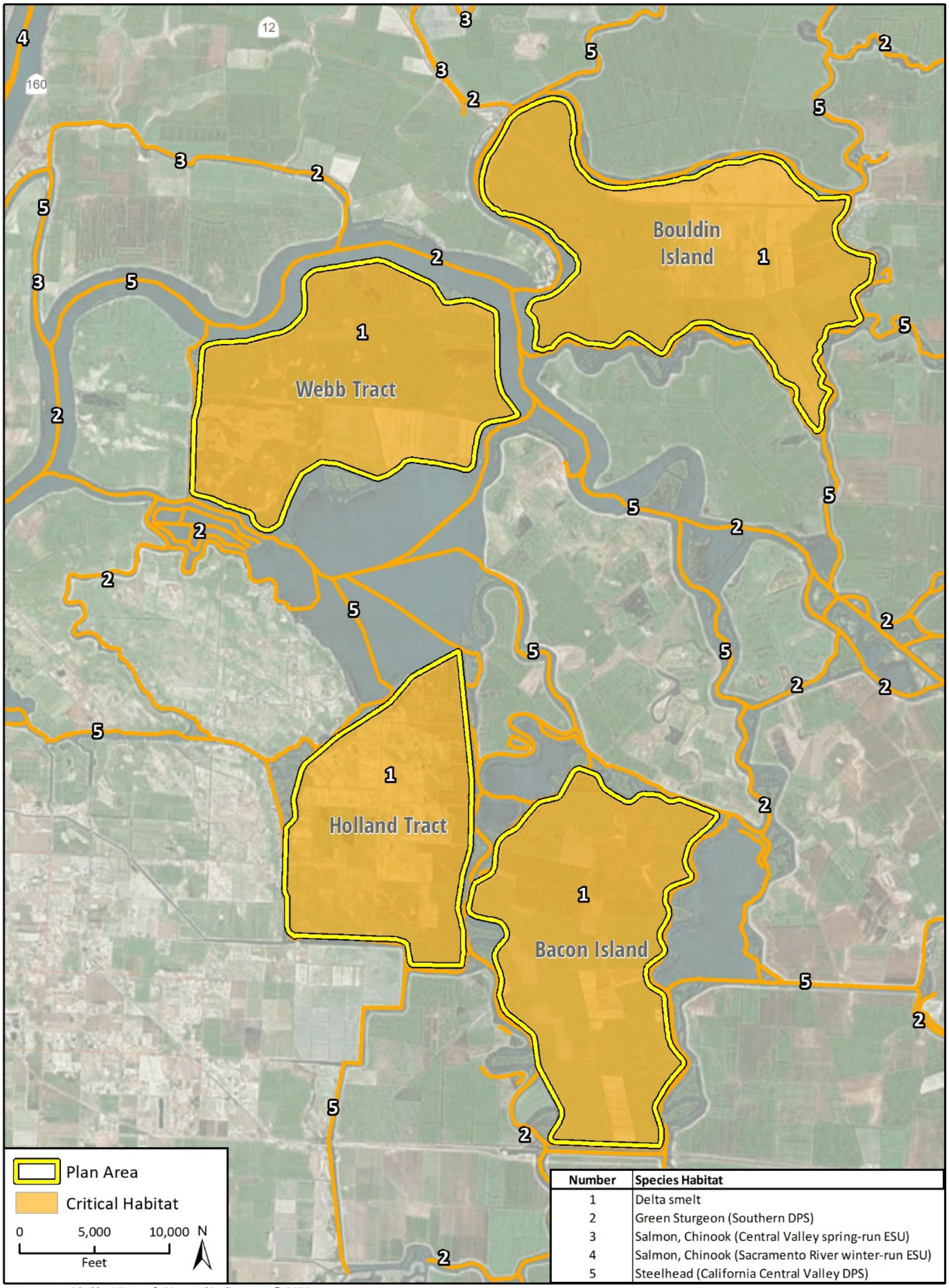
Additional data provided by USFWS, 2019 and NOAA, 2020.

Figure 23 Critical Habitat in the Sacramento-San Joaquin Delta Region



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Additional data provided by USFWS, NOAA, 2020.

Figure 24 Critical Habitat in the Palo Verde Valley

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Additional data provided by USFWS, 2019.

1.5 Wildlife Movement Corridors

Wildlife movement corridors, or habitat linkages, are generally defined as connections between habitat patches that allow for physical and genetic exchange between otherwise isolated animal populations. Such linkages may serve a local purpose, such as providing a linkage between foraging and denning areas, or they may be regional in nature. Some habitat linkages may serve as migration corridors, wherein animals periodically move away from an area and then subsequently return. Others may be important as dispersal corridors for young animals. A group of habitat linkages in an area can form a wildlife corridor network.

The habitats within the linkage do not necessarily need to be the same as the habitats that are being linked. Rather, the linkage merely needs to contain sufficient cover and forage to allow temporary inhabitation by ground-dwelling species. Typically, habitat linkages are contiguous strips of natural areas, though dense plantings of landscape vegetation can be used by certain disturbance-tolerant species. Depending upon the species using a corridor, specific physical resources (such as rock outcroppings, vernal pools, or oak trees) may need to be located within the habitat linkage at certain intervals to allow slower-moving species to traverse the linkage. For highly mobile or aerial species, habitat linkages may be discontinuous patches of suitable resources spaced sufficiently close together to permit travel along a route in a short period of time. Wildlife movement corridors can be both large and small scale.

The mountainous regions of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties support wildlife movement on a regional scale while riparian corridors and waterways, provide more local scale opportunities for wildlife movement throughout each county. No wildlife movement corridors were identified the Sacramento-San Joaquin Delta region or the Palo Verde Valley portion of the Plan Area. The CDFW Biogeographic Information and Observation System (BIOS) (CDFW 2020c) mapped multiple natural landscape blocks and essential connectivity areas within Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties (Figure 25 through Figure 32). Many of these areas are restricted to higher elevation landscapes such as Angeles National Forest, the Santa Monica Mountains, Cleveland National Forest, San Bernardino National Forest, the Chocolate Mountains, Cuyamaca Rancho State Park, and Los Padres National Forest. Large blocks of desert habitats also provide significant movement corridors and include Joshua Tree National Park, Mojave National Preserve, Death Valley National Park, and Anza-Borrego Desert State Park.

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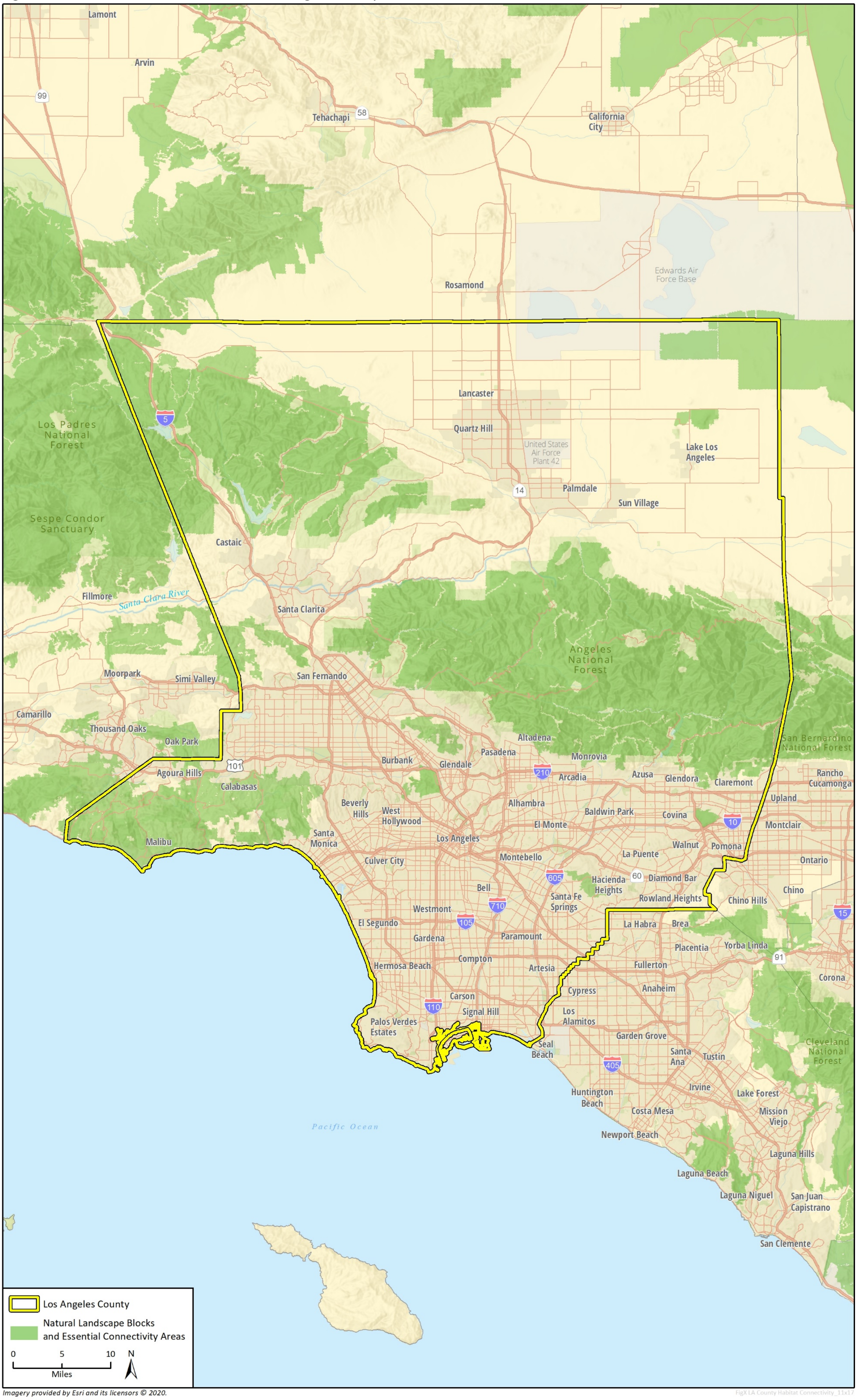
Figure 25 Wildlife Movement Corridors in Los Angeles County



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Additional data provided by CDFW, 2019.

Figure 26 Wildlife Movement Corridors in Orange County

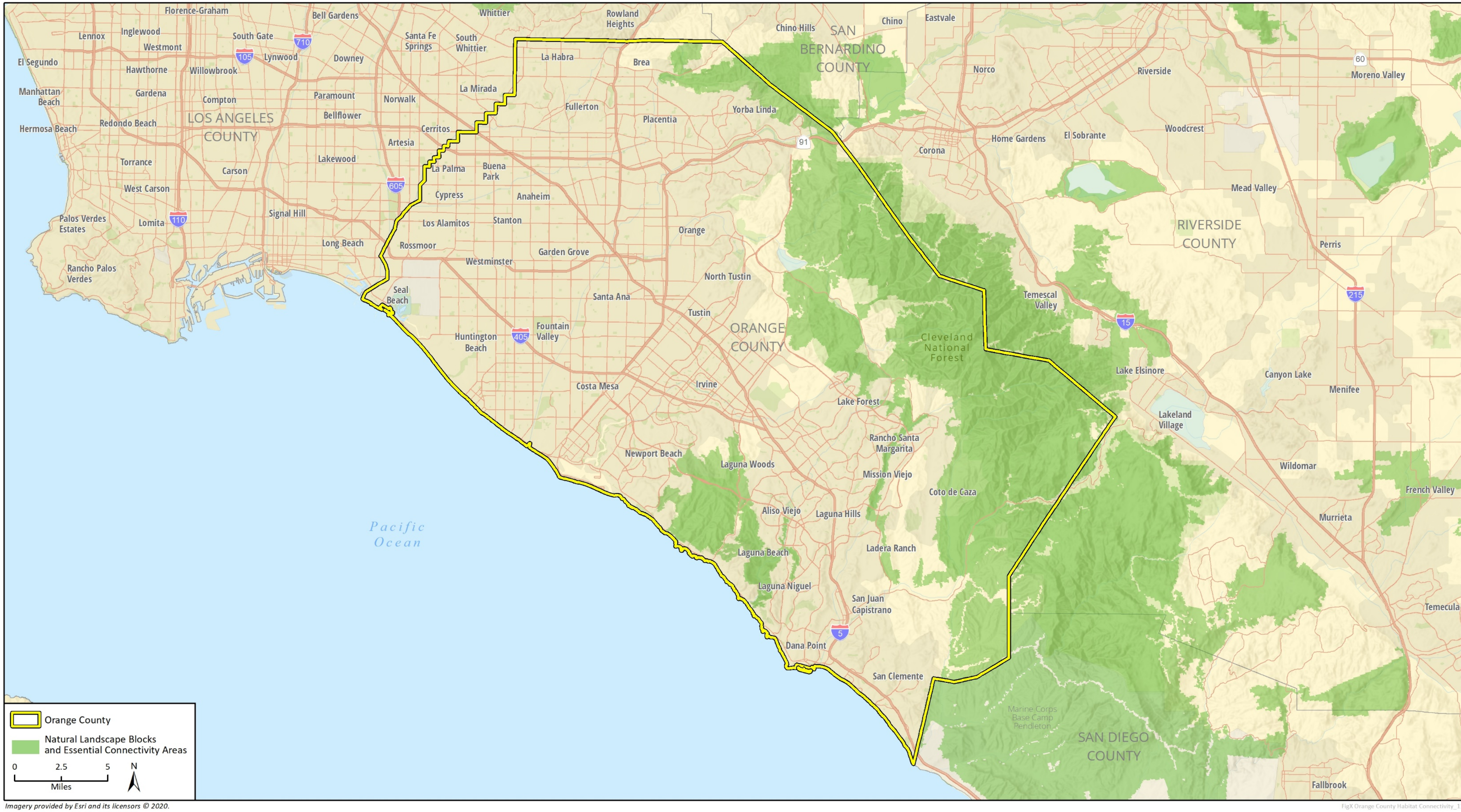
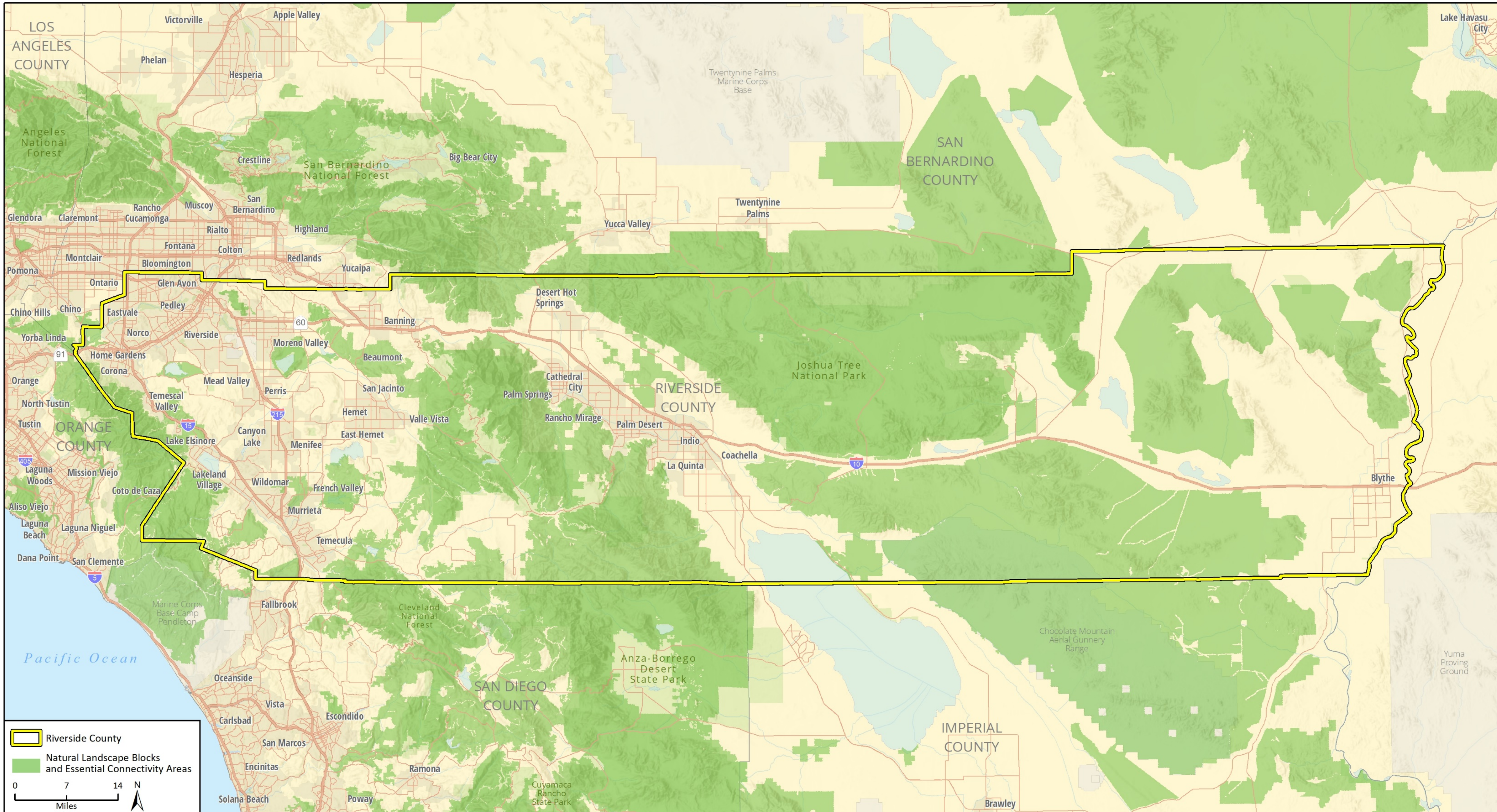


Figure 27 Wildlife Movement Corridors in Riverside County



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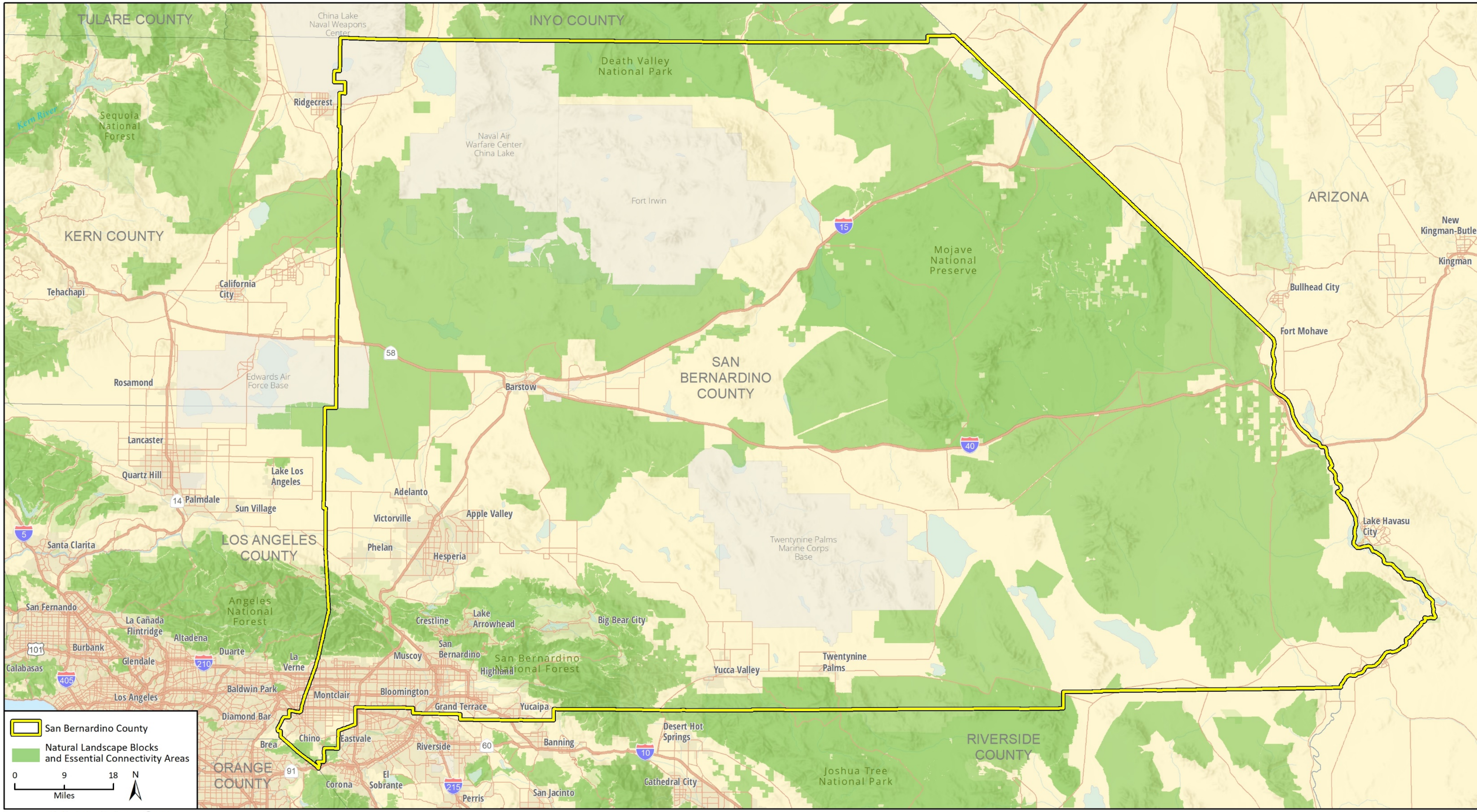
Additional data provided by CDFW, 2019.

FigX Riverside County Habitat Connectivity_11x17

Figure 28 Wildlife Movement Corridors in San Bernardino County



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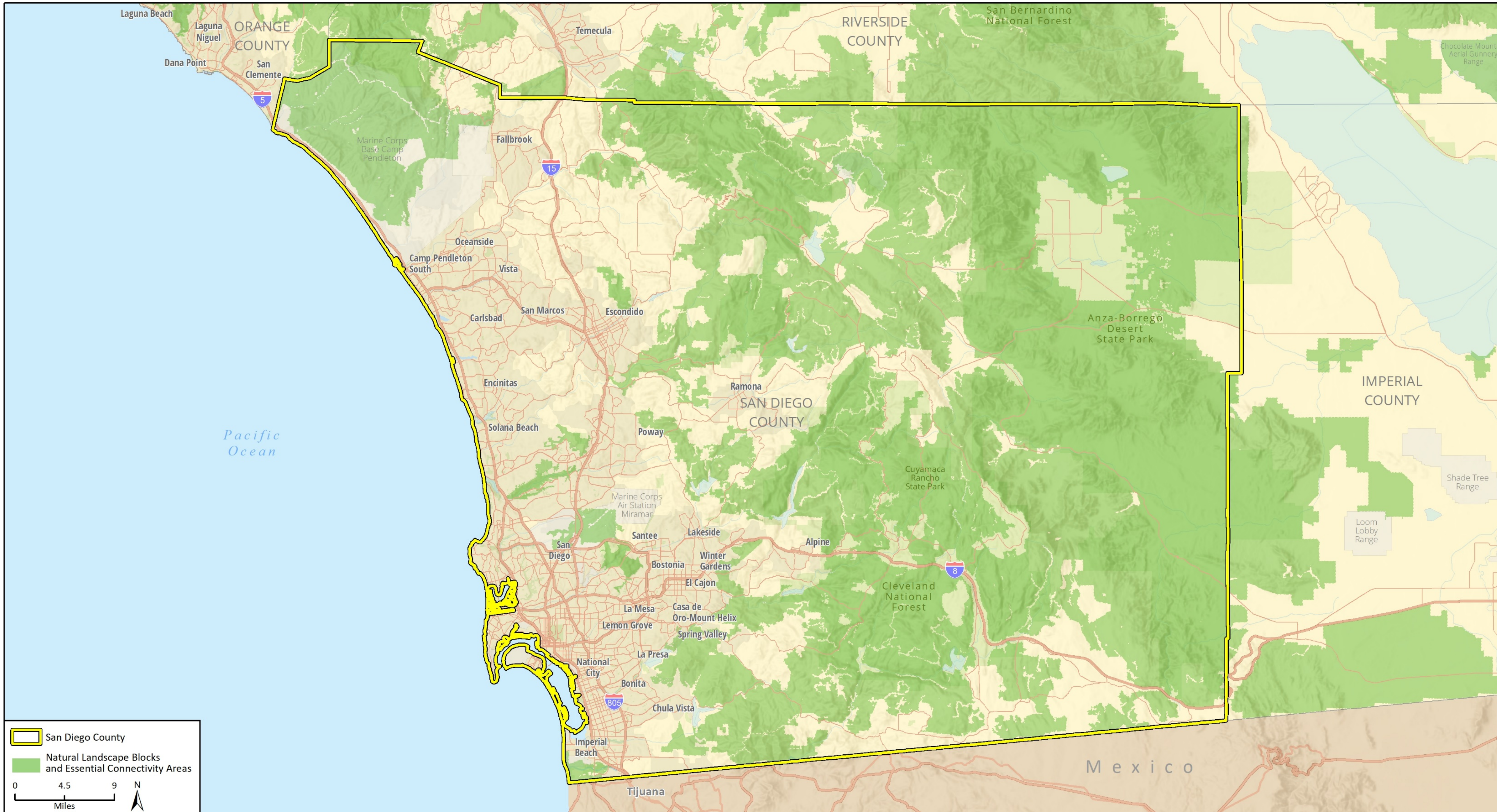
Additional data provided by CDFW, 2019.

FigX San Bernardino County Habitat Connectivity_11x17

Figure 29 Wildlife Movement Corridors in San Diego County



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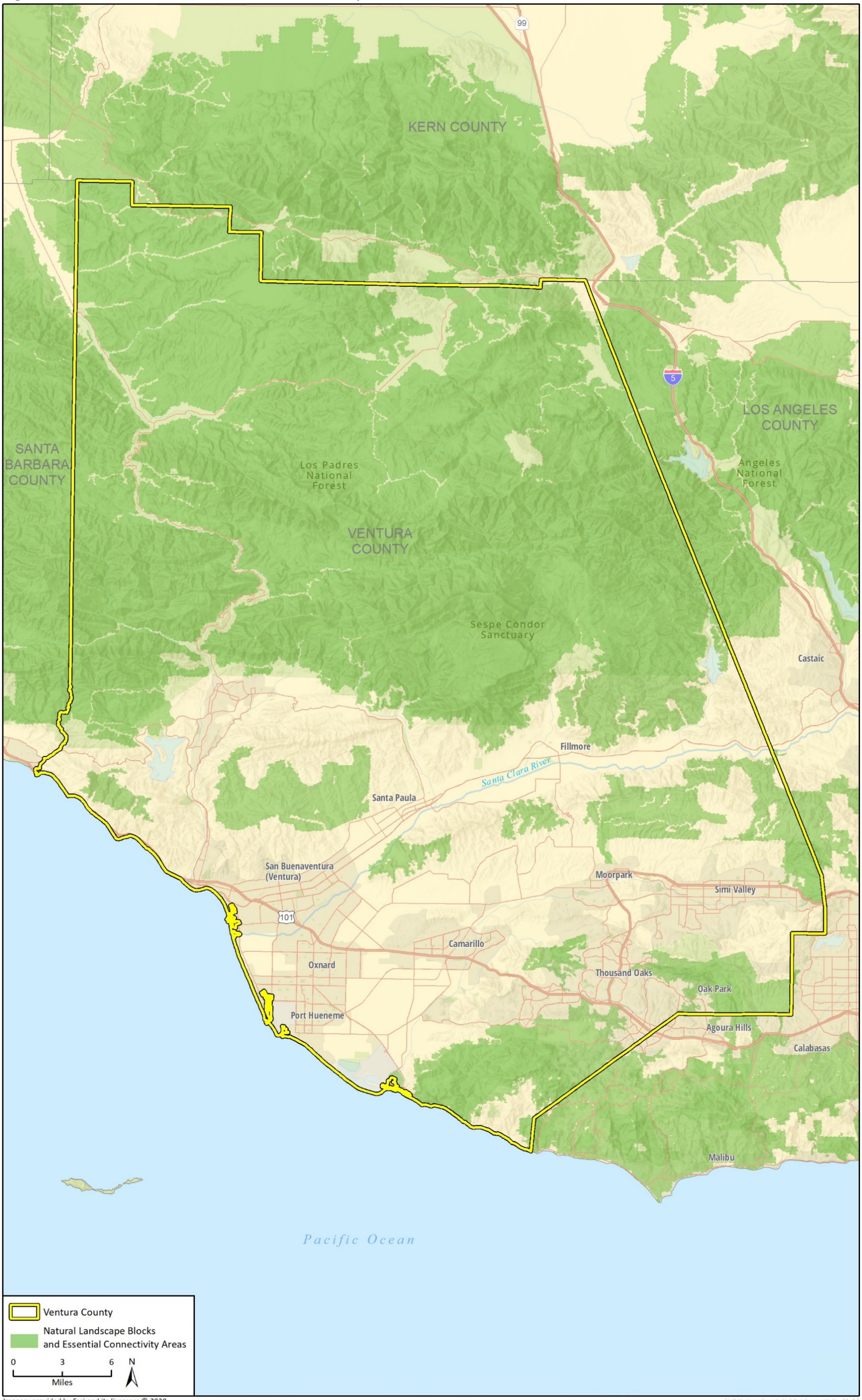
Additional data provided by CDFW, 2019.

FigX San Diego County Habitat Connectivity_11x17

Figure 30 Wildlife Movement Corridors in Ventura County



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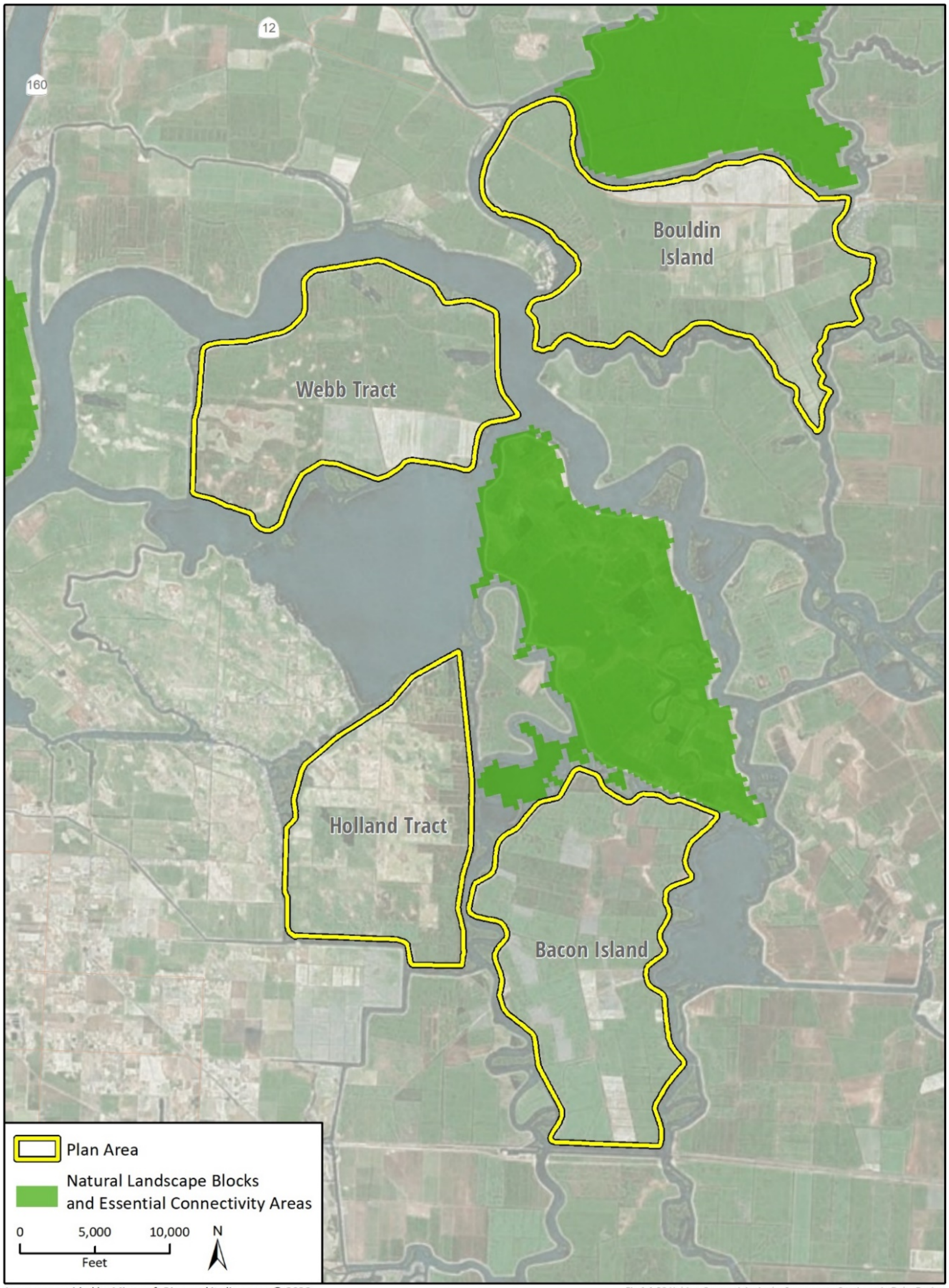
Additional data provided by CDFW, 2019.

Figure 31 Wildlife Movement Corridors in the Sacramento-San Joaquin Delta Region



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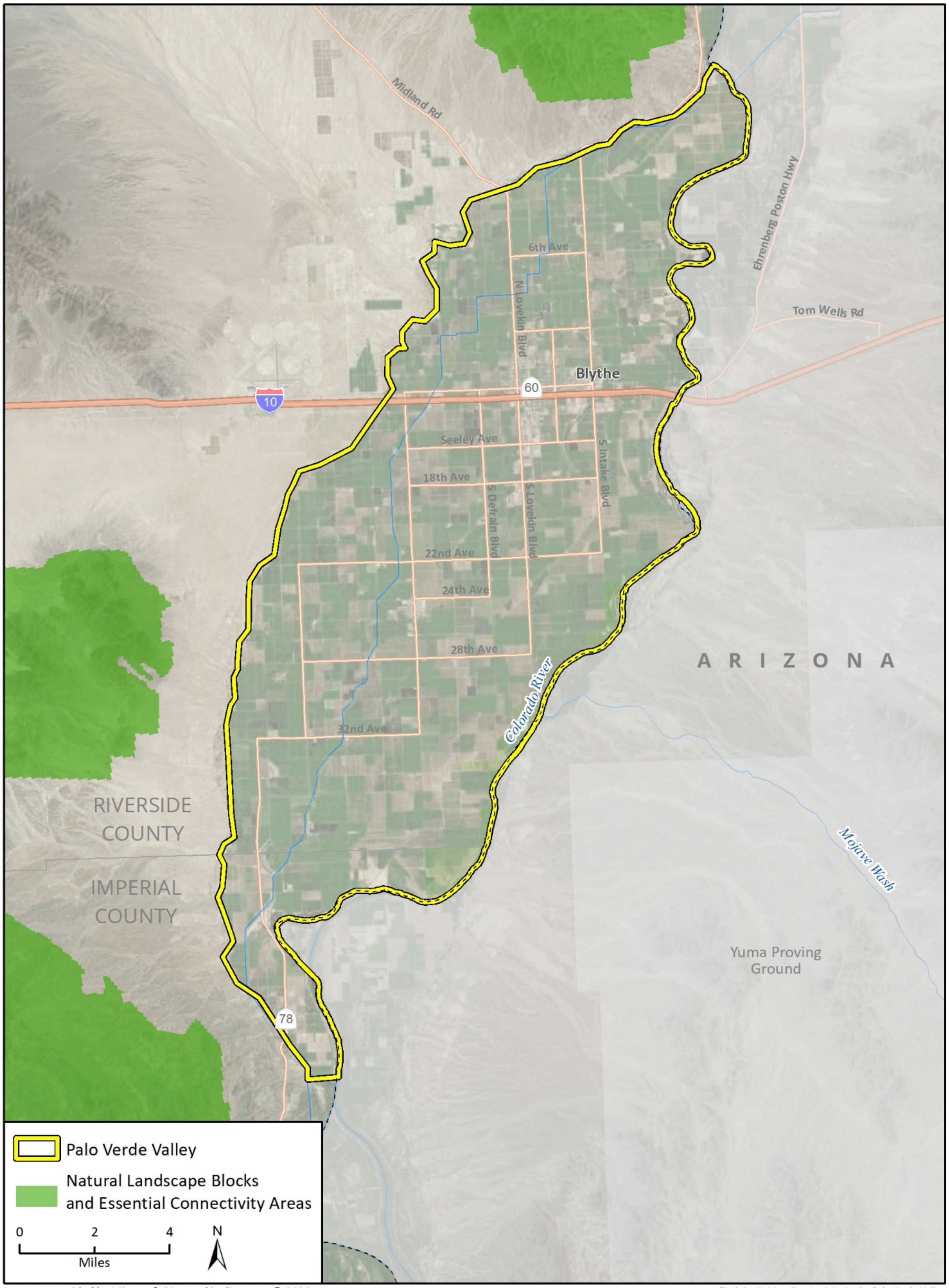
Additional data provided by CDFW, 2019.

Fig 4.4-29 Habitat Connectivity in the Sacramento-San Joaquin Delta Region

Figure 32 Wildlife Movement Corridors in the Palo Verde Valley



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Additional data provided by CDFW, 2019.

Fig 4.4-x Habitat Connectivity in the Palo Verde Valley

Table 4 Special Status Species List

Scientific Name Common Name	Status	Habitat Requirements
Plants and Lichens		
Abronia maritima red sand-verbena	None/None G4/S3? 4.2	Coastal dunes. 0 - 100 m. perennial herb. Blooms Feb-Nov
Abronia nana var. *covillei* Coville's dwarf abronia	None/None G4T3/S3 4.2	Great Basin scrub, Joshua tree woodland, Pinyon and juniper woodland, Subalpine coniferous forest, Upper montane coniferous forest. carbonate, sandy. 1524 - 3100 m. perennial herb. Blooms May-Aug
Abronia villosa var. *aurita* chaparral sand-verbena	None/None G5T2?/S2 1B.1	Chaparral, Coastal scrub, Desert dunes. sandy. 75 - 1600 m. annual herb. Blooms (Jan)Mar-Sep
Abutilon abutiloides shrubby Indian mallow	None/None G5/S1 2B.1	Sonoran desert scrub. Rocky, granitic. 855 - 900 m. perennial herb. Blooms Aug,Nov
Abutilon parvulum dwarf abutilon	None/None G5/S2S3 2B.3	Chenopod scrub (rocky). 900 - 1360 m. perennial herb. Blooms Apr-May
Acanthomintha ilicifolia San Diego thorn-mint	FT/SCE G1/S1 1B.1	Chaparral, Coastal scrub, Valley and foothill grassland, Vernal pools. Clay, openings. 10 - 960 m. annual herb. Blooms Apr-Jun
Acanthomintha obovata ssp. *cordata* heart-leaved thorn-mint	None/None G4T3/S3 4.2	Chaparral (openings), Cismontane woodland, Pinyon and juniper woodland, Valley and foothill grassland. clay. 785 - 1540 m. annual herb. Blooms Apr-Jul
Acanthoscyphus parishii var. *abramsii* Abrams' oxytheca	None/None G4?T1T2/S1S2 1B.2	Chaparral (sandy or shale). 1143 - 2057 m. annual herb. Blooms Jun-Aug
Acanthoscyphus parishii var. *cienegensis* Cienega Seca oxytheca	None/None G4?T2/S2 1B.3	Joshua tree woodland, Pinyon and juniper woodland, Upper montane coniferous forest (sandy, granitic). 2105 - 2450 m. annual herb. Blooms (May)Jun-Sep
Acanthoscyphus parishii var. *goodmaniana* Cushenbury oxytheca	FE/None G4?T1/S1 1B.1	Pinyon and juniper woodland (carbonate, talus). sandy, carbonate. 1219 - 2377 m. annual herb. Blooms May-Oct
Acanthoscyphus parishii var. *parishii* Parish's oxytheca	None/None G4?T3T4/S3S4 4.2	Chaparral, Lower montane coniferous forest. sandy or gravelly. 1220 - 2600 m. annual herb. Blooms Jun-Sep
Acleisanthes longiflora angel trumpets	None/None G5/S1 2B.3	Sonoran desert scrub (carbonate). 90 - 95 m. perennial herb. Blooms May
Acleisanthes nevadensis desert wing-fruit	None/None G4?/S1 2B.1	Joshua tree woodland, Mojavean desert scrub. rocky, gravelly. 795 - 1250 m. perennial herb. Blooms Apr-Sep
Acmispon argophyllus var. *adsurgens* San Clemente Island bird's-foot trefoil	None/SCE G5T2/S2 1B.1	Coastal bluff scrub, Coastal scrub. rocky. 15 - 395 m. perennial herb. Blooms Apr-Jun
Acmispon argyraeus var. *multicaulis* scrub lotus	None/None G4?T2/S2 1B.3	Pinyon and juniper woodland (granitic). 1200 - 1500 m. perennial herb. Blooms Apr-Jun
Acmispon argyraeus var. *notitius* Providence Mountains lotus	None/None G4?T2/S2 1B.3	Pinyon and juniper woodland. 1200 - 2000 m. perennial herb. Blooms May-Aug

Scientific Name Common Name	Status	Habitat Requirements
Acmispon dendroideus var. *traskiae* San Clemente Island lotus	FT/SCE G4T3/S3 1B.3	Coastal bluff scrub, Coastal scrub, Valley and foothill grassland. 15 - 365 m. perennial shrub. Blooms Feb-Aug
Acmispon haydonii pygmy lotus	None/None G3/S3 1B.3	Pinyon and juniper woodland, Sonoran desert scrub. rocky. 520 - 1200 m. perennial herb. Blooms Jan-Jun
Acmispon prostratus Nuttall's acmispon	None/None G1G2/S1 1B.1	Coastal dunes, Coastal scrub (sandy). 0 - 10 m. annual herb. Blooms Mar-Jun(Jul)
Adolphia californica California adolphia	None/None G3/S2 2B.1	Chaparral, Coastal scrub, Valley and foothill grassland. Clay. 10 - 740 m. perennial deciduous shrub. Blooms Dec-May
Agave shawii var. *shawii* Shaw's agave	None/None G2G3T2/S1 2B.1	Coastal bluff scrub, Coastal scrub. Maritime succulent scrub. 3 - 120 m. perennial leaf succulent. Blooms Sep-May
Agave utahensis var. *nevadensis* Clark Mountain agave	None/None G4T4?/S3 4.2	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. carbonate or volcanic. 900 - 1585 m. perennial leaf succulent. Blooms May-Jul
Ageratina herbacea desert ageratina	None/None G5/S3 2B.3	Pinyon and juniper woodland (rocky). 1525 - 2200 m. perennial herb. Blooms Jul-Oct
Aliciella ripleyi Ripley's aliciella	None/None G3/S2 2B.3	Mojavean desert scrub (carbonate). 305 - 1950 m. perennial herb. Blooms May-Jul
Aliciella triodon coyote gilia	None/None G5/S2 2B.2	Great Basin scrub, Pinyon and juniper woodland. sometimes sandy. 610 - 1700 m. annual herb. Blooms Apr-Jun
Allium atrorubens var. *atrorubens* Great Basin onion	None/None G4T4/S2 2B.3	Great Basin scrub, Pinyon and juniper woodland. rocky or sandy. 1200 - 2315 m. perennial bulbiferous herb. Blooms May-Jun
Allium atrorubens var. *cristatum* Inyo onion	None/None G4T4/S4 4.3	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. sandy or rocky. 1200 - 2560 m. perennial bulbiferous herb. Blooms Apr-Jun
Allium howellii var. *clokeyi* Mt. Pinos onion	None/None G4T2/S2 1B.3	Great Basin scrub, Meadows and seeps (edges), Pinyon and juniper woodland. 1300 - 1850 m. perennial bulbiferous herb. Blooms Apr-Jun
Allium marvinii Yucaipa onion	None/None G1/S1 1B.2	Chaparral (clay, openings). 760 - 1065 m. perennial bulbiferous herb. Blooms Apr-May
Allium munzii Munz's onion	FE/SCT G1/S1 1B.1	Chaparral, Cismontane woodland, Coastal scrub, Pinyon and juniper woodland, Valley and foothill grassland. mesic, clay. 297 - 1070 m. perennial bulbiferous herb. Blooms Mar-May
Allium nevadense Nevada onion	None/None G4/S3 2B.3	Pinyon and juniper woodland (sandy or gravelly). 810 - 1700 m. perennial bulbiferous herb. Blooms Apr-May
Allium parishii Parish's onion	None/None G3/S3 4.3	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. rocky. 900 - 1735 m. perennial bulbiferous herb. Blooms Apr-May
Almutaster pauciflorus alkali marsh aster	None/None G4/S1S2 2B.2	Meadows and seeps. alkaline. 240 - 800 m. perennial herb. Blooms Jun-Oct

Scientific Name Common Name	Status	Habitat Requirements
Aloysia wrightii Wright's beebrush	None/None G5/S4 4.3	Joshua tree woodland, Pinyon and juniper woodland. rocky, often carbonate. 900 - 1600 m. perennial evergreen shrub. Blooms Apr-Oct
Amaranthus watsonii Watson's amaranth	None/None G5?/S3 4.3	Mojavean desert scrub, Sonoran desert scrub. 20 - 1700 m. annual herb. Blooms Apr-Sep
Ambrosia chenopodiifolia San Diego bur-sage	None/None G2G3/S1 2B.1	Coastal scrub. 55 - 155 m. perennial shrub. Blooms Apr-Jun
Ambrosia monogyra singlewhorl burrobrush	None/None G5/S2 2B.2	Chaparral, Sonoran desert scrub. sandy. 10 - 500 m. perennial shrub. Blooms Aug-Nov
Ambrosia pumila San Diego ambrosia	FE/None G1/S1 1B.1	Chaparral, Coastal scrub, Valley and foothill grassland, Vernal pools. sandy loam or clay, often in disturbed areas, sometimes alkaline. 20 - 415 m. perennial rhizomatous herb. Blooms Apr-Oct
Androsace elongata ssp. *acuta* California androsace	None/None G5?T3T4/S3S4 4.2	Chaparral, Cismontane woodland, Coastal scrub, Meadows and seeps, Pinyon and juniper woodland, Valley and foothill grassland. 150 - 1305 m. annual herb. Blooms Mar-Jun
Androstephium breviflorum small-flowered androstephium	None/None G4/S2? 2B.2	Desert dunes, Mojavean desert scrub (bajadas). 210 - 890 m. perennial bulbiferous herb. Blooms Mar-Apr
Anomobryum julaceum slender silver moss	None/None G5?/S2 4.2	Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest. damp rock and soil on outcrops, usually on roadcuts. 100 - 1000 m. moss. Blooms
Antennaria marginata white-margined everlasting	None/None G4G5/S1 2B.3	Lower montane coniferous forest, Upper montane coniferous forest. 2120 - 3353 m. perennial stoloniferous herb. Blooms May-Aug
Aphanisma blitoides aphanisma	None/None G3G4/S2 1B.2	Coastal bluff scrub, Coastal dunes, Coastal scrub. sandy or gravelly. 1 - 305 m. annual herb. Blooms Feb-Jun
Arctomecon merriamii white bear poppy	None/None G3/S3 2B.2	Chenopod scrub, Mojavean desert scrub. rocky. 490 - 1800 m. perennial herb. Blooms (Mar) Apr-May
Arctostaphylos catalinae Santa Catalina Island manzanita	None/None G2?/S2? 1B.2	Chaparral (volcanic). 75 - 600 m. perennial evergreen shrub. Blooms (Feb)Mar-Apr (May)
Arctostaphylos crustacea ssp. *subcordata* Santa Cruz Island manzanita	None/None G4T3/S3 4.2	Closed-cone coniferous forest, Chaparral. rocky. 100 - 730 m. perennial evergreen shrub. Blooms Jan, Mar-Apr
Arctostaphylos glandulosa ssp. *crassifolia* Del Mar manzanita	FE/None G5T2/S2 1B.1	Chaparral (maritime, sandy). 0 - 365 m. perennial evergreen shrub. Blooms Dec-Jun
Arctostaphylos glandulosa ssp. *gabrielensis* San Gabriel manzanita	None/None G5T3/S3 1B.2	Chaparral (rocky). 595 - 1500 m. perennial evergreen shrub. Blooms Mar
Arctostaphylos otayensis Otay manzanita	None/None G1/S1 1B.2	Chaparral, Cismontane woodland. metavolcanic. 275 - 1700 m. perennial evergreen shrub. Blooms Jan-Apr
Arctostaphylos parryana ssp. *tumescens* interior manzanita	None/None G4T3T4/S3S4 4.3	Chaparral (montane), Cismontane woodland. 2100 - 2310 m. perennial evergreen shrub. Blooms Feb-Apr

Scientific Name Common Name	Status	Habitat Requirements
Arctostaphylos rainbowensis Rainbow manzanita	None/None G2/S2 1B.1	Chaparral. 205 - 670 m. perennial evergreen shrub. Blooms Dec-Mar
Arctostaphylos refugioensis Refugio manzanita	None/None G3/S3 1B.2	Chaparral (sandstone). 274 - 820 m. perennial evergreen shrub. Blooms Dec-Mar (May)
Arenaria lanuginosa var. *saxosa* rock sandwort	None/None G5T5/S2 2B.3	Subalpine coniferous forest, Upper montane coniferous forest. mesic, sandy. 1455 - 2600 m. perennial herb. Blooms Jul-Aug
Arenaria paludicola marsh sandwort	FE/SCE G1/S1 1B.1	Marshes and swamps (freshwateror brackish). sandy, openings. 3 - 170 m. perennial stoloniferous herb. Blooms May-Aug
Argyrochosma limitanea ssp. *limitanea* southwestern false cloak-fern	None/None G4G5T3T4/S1 2B.1	Pinyon and juniper woodland (carbonate, rocky). 1800 - 1800 m. perennial rhizomatous herb. Blooms Apr-Oct
Artemisia palmeri San Diego sagewort	None/None G3?/S3? 4.2	Chaparral, Coastal scrub, Riparian forest, Riparian scrub, Riparian woodland. sandy, mesic. 15 - 915 m. perennial deciduous shrub. Blooms (Feb)May-Sep
Asclepias asperula ssp. *asperula* antelope-horns	None/None G5T5/S3 4.3	Mojavean desert scrub, Pinyon and juniper woodland. rocky. 915 - 2195 m. perennial herb. Blooms May-Sep
Asclepias nyctaginifolia Mojave milkweed	None/None G4?/S2 2B.1	Mojavean desert scrub, Pinyon and juniper woodland. 875 - 1700 m. perennial herb. Blooms May-Jun
Asplenium vespertinum western spleenwort	None/None G4/S4 4.2	Chaparral, Cismontane woodland, Coastal scrub. rocky. 180 - 1000 m. perennial rhizomatous herb. Blooms Feb-Jun
Astragalus albens Cushenbury milk-vetch	FE/None G1/S1 1B.1	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. usually carbonate, rarely granitic. 1095 - 2000 m. perennial herb. Blooms Mar-Jun
Astragalus allochrous var. *playanus* playa milk-vetch	None/None G4T4/S2 2B.2	Mojavean desert scrub (sandy). 800 - 800 m. perennial herb. Blooms Apr
Astragalus bernardinus San Bernardino milk-vetch	None/None G3/S3 1B.2	Joshua tree woodland, Pinyon and juniper woodland. Often granitic or carbonate. 900 - 2000 m. perennial herb. Blooms Apr-Jun
Astragalus bicristatus crested milk-vetch	None/None G3/S3 4.3	Lower montane coniferous forest, Upper montane coniferous forest. sandy or rocky, mostly carbonate. 1700 - 2745 m. perennial herb. Blooms May-Aug
Astragalus brauntonii Braunton's milk-vetch	FE/None G2/S2 1B.1	Chaparral, Coastal scrub, Valley and foothill grassland. recent burns or disturbed areas, usually sandstone with carbonate layers. 4 - 640 m. perennial herb. Blooms Jan-Aug
Astragalus cimae var. *cimae* Cima milk-vetch	None/None G3T2T3/S2? 1B.2	Great Basin scrub, Joshua tree woodland, Pinyon and juniper woodland. clay. 890 - 1850 m. perennial herb. Blooms Apr-May
Astragalus crotalariae Salton milk-vetch	None/None G4G5/S4 4.3	Sonoran desert scrub (sandy or gravelly). -60 - 250 m. perennial herb. Blooms Jan-Apr
Astragalus deanei Dean's milk-vetch	None/None G1/S1 1B.1	Chaparral, Cismontane woodland, Coastal scrub, Riparian forest. 75 - 695 m. perennial herb. Blooms Feb-May

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Astragalus didymocarpus var. *milesianus* Miles' milk-vetch	None/None G5T2/S2 1B.2	Coastal scrub (clay). 20 - 90 m. annual herb. Blooms Mar-Jun
Astragalus douglasii var. *perstrictus* Jacumba milk-vetch	None/None G5T3?/S2S3 1B.2	Chaparral, Cismontane woodland, Pinyon and juniper woodland, Riparian scrub, Valley and foothill grassland. rocky. 900 - 1370 m. perennial herb. Blooms Apr-Jun
Astragalus hornii var. *hornii* Horn's milk-vetch	None/None G4G5T1T2/S1 1B.1	Meadows and seeps, Playas. lake margins, alkaline. 60 - 850 m. annual herb. Blooms May-Oct
Astragalus insularis var. *harwoodii* Harwood's milk-vetch	None/None G5T4/S2 2B.2	Desert dunes, Mojavean desert scrub. sandy or gravelly. 0 - 710 m. annual herb. Blooms Jan-May
Astragalus jaegerianus Lane Mountain milk-vetch	FE/None G2/S2 1B.1	Joshua tree woodland, Mojavean desert scrub. granitic, sandy or gravelly. 900 - 1200 m. perennial herb. Blooms Apr-Jun
Astragalus lentiginosus var. *antonius* San Antonio milk-vetch	None/None G5T2/S2 1B.3	Lower montane coniferous forest, Upper montane coniferous forest. 1500 - 2600 m. perennial herb. Blooms Apr-Jul
Astragalus lentiginosus var. *borreganus* Borrego milk-vetch	None/None G5T5?/S4 4.3	Mojavean desert scrub, Sonoran desert scrub. sandy. 30 - 895 m. annual herb. Blooms Feb-May
Astragalus lentiginosus var. *coachellae* Coachella Valley milk-vetch	FE/None G5T1/S1 1B.2	Desert dunes, Sonoran desert scrub (sandy). 40 - 655 m. annual/perennial herb. Blooms Feb-May
Astragalus lentiginosus var. *sierrae* Big Bear Valley milk-vetch	None/None G5T2/S2 1B.2	Mojavean desert scrub, Meadows and seeps, Pinyon and juniper woodland, Upper montane coniferous forest. gravelly or rocky. 1800 - 2600 m. perennial herb. Blooms Apr-Aug
Astragalus leucolobus Big Bear Valley woollypod	None/None G2/S2 1B.2	Lower montane coniferous forest, Pebble (Pavement) plain, Pinyon and juniper woodland, Upper montane coniferous forest. rocky. 1100 - 2885 m. perennial herb. Blooms May-Jul
Astragalus magdalenae var. *peirsonii* Peirson's milk-vetch	FT/SCE G3G4T1/S1 1B.2	Desert dunes. 60 - 225 m. perennial herb. Blooms Dec-Apr
Astragalus nevinii San Clemente Island milk-vetch	None/None G3/S3 1B.2	Coastal dunes, Coastal scrub, Valley and foothill grassland. 5 - 225 m. perennial herb. Blooms Feb-Jul
Astragalus nutans Providence Mountains milk-vetch	None/None G3/S3 4.3	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland, Sonoran desert scrub. sandy or gravelly. 450 - 1950 m. annual herb. Blooms Mar-Jun (Oct)
Astragalus oocarpus San Diego milk-vetch	None/None G2?/S2? 1B.2	Chaparral (openings), Cismontane woodland. 305 - 1524 m. perennial herb. Blooms May-Aug
Astragalus pachypus var. *jaegeri* Jaeger's bush milk-vetch	None/None G4T1/S1 1B.1	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland. sandy or rocky. 365 - 975 m. perennial shrub. Blooms Dec-Jun
Astragalus preussii var. *laxiflorus* Lancaster milk-vetch	None/None G4T2/S1 1B.1	Chenopod scrub. 700 - 700 m. perennial herb. Blooms Mar-May
Astragalus preussii var. *preussii* Preuss' milk-vetch	None/None G4T4/S1 2B.1	Chenopod scrub, Mojavean desert scrub. clay. 750 - 805 m. perennial herb. Blooms Apr-Jun

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Astragalus pycnostachyus var. *lanosissimus* Ventura marsh milk-vetch	FE/SCE G2T1/S1 1B.1	Coastal dunes, Coastal scrub, Marshes and swamps (edges, coastal salt or brackish). 1 - 35 m. perennial herb. Blooms (Jun)Aug-Oct
Astragalus sabulonum gravel milk-vetch	None/None G4G5/S2 2B.2	Desert dunes, Mojavean desert scrub, Sonoran desert scrub. Usually sandy, sometimes gravelly. Flats, washes, and roadsides. -60 - 930 m. annual/perennial herb. Blooms Feb-Jun
Astragalus tener var. *tener* alkali milk-vetch	None/None G2T1/S1 1B.2	Playas, Valley and foothill grassland (adobe clay), Vernal pools. alkaline. 1 - 60 m. annual herb. Blooms Mar-Jun
Astragalus tener var. *titi* coastal dunes milk-vetch	FE/SCE G2T1/S1 1B.1	Coastal bluff scrub (sandy), Coastal dunes, Coastal prairie (mesic). often vernally mesic areas. 1 - 50 m. annual herb. Blooms Mar-May
Astragalus tidestromii Tidestrom's milk-vetch	None/None G4/S2 2B.2	Mojavean desert scrub. carbonate, sandy or gravelly. 600 - 1785 m. perennial herb. Blooms (Jan)Apr-Jul
Astragalus traskiae Trask's milk-vetch	None/SCR G3/S3 1B.2	Coastal bluff scrub, Coastal dunes, Coastal scrub. 5 - 245 m. perennial herb. Blooms Feb-Jul
Astragalus tricarinatus triple-ribbed milk-vetch	FE/None G2/S2 1B.2	Joshua tree woodland, Sonoran desert scrub. sandy or gravelly. 450 - 1190 m. perennial herb. Blooms Feb-May
Astrolepis cochisensis ssp. *cochisensis* scaly cloak fern	None/None G5?T4/S2 2B.3	Joshua tree woodland, Pinyon and juniper woodland. carbonate. 900 - 1800 m. perennial rhizomatous herb. Blooms Apr-Oct
Atriplex coronata var. *coronata* crownscale	None/None G4T3/S3 4.2	Chenopod scrub, Valley and foothill grassland, Vernal pools. alkaline, often clay. 1 - 590 m. annual herb. Blooms Mar-Oct
Atriplex coronata var. *notatior* San Jacinto Valley crownscale	FE/None G4T1/S1 1B.1	Playas, Valley and foothill grassland (mesic), Vernal pools. alkaline. 139 - 500 m. annual herb. Blooms Apr-Aug
Atriplex coulteri Coulter's saltbush	None/None G3/S1S2 1B.2	Coastal bluff scrub, Coastal dunes, Coastal scrub, Valley and foothill grassland. alkaline or clay. 3 - 460 m. perennial herb. Blooms Mar-Oct
Atriplex pacifica South Coast saltscale	None/None G4/S2 1B.2	Coastal bluff scrub, Coastal dunes, Coastal scrub, Playas. 0 - 140 m. annual herb. Blooms Mar-Oct
Atriplex parishii Parish's brittlescale	None/None G1G2/S1 1B.1	Chenopod scrub, Playas, Vernal pools. alkaline. 25 - 1900 m. annual herb. Blooms Jun-Oct
Atriplex serenana var. *davidsonii* Davidson's saltscale	None/None G5T1/S1 1B.2	Coastal bluff scrub, Coastal scrub. alkaline. 10 - 200 m. annual herb. Blooms Apr-Oct
Ayenia compacta California ayenia	None/None G4/S3 2B.3	Mojavean desert scrub, Sonoran desert scrub. rocky. 150 - 1095 m. perennial herb. Blooms Mar-Apr
Azolla microphylla Mexican mosquito fern	None/None G5/S4 4.2	Marshes and swamps (ponds, slow water). 30 - 100 m. annual/perennial herb. Blooms Aug
Baccharis malibuensis Malibu baccharis	None/None G1/S1 1B.1	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland. 150 - 305 m. perennial deciduous shrub. Blooms Aug

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Baccharis plummerae ssp. *plummerae* Plummer's baccharis	None/None G3T3/S3 4.3	Broadleafed upland forest, Chaparral, Cismontane woodland, Coastal scrub. rocky. 5 - 425 m. perennial deciduous shrub. Blooms May, Aug-Sep-Oct
Baccharis vanessae Encinitas baccharis	FT/SCE G1/S1 1B.1	Chaparral (maritime), Cismontane woodland. sandstone. 60 - 720 m. perennial deciduous shrub. Blooms Aug, Oct-Nov
Bahia neomexicana many-flowered bahia	None/None G5/S2S3 2B.3	Pinyon and juniper woodland (sandy). 1500 - 1700 m. annual herb. Blooms Sep-Oct
Berberis fremontii Fremont barberry	None/None G5/S3 2B.3	Joshua tree woodland, Pinyon and juniper woodland. Rocky, sometimes granitic. 1145 - 1720 m. perennial evergreen shrub. Blooms Mar-May
Berberis harrisoniana Kofa Mountain barberry	None/None G2/S1 1B.2	Chaparral, Mojavean desert scrub. usually north-facing talus slopes, sometimes volcanic (breccia). 780 - 840 m. perennial evergreen shrub. Blooms Jan-Mar
Berberis higginsiae Higgins? barberry	None/None G3Q/S1 3.2	Chaparral, Sonoran desert scrub. Rocky, sometimes granitic. 800 - 1065 m. perennial shrub. Blooms Mar-Apr
Berberis nevinii Nevin's barberry	FE/SCE G1/S1 1B.1	Chaparral, Cismontane woodland, Coastal scrub, Riparian scrub. sandy or gravelly. 70 - 825 m. perennial evergreen shrub. Blooms (Feb) Mar-Jun
Berberis pinnata ssp. *insularis* island barberry	FE/SCE G5T1/S1 1B.2	Closed-cone coniferous forest, Chaparral, Cismontane woodland, Coastal scrub. rocky. 75 - 400 m. perennial evergreen shrub. Blooms Feb-May
Bergerocactus emoryi golden-spined cereus	None/None G2G3/S2 2B.2	Closed-cone coniferous forest, Chaparral, Coastal scrub. sandy. 3 - 395 m. perennial stem succulent. Blooms May-Jun
Blepharidachne kingii King's eyelash grass	None/None G4/S2 2B.3	Great Basin scrub (usually carbonate). 1065 - 2135 m. perennial herb. Blooms May
Bloomeria clevelandii San Diego goldenstar	None/None G2/S2 1B.1	Chaparral, Coastal scrub, Valley and foothill grassland, Vernal pools. clay. 50 - 465 m. perennial bulbiferous herb. Blooms Apr-May
Boechera dispar pinyon rockcress	None/None G3/S3 2B.3	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. granitic, gravelly. 1200 - 2540 m. perennial herb. Blooms Mar-Jun
Boechera hirshbergiae Hirshberg's rockcress	None/None G1Q/S1 1B.2	Pebble (Pavement) plain. 1400 - 1415 m. perennial herb. Blooms Mar-May
Boechera hoffmannii Hoffmann's rockcress	FE/None G1G2/S1S2 1B.1	Coastal bluff scrub, Chaparral, Coastal scrub. sandy, rocky, volcanic. 60 - 395 m. perennial herb. Blooms Feb-Apr
Boechera johnstonii Johnston's rockcress	None/None G1/S1 1B.2	Chaparral, Lower montane coniferous forest. often on eroded clay. 1350 - 2150 m. perennial herb. Blooms Feb-Jun
Boechera lincolnensis Lincoln rockcress	None/None G4G5/S3 2B.3	Chenopod scrub, Mojavean desert scrub. carbonate. 1100 - 2705 m. perennial herb. Blooms Mar-May
Boechera parishii Parish's rockcress	None/None G2/S2 1B.2	Pebble (Pavement) plain, Pinyon and juniper woodland, Upper montane coniferous forest. rocky, quartzite on clay, or sometimes carbonate. 1770 - 2990 m. perennial herb. Blooms Apr-May

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Boechera peirsonii San Bernardino rockcress	None/None G1/S1 1B.2	Subalpine coniferous forest (rocky). 2700 - 3200 m. perennial herb. Blooms Mar-Aug
Boechera shockleyi Shockley's rockcress	None/None G3/S2 2B.2	Pinyon and juniper woodland (carbonate or quartzite, rocky or gravelly). 875 - 2310 m. perennial herb. Blooms May-Jun
Botrychium ascendens upswept moonwort	None/None G3G4/S2 2B.3	Lower montane coniferous forest, Meadows and seeps. mesic. 1115 - 3045 m. perennial rhizomatous herb. Blooms (Jun) Jul-Aug
Botrychium crenulatum scalloped moonwort	None/None G4/S3 2B.2	Bogs and fens, Lower montane coniferous forest, Meadows and seeps, Marshes and swamps (freshwater), Upper montane coniferous forest. 1268 - 3280 m. perennial rhizomatous herb. Blooms Jun-Sep
Botrychium minganense Mingan moonwort	None/None G4G5/S3 2B.2	Bogs and fens, Lower montane coniferous forest, Meadows and seeps (edges), Upper montane coniferous forest. Mesic. 1455 - 2180 m. perennial rhizomatous herb. Blooms Jul-Sep
Bouteloua eriopoda black grama	None/None G5/S4 4.2	Joshua tree woodland, Pinyon and juniper woodland. 900 - 1900 m. perennial stoloniferous herb. Blooms May-Aug
Bouteloua trifida three-awned grama	None/None G4G5/S3 2B.3	Mojavean desert scrub (carbonate, rocky). 700 - 2000 m. perennial herb. Blooms (Apr) May-Sep
Brasenia schreberi watershield	None/None G5/S3 2B.3	Marshes and swamps (freshwater). 30 - 2200 m. perennial rhizomatous herb (aquatic). Blooms Jun-Sep
Brodiaea filifolia thread-leaved brodiaea	FT/SCE G2/S2 1B.1	Chaparral (openings), Cismontane woodland, Coastal scrub, Playas, Valley and foothill grassland, Vernal pools. often clay. 25 - 1120 m. perennial bulbiferous herb. Blooms Mar-Jun
Brodiaea kinkiensis San Clemente Island brodiaea	None/None G2/S2 1B.2	Valley and foothill grassland (clay). 305 - 600 m. perennial bulbiferous herb. Blooms May-Jun
Brodiaea orcuttii Orcutt's brodiaea	None/None G2/S2 1B.1	Closed-cone coniferous forest, Chaparral, Cismontane woodland, Meadows and seeps, Valley and foothill grassland, Vernal pools. mesic, clay. 30 - 1692 m. perennial bulbiferous herb. Blooms May-Jul
Brodiaea santarosae Santa Rosa Basalt brodiaea	None/None G1/S1 1B.2	Valley and foothill grassland. basaltic. 565 - 1045 m. perennial bulbiferous herb. Blooms May-Jun
Bursera microphylla little-leaf elephant tree	None/None G4/S2 2B.3	Sonoran desert scrub (rocky). 200 - 700 m. perennial deciduous tree. Blooms Jun-Jul
Calandrinia breweri Brewer's calandrinia	None/None G4/S4 4.2	Chaparral, Coastal scrub. sandy or loamy, disturbed sites and burns. 10 - 1220 m. annual herb. Blooms (Jan)Mar-Jun
Calliandra eriophylla pink fairy-duster	None/None G5/S3 2B.3	Sonoran desert scrub (sandy or rocky). 120 - 1500 m. perennial deciduous shrub. Blooms Jan-Mar
Calochortus catalinae Catalina mariposa lily	None/None G3G4/S3S4 4.2	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland. 15 - 700 m. perennial bulbiferous herb. Blooms (Feb) Mar-Jun

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Calochortus clavatus var. *clavatus* club-haired mariposa lily	None/None G4T3/S3 4.3	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland. usually serpentinite, clay, rocky. 75 - 1300 m. perennial bulbiferous herb. Blooms (Mar)May-Jun
Calochortus clavatus var. *gracilis* slender mariposa lily	None/None G4T2T3/S2S3 1B.2	Chaparral, Coastal scrub, Valley and foothill grassland. 320 - 1000 m. perennial bulbiferous herb. Blooms Mar-Jun (Nov)
Calochortus dunnii Dunn's mariposa lily	None/SCR G2G3/S2S3 1B.2	Closed-cone coniferous forest, Chaparral, Valley and foothill grassland. gabbroic or metavolcanic, rocky. 185 - 1830 m. perennial bulbiferous herb. Blooms (Feb) Apr-Jun
Calochortus fimbriatus late-flowered mariposa lily	None/None G3/S3 1B.3	Chaparral, Cismontane woodland, Riparian woodland. often serpentinite. 275 - 1905 m. perennial bulbiferous herb. Blooms Jun-Aug
Calochortus palmeri var. *munzii* San Jacinto mariposa lily	None/None G3T3/S3 1B.2	Chaparral, Lower montane coniferous forest, Meadows and seeps. 855 - 2200 m. perennial bulbiferous herb. Blooms Apr-Jul
Calochortus palmeri var. *palmeri* Palmer's mariposa lily	None/None G3T2/S2 1B.2	Chaparral, Lower montane coniferous forest, Meadows and seeps. mesic. 710 - 2390 m. perennial bulbiferous herb. Blooms Apr-Jul
Calochortus plummerae Plummer's mariposa lily	None/None G4/S4 4.2	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland. granitic, rocky. 100 - 1700 m. perennial bulbiferous herb. Blooms May-Jul
Calochortus striatus alkali mariposa lily	None/None G3?/S2S3 1B.2	Chaparral, Chenopod scrub, Mojavean desert scrub, Meadows and seeps. alkaline, mesic. 70 - 1595 m. perennial bulbiferous herb. Blooms Apr-Jun
Calochortus weedii var. *intermedius* intermediate mariposa lily	None/None G3G4T2/S2 1B.2	Chaparral, Coastal scrub, Valley and foothill grassland. rocky, calcareous. 105 - 855 m. perennial bulbiferous herb. Blooms May-Jul
Calyptridium arizonicum Arizona pussypaws	None/None G3?/S1 2B.1	Sonoran desert scrub. Metamorphic, washes. 610 - 790 m. annual herb. Blooms Mar-Apr
Calyptridium pygmaeum pygmy pussypaws	None/None G1G2/S1S2 1B.2	Subalpine coniferous forest, Upper montane coniferous forest. sandy or gravelly. 1980 - 3110 m. annual herb. Blooms Jun-Aug
Calystegia felix lucky morning-glory	None/None G1Q/S1 1B.1	Meadows and seeps (sometimes alkaline), Riparian scrub (alluvial). Historically associated with wetland and marshy places, but possibly in drier situations as well. Possibly silty loam and alkaline. 30 - 215 m. annual rhizomatous herb. Blooms Mar-Sep
Calystegia peirsonii Peirson's morning-glory	None/None G4/S4 4.2	Chaparral, Chenopod scrub, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland. 30 - 1500 m. perennial rhizomatous herb. Blooms Apr-Jun
Calystegia sepium ssp. *binghamiae* Santa Barbara morning-glory	None/None G5TXQ/SX 1A	Marshes and swamps (coastal). 5 - 5 m. perennial rhizomatous herb. Blooms Aug
Camissoniopsis guadalupensis ssp. *clementina* San Clemente Island evening-primrose	None/None G3T2/S2 1B.2	Coastal dunes. 0 - 30 m. annual herb. Blooms Apr-Jun
Camissoniopsis lewisii Lewis' evening-primrose	None/None G4/S4 3	Coastal bluff scrub, Cismontane woodland, Coastal dunes, Coastal scrub, Valley and foothill grassland. sandy or clay. 0 - 300 m. annual herb. Blooms Mar-May (Jun)

Scientific Name Common Name	Status	Habitat Requirements
Canbya candida white pygmy-poppy	None/None G3G4/S3S4 4.2	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. gravelly, sandy, granitic. 600 - 1460 m. annual herb. Blooms Mar-Jun
Carex comosa bristly sedge	None/None G5/S2 2B.1	Coastal prairie, Marshes and swamps (lake margins), Valley and foothill grassland. 0 - 625 m. perennial rhizomatous herb. Blooms May-Sep
Carex obispoensis San Luis Obispo sedge	None/None G3?/S3? 1B.2	Closed-cone coniferous forest, Chaparral, Coastal prairie, Coastal scrub, Valley and foothill grassland. often serpentinite seeps, sometimes gabbro; often on clay soils. 10 - 820 m. perennial herb. Blooms Apr-Jun
Carex occidentalis western sedge	None/None G4/S3 2B.3	Lower montane coniferous forest, Meadows and seeps. 1645 - 3135 m. perennial rhizomatous herb. Blooms Jun-Aug
Carlowrightia arizonica Arizona carlowrightia	None/None G4G5/S2 2B.2	Sonoran desert scrub (sandy, granitic alluvium). 285 - 430 m. perennial deciduous shrub. Blooms Mar-May
Carnegiea gigantea saguaro	None/None G5/S1 2B.2	Sonoran desert scrub (rocky). 50 - 1500 m. perennial stem succulent. Blooms May-Jun
Castela emoryi Emory's crucifixion-thorn	None/None G3G4/S2S3 2B.2	Mojavean desert scrub, Playas, Sonoran desert scrub. gravelly. 90 - 725 m. perennial deciduous shrub. Blooms (Apr) Jun-Jul (Sep-Oct)
Castilleja cinerea ash-gray paintbrush	FT/None G1G2/S1S2 1B.2	Mojavean desert scrub, Meadows and seeps, Pebble (Pavement) plain, Pinyon and juniper woodland, Upper montane coniferous forest (clay openings). 1800 - 2960 m. perennial herb (hemiparasitic). Blooms Jun-Aug
Castilleja gleasoni Mt. Gleason paintbrush	None/SCR G2/S2 1B.2	Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland. granitic. 665 - 2170 m. perennial herb (hemiparasitic). Blooms May-Jun (Sep)
Castilleja grisea San Clemente Island paintbrush	FT/SCE G3/S3 1B.3	Coastal bluff scrub, Coastal scrub. rocky, often canyons. 10 - 535 m. perennial herb (hemiparasitic). Blooms (Dec)Feb-Aug
Castilleja hololeuca island white-felted paintbrush	None/None G3/S3 1B.2	Closed-cone coniferous forest, Chaparral, Coastal scrub. rocky. 20 - 365 m. perennial herb (hemiparasitic). Blooms Feb-Sep
Castilleja lasiorhyncha San Bernardino Mountains owl's-clover	None/None G2?/S2? 1B.2	Chaparral, Meadows and seeps, Pebble (Pavement) plain, Riparian woodland, Upper montane coniferous forest. mesic. 1300 - 2390 m. annual herb (hemiparasitic). Blooms May-Aug
Castilleja montigena Heckard's paintbrush	None/None G3/S3 4.3	Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest. 1950 - 2800 m. perennial herb (hemiparasitic). Blooms May-Aug
Castilleja plagiotoma Mojave paintbrush	None/None G4/S4 4.3	Great Basin scrub (alluvial), Joshua tree woodland, Lower montane coniferous forest, Pinyon and juniper woodland. 300 - 2500 m. perennial herb (hemiparasitic). Blooms Apr-Jun
Caulanthus lemmonii Lemmon's jewelflower	None/None G3/S3 1B.2	Pinyon and juniper woodland, Valley and foothill grassland. 80 - 1580 m. annual herb. Blooms Feb-May
Caulanthus simulans Payson's jewelflower	None/None G4/S4 4.2	Chaparral, Coastal scrub. sandy, granitic. 90 - 2200 m. annual herb. Blooms (Feb) Mar-May (Jun)

Scientific Name Common Name	Status	Habitat Requirements
Ceanothus cyaneus Lakeside ceanothus	None/None G2/S2 1B.2	Closed-cone coniferous forest, Chaparral. 235 - 755 m. perennial evergreen shrub. Blooms Apr-Jun
Ceanothus foliosus var. *viejasensis* Viejas Mountain ceanothus	None/None G5T1/S1 1B.2	Chaparral. Gabbro. 785 - 1370 m. perennial shrub. Blooms Mar-Jun
Ceanothus ophiochilus Vail Lake ceanothus	FT/SCE G1/S1 1B.1	Chaparral (gabbroic or pyroxenite-rich outcrops). 580 - 1065 m. perennial evergreen shrub. Blooms Feb-Mar
Ceanothus otayensis Otay Mountain ceanothus	None/None G1G2/S1 1B.2	Chaparral (metavolcanic or gabbroic). 600 - 1100 m. perennial evergreen shrub. Blooms Jan-Apr
Ceanothus pendletonensis Pendleton ceanothus	None/None G1/S1 1B.2	Chaparral, Cismontane woodland. Granitic. 110 - 870 m. perennial shrub. Blooms Mar-Jun
Ceanothus verrucosus wart-stemmed ceanothus	None/None G2/S2? 2B.2	Chaparral. 1 - 380 m. perennial evergreen shrub. Blooms Dec-May
Centromadia parryi ssp. *australis* southern tarplant	None/None G3T2/S2 1B.1	Marshes and swamps (margins), Valley and foothill grassland (vernally mesic), Vernal pools. 0 - 480 m. annual herb. Blooms May-Nov
Centromadia pungens ssp. *laevis* smooth tarplant	None/None G3G4T2/S2 1B.1	Chenopod scrub, Meadows and seeps, Playas, Riparian woodland, Valley and foothill grassland. alkaline. 0 - 640 m. annual herb. Blooms Apr-Sep
Cercocarpus betuloides var. *blancheae* island mountain-mahogany	None/None G5T4/S4 4.3	Closed-cone coniferous forest, Chaparral. 30 - 600 m. perennial evergreen shrub. Blooms Feb-May
Cercocarpus traskiae Catalina Island mountain-mahogany	FE/SCE G1/S1 1B.1	Chaparral, Coastal scrub. rocky, sausserite gabbro. 100 - 250 m. perennial evergreen shrub. Blooms Mar-May
Chaenactis carphoclinia var. *peirsonii* Peirson's pincushion	None/None G5T2/S2 1B.3	Sonoran desert scrub (sandy). 3 - 500 m. annual herb. Blooms Mar-Apr
Chaenactis glabriuscula var. *orcuttiana* Orcutt's pincushion	None/None G5T1T2/S1 1B.1	Coastal bluff scrub (sandy), Coastal dunes. 0 - 100 m. annual herb. Blooms Jan-Aug
Chaenactis parishii Parish's chaenactis	None/None G3G4/S3 1B.3	Chaparral (rocky). 1300 - 2500 m. perennial herb. Blooms May-Jul
Chamaebatia australis southern mountain misery	None/None G4/S4 4.2	Chaparral (gabbroic or metavolcanic). 300 - 1020 m. perennial evergreen shrub. Blooms Nov-May
Chenopodium littoreum coastal goosefoot	None/None G1/S1 1B.2	Coastal dunes. 10 - 30 m. annual herb. Blooms Apr-Aug
Chloropyron maritimum ssp. *maritimum* salt marsh bird's-beak	FE/SCE G4?T1/S1 1B.2	Coastal dunes, Marshes and swamps (coastal salt). 0 - 30 m. annual herb (hemiparasitic). Blooms May-Oct (Nov)
Chloropyron molle ssp. *molle* soft bird's-beak	FE/SCR G2T1/S1 1B.2	Marshes and swamps (coastal salt). 0 - 3 m. annual herb (hemiparasitic). Blooms Jun-Nov

Scientific Name Common Name	Status	Habitat Requirements
Chloropyron tecopense Tecopa bird's-beak	None/None G2/S1 1B.2	Mojavean desert scrub, Meadows and seeps. Mesic, alkaline. 60 - 900 m. annual herb (hemiparasitic). Blooms Jul-Oct
Chorizanthe blakleyi Blakley's spineflower	None/None G2/S2 1B.3	Chaparral, Pinyon and juniper woodland. 600 - 1600 m. annual herb. Blooms Apr-Jun
Chorizanthe leptotheca Peninsular spineflower	None/None G3/S3 4.2	Chaparral, Coastal scrub, Lower montane coniferous forest. alluvial fan, granitic. 300 - 1900 m. annual herb. Blooms May-Aug
Chorizanthe orcuttiana Orcutt's spineflower	FE/SCE G1/S1 1B.1	Closed-cone coniferous forest, Chaparral (maritime), Coastal scrub. sandy openings. 3 - 125 m. annual herb. Blooms Mar-May
Chorizanthe parryi var. *fernandina* San Fernando Valley spineflower	FC/SCE G2T1/S1 1B.1	Coastal scrub (sandy), Valley and foothill grassland. 150 - 1220 m. annual herb. Blooms Apr-Jul
Chorizanthe parryi var. *parryi* Parry's spineflower	None/None G3T2/S2 1B.1	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland. sandy or rocky, openings. 275 - 1220 m. annual herb. Blooms Apr-Jun
Chorizanthe polygonoides var. *longispina* long-spined spineflower	None/None G5T3/S3 1B.2	Chaparral, Coastal scrub, Meadows and seeps, Valley and foothill grassland, Vernal pools. often clay. 30 - 1530 m. annual herb. Blooms Apr-Jul
Chorizanthe spinosa Mojave spineflower	None/None G4/S4 4.2	Chenopod scrub, Joshua tree woodland, Mojavean desert scrub, Playas. Sometimes alkaline. 6 - 1300 m. annual herb. Blooms Mar-Jul
Chorizanthe xanti var. *leucotheca* white-bracted spineflower	None/None G4T3/S3 1B.2	Coastal scrub (alluvial fans), Mojavean desert scrub, Pinyon and juniper woodland. sandy or gravelly. 300 - 1200 m. annual herb. Blooms Apr-Jun
Chylismia arenaria sand evening-primrose	None/None G4?/S2S3 2B.2	Sonoran desert scrub (sandy or rocky). -70 - 915 m. annual/perennial herb. Blooms Nov-May
Cicuta maculata var. *bolanderi* Bolander's water-hemlock	None/None G5T4T5/S2? 2B.1	Marshes and swamps Coastal, fresh or brackish water. 0 - 200 m. perennial herb. Blooms Jul-Sep
Cirsium arizonicum var. *tenuisectum* desert mountain thistle	None/None G5T2/S2 1B.2	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. rocky, disturbed areas, often roadsides. 1500 - 2800 m. perennial herb. Blooms Jun-Nov
Cirsium occidentale var. *compactum* compact cobwebby thistle	None/None G3G4T2/S2 1B.2	Chaparral, Coastal dunes, Coastal prairie, Coastal scrub. 5 - 150 m. perennial herb. Blooms Apr-Jun
Cistanthe maritima seaside cistanthe	None/None G3G4/S3 4.2	Coastal bluff scrub, Coastal scrub, Valley and foothill grassland. sandy. 5 - 300 m. annual herb. Blooms (Feb) Mar-Jun (Aug)
Cladium californicum California sawgrass	None/None G4/S2 2B.2	Meadows and seeps, Marshes and swamps Alkaline or Freshwater. 60 - 1600 m. perennial rhizomatous herb. Blooms Jun-Sep
Clarkia delicata delicate clarkia	None/None G3/S3 1B.2	Chaparral, Cismontane woodland. often gabbroic. 235 - 1000 m. annual herb. Blooms Apr-Jun
Clarkia xantiana ssp. *parviflora* Kern Canyon clarkia	None/None G4T3?/S3? 4.2	Chaparral, Cismontane woodland, Great Basin scrub, Valley and foothill grassland. often sandy, sometimes rocky, slopes, sometimes roadsides. 700 - 3620 m. annual herb. Blooms May-Jun

Scientific Name Common Name	Status	Habitat Requirements
Claytonia lanceolata var. *peirsonii* Peirson's spring beauty - Synonym	None/None G5T1Q/S1 3.1	Subalpine coniferous forest, Upper montane coniferous forest. Scree. 1510 - 2745 m. perennial herb. Blooms (Mar) May-Jun
Claytonia peirsonii ssp. *bernardinus* San Bernardino spring beauty	None/None G3G4T1 G2G3T1/S1 1B.1	pinyon and juniper woodland, upper montane coniferous forest. rocky, talus, carbonate, usually openings. 2360 - 2465 m. perennial herb. Blooms Mar-Apr
Claytonia peirsonii ssp. *californacis* Furnace spring beauty	None/None G3G4T1 G2G3T1/S1 1B.1	pinyon and juniper woodland, upper montane coniferous forest. rocky, talus, carbonate, usually openings. 2300 - 2300 m. perennial herb. Blooms Mar-May
Claytonia peirsonii ssp. *peirsonii* Peirson's spring beauty	None/None G5T2 G2G3T2/S2 1B.2	subalpine coniferous forest, upper montane coniferous forest. granitic, metamorphic, scree, talus. 1510 - 2745 m. perennial herb. Blooms (Mar) May-Jun
Cleomella brevipes short-pedicelled cleomella	None/None G4/S3 4.2	Meadows and seeps, Marshes and swamps, Playas. alkaline. 395 - 2195 m. annual herb. Blooms May-Oct
Clinopodium chandleri San Miguel savory	None/None G3/S2 1B.2	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland, Valley and foothill grassland. Rocky, gabbroic or metavolcanic. 120 - 1075 m. perennial shrub. Blooms Mar-Jul
Clinopodium mimuloides monkey-flower savory	None/None G3/S3 4.2	Chaparral, North Coast coniferous forest. streambanks, mesic. 305 - 1800 m. perennial herb. Blooms Jun-Oct
Colubrina californica Las Animas colubrina	None/None G4/S2S3 2B.3	Mojavean desert scrub, Sonoran desert scrub. 10 - 1000 m. perennial deciduous shrub. Blooms Apr-Jun
Comarostaphylis diversifolia ssp. *diversifolia* summer holly	None/None G3T2/S2 1B.2	Chaparral, Cismontane woodland. 30 - 790 m. perennial evergreen shrub. Blooms Apr-Jun
Condalia globosa var. *pubescens* spiny abrojo	None/None G5T4/S3 4.2	Sonoran desert scrub. 85 - 1000 m. perennial deciduous shrub. Blooms Mar-May (Nov)
Constancea nevinii Nevin's woolly sunflower	None/None G3/S3 1B.3	Coastal bluff scrub, Coastal scrub. 5 - 410 m. perennial deciduous shrub. Blooms Apr-Aug
Convolvulus simulans small-flowered morning-glory	None/None G4/S4 4.2	Chaparral (openings), Coastal scrub, Valley and foothill grassland. clay, serpentinite seeps. 30 - 740 m. annual herb. Blooms Mar-Jul
Cordylanthus eremicus ssp. *eremicus* desert bird's-beak	None/None G3T3/S3 4.3	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. 1000 - 3000 m. annual herb (hemiparasitic). Blooms Jul-Oct
Cordylanthus parviflorus small-flowered bird's-beak	None/None G4/S2 2B.3	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. 700 - 2200 m. annual herb (hemiparasitic). Blooms Aug-Oct
Corethrogyne filaginifolia var. *incana* San Diego sand aster	None/None G4T1Q/S1 1B.1	Coastal bluff scrub, Chaparral, Coastal scrub. 3 - 115 m. perennial herb. Blooms Jun-Sep
Corethrogyne filaginifolia var. *linifolia* Del Mar Mesa sand aster	None/None G4T1Q/S1 1B.1	Coastal bluff scrub, Chaparral (maritime, openings), Coastal scrub. sandy. 15 - 150 m. perennial herb. Blooms May-Jul, Aug-Sep

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Coryphantha alversonii foxtail cactus	None/None G3/S3 4.3	Mojavean desert scrub, Sonoran desert scrub. sandy or rocky, usually granitic. 75 - 1525 m. perennial stem succulent. Blooms Apr-Jun
Coryphantha chlorantha desert pincushion	None/None G4/S3 2B.1	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. carbonate, gravelly, rocky. 45 - 1705 m. perennial stem succulent. Blooms Apr-Sep
Coryphantha vivipara var. *rosea* viviparous foxtail cactus	None/None G5T3/S1 2B.2	Mojavean desert scrub, Pinyon and juniper woodland. carbonate. 1250 - 2700 m. perennial stem succulent. Blooms May-Jun
Crocanthemum greenei island rush-rose	FT/None G3/S3 1B.2	Closed-cone coniferous forest, Chaparral, Cismontane woodland, Coastal scrub. Rocky, openings. 15 - 490 m. perennial evergreen shrub. Blooms (Jan) Mar-Jul (Aug)
Crossosoma californicum Catalina crossosoma	None/None G3/S3 1B.2	Chaparral, Coastal scrub. rocky. 0 - 500 m. perennial deciduous shrub. Blooms Feb-May
Cryptantha clokeyi Clokey's cryptantha	None/None G3/S3 1B.2	Mojavean desert scrub. 725 - 1365 m. annual herb. Blooms Apr
Cryptantha ganderi Gander's cryptantha	None/None G2G3/S1 1B.1	Desert dunes, Sonoran desert scrub (sandy). 160 - 400 m. annual herb. Blooms Feb-May
Cryptantha traskiae Trask's cryptantha	None/None G2/S2 1B.1	Coastal bluff scrub, Coastal dunes, Coastal scrub. 15 - 400 m. annual herb. Blooms Mar-Jun
Cryptantha tumulosa New York Mountains cryptantha	None/None G4/S4 4.3	Mojavean desert scrub, Pinyon and juniper woodland. gravelly or clay, granitic or carbonate. 915 - 2130 m. perennial herb. Blooms Apr-Jun
Cryptantha wigginsii Wiggins' cryptantha	None/None G2/S1 1B.2	Coastal scrub. often clay. 20 - 275 m. annual herb. Blooms Feb-Jun
Cuscuta californica var. *apiculata* pointed dodder	None/None G5T3/S3? 3	Mojavean desert scrub, Sonoran desert scrub. sandy. 0 - 500 m. annual vine (parasitic). Blooms Feb-Aug
Cuscuta obtusiflora var. *glandulosa* Peruvian dodder	None/None G5T4?/SH 2B.2	Marshes and swamps (freshwater). 15 - 280 m. annual vine (parasitic). Blooms Jul-Oct
Cylindropuntia californica var. *californica* snake cholla	None/None G3T2/S1 1B.1	Chaparral, Coastal scrub. 30 - 150 m. perennial stem succulent. Blooms Apr-May
Cylindropuntia fosbergii pink teddy-bear cholla	None/None G2/S2 1B.3	Sonoran desert scrub. 85 - 850 m. perennial stem succulent. Blooms Mar-May
Cylindropuntia munzii Munz's cholla	None/None G3/S1 1B.3	Sonoran desert scrub (sandy or gravelly). 150 - 600 m. perennial stem succulent. Blooms May
Cylindropuntia wolfii Wolf's cholla	None/None G4/S3 4.3	Sonoran desert scrub. 100 - 1200 m. perennial stem succulent. Blooms Mar-May
Cymopterus deserticola desert cymopterus	None/None G2/S2 1B.2	Joshua tree woodland, Mojavean desert scrub. sandy. 630 - 1500 m. perennial herb. Blooms Mar-May

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Cymopterus gilmanii Gilman's cymopterus	None/None G3/S2 2B.3	Mojavean desert scrub (often carbonate). 915 - 2000 m. perennial herb. Blooms Apr-May
Cymopterus multinervatus purple-nerve cymopterus	None/None G4G5/S2 2B.2	Mojavean desert scrub, Pinyon and juniper woodland. sandy or gravelly. 790 - 1800 m. perennial herb. Blooms Mar-Apr
Deinandra conjugens Otay tarplant	FT/SCE G1/S1 1B.1	Coastal scrub, Valley and foothill grassland. clay. 25 - 300 m. annual herb. Blooms (Apr) May-Jun
Deinandra floribunda Tecate tarplant	None/None G2/S2 1B.2	Chaparral, Coastal scrub. 70 - 1220 m. annual herb. Blooms Aug-Oct
Deinandra minthornii Santa Susana tarplant	None/SCR G2/S2 1B.2	Chaparral, Coastal scrub. rocky. 280 - 760 m. perennial deciduous shrub. Blooms Jul-Nov
Deinandra mohavensis Mojave tarplant	None/SCE G2/S2 1B.3	Chaparral, Coastal scrub, Riparian scrub. mesic. 640 - 1600 m. annual herb. Blooms (May) Jun-Oct (Jan)
Deinandra paniculata paniculate tarplant	None/None G4/S4 4.2	Coastal scrub, Valley and foothill grassland, Vernal pools. usually vernally mesic, sometimes sandy. 25 - 940 m. annual herb. Blooms (Mar) Apr-Nov (Dec)
Delphinium hesperium ssp. *cuyamacae* Cuyamaca larkspur	None/SCR G4T2/S2 1B.2	Lower montane coniferous forest, Meadows and seeps, Vernal pools. mesic. 1220 - 1631 m. perennial herb. Blooms May-Jul
Delphinium parishii ssp. *subglobosum* Colorado Desert larkspur	None/None G4T4/S4 4.3	Chaparral, Cismontane woodland, Pinyon and juniper woodland, Sonoran desert scrub. 600 - 1800 m. perennial herb. Blooms Mar-Jun
Delphinium parryi ssp. *blochmaniae* dune larkspur	None/None G4T2/S2 1B.2	Chaparral (maritime), Coastal dunes. 0 - 200 m. perennial herb. Blooms Apr-Jun
Delphinium scaposum bare-stem larkspur	None/None G5/S1 2B.3	Sonoran desert scrub. rocky, sometimes washes. 270 - 1055 m. perennial herb. Blooms Mar-Apr
Delphinium umbraculorum umbrella larkspur	None/None G3/S3 1B.3	Chaparral, Cismontane woodland. 400 - 1600 m. perennial herb. Blooms Apr-Jun
Delphinium variegatum ssp. *kinkiense* San Clemente Island larkspur	FE/SCE G4T2/S2 1B.1	Valley and foothill grassland (coastal). 75 - 500 m. perennial herb. Blooms Mar-Apr
Delphinium variegatum ssp. *thornei* Thorne's royal larkspur	None/None G4T1/S1 1B.1	Cismontane woodland, Valley and foothill grassland (coastal). 250 - 575 m. perennial herb. Blooms (Mar)Apr-May
Dendromecon harfordii var. *rhamnoides* south island bush-poppy	None/None G4T1Q/S1 3.1	Chaparral, Cismontane woodland, Coastal scrub. 150 - 520 m. perennial evergreen shrub. Blooms Apr-Jun
Dichondra occidentalis western dichondra	None/None G3G4/S3S4 4.2	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland. 50 - 500 m. perennial rhizomatous herb. Blooms (Jan) Mar-Jul
Dicranostegia orcuttiana Orcutt's bird's-beak	None/None G2G3/S1 2B.1	Coastal scrub. 10 - 350 m. annual herb (hemiparasitic). Blooms (Mar) Apr-Jul (Sep)

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Dieteria asteroides var. *lagunensis* Mt. Laguna aster	None/SCR G5T2T3/S1 2B.1	Cismontane woodland, Lower montane coniferous forest. 790 - 2400 m. perennial herb. Blooms (May) Jul-Aug (Sep-Oct)
Dieteria canescens var. *ziegleri* Ziegler's aster	None/None G5T1/S1 1B.2	Lower montane coniferous forest, Upper montane coniferous forest. 1372 - 2499 m. perennial herb. Blooms Jul-Oct
Digitaria californica var. *californica* Arizona cottontop	None/None G5T5/S2 2B.3	Mojavean desert scrub, Sonoran desert scrub. rocky. 290 - 1490 m. perennial herb. Blooms Jul-Nov
Diplacus aridus low bush monkeyflower	None/None G4/S3 4.3	Chaparral (rocky), Sonoran desert scrub. 750 - 1200 m. perennial evergreen shrub. Blooms Apr-Jul
Diplacus clevelandii Cleveland's bush monkeyflower	None/None G4/S4 4.2	Chaparral, Cismontane woodland, Lower montane coniferous forest. Gabbroic, often in disturbed areas, openings, rocky. 450 - 2000 m. perennial rhizomatous herb. Blooms Apr-Jul
Diplacus johnstonii Johnston's monkeyflower	None/None G4/S4 4.3	Lower montane coniferous forest (scree, disturbed areas, rocky or gravelly, roadside). 975 - 2920 m. annual herb. Blooms (Apr) May-Aug
Diplacus mohavensis Mojave monkeyflower	None/None G2/S2 1B.2	Joshua tree woodland, Mojavean desert scrub. sandy or gravelly, often in washes. 600 - 1200 m. annual herb. Blooms Apr-Jun
Diplacus traskiae Santa Catalina Island monkeyflower	None/None GX/SX 1A	Coastal scrub. - m. annual herb. Blooms Mar-Apr
Dissanthelium californicum California dissanthelium	None/None G2/S1 1B.2	Coastal scrub. 5 - 500 m. annual herb. Blooms Mar-May
Ditaxis claryana glandular ditaxis	None/None G3G4/S2 2B.2	Mojavean desert scrub, Sonoran desert scrub. sandy. 0 - 465 m. perennial herb. Blooms Oct, Dec, Jan, Feb, Mar
Ditaxis serrata var. *californica* California ditaxis	None/None G5T3T4/S2? 3.2	Sonoran desert scrub. 30 - 1000 m. perennial herb. Blooms Mar-Dec
Dithyrea maritima beach spectaclepod	None/SCT G1/S1 1B.1	Coastal dunes, Coastal scrub (sandy). 3 - 50 m. perennial rhizomatous herb. Blooms Mar-May
Dodecahema leptoceras slender-horned spineflower	FE/SCE G1/S1 1B.1	Chaparral, Cismontane woodland, Coastal scrub (alluvial fan). sandy. 200 - 760 m. annual herb. Blooms Apr-Jun
Downingia concolor var. *brevior* Cuyamaca Lake downingia	None/SCE G4T1/S1 1B.1	Meadows and seeps (vernally mesic), Vernal pools. 1030 - 1500 m. annual herb. Blooms May-Jul
Draba saxosa Southern California rock draba	None/None G2G3/S2S3 1B.3	Alpine boulder and rock field, Subalpine coniferous forest, Upper montane coniferous forest. rocky. 2440 - 3600 m. perennial herb. Blooms Jun-Sep
Drymocallis cuneifolia var. *cuneifolia* wedgeleaf woodbeauty	None/None G2T1/S1 1B.1	Riparian scrub, Upper montane coniferous forest. Sometimes carbonate. 1800 - 2415 m. perennial herb. Blooms Jun-Aug
Drymocallis cuneifolia var. *ewanii* Ewan's woodbeauty	None/None G2T2/S2 1B.3	Lower montane coniferous forest (near seeps and springs), Meadows and seeps. 1900 - 2400 m. perennial herb. Blooms Jun-Jul

Scientific Name Common Name	Status	Habitat Requirements
Dryopteris filix-mas male fern	None/None G5/S2 2B.3	Upper montane coniferous forest (granitic, rocky). 1850 - 3100 m. perennial rhizomatous herb. Blooms Jul-Sep
Dudleya abramsii ssp. *affinis* San Bernardino Mountains dudleya	None/None G4T2/S2 1B.2	Pebble (Pavement) plain, Pinyon and juniper woodland, Upper montane coniferous forest. granitic, quartzite, or carbonate. 1250 - 2600 m. perennial herb. Blooms Apr-Jul
Dudleya alainae Banner dudleya	None/None G2Q/S2 3.2	Chaparral, Lower montane coniferous forest, Sonoran desert scrub. rocky. 740 - 1200 m. perennial herb. Blooms Apr-Jul
Dudleya attenuata ssp. *attenuata* Orcutt's dudleya	None/None G4T1T2/S1 2B.1	Coastal bluff scrub, Chaparral, Coastal scrub. rocky or gravelly. 3 - 50 m. perennial herb. Blooms May-Jul
Dudleya blochmaniae ssp. *blochmaniae* Blochman's dudleya	None/None G3T2/S2 1B.1	Coastal bluff scrub, Chaparral, Coastal scrub, Valley and foothill grassland. rocky, often clay or serpentinite. 5 - 450 m. perennial herb. Blooms Apr-Jun
Dudleya blochmaniae ssp. *insularis* Santa Rosa Island dudleya	None/None G3T1/S1 1B.1	Coastal bluff scrub. 3 - 10 m. perennial herb. Blooms Mar-Apr
Dudleya brevifolia short-leaved dudleya	None/SCE G1/S1 1B.1	Chaparral (maritime, openings), Coastal scrub. Torrey sandstone. 30 - 250 m. perennial herb. Blooms Apr-May
Dudleya cymosa ssp. *agourensis* Agoura Hills dudleya	FT/None G5T1/S1 1B.2	Chaparral, Cismontane woodland. rocky, volcanic. 200 - 500 m. perennial herb. Blooms May-Jun
Dudleya cymosa ssp. *crebrifolia* San Gabriel River dudleya	None/None G5T2/S2 1B.2	Chaparral (granitic). 275 - 457 m. perennial herb. Blooms Apr-Jul
Dudleya cymosa ssp. *marcescens* marcescent dudleya	FT/SCR G5T2/S2 1B.2	Chaparral. volcanic, rocky. 150 - 520 m. perennial herb. Blooms Apr-Jul
Dudleya cymosa ssp. *ovatifolia* Santa Monica dudleya	FT/None G5T1/S1 1B.1	Chaparral, Coastal scrub. volcanic or sedimentary, rocky. 150 - 1675 m. perennial herb. Blooms Mar-Jun
Dudleya densiflora San Gabriel Mountains dudleya	None/None G2/S2 1B.1	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Riparian woodland. granitic, cliffs and canyon walls. 244 - 610 m. perennial herb. Blooms Mar-Jun
Dudleya multicaulis many-stemmed dudleya	None/None G2/S2 1B.2	Chaparral, Coastal scrub, Valley and foothill grassland. often clay. 15 - 790 m. perennial herb. Blooms Apr-Jul
Dudleya parva Conejo dudleya	FT/None G1/S1 1B.2	Coastal scrub, Valley and foothill grassland. rocky or gravelly, clay or volcanic. 60 - 450 m. perennial herb. Blooms May-Jun
Dudleya stolonifera Laguna Beach dudleya	FT/SCT G1/S1 1B.1	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland. rocky. 10 - 260 m. perennial stoloniferous herb. Blooms May-Jul
Dudleya var*iegata* variegated dudleya	None/None G2/S2 1B.2	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland, Vernal pools. clay. 3 - 580 m. perennial herb. Blooms Apr-Jun
Dudleya verityi Verity's dudleya	FT/None G1/S1 1B.1	Chaparral, Cismontane woodland, Coastal scrub. volcanic, rocky. 60 - 120 m. perennial herb. Blooms May-Jun

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Dudleya virens ssp. *hassei* Catalina Island dudleya	None/None G3?T2/S2 1B.2	Coastal bluff scrub, Coastal scrub. Rocky. 0 - 400 m. perennial herb. Blooms Mar-Jun
Dudleya virens ssp. *insularis* island green dudleya	None/None G3?T3/S3 1B.2	Coastal bluff scrub, Coastal scrub. rocky. 5 - 300 m. perennial herb. Blooms Apr-Jun
Dudleya virens ssp. *virens* bright green dudleya	None/None G3?T2/S2 1B.2	Coastal bluff scrub, Chaparral, Coastal scrub. rocky. 5 - 400 m. perennial herb. Blooms Apr-Jul
Dudleya viscida sticky dudleya	None/None G2/S2 1B.2	Coastal bluff scrub, Chaparral, Cismontane woodland, Coastal scrub. rocky. 10 - 550 m. perennial herb. Blooms May-Jun
Echinocereus engelmannii var. *howei* Howe's hedgehog cactus	None/None G5T1/S1 1B.1	Mojavean desert scrub. 430 - 775 m. perennial stem succulent. Blooms Apr-May
Eleocharis parvula small spikerush	None/None G5/S3 4.3	Marshes and swamps. 1 - 3020 m. perennial herb. Blooms (Apr) Jun-Aug (Sep)
Elymus salina Salina Pass wild-rye	None/None G4G5/S2S3 2B.3	Pinyon and juniper woodland (rocky). 1350 - 2135 m. perennial rhizomatous herb. Blooms May-Jun
Enceliopsis nudicaulis var. *nudicaulis* naked-stemmed daisy	None/None G5T5/S3 4.3	Great Basin scrub, Mojavean desert scrub. volcanic or carbonate. 950 - 2000 m. perennial herb. Blooms Apr-May
Enneapogon desvauxii nine-awned pappus grass	None/None G5/S3 2B.2	Pinyon and juniper woodland (rocky, carbonate). 1275 - 1825 m. perennial herb. Blooms Aug-Sep
Eremalche parryi ssp. *kernensis* Kern mallow	FE/None G3G4T3/S3 1B.2	Chenopod scrub, Pinyon and juniper woodland, Valley and foothill grassland. On dry, open sandy to clay soils; often at edge of balds. 70 - 1290 m. annual herb. Blooms Jan, Mar, Apr, May (Feb)
Eremogone congesta var. *charlestonensis* Charleston sandwort	None/None G5T2?/S1 1B.3	Pinyon and juniper woodland (sandy). 2200 - 2225 m. perennial herb. Blooms Jun
Eremogone ursina Big Bear Valley sandwort	FT/None G1/S1 1B.2	Meadows and seeps, Pebble (Pavement) plain, Pinyon and juniper woodland. mesic, rocky. 1800 - 2900 m. perennial herb. Blooms May-Aug
Eremothera boothii ssp. *boothii* Booth's evening-primrose	None/None G5T4/S3 2B.3	Joshua tree woodland, Pinyon and juniper woodland. 815 - 2400 m. annual herb. Blooms Apr-Sep
Eremothera boothii ssp. *intermedia* Booth's hairy evening-primrose	None/None G5T3T4/S3 2B.3	Great Basin scrub (sandy), Pinyon and juniper woodland. 1500 - 2150 m. annual herb. Blooms (May) Jun
Eriastrum densifolium ssp. *sanctorum* Santa Ana River woollystar	FE/SCE G4T1/S1 1B.1	Chaparral, Coastal scrub (alluvial fan). sandy or gravelly. 91 - 610 m. perennial herb. Blooms Apr-Sep
Eriastrum harwoodii Harwood's eriastrum	None/None G2/S2 1B.2	Desert dunes. 125 - 915 m. annual herb. Blooms Mar-Jun
Eriastrum hooveri Hoover's eriastrum	None/None G3/S3 4.2	Chenopod scrub, Pinyon and juniper woodland, Valley and foothill grassland. Sometimes gravelly. 50 - 915 m. annual herb. Blooms (Feb) Mar-Jul

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Eriastrum rosamondense Rosamond eriastrum	None/None G1?/S1? 1B.1	Chenopod scrub (openings), Vernal pools (edges). Alkaline hummocks, often sandy. 700 - 715 m. annual herb. Blooms Apr-May (Jun-Jul)
Ericameria cuneata var. *macrocephala* Laguna Mountains goldenbush	None/None G5T2T3/S2S3 1B.3	Chaparral (granitic). 1195 - 1850 m. perennial shrub. Blooms Sep-Dec
Ericameria nana dwarf goldenbush	None/None G5/S4 4.3	Pinyon and juniper woodland (rocky, carbonate or granitic). 1465 - 2800 m. perennial shrub. Blooms Jul-Nov
Ericameria palmeri var. *palmeri* Palmer's goldenbush	None/None G4T2?/S2 1B.1	Chaparral, Coastal scrub. mesic. 30 - 600 m. perennial evergreen shrub. Blooms (Jul) Sep-Nov
Erigeron breweri var. *jacinteus* San Jacinto Mountains daisy	None/None G5T3/S3 4.3	Subalpine coniferous forest, Upper montane coniferous forest. rocky. 2700 - 2900 m. perennial rhizomatous herb. Blooms Jun-Sep
Erigeron oxyphyllus wand-like fleabane daisy	None/None G4/S2 2B.3	Sonoran desert scrub. dry, rocky slopes and washes. 645 - 790 m. perennial herb. Blooms Apr-May
Erigeron parishii Parish's daisy	FT/None G2/S2 1B.1	Mojavean desert scrub, Pinyon and juniper woodland. usually carbonate, sometimes granitic. 800 - 2000 m. perennial herb. Blooms May-Aug
Erigeron uncialis var. *uncialis* limestone daisy	None/None G3G4T2/S2 1B.2	Great Basin scrub, Pinyon and juniper woodland, Subalpine coniferous forest. carbonate. 1900 - 2900 m. perennial herb. Blooms May-Jul
Erigeron utahensis Utah daisy	None/None G4/S2 2B.3	Pinyon and juniper woodland (carbonate). 1500 - 2320 m. perennial herb. Blooms May-Jun
Eriodictyon angustifolium narrow-leaved yerba santa	None/None G5/S3 2B.3	Pinyon and juniper woodland. 1500 - 1900 m. perennial evergreen shrub. Blooms May-Aug
Eriodictyon sessilifolium sessile-leaved yerba stanta	None/None G4/S1 2B.1	Coastal scrub. volcanic. 170 - 170 m. perennial shrub. Blooms Jul
Eriogonum bifurcatum forked buckwheat	None/None G3/S3 1B.2	Chenopod scrub (sandy). 645 - 810 m. annual herb. Blooms Apr-Jun
Eriogonum contiguum Reveal's buckwheat	None/None G3/S2 2B.3	Mojavean desert scrub (sandy). 30 - 1320 m. annual herb. Blooms (Feb) Mar-May (Jun)
Eriogonum crocatum conejo buckwheat	None/SCR G1/S1 1B.2	Chaparral, Coastal scrub, Valley and foothill grassland. Conejo volcanic outcrops, rocky. 50 - 580 m. perennial herb. Blooms Apr-Jul
Eriogonum evanidum vanishing wild buckwheat	None/None G2/S1 1B.1	Chaparral, Cismontane woodland, Lower montane coniferous forest, Pinyon and juniper woodland. sandy or gravelly. 1100 - 2225 m. annual herb. Blooms Jul-Oct
Eriogonum giganteum var. *formosum* San Clemente Island buckwheat	None/None G3T3?/S3? 1B.2	Coastal bluff scrub (rocky). 10 - 455 m. perennial deciduous shrub. Blooms Mar-Oct
Eriogonum grande var. *timorum* San Nicolas Island buckwheat	None/SCE G4T1/S1 1B.1	Coastal bluff scrub. 10 - 215 m. perennial herb. Blooms Mar, May, Jun, Jul, Aug, Sep, Oct

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Eriogonum heermannii var. *floccosum* Clark Mountain buckwheat	None/None G5T4/S4 4.3	Pinyon and juniper woodland (carbonate). 900 - 2400 m. perennial deciduous shrub. Blooms Aug-Oct
Eriogonum kennedyi var. *alpigenum* southern alpine buckwheat	None/None G4T3/S3 1B.3	Alpine boulder and rock field, Subalpine coniferous forest. granitic, gravelly. 2600 - 3500 m. perennial herb. Blooms Jul-Sep
Eriogonum kennedyi var. *austromontanum* southern mountain buckwheat	FT/None G4T2/S2 1B.2	Lower montane coniferous forest (gravelly), Pebble (Pavement) plain. 1770 - 2890 m. perennial herb. Blooms Jun-Sep
Eriogonum microthecum var. *johnstonii* Johnston's buckwheat	None/None G5T2/S2 1B.3	Subalpine coniferous forest, Upper montane coniferous forest. rocky. 1829 - 2926 m. perennial deciduous shrub. Blooms Jul-Sep
Eriogonum microthecum var. *lacus-ursi* Bear Lake buckwheat	None/None G5T1/S1 1B.1	Great Basin scrub, Lower montane coniferous forest. clay outcrops. 2000 - 2100 m. perennial shrub. Blooms Jul-Aug
Eriogonum ovalifolium var. *vineum* Cushenbury buckwheat	FE/None G5T1/S1 1B.1	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. carbonate. 1400 - 2440 m. perennial herb. Blooms May-Aug
Eriogonum thornei Thorne's buckwheat	None/SCE G1/S1 1B.2	Pinyon and juniper woodland (gravelly). 1800 - 1830 m. perennial shrub. Blooms Jul-Aug
Eriogonum umbellatum var. *juniporinum* juniper sulphur-flowered buckwheat	None/None G5T4/S3 2B.3	Mojavean desert scrub, Pinyon and juniper woodland. 1300 - 2500 m. perennial herb. Blooms Jul-Oct
Eriogonum umbellatum var. *minus* alpine sulfur-flowered buckwheat	None/None G5T4/S4 4.3	Subalpine coniferous forest, Upper montane coniferous forest. gravelly. 1800 - 3068 m. perennial herb. Blooms Jun-Sep
Erioneuron pilosum hairy erioneuron	None/None G5/S2 2B.3	Pinyon and juniper woodland (rocky, sometimes carbonate). 1420 - 2010 m. perennial herb. Blooms (Apr) May-Jun
Eriophyllum lanatum var. *obovatum* southern Sierra woolly sunflower	None/None G5T4/S4 4.3	Lower montane coniferous forest, Upper montane coniferous forest. sandy loam. 1114 - 2500 m. perennial herb. Blooms Jun-Jul
Eriophyllum mohavense Barstow woolly sunflower	None/None G2/S2 1B.2	Chenopod scrub, Mojavean desert scrub, Playas. 500 - 960 m. annual herb. Blooms Mar-May
Eryngium aristulatum var. *hooveri* Hoover's button-celery	None/None G5T1/S1 1B.1	Vernal pools. 3 - 45 m. annual/perennial herb. Blooms (Jun) Jul (Aug)
Eryngium aristulatum var. *parishii* San Diego button-celery	FE/SCE G5T1/S1 1B.1	Coastal scrub, Valley and foothill grassland, Vernal pools. mesic. 20 - 620 m. annual/perennial herb. Blooms Apr-Jun
Eryngium pendletonense Pendleton button-celery	None/None G1/S1 1B.1	Coastal bluff scrub, Valley and foothill grassland, Vernal pools. clay, vernally mesic. 15 - 110 m. perennial herb. Blooms Apr-Jun (Jul)
Eryngium racemosum Delta button-celery	None/SCE G1/S1 1B.1	Riparian scrub (vernally mesic clay depressions). 3 - 30 m. annual/perennial herb. Blooms Jun-Oct

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Erysimum ammophilum sand-loving wallflower	None/None G2/S2 1B.2	Chaparral (maritime), Coastal dunes, Coastal scrub. sandy, openings. 0 - 60 m. perennial herb. Blooms Feb-Jun
Erysimum insulare island wallflower	None/None G3/S3 1B.3	Coastal bluff scrub, Coastal dunes. 0 - 300 m. perennial herb. Blooms Mar-Jul
Erysimum suffrutescens suffrutescent wallflower	None/None G3/S3 4.2	Coastal bluff scrub, Chaparral (maritime), Coastal dunes, Coastal scrub. 0 - 150 m. perennial herb. Blooms Jan-Jul (Aug)
Erythranthe diffusa Palomar monkeyflower	None/None G4/S3 4.3	Chaparral, Lower montane coniferous forest. sandy or gravelly. 1220 - 1830 m. annual herb. Blooms Apr-Jun
Erythranthe exigua San Bernardino Mountains monkeyflower	None/None G2/S2 1B.2	Meadows and seeps, Pebble (Pavement) plain, Upper montane coniferous forest. mesic, clay. 1800 - 2315 m. annual herb. Blooms May-Jul
Erythranthe purpurea little purple monkeyflower	None/None G2/S2 1B.2	Meadows and seeps, Pebble (Pavement) plain, Upper montane coniferous forest. 1900 - 2300 m. annual herb. Blooms May-Jun
Eschscholzia androuxii Joshua Tree poppy	None/None G3/S3 4.3	Joshua tree woodland, Mojavean desert scrub. Desert washes, flats, and slopes; sandy, gravelly, and/or rocky. 585 - 1685 m. annual herb. Blooms Feb-May (Jun)
Eschscholzia minutiflora ssp. *twisselmannii* Red Rock poppy	None/None G5T2/S2 1B.2	Mojavean desert scrub (volcanic tuff). 680 - 1230 m. annual herb. Blooms Mar-May
Eucnide rupestris annual rock-nettle	None/None G3/S1 2B.2	Sonoran desert scrub. 500 - 600 m. annual herb. Blooms Dec-Apr
Euphorbia abramsiana Abrams' spurge	None/None G4/S2 2B.2	Mojavean desert scrub, Sonoran desert scrub. sandy. -5 - 1310 m. annual herb. Blooms (Aug) Sep-Nov
Euphorbia arizonica Arizona spurge	None/None G5/S3 2B.3	Sonoran desert scrub (sandy). 50 - 300 m. perennial herb. Blooms Mar-Apr
Euphorbia exstipulata var. *exstipulata* Clark Mountain spurge	None/None G5T5?/S2 2B.1	Mojavean desert scrub (rocky). 1280 - 2000 m. annual herb. Blooms Sep
Euphorbia jaegeri Orocopia Mountains spurge	None/None G1/S1 1B.1	Mojavean desert scrub. Rocky hillsides and arroyos, gravelly or rocky crevices; granitic, carbonate, or metamorphic. 600 - 850 m. perennial shrub. Blooms Oct-May
Euphorbia misera cliff spurge	None/None G5/S2 2B.2	Coastal bluff scrub, Coastal scrub, Mojavean desert scrub. rocky. 10 - 500 m. perennial shrub. Blooms Dec-Aug (Oct)
Euphorbia parryi Parry's spurge	None/None G5/S1 2B.3	Desert dunes, Mojavean desert scrub (sandy). 395 - 730 m. annual herb. Blooms May-Nov
Euphorbia platysperma flat-seeded spurge	None/None G3/S1 1B.2	Desert dunes, Sonoran desert scrub (sandy). 65 - 100 m. annual herb. Blooms Feb-Sep
Euphorbia revoluta revolute spurge	None/None G5/S4 4.3	Mojavean desert scrub (rocky). 1095 - 3100 m. annual herb. Blooms Aug-Sep

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Euphorbia vallis-mortae Death Valley sandmat	None/None G3/S3 4.2	Mojavean desert scrub (sandy or gravelly). 230 - 1460 m. perennial herb. Blooms May-Oct
Extriplex joaquinana San Joaquin spearscale	None/None G2/S2 1B.2	Chenopod scrub, Meadows and seeps, Playas, Valley and foothill grassland. alkaline. 1 - 835 m. annual herb. Blooms Apr-Oct
Fendlerella utahensis yerba desierto	None/None G5/S4 4.3	Lower montane coniferous forest, Mojavean desert scrub, Pinyon and juniper woodland. carbonate. 1300 - 2800 m. perennial deciduous shrub. Blooms Jun-Aug
Ferocactus viridescens San Diego barrel cactus	None/None G3?/S2S3 2B.1	Chaparral, Coastal scrub, Valley and foothill grassland, Vernal pools. 3 - 450 m. perennial stem succulent. Blooms May-Jun
Fimbristylis thermalis hot springs fimbristylis	None/None G4/S1S2 2B.2	Meadows and seeps (alkaline, near hot springs). 110 - 1340 m. perennial rhizomatous herb. Blooms Jul-Sep
Frankenia palmeri Palmer's frankenia	None/None G3?/S1 2B.1	Coastal dunes, Marshes and swamps (coastal salt), Playas. 0 - 10 m. perennial herb. Blooms May-Jul
Frasera albomarginata var. *albomarginata* desert green-gentian	None/None G5T5/S3 2B.2	Pinyon and juniper woodland (rocky or gravelly). 1370 - 2315 m. perennial herb. Blooms Apr-Jun (Jul-Sep)
Frasera albomarginata var. *induta* Clark Mountain green-gentian	None/None G5T2/S1 1B.2	Pinyon and juniper woodland. Rocky or gravelly, usually carbonate. 1705 - 1770 m. perennial herb. Blooms May-Jun (Sep)
Frasera neglecta pine green-gentian	None/None G4/S4 4.3	Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest. 1400 - 2500 m. perennial herb. Blooms May-Jul
Fraxinus parryi chaparral ash	None/None G3?/S1 2B.2	Chaparral. 213 - 620 m. perennial shrub. Blooms Mar-May
Fremontodendron mexicanum Mexican flannelbush	FE/SCR G2/S1 1B.1	Closed-cone coniferous forest, Chaparral, Cismontane woodland. gabbroic, metavolcanic, or serpentinite. 10 - 716 m. perennial evergreen shrub. Blooms Mar-Jun
Fritillaria ojaiensis Ojai fritillary	None/None G3/S3 1B.2	Broadleafed upland forest (mesic), Chaparral, Cismontane woodland, Lower montane coniferous forest. rocky. 225 - 998 m. perennial bulbiferous herb. Blooms Feb-May
Fritillaria pinetorum pine fritillary	None/None G4/S4 4.3	Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland, Subalpine coniferous forest, Upper montane coniferous forest. granitic or metamorphic. 1735 - 3300 m. perennial bulbiferous herb. Blooms May-Jul (Sep)
Funastrum crispum wavyleaf twinevine	None/None G4/S1 2B.2	Chaparral, Pinyon and juniper woodland. 1165 - 1840 m. perennial herb. Blooms May-Aug
Funastrum utahense Utah vine milkweed	None/None G4/S4 4.2	Mojavean desert scrub, Sonoran desert scrub. sandy or gravelly. 100 - 1435 m. perennial herb. Blooms (Mar) Apr-Jun (Sep-Oct)
Galium andrewsii ssp. *gatense* phlox-leaf serpentine bedstraw	None/None G5T3/S3 4.2	Chaparral, Cismontane woodland, Lower montane coniferous forest. serpentinite, rocky. 150 - 1450 m. perennial herb. Blooms Apr-Jul
Galium angustifolium ssp. *borregoense* Borrego bedstraw	None/SCR G5T3?/S3? 1B.3	Sonoran desert scrub (rocky). 350 - 1250 m. perennial herb. Blooms Mar (May)

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Galium angustifolium ssp. *gabrielense* San Antonio Canyon bedstraw	None/None G5T3/S3 4.3	Chaparral, Lower montane coniferous forest. granitic, sandy or rocky. 1200 - 2650 m. perennial herb. Blooms Apr-Aug
Galium angustifolium ssp. *gracillimum* slender bedstraw	None/None G5T4/S4 4.2	Joshua tree woodland, Sonoran desert scrub. granitic, rocky. 130 - 1550 m. perennial herb. Blooms Apr-Jun (Jul)
Galium angustifolium ssp. *jacinticum* San Jacinto Mountains bedstraw	None/None G5T2?/S2? 1B.3	Lower montane coniferous forest. 1350 - 2100 m. perennial herb. Blooms Jun-Aug
Galium californicum ssp. *primum* Alvin Meadow bedstraw	None/None G5T2/S2 1B.2	Chaparral, Lower montane coniferous forest. granitic, sandy. 1350 - 1700 m. perennial herb. Blooms May-Jul
Galium catalinense ssp. *acrispum* San Clemente Island bedstraw	None/SCE G4T3/S3 1B.3	Valley and foothill grassland. 25 - 275 m. perennial deciduous shrub. Blooms Mar-May (Aug)
Galium catalinense ssp. *catalinense* Santa Catalina Island bedstraw	None/None G4T2/S2 1B.3	Chaparral, Coastal scrub. 5 - 440 m. perennial deciduous shrub. Blooms Feb-Jul
Galium cliftonsmithii Santa Barbara bedstraw	None/None G4/S4 4.3	Cismontane woodland. 200 - 1220 m. perennial herb. Blooms May-Jul
Galium grande San Gabriel bedstraw	None/None G1/S1 1B.2	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest. 425 - 1500 m. perennial deciduous shrub. Blooms Jan-Jul
Galium hilendiae ssp. *kingstonense* Kingston Mountains bedstraw	None/None G4T3/S2 1B.3	Lower montane coniferous forest, Pinyon and juniper woodland. rocky. 1200 - 2100 m. perennial herb. Blooms (May) Jun (Oct)
Galium jepsonii Jepson's bedstraw	None/None G3/S3 4.3	Lower montane coniferous forest, Upper montane coniferous forest. granitic, rocky or gravelly. 1540 - 2500 m. perennial rhizomatous herb. Blooms Jul-Aug
Galium johnstonii Johnston's bedstraw	None/None G4/S4 4.3	Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland, Riparian woodland. 1220 - 2300 m. perennial herb. Blooms Jun-Jul
Galium munzii Munz's bedstraw	None/None G4G5/S4 4.3	Great Basin scrub, Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest. 1100 - 3330 m. perennial herb. Blooms May-Jul
Galium proliferum desert bedstraw	None/None G5/S2 2B.2	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. rocky, carbonate (limestone). 1190 - 1630 m. annual herb. Blooms Mar-Jun
Galium wrightii Wright's bedstraw	None/None G5/S3 2B.3	Lower montane coniferous forest, Pinyon and juniper woodland. carbonate, rocky. 1600 - 2000 m. perennial herb. Blooms Jun-Oct
Gambelia speciosa showy island snapdragon	None/None G3/S3 1B.2	Coastal scrub. rocky. 0 - 900 m. perennial shrub. Blooms Feb-May
Gentiana fremontii Fremont's gentian	None/None G4/S2 2B.3	Meadows and seeps (mesic), Upper montane coniferous forest. 2400 - 2700 m. annual herb. Blooms Jun-Aug
Geothallus tuberosus Campbell's liverwort	None/None G1/S1 1B.1	Coastal scrub (mesic), Vernal pools. soil. 10 - 600 m. ephemeral liverwort. Blooms

Scientific Name Common Name	Status	Habitat Requirements
Geraea viscida sticky geraea	None/None G2G3/S2 2B.2	Chaparral (often in disturbed areas). 450 - 1700 m. perennial herb. Blooms (Apr) May-Jun
Gilia latiflora ssp. *cuyamensis* Cuyama gilia	None/None G5?T4/S4 4.3	Pinyon and juniper woodland (sandy). 595 - 2000 m. annual herb. Blooms Apr-Jun
Gilia leptantha ssp. *leptantha* San Bernardino gilia	None/None G4T2/S2 1B.3	Lower montane coniferous forest (sandy or gravelly). 1500 - 2560 m. annual herb. Blooms Jun-Aug
Gilia mexicana El Paso gilia	None/None G4/S1 2B.3	Pinyon and juniper woodland. 1475 - 1475 m. annual herb. Blooms May
Githopsis diffusa ssp. *filicaulis* Mission Canyon bluecup	None/None G5T1Q/S1 3.1	Chaparral (mesic, disturbed areas). 450 - 700 m. annual herb. Blooms Apr-Jun
Glossopetalon pungens pungent glossopetalon	None/None G2/S1 1B.2	Chaparral, Pinyon and juniper woodland. carbonate. 1675 - 2000 m. perennial deciduous shrub. Blooms May-Jun
Goodmania luteola golden goodmania	None/None G3/S3 4.2	Mojavean desert scrub, Meadows and seeps, Playas, Valley and foothill grassland. alkaline or clay. 20 - 2200 m. annual herb. Blooms Apr-Aug
Graphis saxorum Baja rock lichen	None/None G2?/S1 3	Coastal scrub (?). Volcanic rocks. 30 - 80 m. crustose lichen (saxicolous). Blooms
Grimmia vaginulata vaginulate grimmia	None/None G2G3/S1 1B.1	Chaparral (openings). Rocky, boulder and rock walls, carbonate. 685 - 685 m. moss. Blooms
Grindelia hallii San Diego gumplant	None/None G2/S2 1B.2	Chaparral, Lower montane coniferous forest, Meadows and seeps, Valley and foothill grassland. 185 - 1745 m. perennial herb. Blooms May-Oct
Grusonia parishii Parish's club-cholla	None/None G3G4/S2 2B.2	Joshua tree woodland, Mojavean desert scrub, Sonoran desert scrub. sandy, rocky. 300 - 1524 m. perennial stem succulent. Blooms May-Jun (Jul)
Harpagonella palmeri Palmer's grapplinghook	None/None G4/S3 4.2	Chaparral, Coastal scrub, Valley and foothill grassland. Clay; open grassy areas within shrubland. 20 - 955 m. annual herb. Blooms Mar-May
Hazardia cana San Clemente Island hazardia	None/None G3/S3 1B.2	Coastal bluff scrub, Coastal scrub, Riparian forest. 60 - 500 m. perennial evergreen shrub. Blooms Jun-Sep
Hazardia orcuttii Orcutt's hazardia	None/SCT G1/S1 1B.1	Chaparral (maritime), Coastal scrub. often clay. 80 - 85 m. perennial evergreen shrub. Blooms Aug-Oct
Hecastocleis shockleyi prickle-leaf	None/None G4/S4 3	Chenopod scrub, Mojavean desert scrub. rocky slopes, washes; often carbonate or slate. 1200 - 2200 m. perennial evergreen shrub. Blooms May-Jul
Hedeoma drummondii Drummond's false pennyroyal	None/None G5/S1 2B.2	Great Basin scrub, Pinyon and juniper woodland. rocky or gravelly, usually carbonate. 1400 - 1700 m. perennial herb. Blooms May-Jul
Hedeoma nana ssp. *californica* California mock pennyroyal	None/None G5T4/S4 4.3	Joshua tree woodland, Pinyon and juniper woodland. rocky, often carbonate. 855 - 2100 m. perennial herb. Blooms Apr-Jun

Scientific Name Common Name	Status	Habitat Requirements
Helianthus inexpectatus Newhall sunflower	None/None G1/S1 1B.1	Marshes and swamps, Riparian woodland. freshwater, seeps. 305 - 305 m. perennial rhizomatous herb. Blooms Aug-Oct
Helianthus niveus ssp. *tephrodes* Algodones Dunes sunflower	None/SCE G4T2T3/S1 1B.2	Desert dunes. 50 - 100 m. perennial herb. Blooms Sep-May
Helianthus nuttallii ssp. *parishii* Los Angeles sunflower	None/None G5TH/SH 1A	Marshes and swamps (coastal salt and freshwater). 10 - 1525 m. perennial rhizomatous herb. Blooms Aug-Oct
Herissantia crispa curly herissantia	None/None G5/S1 2B.3	Sonoran desert scrub. 700 - 725 m. annual/perennial herb. Blooms (Apr) Aug-Sep
Hesperevax caulescens hogwallow starfish	None/None G3/S3 4.2	Valley and foothill grassland (mesic, clay), Vernal pools (shallow). sometimes alkaline. 0 - 505 m. annual herb. Blooms Mar-Jun
Hesperocyparis forbesii Tecate cypress	None/None G2/S2 1B.1	Closed-cone coniferous forest, Chaparral. clay, gabbroic or metavolcanic. 80 - 1500 m. perennial evergreen tree. Blooms
Hesperocyparis stephensonii Cuyamaca cypress	None/None G1/S1 1B.1	Closed-cone coniferous forest, Chaparral, Cismontane woodland, Riparian forest. gabbroic. 1035 - 1705 m. perennial evergreen tree. Blooms
Heterotheca sessiliflora ssp. *sessiliflora* beach goldenaster	None/None G4T2T3/S1 1B.1	Chaparral (coastal), Coastal dunes, Coastal scrub. 0 - 1225 m. perennial herb. Blooms Mar-Dec
Heuchera abramsii Abrams' alumroot	None/None G3/S3 4.3	Upper montane coniferous forest (rocky). 2800 - 3500 m. perennial rhizomatous herb. Blooms Jul-Aug
Heuchera brevistaminea Laguna Mountains alumroot	None/None G2/S2 1B.3	Broadleafed upland forest, Chaparral, Cismontane woodland, Riparian forest. rocky. 1370 - 2000 m. perennial rhizomatous herb. Blooms Apr-Jul (Sep)
Heuchera caespitosa urn-flowered alumroot	None/None G3/S3 4.3	Cismontane woodland, Lower montane coniferous forest, Riparian forest (montane), Upper montane coniferous forest. rocky. 1155 - 2650 m. perennial rhizomatous herb. Blooms May-Aug
Heuchera hirsutissima shaggy-haired alumroot	None/None G3/S3 1B.3	Subalpine coniferous forest, Upper montane coniferous forest. rocky, granitic. 1520 - 3500 m. perennial rhizomatous herb. Blooms (May) Jun-Jul
Heuchera maxima island alumroot	None/None G3/S3 1B.2	Coastal bluff scrub, Chaparral, Cismontane woodland, Coastal scrub. rocky. 10 - 500 m. perennial rhizomatous herb. Blooms Feb-May
Heuchera parishii Parish's alumroot	None/None G3/S3 1B.3	Alpine boulder and rock field, Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest. rocky, sometimes carbonate. 1500 - 3800 m. perennial rhizomatous herb. Blooms Jun-Aug
Heuchera rubescens var. *versicolor* San Diego County alumroot	None/None G5T4/S2 3.3	Chaparral, Lower montane coniferous forest. rocky. 1500 - 4000 m. perennial rhizomatous herb. Blooms May-Jun
Hibiscus lasiocarpos var. *occidentalis* woolly rose-mallow	None/None G5T3/S3 1B.2	Marshes and swamps (freshwater). Often in riprap on sides of levees. 0 - 120 m. perennial rhizomatous herb (emergent). Blooms Jun-Sep
Holocarpha virgata ssp. *elongata* graceful tarplant	None/None G5T3/S3 4.2	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland. 60 - 1100 m. annual herb. Blooms May-Nov

Scientific Name Common Name	Status	Habitat Requirements
Hordeum intercedens vernal barley	None/None G3G4/S3S4 3.2	Coastal dunes, Coastal scrub, Valley and foothill grassland (saline flats and depressions), Vernal pools. 5 - 1000 m. annual herb. Blooms Mar-Jun
Horkelia cuneata var. *puberula* mesa horkelia	None/None G4T1/S1 1B.1	Chaparral (maritime), Cismontane woodland, Coastal scrub. sandy or gravelly. 70 - 810 m. perennial herb. Blooms Feb-Jul (Sep)
Horkelia truncata Ramona horkelia	None/None G3/S3 1B.3	Chaparral, Cismontane woodland. clay, gabbroic. 400 - 1300 m. perennial herb. Blooms May-Jun
Horkelia wilderae Barton Flats horkelia	None/None G1/S1 1B.1	Chaparral (edges), Lower montane coniferous forest, Upper montane coniferous forest. 1675 - 2925 m. perennial herb. Blooms May-Sep
Horsfordia alata pink velvet-mallow	None/None G5/S4 4.3	Sonoran desert scrub (rocky). 100 - 500 m. perennial shrub. Blooms Feb-Dec
Horsfordia newberryi Newberry's velvet-mallow	None/None G5/S4 4.3	Sonoran desert scrub (rocky). 3 - 800 m. perennial shrub. Blooms Feb,Apr,Nov,Dec
Hosackia crassifolia var. *otayensis* Otay Mountain lotus	None/None G5T1/S1 1B.1	Chaparral (metavolcanic, often in disturbed areas). 380 - 1005 m. perennial herb. Blooms May-Aug
Hulsea californica San Diego sunflower	None/None G3/S3 1B.3	Chaparral, Lower montane coniferous forest, Upper montane coniferous forest. openings and burned areas. 915 - 2915 m. perennial herb. Blooms Apr-Jun
Hulsea mexicana Mexican hulsea	None/None G3G4/S1 2B.3	Chaparral (volcanic, often on burns or disturbed areas). 1200 - 1200 m. annual/perennial herb. Blooms Apr-Jun
Hulsea vestita ssp. *callicarpha* beautiful hulsea	None/None G5T4/S4 4.2	Chaparral, Lower montane coniferous forest. rocky or gravelly, granitic. 915 - 3050 m. perennial herb. Blooms May-Oct
Hulsea vestita ssp. *gabrielensis* San Gabriel Mountains sunflower	None/None G5T3/S3 4.3	Lower montane coniferous forest, Upper montane coniferous forest. rocky. 1500 - 2500 m. perennial herb. Blooms May-Jul
Hulsea vestita ssp. *parryi* Parry's sunflower	None/None G5T4/S4 4.3	Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest. granitic or carbonate, rocky, openings. 1370 - 2895 m. perennial herb. Blooms Apr-Aug
Hulsea vestita ssp. *pygmaea* pygmy hulsea	None/None G5T1/S1 1B.3	Alpine boulder and rock field, Subalpine coniferous forest. granitic, gravelly. 2835 - 3900 m. perennial herb. Blooms Jun-Oct
Hymenopappus filifolius var. *eriopodus* hairy-podded fine-leaf hymenopappus	None/None G5T3/S2S3 2B.3	Pinyon and juniper woodland. carbonate. 1600 - 1700 m. perennial herb. Blooms May-Jul
Hymenothrix wrightii Wright's hymenothrix	None/None G5/S3 4.3	Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland. 1400 - 1550 m. perennial herb. Blooms Jun-Oct
Hymenoxys odorata bitter hymenoxys	None/None G5/S2 2B.1	Riparian scrub, Sonoran desert scrub. sandy. 45 - 150 m. annual herb. Blooms Feb, Apr, May, Jun, Aug, Sep, Oct, Nov
Imperata brevifolia California satintail	None/None G4/S3 2B.1	Chaparral, Coastal scrub, Mojavean desert scrub, Meadows and seeps (often alkali), Riparian scrub. mesic. 0 - 1215 m. perennial rhizomatous herb. Blooms Sep-May

Scientific Name Common Name	Status	Habitat Requirements
Ipomopsis tenuifolia slender-leaved ipomopsis	None/None G4/S2 2B.3	Chaparral, Pinyon and juniper woodland, Sonoran desert scrub. gravelly or rocky. 100 - 1200 m. perennial herb. Blooms Mar-May
Isocoma menziesii var. *decumbens* decumbent goldenbush	None/None G3G5T2T3/S2 1B.2	Chaparral, Coastal scrub (sandy, often in disturbed areas). 10 - 135 m. perennial shrub. Blooms Apr-Nov
Iva hayesiana San Diego marsh-elder	None/None G3/S2 2B.2	Marshes and swamps, Playas. 10 - 500 m. perennial herb. Blooms Apr-Oct
Ivesia argyrocoma var. *argyrocoma* silver-haired ivesia	None/None G2T2/S2 1B.2	Meadows and seeps (alkaline), Pebble (Pavement) plain, Upper montane coniferous forest. 1463 - 2960 m. perennial herb. Blooms (May) Jun-Aug
Ivesia callida Tahquitz ivesia	None/SCR G1/S1 1B.3	Upper montane coniferous forest (granitic, rocky). 2410 - 2450 m. perennial herb. Blooms Jul-Sep
Ivesia jaegeri Jaeger's ivesia	None/None G2G3/S1 1B.3	Pinyon and juniper woodland, Upper montane coniferous forest. carbonate, rocky. 1830 - 3600 m. perennial herb. Blooms Jun-Jul
Ivesia patellifera Kingston Mountains ivesia	None/None G2/S2 1B.3	Pinyon and juniper woodland (granitic, rocky). 1400 - 2100 m. perennial herb. Blooms Jun-Oct
Jaffueliobryum raui Rau?s jaffueliobryum moss	None/None G4?/S2? 2B.3	Alpine dwarf scrub, Chaparral, Mojavean desert scrub, Sonoran desert scrub. Dry openings, rock crevices, carbonate. 490 - 2100 m. moss. Blooms
Jaffueliobryum wrightii Wright?s jaffueliobryum moss	None/None G4G5/S2? 2B.3	Alpine dwarf scrub, Mojavean desert scrub, Pinyon and juniper woodland. Dry openings, rock crevices, carbonate. 160 - 2500 m. moss. Blooms
Johnstonella costata ribbed cryptantha	None/None G4G5/S4 4.3	Desert dunes, Mojavean desert scrub, Sonoran desert scrub. sandy. -60 - 500 m. annual herb. Blooms Feb-May
Johnstonella holoptera winged cryptantha	None/None G4G5/S4 4.3	Mojavean desert scrub, Sonoran desert scrub. 100 - 1690 m. annual herb. Blooms Mar-Apr
Juglans californica Southern California black walnut	None/None G4/S4 4.2	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland. alluvial. 50 - 900 m. perennial deciduous tree. Blooms Mar-Aug
Juncus acutus ssp. *leopoldii* southwestern spiny rush	None/None G5T5/S4 4.2	Coastal dunes (mesic), Meadows and seeps (alkaline seeps), Marshes and swamps (coastal salt). 3 - 900 m. perennial rhizomatous herb. Blooms (Mar) May-Jun
Juncus cooperi Cooper's rush	None/None G4/S3 4.3	Meadows and seeps (mesic, alkaline or saline). -260 - 1770 m. perennial herb. Blooms Apr-May (Aug)
Juncus duranii Duran's rush	None/None G3/S3 4.3	Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest. mesic. 1768 - 2804 m. perennial rhizomatous herb. Blooms Jul-Aug
Juncus interior inland rush	None/None G4/S1 2B.2	Pinyon and juniper woodland. 1830 - 1845 m. perennial herb. Blooms Jun-Aug
Juncus luciensis Santa Lucia dwarf rush	None/None G3/S3 1B.2	Chaparral, Great Basin scrub, Lower montane coniferous forest, Meadows and seeps, Vernal pools. 300 - 2040 m. annual herb. Blooms Apr-Jul

Scientific Name Common Name	Status	Habitat Requirements
Juncus nodosus knotted rush	None/None G5/S3 2B.3	Meadows and seeps (mesic), Marshes and swamps (lake margins). 30 - 1980 m. perennial rhizomatous herb. Blooms Jul-Sep
Kallstroemia parviflora warty caltrop	None/None G5/S3 4.2	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. Sometimes disturbed areas. 855 - 1705 m. annual herb. Blooms Aug-Nov
Koeberlinia spinosa var. *tenuispina* slender-spined all thorn	None/None G4T4?/S2 2B.2	Riparian woodland, Sonoran desert scrub. 150 - 510 m. perennial deciduous shrub. Blooms May-Jul
Lasthenia glabrata ssp. *coulteri* Coulter's goldfields	None/None G4T2/S2 1B.1	Marshes and swamps (coastal salt), Playas, Vernal pools. 1 - 1220 m. annual herb. Blooms Feb-Jun
Lathyrus jepsonii var. *jepsonii* Delta tule pea	None/None G5T2/S2 1B.2	Marshes and swamps (freshwater and brackish). 0 - 5 m. perennial herb. Blooms May-Jul (Aug-Sep)
Lathyrus splendens pride-of-California	None/None G4/S4 4.3	Chaparral. 200 - 1525 m. perennial herb. Blooms Mar-Jun
Lavatera assurgentiflora ssp. *assurgentiflora* island mallow	None/None G1T1/S1 1B.1	Coastal bluff scrub, Coastal scrub. sandy or rocky. 15 - 245 m. perennial evergreen shrub. Blooms Mar-Nov
Lavatera assurgentiflora ssp. *glabra* southern island mallow	None/None G1T1/S1 1B.1	Coastal bluff scrub. 5 - 250 m. perennial evergreen shrub. Blooms May-Sep
Layia heterotricha pale-yellow layia	None/None G2/S2 1B.1	Cismontane woodland, Coastal scrub, Pinyon and juniper woodland, Valley and foothill grassland. alkaline or clay. 300 - 1705 m. annual herb. Blooms Mar-Jun
Layia munzii Munz's tidy-tips	None/None G2/S2 1B.2	Chenopod scrub, Valley and foothill grassland (alkaline clay). 150 - 700 m. annual herb. Blooms Mar-Apr
Lepechinia cardiophylla heart-leaved pitcher sage	None/None G3/S2S3 1B.2	Closed-cone coniferous forest, Chaparral, Cismontane woodland. 520 - 1370 m. perennial shrub. Blooms Apr-Jul
Lepechinia fragrans fragrant pitcher sage	None/None G3/S3 4.2	Chaparral. 20 - 1310 m. perennial shrub. Blooms Mar-Oct
Lepechinia ganderi Gander's pitcher sage	None/None G3/S3 1B.3	Closed-cone coniferous forest, Chaparral, Coastal scrub, Valley and foothill grassland. Gabbroic or metavolcanic. 305 - 1005 m. perennial shrub. Blooms Jun-Jul
Lepechinia rossii Ross' pitcher sage	None/None G1/S1 1B.2	Chaparral. 305 - 790 m. perennial shrub. Blooms May-Sep
Lepidium flavum var. *felipense* Blair Valley pepper-grass	None/None G5T1/S1 1B.2	Pinyon and juniper woodland, Sonoran desert scrub. sandy. 455 - 840 m. annual herb. Blooms Mar-May
Lepidium virginicum var. *robinsonii* Robinson's pepper-grass	None/None G5T3/S3 4.3	Chaparral, Coastal scrub. 1 - 885 m. annual herb. Blooms Jan-Jul
Leptosiphon floribundus ssp. *hallii* Santa Rosa Mountains leptosiphon	None/None G4T1T2/S1S2 1B.3	Pinyon and juniper woodland, Sonoran desert scrub. 1000 - 2000 m. perennial herb. Blooms May-Jul (Nov)

Scientific Name Common Name	Status	Habitat Requirements
Leptosiphon pygmaeus ssp. *pygmaeus* pygmy leptosiphon	None/None G4T1/S1 1B.2	Coastal scrub, Valley and foothill grassland. 455 - 595 m. annual herb. Blooms Apr
Leptosyne maritima sea dahlia	None/None G2/S1S2 2B.2	Coastal bluff scrub, Coastal scrub. 5 - 150 m. perennial herb. Blooms Mar-May
Lessingia glandulifera var. *tomentosa* Warner Springs lessingia	None/None G4?T2/S2 1B.1	Chaparral (sandy). 870 - 1220 m. annual herb. Blooms Aug, Oct
Lewisia brachycalyx short-sepaled lewisia	None/None G4/S2 2B.2	Lower montane coniferous forest, Meadows and seeps. mesic. 1370 - 2300 m. perennial herb. Blooms (Feb)Apr-Jun (Jul)
Lilaeopsis masonii Mason's lilaeopsis	None/SCR G2/S2 1B.1	Marshes and swamps (brackish or freshwater), Riparian scrub. 0 - 10 m. perennial rhizomatous herb. Blooms Apr-Nov
Lilium humboldtii ssp. *ocellatum* ocellated Humboldt lily	None/None G4T4?/S4? 4.2	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Riparian woodland. openings. 30 - 1800 m. perennial bulbiferous herb. Blooms Mar-Jul (Aug)
Lilium parryi lemon lily	None/None G3/S3 1B.2	Lower montane coniferous forest, Meadows and seeps, Riparian forest, Upper montane coniferous forest. mesic. 1220 - 2745 m. perennial bulbiferous herb. Blooms Jul-Aug
Limnanthes alba ssp. *parishii* Parish's meadowfoam	None/SCE G4T2/S2 1B.2	Lower montane coniferous forest, Meadows and seeps, Vernal pools. vernally mesic. 600 - 2000 m. annual herb. Blooms Apr-Jun
Limosella australis Delta mudwort	None/None G4G5/S2 2B.1	Marshes and swamps (freshwater or brackish), Riparian scrub. Usually mud banks. 0 - 3 m. perennial stoloniferous herb. Blooms May-Aug
Linanthus bellus desert beauty	None/None G2G3/S2 2B.1	Chaparral (sandy). 1000 - 1400 m. annual herb. Blooms Apr-May
Linanthus bernardinus Pioneertown linanthus	None/None G1/S1 1B.2	Joshua tree woodland, Pinyon and juniper woodland. 1190 - 1340 m. annual herb. Blooms Mar-May
Linanthus concinnus San Gabriel linanthus	None/None G2/S2 1B.2	Chaparral, Lower montane coniferous forest, Upper montane coniferous forest. rocky, openings. 1520 - 2800 m. annual herb. Blooms Apr-Jul
Linanthus jaegeri San Jacinto linanthus	None/None G2/S2 1B.2	Subalpine coniferous forest, Upper montane coniferous forest. granitic, rocky. 2195 - 3050 m. perennial herb. Blooms Jul-Sep
Linanthus killipii Baldwin Lake linanthus	None/None G1/S1 1B.2	Joshua tree woodland, Meadows and seeps (alkaline), Pebble (Pavement) plain, Pinyon and juniper woodland. 1700 - 2400 m. annual herb. Blooms May-Jul
Linanthus maculatus ssp. *emaculatus* Jacumba Mountains linanthus	None/None G2T1/S1 1B.1	Desert dunes (edges), Sonoran desert scrub. Sandy or course, opaque-white, decomposed granite soils of washes and on flats near wash margins. 395 - 585 m. annual herb. Blooms (Mar) Apr (May)
Linanthus maculatus ssp. *maculatus* Little San Bernardino Mtns. linanthus	None/None G2T2/S2 1B.2	Desert dunes, Joshua tree woodland, Mojavean desert scrub, Sonoran desert scrub. Sandy. 140 - 1220 m. annual herb. Blooms Mar-May
Linanthus orcuttii Orcutt's linanthus	None/None G3/S2 1B.3	Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland. openings. 915 - 2145 m. annual herb. Blooms May-Jun

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Linum puberulum plains flax	None/None G5/S2 2B.3	Great Basin scrub, Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. 1000 - 2500 m. perennial herb. Blooms May-Jul(Oct)
Lithophragma maximum San Clemente Island woodland star	FE/SCE G1/S1 1B.1	Coastal bluff scrub, Coastal scrub. rocky. 120 - 400 m. perennial rhizomatous herb. Blooms Apr-Jun
Lithospermum incisum plains stoneseed	None/None G5/S1 2B.3	Pinyon and juniper woodland. 1650 - 1720 m. perennial herb. Blooms May
Loeflingia squarrosa var. *artemisiarum* sagebrush loeflingia	None/None G5T3/S2 2B.2	Desert dunes, Great Basin scrub, Sonoran desert scrub. sandy. 700 - 1615 m. annual herb. Blooms Apr-May
Loeseliastrum depressum depressed standing-cypress	None/None G5/S3S4 4.3	Great Basin scrub, Mojavean desert scrub, Pinyon and juniper woodland. sandy or gravelly. 1220 - 2100 m. annual herb. Blooms
Lomatium insulare San Nicolas Island lomatium	None/None G3/S2S3 1B.2	Coastal bluff scrub (sandy). 15 - 800 m. perennial herb. Blooms Jan-Apr (Jun)
Lonicera subspicata var. *subspicata* Santa Barbara honeysuckle	None/None G5T2?/S2? 1B.2	Chaparral, Cismontane woodland, Coastal scrub. 10 - 1000 m. perennial evergreen shrub. Blooms May-Aug (Dec-Feb)
Lupinus albifrons var. *johnstonii* interior bush lupine	None/None G4T4/S4 4.3	Chaparral, Lower montane coniferous forest. decomposed granitic. 1500 - 2500 m. perennial shrub. Blooms May-Jul
Lupinus albifrons var. *medius* Mountain Springs bush lupine	None/None G4T3/S2 1B.3	Pinyon and juniper woodland, Sonoran desert scrub. 425 - 1370 m. perennial shrub. Blooms Mar-May
Lupinus elatus silky lupine	None/None G4/S4 4.3	Lower montane coniferous forest, Upper montane coniferous forest. 1500 - 3000 m. perennial herb. Blooms (May) Jun-Aug
Lupinus guadalupensis Guadalupe Island lupine	None/None G3/S3 4.2	Coastal scrub. Sandy, gravelly, or rocky; sometimes in disturbed areas. 10 - 465 m. annual herb. Blooms Feb-Apr
Lupinus magnificus var. *glarecola* Coso Mountains lupine	None/None G3T4/S4 4.3	Great Basin scrub, Joshua tree woodland, Mojavean desert scrub. granitic, often talus and scree. 1110 - 2440 m. perennial herb. Blooms Apr-Jun
Lupinus paynei Payne's bush lupine	None/None G1Q/S1 1B.1	Coastal scrub, Riparian scrub, Valley and foothill grassland. Sandy. 220 - 420 m. perennial shrub. Blooms Mar-Apr (May-Jul)
Lupinus peirsonii Peirson's lupine	None/None G3/S3 1B.3	Joshua tree woodland, Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest. gravelly or rocky. 1000 - 2500 m. perennial herb. Blooms Apr-Jun
Lycium brevipes var. *hassei* Santa Catalina Island desert-thorn	None/None G5T1Q/S1 3.1	Coastal bluff scrub, Coastal scrub. 65 - 300 m. perennial deciduous shrub. Blooms Jun (Aug)
Lycium californicum California box-thorn	None/None G4/S4 4.2	Coastal bluff scrub, Coastal scrub. 5 - 150 m. perennial shrub. Blooms (Dec)Mar, Jun, Jul, Aug
Lycium exsertum Arizona desert-thorn	None/None G4G5/S1 2B.1	Sonoran desert scrub. volcanic, gravelly. 265 - 265 m. perennial shrub. Blooms Jan-Mar

Scientific Name Common Name	Status	Habitat Requirements
Lycium parishii Parish's desert-thorn	None/None G3?/S1 2B.3	Coastal scrub, Sonoran desert scrub. 135 - 1000 m. perennial shrub. Blooms Mar-Apr
Lycium torreyi Torrey's box-thorn	None/None G4G5/S3 4.2	Mojavean desert scrub, Sonoran desert scrub. Sandy, rocky, washes, streambanks, desert valleys. -50 - 1220 m. perennial shrub. Blooms (Jan-Feb) Mar-Jun (Sep-Nov)
Lycium verrucosum San Nicolas Island desert-thorn	None/None GXQ/SX 1A	Coastal scrub. - m. perennial shrub. Blooms Apr
Lyonothamnus floribundus ssp. *aspleniifolius* Santa Cruz Island ironwood	None/None G3T3/S3 1B.2	Broadleafed upland forest, Chaparral, Cismontane woodland. 20 - 580 m. perennial evergreen tree. Blooms May-Jul
Lyonothamnus floribundus ssp. *floribundus* Santa Catalina Island ironwood	None/None G3T2/S2 1B.2	Broadleafed upland forest, Chaparral, Cismontane woodland. 75 - 500 m. perennial evergreen tree. Blooms May-Jun
Lyrocarpa coulteri Palmer's lyrepod	None/None G4G5/S4 4.3	Sonoran desert scrub (gravelly or rocky). 120 - 795 m. perennial herb. Blooms Dec-Apr
Malacothamnus clementinus San Clemente Island bush-mallow	FE/SCE G2G3/S2S3 1B.1	Valley and foothill grassland (rocky). 10 - 275 m. perennial deciduous shrub. Blooms Mar-Aug
Malacothamnus davidsonii Davidson's bush-mallow	None/None G2/S2 1B.2	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland. 185 - 1140 m. perennial deciduous shrub. Blooms Jun-Jan
Malacothamnus parishii Parish's bush-mallow	None/None GXQ/SX 1A	Chaparral, Coastal scrub. 305 - 455 m. perennial deciduous shrub. Blooms Jun-Jul
Malacothrix foliosa ssp. *crispifolia* wavy-leaved malacothrix	None/None G4T1/S1 1B.2	Coastal scrub (rocky). 3 - 65 m. annual herb. Blooms Mar, May (Jul)
Malacothrix incana dunedelion	None/None G3G4/S3S4 4.3	Coastal dunes, Coastal scrub. 2 - 35 m. perennial herb. Blooms (Jan) Apr-Oct
Malacothrix junakii Junak's malcothrix	None/None G1/S1 1B.1	Coastal scrub. 20 - 25 m. annual herb. Blooms Apr,Jun
Malacothrix saxatilis var. *saxatilis* cliff malacothrix	None/None G5T4/S4 4.2	Coastal bluff scrub, Coastal scrub. 3 - 200 m. perennial rhizomatous herb. Blooms Mar-Sep
Malacothrix similis Mexican malacothrix	None/None G2G3/SH 2A	Coastal dunes. 0 - 40 m. annual herb. Blooms Apr-May
Malacothrix squalida island malacothrix	FE/None G1/S1 1B.1	Coastal bluff scrub, Chaparral, Cismontane woodland. 15 - 200 m. annual herb. Blooms Apr-Jul
Malaxis monophyllos var. *brachypoda* white bog adder's-mouth	None/None G4?T4/S1 2B.1	Bogs and fens, Meadows and seeps, Upper montane coniferous forest. mesic. 2200 - 2743 m. perennial bulbiferous herb. Blooms Jun, Aug
Malperia tenuis brown turbans	None/None G4?/S2? 2B.3	Sonoran desert scrub (sandy, gravelly). 15 - 335 m. annual herb. Blooms (Feb) Mar-Apr

Scientific Name Common Name	Status	Habitat Requirements
Mammillaria grahamii var. *grahamii* Graham's fishhook cactus	None/None G4T4/S2 2B.2	Sonoran desert scrub gravelly or rocky. 300 - 900 m. perennial stem succulent. Blooms Apr-Sep
Marina orcuttii var. *orcuttii* California marina	None/None G2G3T1T2/S2? 1B.3	Chaparral, Pinyon and juniper woodland, Sonoran desert scrub. rocky. 1050 - 1160 m. perennial herb. Blooms May-Oct
Matelea parvifolia spearleaf	None/None G5/S3 2B.3	Mojavean desert scrub, Sonoran desert scrub. rocky. 440 - 1095 m. perennial herb. Blooms Mar-May (Jul)
Maurandella antirrhiniflora violet twining snapdragon	None/None G5/S2 2B.3	Joshua tree woodland, Mojavean desert scrub. carbonate. 760 - 1525 m. perennial herb. Blooms Apr-May
Meesia triquetra three-ranked hump moss	None/None G5/S4 4.2	Bogs and fens, Meadows and seeps, Subalpine coniferous forest, Upper montane coniferous forest (mesic). soil. 1300 - 2953 m. moss. Blooms Jul
Meesia uliginosa broad-nerved hump moss	None/None G5/S3 2B.2	Bogs and fens, Meadows and seeps, Subalpine coniferous forest, Upper montane coniferous forest. damp soil. 1210 - 2804 m. moss. Blooms Jul, Oct
Menodora scabra var. *scabra* rough menodora	None/None G5T4T5/S3 2B.3	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. 1200 - 1800 m. perennial herb. Blooms May-Jun
Menodora spinescens var. *mohavensis* Mojave menodora	None/None G4T2/S2 1B.2	Mojavean desert scrub. Andesite gravel, rocky hillsides, canyons. 690 - 2000 m. perennial deciduous shrub. Blooms Apr-May
Mentzelia eremophila solitary blazing star	None/None G4/S3S4 4.2	Mojavean desert scrub. 700 - 1220 m. annual herb. Blooms Mar-May
Mentzelia hirsutissima hairy stickleaf	None/None G4?/S3 2B.3	Sonoran desert scrub (rocky). 0 - 700 m. annual herb. Blooms Mar-May
Mentzelia polita polished blazing star	None/None G2G3/S2? 1B.2	Mojavean desert scrub. carbonate. 1200 - 1580 m. perennial herb. Blooms Apr-Aug
Mentzelia pterosperma wing-seed blazing star	None/None G4/S1S2 2B.2	Mojavean desert scrub. clay, gypseous. 1140 - 1140 m. annual/perennial herb. Blooms Apr-Jun
Mentzelia puberula Darlington's blazing star	None/None G5/S2 2B.2	Mojavean desert scrub, Sonoran desert scrub. sandy or rocky. 90 - 1280 m. perennial herb. Blooms Mar-May
Mentzelia tricuspis spiny-hair blazing star	None/None G4/S2 2B.1	Mojavean desert scrub. sandy, gravelly, slopes, and washes. 150 - 1280 m. annual herb. Blooms Mar-May
Mentzelia tridentata creamy blazing star	None/None G3/S3 1B.3	Mojavean desert scrub. rocky, gravelly, sandy. 700 - 1175 m. annual herb. Blooms Mar-May
Micromonolepis pusilla dwarf monolepis	None/None G5/S3? 2B.3	Great Basin scrub. alkaline, openings. 1500 - 2400 m. annual herb. Blooms May-Aug
Microseris douglasii ssp. *platycarpha* small-flowered microseris	None/None G4T4/S4 4.2	Cismontane woodland, Coastal scrub, Valley and foothill grassland, Vernal pools. clay. 15 - 1070 m. annual herb. Blooms Mar-May

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Microseris sylvatica sylvan microseris	None/None G4/S4 4.2	Chaparral, Cismontane woodland, Great Basin scrub, Pinyon and juniper woodland, Valley and foothill grassland (serpentinite). 45 - 1500 m. perennial herb. Blooms Mar-Jun
Mielichhoferia shevockii Shevock's copper moss	None/None G2/S2 1B.2	Cismontane woodland (metamorphic, rock, mesic). 750 - 1400 m. moss. Blooms
Mirabilis coccinea red four o'clock	None/None G5/S2 2B.3	Pinyon and juniper woodland. 1070 - 1800 m. perennial herb. Blooms May-Jul
Mirabilis tenuiloba slender-lobed four o'clock	None/None G5/S4 4.3	Sonoran desert scrub. 230 - 1095 m. perennial herb. Blooms (Feb) Mar-May
Mobergia calculiformis light gray lichen	None/None G3/S1 3	Coastal scrub. Abundant on cobbles in right habitat; only known from one site in Baja and one in San Diego area.
Monarda pectinata plains bee balm	None/None G5/SH 2B.3	Joshua tree woodland, Pinyon and juniper woodland. rocky. 1150 - 1525 m. annual herb. Blooms Jul-Sep
Monardella australis ssp. *cinerea* gray monardella	None/None G4T3/S3 4.3	Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest. 1800 - 3050 m. perennial rhizomatous herb. Blooms Jul-Aug
Monardella australis ssp. *jokerstii* Jokerst?s monardella	None/None G4T1/S1 1B.1	Chaparral, Lower montane coniferous forest. Steep scree or talus slopes between breccia, secondary alluvial benches along drainages and washes. 1350 - 1750 m. perennial rhizomatous herb. Blooms Jul-Sep
Monardella boydii Boyd?s monardella	None/None G1?Q/S1? 1B.2	Mojavean desert scrub, Pinyon and juniper woodland, Riparian scrub (desert). Usually in alluvial soils and cracks of bedrock in washes on canyon bottoms and rocky slopes. 1400 - 1650 m. perennial shrub. Blooms Aug-Oct
Monardella eremicola Clark Mountain monardella	None/None G3Q/S3 1B.3	Pinyon and juniper woodland, Riparian scrub (desert). Granitic or carbonate. Usually in bedrock cracks and benches along canyon washes. 1500 - 2100 m. perennial shrub. Blooms Jun-Aug
Monardella hypoleuca ssp. *hypoleuca* white-veined monardella	None/None G4T3/S3 1B.3	Chaparral, Cismontane woodland. 50 - 1525 m. perennial herb. Blooms (Apr) May-Aug (Sep-Dec)
Monardella hypoleuca ssp. *intermedia* intermediate monardella	None/None G4T2?/S2? 1B.3	Chaparral, Cismontane woodland, Lower montane coniferous forest (sometimes). Usually understory. 400 - 1250 m. perennial rhizomatous herb. Blooms Apr-Sep
Monardella hypoleuca ssp. *lanata* felt-leaved monardella	None/None G4T3/S3 1B.2	Chaparral, Cismontane woodland. 300 - 1575 m. perennial rhizomatous herb. Blooms Jun-Aug
Monardella linoides ssp. *oblonga* Tehachapi monardella	None/None G5T2/S2 1B.3	Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest. 900 - 2470 m. perennial rhizomatous herb. Blooms (May) Jun-Aug
Monardella macrantha ssp. *hallii* Hall's monardella	None/None G5T3/S3 1B.3	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland. 730 - 2195 m. perennial rhizomatous herb. Blooms Jun-Oct
Monardella nana ssp. *leptosiphon* San Felipe monardella	None/None G4G5T2Q/S2 1B.2	Chaparral, Lower montane coniferous forest. 1200 - 1855 m. perennial rhizomatous herb. Blooms Jun-Jul

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Monardella pringlei Pringle's monardella	None/None GX/SX 1A	Coastal scrub (sandy). 300 - 400 m. annual herb. Blooms May-Jun
Monardella robisonii Robison's monardella	None/None G3/S3 1B.3	Pinyon and juniper woodland. 610 - 1500 m. perennial rhizomatous herb. Blooms (Feb) Apr-Sep (Oct)
Monardella saxicola rock monardella	None/None G3/S3 4.2	Closed-cone coniferous forest, Chaparral, Lower montane coniferous forest. rocky, usually serpentinite. 500 - 1800 m. perennial rhizomatous herb. Blooms Jun-Sep
Monardella sinuata ssp. *gerryi* Gerry?s curly-leaved monardella	None/None G3T1/S1 1B.1	Coastal scrub. Sandy openings. 150 - 245 m. annual herb. Blooms Apr-Jun
Monardella stoneana Jennifer's monardella	None/None G2/S1 1B.2	Closed-cone coniferous forest, Chaparral, Coastal scrub, Riparian scrub. usually rocky intermittent streambeds. 10 - 790 m. perennial herb. Blooms Jun-Sep
Monardella viminea willowy monardella	FE/SCE G1/S1 1B.1	Chaparral, Coastal scrub, Riparian forest, Riparian scrub, Riparian woodland. alluvial ephemeral washes. 50 - 225 m. perennial herb. Blooms Jun-Aug
Mortonia utahensis Utah mortonia	None/None G4G5/S3? 4.3	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. carbonate. 760 - 2100 m. perennial evergreen shrub. Blooms Mar-May
Mucronea californica California spineflower	None/None G3/S3 4.2	Chaparral, Cismontane woodland, Coastal dunes, Coastal scrub, Valley and foothill grassland. sandy. 0 - 1400 m. annual herb. Blooms Mar-Jul (Aug)
Muhlenbergia alopecuroides wolftail	None/None G5/S1? 2B.2	Joshua tree woodland, Pinyon and juniper woodland. 500 - 500 m. perennial herb. Blooms Aug-Sep
Muhlenbergia appressa appressed muhly	None/None G4/S3 2B.2	Coastal scrub, Mojavean desert scrub, Valley and foothill grassland. rocky. 20 - 1600 m. annual herb. Blooms Apr-May
Muhlenbergia arsenei tough muhly	None/None G5/S2 2B.3	Pinyon and juniper woodland (rocky, carbonate). 1400 - 1860 m. perennial rhizomatous herb. Blooms Aug-Oct
Muhlenbergia californica California muhly	None/None G4/S4 4.3	Chaparral, Coastal scrub, Lower montane coniferous forest, Meadows and seeps. mesic, seeps and streambanks. 100 - 2000 m. perennial rhizomatous herb. Blooms Jun-Sep
Muhlenbergia fragilis delicate muhly	None/None G5/S2 2B.3	Pinyon and juniper woodland (carbonate, gravelly). 1600 - 1600 m. annual herb. Blooms Oct
Muhlenbergia pauciflora few-flowered muhly	None/None G5/S2 2B.3	Pinyon and juniper woodland (rocky). 1755 - 1860 m. perennial rhizomatous herb. Blooms Sep-Oct
Muhlenbergia utilis aparejo grass	None/None G4/S2S3 2B.2	meadows and seeps, marshes and swamps, chaparral, coastal scrub, cismontane woodland. sometimes alkaline, sometimes serpentinite. 25 - 2325 m. perennial rhizomatous herb. Blooms Mar-Oct
Muilla coronata crowned muilla	None/None G3/S3 4.2	Chenopod scrub, Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. 670 - 1960 m. perennial bulbiferous herb. Blooms Mar-Apr (May)
Munroa squarrosa false buffalo-grass	None/None G5/S2 2B.2	Pinyon and juniper woodland (gravelly or rocky). 1500 - 1800 m. annual herb. Blooms Oct

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Munzothamnus blairii Blair's munzothamnus	None/None G3/S3 1B.2	Coastal bluff scrub, Coastal scrub. rocky. 25 - 455 m. perennial shrub. Blooms Jul-Sep
Myosurus minimus ssp. *apus* little mousetail	None/None G5T2Q/S2 3.1	Valley and foothill grassland, Vernal pools (alkaline). 20 - 640 m. annual herb. Blooms Mar-Jun
Myriopteris wootonii Wooton's lace fern	None/None G5/S2 2B.3	Joshua tree woodland, Pinyon and juniper woodland. rocky. 1600 - 1900 m. perennial rhizomatous herb. Blooms May-Oct
Nama demissa var. *covillei* Coville's purple mat	None/None G5T3/S3 1B.3	Mojavean desert scrub. dry, sandy flats, slopes; often roadsides. -85 - 1800 m. annual herb. Blooms Feb-May
Nama dichotoma var. *dichotoma* forked purple mat	None/None G5T5?/S1 2B.3	Pinyon and juniper woodland (granitic or carbonate). 1900 - 2200 m. annual herb. Blooms Sep-Oct
Nama stenocarpa mud nama	None/None G4G5/S1S2 2B.2	Marshes and swamps (lake margins, riverbanks). 5 - 500 m. annual/perennial herb. Blooms Jan-Jul
Nasturtium gambelii Gambel's water cress	FE/SCT G1/S1 1B.1	Marshes and swamps (freshwater or brackish). 5 - 330 m. perennial rhizomatous herb. Blooms Apr-Oct
Navarretia fossalis spreading navarretia	FT/None G2/S2 1B.1	Chenopod scrub, Marshes and swamps (assorted shallow freshwater), Playas, Vernal pools. 30 - 655 m. annual herb. Blooms Apr-Jun
Navarretia ojaiensis Ojai navarretia	None/None G2/S2 1B.1	Chaparral (openings), Coastal scrub (openings), Valley and foothill grassland. 275 - 620 m. annual herb. Blooms May-Jul
Navarretia peninsularis Baja navarretia	None/None G3/S2 1B.2	Chaparral (openings), Lower montane coniferous forest, Meadows and seeps, Pinyon and juniper woodland. mesic. 1500 - 2300 m. annual herb. Blooms (May)Jun-Aug
Navarretia prostrata prostrate vernal pool navarretia	None/None G2/S2 1B.1	Coastal scrub, Meadows and seeps, Valley and foothill grassland (alkaline), Vernal pools. Mesic. 3 - 1210 m. annual herb. Blooms Apr-Jul
Navarretia setiloba Piute Mountains navarretia	None/None G2/S2 1B.1	Cismontane woodland, Pinyon and juniper woodland, Valley and foothill grassland. clay or gravelly loam. 285 - 2100 m. annual herb. Blooms Apr-Jul
Nemacaulis denudata var. *denudata* coast woolly-heads	None/None G3G4T2/S2 1B.2	Coastal dunes. 0 - 100 m. annual herb. Blooms Apr-Sep
Nemacaulis denudata var. *gracilis* slender cottonheads	None/None G3G4T3?/S2 2B.2	Coastal dunes, Desert dunes, Sonoran desert scrub. -50 - 400 m. annual herb. Blooms (Mar) Apr-May
Nemacladus gracilis slender nemacladus	None/None G4/S4 4.3	Cismontane woodland, Valley and foothill grassland. sandy or gravelly. 120 - 1900 m. annual herb. Blooms Mar-May
Nemacladus secundiflorus var. *robbinsii* Robbins' nemacladus	None/None G3T2/S2 1B.2	Chaparral, Valley and foothill grassland. openings. 350 - 1700 m. annual herb. Blooms Apr-Jun
Nemacladus twisselmannii Twisselmann's nemacladus	None/SCR G1/S1 1B.2	Upper montane coniferous forest (sandy or rocky, granitic). 2240 - 2450 m. annual herb. Blooms Jul

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Nolina cismontana chaparral nolina	None/None G3/S3 1B.2	Chaparral, Coastal scrub. sandstone or gabbro. 140 - 1275 m. perennial evergreen shrub. Blooms (Mar) May-Jul
Nolina interrata Dehesa nolina	None/SCE G2/S2 1B.1	Chaparral (gabbroic, metavolcanic, or serpentinite). 185 - 855 m. perennial herb. Blooms Jun-Jul
Oenothera cavernae cave evening-primrose	None/None G2G3/S1 2B.1	Great Basin scrub, Joshua tree woodland, Mojavean desert scrub. gravelly, often calcareous. 760 - 1280 m. annual herb. Blooms Mar-Nov
Oenothera cespitosa ssp. *crinita* caespitose evening-primrose	None/None G5T4/S4? 4.2	Pinyon and juniper woodland, Subalpine coniferous forest, Sonoran desert scrub. 1150 - 3370 m. perennial rhizomatous herb. Blooms (Apr) Jun-Sep
Oenothera deltoides ssp. *howellii* Antioch Dunes evening-primrose	FE/SCE G5T1/S1 1B.1	Inland dunes. 0 - 30 m. perennial herb. Blooms Mar-Sep
Oenothera longissima long-stem evening-primrose	None/None G4/S1 2B.2	Mojavean desert scrub, Pinyon and juniper woodland. seasonally mesic. 1000 - 1700 m. annual/perennial herb. Blooms Jul-Sep
Ophioglossum californicum California adder's-tongue	None/None G4/S4 4.2	Chaparral, Valley and foothill grassland, Vernal pools (margins). mesic. 60 - 525 m. perennial rhizomatous herb. Blooms (Dec) Jan-Jun
Opuntia basilaris var. *brachyclada* short-joint beavertail	None/None G5T3/S3 1B.2	Chaparral, Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. 425 - 1800 m. perennial stem succulent. Blooms Apr-Jun (Aug)
Opuntia basilaris var. *treleasei* Bakersfield cactus	FE/SCE G5T1/S1 1B.1	Chenopod scrub, Cismontane woodland, Valley and foothill grassland. sandy or gravelly. 100 - 1450 m. perennial stem succulent. Blooms Apr-May
Opuntia wigginsii Wiggins' cholla	None/None G3?Q/S1? 3.3	Sonoran desert scrub (sandy). 30 - 885 m. perennial stem succulent. Blooms Mar
Opuntia xcurvispina curved-spine beavertail	None/None G2G3/S1 2B.2	Chaparral, Mojavean desert scrub, Pinyon and juniper woodland. 1000 - 1400 m. perennial stem succulent. Blooms Apr-Jun
Orcuttia californica California Orcutt grass	FE/SCE G1/S1 1B.1	Vernal pools. 15 - 660 m. annual herb. Blooms Apr-Aug
Oreonana vestita woolly mountain-parsley	None/None G3/S3 1B.3	Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest. gravel or talus. 1615 - 3500 m. perennial herb. Blooms Mar-Sep
Ornithostaphylos oppositifolia Baja California birdbush	None/SCE G3/S1 2B.1	Chaparral. 55 - 800 m. perennial evergreen shrub. Blooms Jan-Apr
Orobanche parishii ssp. *brachyloba* short-lobed broomrape	None/None G4?T4/S3 4.2	Coastal bluff scrub, Coastal dunes, Coastal scrub. sandy. 3 - 305 m. perennial herb (parasitic). Blooms Apr-Oct
Orobanche valida ssp. *valida* Rock Creek broomrape	None/None G4T2/S2 1B.2	Chaparral, Pinyon and juniper woodland. granitic. 1030 - 2000 m. perennial herb (parasitic). Blooms May-Sep
Oxytropis oreophila var. *oreophila* rock-loving oxytrope	None/None G5T4T5/S2 2B.3	Alpine boulder and rock field, Subalpine coniferous forest. gravelly or rocky. 3400 - 3800 m. perennial herb. Blooms Jun-Sep

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Packera bernardina San Bernardino ragwort	None/None G2/S2 1B.2	Meadows and seeps (mesic, sometimes alkaline), Pebble (Pavement) plain, Upper montane coniferous forest. 1800 - 2300 m. perennial herb. Blooms May-Jul
Packera ganderi Gander's ragwort	None/SCR G2/S2 1B.2	Chaparral (burns, gabbroic outcrops). 400 - 1200 m. perennial herb. Blooms Apr-Jun
Packera ionophylla Tehachapi ragwort	None/None G4/S4 4.3	Lower montane coniferous forest, Upper montane coniferous forest. granitic, rocky. 1500 - 2700 m. perennial herb. Blooms Jun-Jul
Panicum hirticaule ssp. *hirticaule* roughstalk witch grass	None/None G5T5/S2 2B.1	Desert dunes, Joshua tree woodland, Mojavean desert scrub, Sonoran desert scrub. sandy, silty, depressions. 45 - 1315 m. annual herb. Blooms Aug-Dec
Parkinsonia microphylla little-leaved palo verde	None/None G5/S3 4.3	Mojavean desert scrub (rocky or gravelly). 45 - 1070 m. perennial deciduous shrub. Blooms Apr-May
Parnassia cirrata var. *cirrata* San Bernardino grass-of-Parnassus	None/None G5T2/S2 1B.3	Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest. mesic, streamsides, sometimes calcareous. 1250 - 2440 m. perennial herb. Blooms Aug-Sep
Pediomelum castoreum Beaver Dam breadroot	None/None G3/S2 1B.2	Joshua tree woodland, Mojavean desert scrub. Sandy, washes and roadcuts. 610 - 1525 m. perennial herb. Blooms Apr-May
Pellaea truncata spiny cliff-brake	None/None G5/S3 2B.3	Pinyon and juniper woodland (volcanic or granitic, rocky). 1200 - 2150 m. perennial rhizomatous herb. Blooms Apr-Jun
Penstemon albomarginatus white-margined beardtongue	None/None G2/S1 1B.1	Desert dunes (stabilized), Mojavean desert scrub (sandy). 640 - 1065 m. perennial herb. Blooms Mar-May (Jun)
Penstemon bicolor ssp. *roseus* rosy two-toned beardtongue	None/None G3T3Q/S1 1B.1	Joshua tree woodland, Mojavean desert scrub. rocky or gravelly, sometimes disturbed areas. 700 - 1500 m. perennial herb. Blooms May
Penstemon calcareus limestone beardtongue	None/None G3?/S3? 1B.3	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. carbonate, rocky. 1065 - 2040 m. perennial herb. Blooms Apr-May
Penstemon californicus California beardtongue	None/None G3/S2 1B.2	Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland. sandy. 1170 - 2300 m. perennial herb. Blooms May-Jun (Aug)
Penstemon clevelandii var. *connatus* San Jacinto beardtongue	None/None G5T4/S3 4.3	Chaparral, Pinyon and juniper woodland, Sonoran desert scrub. rocky. 400 - 1500 m. perennial herb. Blooms Mar-May
Penstemon fruticiformis var. *amargosae* Amargosa beardtongue	None/None G4T3/S2 1B.3	Mojavean desert scrub. 850 - 1400 m. perennial herb. Blooms Apr-Jun
Penstemon pseudospectabilis ssp. *pseudospectabilis* desert beardtongue	None/None G4G5T4/S3 2B.2	Mojavean desert scrub, Sonoran desert scrub. often sandy washes, sometimes rocky. 80 - 1935 m. perennial herb. Blooms Jan-May
Penstemon stephensii Stephens' beardtongue	None/None G3?/S3? 1B.3	Mojavean desert scrub, Pinyon and juniper woodland. usually carbonate, rocky. 1160 - 1850 m. perennial herb. Blooms Apr-Jun
Penstemon thompsoniae Thompson's beardtongue	None/None G4/S1 2B.3	Pinyon and juniper woodland (gravelly, carbonate). 1500 - 2700 m. perennial herb. Blooms May-Jun

Scientific Name Common Name	Status	Habitat Requirements
Penstemon thurberi Thurber's beardtongue	None/None G5/S3 4.2	Chaparral, Joshua tree woodland, Pinyon and juniper woodland, Sonoran desert scrub. 500 - 1220 m. perennial herb. Blooms May-Jul
Penstemon utahensis Utah beardtongue	None/None G4/S2 2B.3	Chenopod scrub, Great Basin scrub, Mojavean desert scrub, Pinyon and juniper woodland. rocky. 1065 - 2500 m. perennial herb. Blooms Apr-May
Pentachaeta aurea ssp. *allenii* Allen's pentachaeta	None/None G4T1/S1 1B.1	Coastal scrub (openings), Valley and foothill grassland. 75 - 520 m. annual herb. Blooms Mar-Jun
Pentachaeta aurea ssp. *aurea* golden-rayed pentachaeta	None/None G4T3/S3 4.2	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Riparian woodland, Valley and foothill grassland. 80 - 1850 m. annual herb. Blooms Mar-Jul
Pentachaeta lyonii Lyon's pentachaeta	FE/SCE G1/S1 1B.1	Chaparral (openings), Coastal scrub, Valley and foothill grassland. rocky, clay. 30 - 690 m. annual herb. Blooms (Feb) Mar-Aug
Perideridia gairdneri ssp. *gairdneri* Gairdner's yampah	None/None G5T3T4/S3S4 4.2	Broadleafed upland forest, Chaparral, Coastal prairie, Valley and foothill grassland, Vernal pools. vernally mesic. 0 - 610 m. perennial herb. Blooms Jun-Oct
Perideridia parishii ssp. *parishii* Parish's yampah	None/None G4T3T4/S2 2B.2	Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest. 1465 - 3000 m. perennial herb. Blooms Jun-Aug
Perideridia pringlei adobe yampah	None/None G4/S4 4.3	Chaparral, Cismontane woodland, Coastal scrub, Pinyon and juniper woodland. Serpentinite, often clay. 300 - 1800 m. perennial herb. Blooms Apr-Jun (Jul)
Petalonyx linearis narrow-leaf sandpaper-plant	None/None G4/S3? 2B.3	Mojavean desert scrub, Sonoran desert scrub. Sandy or rocky canyons. -25 - 1115 m. perennial shrub. Blooms (Jan-Feb) Mar-May (Jun-Dec)
Petalonyx thurberi ssp. *gilmanii* Death Valley sandpaper-plant	None/None G5T2/S2 1B.3	Desert dunes, Mojavean desert scrub. 260 - 1445 m. perennial evergreen shrub. Blooms May-Sep
Petradoria pumila ssp. *pumila* rock goldenrod	None/None G5T4/S4? 4.3	Pinyon and juniper woodland (rocky, carbonate). 1070 - 3400 m. perennial herb. Blooms Jul-Oct
Phacelia anelsonii Aven Nelson's phacelia	None/None G3/S2 2B.3	Joshua tree woodland, Pinyon and juniper woodland. carbonate, sandy or gravelly. 1200 - 1980 m. annual herb. Blooms Apr-May
Phacelia barnebyana Barneby's phacelia	None/None G3?/S2 2B.3	Great Basin scrub, Pinyon and juniper woodland. usually carbonate, gravelly, rocky. 1600 - 2700 m. annual herb. Blooms (Apr)May-Jul
Phacelia coerulea sky-blue phacelia	None/None G5/S2 2B.3	Mojavean desert scrub, Pinyon and juniper woodland. 1400 - 2000 m. annual herb. Blooms Apr-May
Phacelia exilis Transverse Range phacelia	None/None G4Q/S4 4.3	Lower montane coniferous forest, Meadows and seeps, Pebble (Pavement) plain, Upper montane coniferous forest. sandy or gravelly. 1100 - 2700 m. annual herb. Blooms May-Aug
Phacelia floribunda many-flowered phacelia	None/None G2/S2 1B.2	Coastal scrub. 15 - 500 m. annual herb. Blooms Mar-May
Phacelia hubbyi Hubby's phacelia	None/None G4/S4 4.2	Chaparral, Coastal scrub, Valley and foothill grassland. gravelly, rocky, talus. 0 - 1000 m. annual herb. Blooms Apr-Jul

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Phacelia keckii Santiago Peak phacelia	None/None G1/S1 1B.3	Closed-cone coniferous forest, Chaparral. 545 - 1600 m. annual herb. Blooms May-July
Phacelia mohavensis Mojave phacelia	None/None G4Q/S4 4.3	Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Pinyon and juniper woodland. sandy or gravelly. 1400 - 2500 m. annual herb. Blooms Apr-Aug
Phacelia mustelina Death Valley round-leaved phacelia	None/None G3/S2 1B.3	Mojavean desert scrub, Pinyon and juniper woodland. carbonate or volcanic, gravelly or rocky. 730 - 2620 m. annual herb. Blooms May-Jul
Phacelia parishii Parish's phacelia	None/None G2G3/S1 1B.1	Mojavean desert scrub, Playas. clay or alkaline. 540 - 1200 m. annual herb. Blooms Apr-May (Jun-Jul)
Phacelia perityloides var. *jaegeri* Jaeger's phacelia	None/None G4T2/S2 1B.3	Pinyon and juniper woodland (rocky, often carbonate). 1830 - 2345 m. perennial herb. Blooms May-Jul
Phacelia pulchella var. *gooddingii* Goodding's phacelia	None/None G5T3/S2 2B.2	Mojavean desert scrub (clay, often alkaline). 765 - 1000 m. annual herb. Blooms Apr-Jun
Phacelia ramosissima var. *austrolitoralis* south coast branching phacelia	None/None G5?T3Q/S3 3.2	Chaparral, Coastal dunes, Coastal scrub, Marshes and swamps (coastal salt). sandy, sometimes rocky. 5 - 300 m. perennial herb. Blooms Mar-Aug
Phacelia stellaris Brand's star phacelia	None/None G1/S1 1B.1	Coastal dunes, Coastal scrub. 1 - 400 m. annual herb. Blooms Mar-Jun
Phaseolus filiformis slender-stem bean	None/None G5/S1 2B.1	Sonoran desert scrub. 125 - 125 m. annual herb. Blooms Apr
Phlox dolichantha Big Bear Valley phlox	None/None G2/S2 1B.2	Pebble (Pavement) plain, Upper montane coniferous forest (openings). 1830 - 2970 m. perennial herb. Blooms May-Jul
Pholistoma auritum var. *arizonicum* Arizona pholistoma	None/None G5T4?/S3 2B.3	Mojavean desert scrub. 275 - 835 m. annual herb. Blooms Mar
Physalis lobata lobed ground-cherry	None/None G5/S1S2 2B.3	Mojavean desert scrub (decomposed granitic), Playas. 500 - 800 m. perennial herb. Blooms (May) Sep-Jan
Physaria chambersii Chambers' physaria	None/None G5/S2S3 2B.3	Pinyon and juniper woodland (carbonate, rocky). 1500 - 2590 m. perennial herb. Blooms Apr-May
Physaria kingii ssp. *bernardina* San Bernardino Mountains bladderpod	FE/None G5T1/S1 1B.1	Lower montane coniferous forest, Pinyon and juniper woodland, Subalpine coniferous forest. usually carbonate. 1850 - 2700 m. perennial herb. Blooms May-Jun
Pickeringia montana var. *tomentosa* woolly chaparral-pea	None/None G5T3T4/S3S4 4.3	Chaparral. Gabbroic, granitic, clay. 0 - 1700 m. evergreen shrub. Blooms May-Aug
Pilostyles thurberi Thurber's pilostyles	None/None G5/S4 4.3	Sonoran desert scrub. 0 - 365 m. perennial herb (parasitic). Blooms Dec-Apr
Pinus edulis two-needle pinyon pine	None/None G5/S3 3.3	Lower montane coniferous forest, Pinyon and juniper woodland. 1300 - 2700 m. perennial evergreen tree. Blooms

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Pinus torreyana ssp. *torreyana* Torrey pine	None/None G1T1/S1 1B.2	Closed-cone coniferous forest, Chaparral. Sandstone. 30 - 160 m. perennial evergreen tree. Blooms
Piperia cooperi chaparral rein orchid	None/None G3G4/S3S4 4.2	Chaparral, Cismontane woodland, Valley and foothill grassland. 15 - 1585 m. perennial herb. Blooms Mar-Jun
Piperia leptopetala narrow-petaled rein orchid	None/None G4/S4 4.3	Cismontane woodland, Lower montane coniferous forest, Upper montane coniferous forest. 380 - 2225 m. perennial herb. Blooms May-Jul
Piperia michaelii Michael's rein orchid	None/None G3/S3 4.2	Coastal bluff scrub, Closed-cone coniferous forest, Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest. 3 - 915 m. perennial herb. Blooms Apr-Aug
Plagiobothrys parishii Parish's popcornflower	None/None G1/S1 1B.1	Great Basin scrub, Joshua tree woodland. alkaline, mesic. 750 - 1400 m. annual herb. Blooms Mar-Jun (Nov)
Plagiobryoides vinosula wine-colored tufa moss	None/None G3G4/S2 4.2	Cismontane woodland, Mojavean desert scrub, Meadows and seeps, Pinyon and juniper woodland, Riparian woodland. usually granitic rock or granitic soil along seeps and streams, sometimes clay. 30 - 1735 m. moss. Blooms
Poa atropurpurea San Bernardino blue grass	FE/None G2/S2 1B.2	Meadows and seeps (mesic). 1360 - 2455 m. perennial rhizomatous herb. Blooms (Apr) May-Jul (Aug)
Podistera nevadensis Sierra podistera	None/None G4/S4 4.3	Alpine boulder and rock field. 3000 - 4000 m. perennial herb. Blooms Jul-Sep
Pogogyne abramsii San Diego mesa mint	FE/SCE G1/S1 1B.1	Vernal pools. 90 - 200 m. annual herb. Blooms Mar-Jul
Pogogyne nudiuscula Otay Mesa mint	FE/SCE G1/S1 1B.1	Vernal pools. 90 - 250 m. annual herb. Blooms May-Jul
Poliomintha incana frosted mint	None/None G5/SH 2A	Lower montane coniferous forest (mesic). 1600 - 1700 m. perennial shrub. Blooms Jun-Jul
Polygala acanthoclada thorny milkwort	None/None G4/S2S3 2B.3	Chenopod scrub, Joshua tree woodland, Pinyon and juniper woodland. 760 - 2285 m. perennial shrub. Blooms May-Aug
Polygala cornuta var. *fishiae* Fish's milkwort	None/None G5T4/S4 4.3	Chaparral, Cismontane woodland, Riparian woodland. 100 - 1000 m. perennial deciduous shrub. Blooms May-Aug
Polygala intermontana intermountain milkwort	None/None G4/S2 2B.1	Pinyon and juniper woodland. 2010 - 3080 m. perennial shrub. Blooms Jun-Jul (Oct)
Polystichum kruckebergii Kruckeberg's sword fern	None/None G4/S4 4.3	Subalpine coniferous forest, Upper montane coniferous forest. rocky. 2100 - 3200 m. perennial rhizomatous herb. Blooms Jun-Aug
Populus angustifolia narrow-leaved cottonwood	None/None G5/S2 2B.2	Riparian forest. 1200 - 1800 m. perennial deciduous tree. Blooms Mar-Apr
Portulaca halimoides desert portulaca	None/None G5/S3 4.2	Joshua tree woodland (sandy). 1000 - 1200 m. annual herb. Blooms Sep

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Potamogeton zosteriformis eel-grass pondweed	None/None G5/S3 2B.2	Marshes and swamps (assorted freshwater). 0 - 1860 m. annual herb (aquatic). Blooms Jun-Jul
Potentilla multijuga Ballona cinquefoil	None/None GX/SX 1A	Meadows and seeps (brackish). 0 - 2 m. perennial herb. Blooms Jun-Aug
Potentilla rimicola cliff cinquefoil	None/None G2/S1 2B.3	Subalpine coniferous forest, Upper montane coniferous forest. granitic, rocky. 2400 - 2800 m. perennial herb. Blooms Jul-Sep
Proboscidea althaeifolia desert unicorn-plant	None/None G5/S4 4.3	Sonoran desert scrub. gently sloping sandy flats and washes, sometimes roadsides. 85 - 1000 m. perennial herb. Blooms May-Sep (Oct)
Prunus eremophila Mojave Desert plum	None/None G2/S2 1B.2	Mojavean desert scrub. granitic or rhyolitic, usually washes. 975 - 1175 m. perennial deciduous shrub. Blooms Mar-Apr
Pseudognaphalium leucocephalum white rabbit-tobacco	None/None G4/S2 2B.2	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland. sandy, gravelly. 0 - 2100 m. perennial herb. Blooms (Jul) Aug-Nov (Dec)
Pseudorontium cyathiferum Deep Canyon snapdragon	None/None G4G5/S1 2B.3	Sonoran desert scrub (rocky). 0 - 800 m. annual herb. Blooms Feb-Apr
Psilocarphus brevissimus var. *multiflorus* Delta woolly-marbles	None/None G4T3/S3 4.2	Vernal pools. 10 - 500 m. annual herb. Blooms May-Jun
Psorothamnus arborescens var. *arborescens* Mojave indigo-bush	None/None G5T4/S4 4.3	Mojavean desert scrub, Riparian scrub. 400 - 1185 m. perennial deciduous shrub. Blooms Apr-May
Psorothamnus fremontii var. *attenuatus* narrow-leaved psorothamnus	None/None G5T4?/S3 2B.3	Sonoran desert scrub (granitic or volcanic). 335 - 915 m. perennial shrub. Blooms Apr
Puccinellia parishii Parish's alkali grass	None/None G3/S1 1B.1	Meadows and seeps (alkaline springs and seeps). 700 - 1000 m. annual herb. Blooms Apr-May
Puccinellia simplex California alkali grass	None/None G3/S2 1B.2	Chenopod scrub, Meadows and seeps, Valley and foothill grassland, Vernal pools. Alkaline, vernally mesic; sinks, flats, and lake margins. 2 - 930 m. annual herb. Blooms Mar-May
Pyrrocoma uniflora var. *gossypina* Bear Valley pyrrocoma	None/None G5T1/S1 1B.2	Meadows and seeps, Pebble (Pavement) plain. 1600 - 2300 m. perennial herb. Blooms Jul-Sep
Quercus cedrosensis Cedros Island oak	None/None G3/S1 2B.2	Closed-cone coniferous forest, Chaparral, Coastal scrub. 255 - 960 m. perennial evergreen tree. Blooms Apr-May
Quercus dumosa Nuttall's scrub oak	None/None G3/S3 1B.1	Closed-cone coniferous forest, Chaparral, Coastal scrub. sandy, clay loam. 15 - 400 m. perennial evergreen shrub. Blooms Feb-Apr (May-Aug)
Quercus durata var. *gabrielensis* San Gabriel oak	None/None G4T3/S3 4.2	Chaparral, Cismontane woodland. 450 - 1000 m. perennial evergreen shrub. Blooms Apr-May
Quercus engelmannii Engelmann oak	None/None G3/S3 4.2	Chaparral, Cismontane woodland, Riparian woodland, Valley and foothill grassland. 50 - 1300 m. perennial deciduous tree. Blooms Mar-Jun

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Quercus turbinella shrub live oak	None/None G5/S4 4.3	Chaparral, Cismontane woodland, Lower montane coniferous forest, Pinyon and juniper woodland. 1200 - 2000 m. perennial evergreen shrub. Blooms Apr-Jun
Rhus aromatica var. *simplicifolia* single-leaved skunkbrush	None/None G5T5/S2 2B.3	Pinyon and juniper woodland. Usually granitic. 1220 - 1370 m. perennial deciduous shrub. Blooms Mar-Apr
Ribes canthariforme Moreno currant	None/None G2/S2 1B.3	Chaparral, Riparian scrub. 340 - 1200 m. perennial deciduous shrub. Blooms Feb-Apr
Ribes divaricatum var. parishii Parish's gooseberry	None/None G5TX/SX 1A	Riparian woodland. 65 - 300 m. perennial deciduous shrub. Blooms Feb-Apr
Ribes viburnifolium Santa Catalina Island currant	None/None G2?/S2? 1B.2	Chaparral, Cismontane woodland. 30 - 350 m. perennial evergreen shrub. Blooms Feb-Apr
Robinia neomexicana New Mexico locust	None/None G4/S1 2B.3	Pinyon and juniper woodland (sandy). 1500 - 1770 m. perennial deciduous shrub. Blooms May, Jul
Romneya coulteri Coulter's matilija poppy	None/None G4/S4 4.2	Chaparral, Coastal scrub. Often in burns. 20 - 1200 m. perennial rhizomatous herb. Blooms Mar-Jul (Aug)
Rosa minutifolia small-leaved rose	None/SCE G2G3/SXC 2B.1	Chaparral, Coastal scrub. 150 - 160 m. perennial deciduous shrub. Blooms Jan-Jun
Rosa woodsii var. *glabrata* Cushenbury rose	None/None G5T1/S1 1B.1	Mojavean desert scrub (springs). 910 - 1435 m. perennial shrub. Blooms (Apr) May-Aug
Rubus glaucifolius var. *ganderi* Cuyamaca raspberry	None/None G5T1Q/S1 3.1	Lower montane coniferous forest (gabbroic). 1200 - 1675 m. perennial evergreen shrub. Blooms May-Jun
Rupertia rigida Parish's rupertia	None/None G4/S4 4.3	Chaparral, Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Pebble (Pavement) plain, Valley and foothill grassland. 700 - 2500 m. perennial herb. Blooms Jun-Aug
Sagittaria sanfordii Sanford's arrowhead	None/None G3/S3 1B.2	Marshes and swamps (assorted shallow freshwater). 0 - 650 m. perennial rhizomatous herb (emergent). Blooms May-Oct (Nov)
Saltugilia caruifolia caraway-leaved woodland-gilia	None/None G4/S4 4.3	Chaparral, Lower montane coniferous forest. Sandy, openings. 840 - 2300 m. annual herb. Blooms May-Aug
Saltugilia latimeri Latimer's woodland-gilia	None/None G3/S3 1B.2	Chaparral, Mojavean desert scrub, Pinyon and juniper woodland. rocky or sandy, often granitic, sometimes washes. 400 - 1900 m. annual herb. Blooms Mar-Jun
Salvia eremostachya desert sage	None/None G4/S3 4.3	Sonoran desert scrub (rocky or gravelly). 700 - 1400 m. perennial evergreen shrub. Blooms Mar-May
Salvia greatae Orocopia sage	None/None G2G3/S2S3 1B.3	Mojavean desert scrub, Sonoran desert scrub. -40 - 825 m. perennial evergreen shrub. Blooms Mar-Apr
Salvia munzii Munz's sage	None/None G2/S2 2B.2	Chaparral, Coastal scrub. 115 - 1065 m. perennial evergreen shrub. Blooms Feb-Apr

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Sanvitalia abertii Abert's sanvitalia	None/None G5/S2S3 2B.2	Pinyon and juniper woodland (carbonate). 1570 - 1800 m. annual herb. Blooms Aug-Sep (Oct)
Schoenus nigricans black bog-rush	None/None G4/S2 2B.2	Marshes and swamps (often alkaline). 150 - 2000 m. perennial herb. Blooms Aug-Sep
Sclerocactus johnsonii Johnson's bee-hive cactus	None/None G3/S2 2B.2	Mojavean desert scrub (granitic). 500 - 1200 m. perennial stem succulent. Blooms Apr-May
Sclerocactus polyancistrus Mojave fish-hook cactus	None/None G3/S3 4.2	Great Basin scrub, Joshua tree woodland, Mojavean desert scrub. usually carbonate. 640 - 2320 m. perennial stem succulent. Blooms Apr-Jul
Scleropogon brevifolius burro grass	None/None G5/S1S2 2B.3	Joshua tree woodland, Mojavean desert scrub (decomposed granitic). 1360 - 1600 m. perennial stoloniferous herb. Blooms Oct
Scrophularia villosa Santa Catalina figwort	None/None G3/S3 1B.2	Chaparral, Coastal scrub. 45 - 510 m. perennial shrub. Blooms Apr-Aug
Scutellaria bolanderi ssp. *austromontana* southern mountains skullcap	None/None G4T3/S3 1B.2	Chaparral, Cismontane woodland, Lower montane coniferous forest. mesic. 425 - 2000 m. perennial rhizomatous herb. Blooms Jun-Aug
Scutellaria galericulata marsh skullcap	None/None G5/S2 2B.2	Lower montane coniferous forest, Meadows and seeps (mesic), Marshes and swamps. 0 - 2100 m. perennial rhizomatous herb. Blooms Jun-Sep
Scutellaria lateriflora side-flowering skullcap	None/None G5/S2 2B.2	Meadows and seeps (mesic), Marshes and swamps. 0 - 500 m. perennial rhizomatous herb. Blooms Jul-Sep
Sedum niveum Davidson's stonecrop	None/None G3/S3 4.2	Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest. rocky. 2075 - 3000 m. perennial rhizomatous herb. Blooms Jun-Aug
Selaginella asprella bluish spike-moss	None/None G4/S4 4.3	Cismontane woodland, Lower montane coniferous forest, Pinyon and juniper woodland, Subalpine coniferous forest, Upper montane coniferous forest. granitic, rocky. 1600 - 2700 m. perennial rhizomatous herb. Blooms Jul
Selaginella cinerascens ashy spike-moss	None/None G3G4/S3 4.1	Chaparral, Coastal scrub. 20 - 640 m. perennial rhizomatous herb. Blooms
Selaginella eremophila desert spike-moss	None/None G4/S2S3 2B.2	Chaparral, Sonoran desert scrub (gravelly or rocky). 200 - 1295 m. perennial rhizomatous herb. Blooms (May) Jun (Jul)
Selaginella leucobryoides Mojave spike-moss	None/None G4/S3S4 4.3	Great Basin scrub, Lower montane coniferous forest, Mojavean desert scrub, Pinyon and juniper woodland. rocky, usually carbonate. 600 - 3150 m. perennial rhizomatous herb. Blooms Jun
Senecio aphanactis chaparral ragwort	None/None G3/S2 2B.2	Chaparral, Cismontane woodland, Coastal scrub. sometimes alkaline. 15 - 800 m. annual herb. Blooms Jan-Apr (May)
Senecio astephanus San Gabriel ragwort	None/None G3/S3 4.3	Coastal bluff scrub, Chaparral. rocky slopes. 400 - 1500 m. perennial herb. Blooms May-Jul
Senna covesii Coves' cassia	None/None G5/S3 2B.2	Sonoran desert scrub. Dry, sandy desert washes and slopes. 225 - 1295 m. perennial herb. Blooms Mar-Jun (Aug)

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Sibara deserti desert winged-rockcress	None/None G4/S4 4.3	Mojavean desert scrub. 345 - 1300 m. annual herb. Blooms Mar-Apr
Sibara filifolia Santa Cruz Island winged-rockcress	FE/None G2/S2 1B.1	Coastal scrub (rocky, volcanic). often openings. 60 - 305 m. annual herb. Blooms (Feb) Mar-Apr
Sibaropsis hammittii Hammitt's clay-cress	None/None G2/S2 1B.2	Chaparral (openings), Valley and foothill grassland. clay. 720 - 1065 m. annual herb. Blooms Mar-Apr
Sidalcea hickmanii ssp. *parishii* Parish's checkerbloom	None/SCR G3T1/S1 1B.2	Chaparral, Cismontane woodland, Lower montane coniferous forest. 1000 - 2499 m. perennial herb. Blooms (May) Jun-Aug
Sidalcea malviflora ssp. *dolosa* Bear Valley checkerbloom	None/None G5T2/S2 1B.2	Lower montane coniferous forest (meadows and seeps), Meadows and seeps, Riparian woodland, Upper montane coniferous forest (meadows and seeps). 1495 - 2685 m. perennial herb. Blooms May-Aug
Sidalcea neomexicana salt spring checkerbloom	None/None G4/S2 2B.2	Chaparral, Coastal scrub, Lower montane coniferous forest, Mojavean desert scrub, Playas. alkaline, mesic. 15 - 1530 m. perennial herb. Blooms Mar-Jun
Sidalcea pedata bird-foot checkerbloom	FE/SCE G1/S1 1B.1	Meadows and seeps (mesic), Pebble (Pavement) plain. 1600 - 2500 m. perennial herb. Blooms May-Aug
Sidotheca caryophylloides chickweed oxytheca	None/None G4/S4 4.3	Lower montane coniferous forest (sandy). 1114 - 2600 m. annual herb. Blooms Jul-Sep (Oct)
Sidotheca emarginata white-margined oxytheca	None/None G3/S3 1B.3	Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland. 1200 - 2500 m. annual herb. Blooms (Feb) Apr-Jul (Aug)
Silene krantzii Krantz's catchfly	None/None G1/S1 1B.2	Alpine dwarf scrub. Usually sandy or gravelly, sometimes rocky. 3235 - 3510 m. perennial herb. Blooms Apr-Sep
Sisyrinchium longipes timberland blue-eyed-grass	None/None G3G4/S1 2B.2	Meadows and seeps. mesic. 2060 - 2060 m. perennial herb. Blooms Jun-Aug
Solanum wallacei Wallace's nightshade	None/None G3Q/S2 1B.1	Chaparral, Cismontane woodland. rocky. 3 - 410 m. perennial herb. Blooms Mar-Aug
Spermolepis gigantea desert scaleseed	None/None G2G3/SH 2B.1	Sonoran desert scrub. 400 - 400 m. annual herb. Blooms Mar-Apr
Spermolepis infernensis Hellhole scaleseed	None/None G1/S1 1B.2	Sonoran desert scrub. Rocky or sandy. 230 - 670 m. annual herb. Blooms Mar-Apr
Spermolepis lateriflora western bristly scaleseed	None/None G5/SH 2A	Sonoran desert scrub. Rocky or sandy. 365 - 670 m. annual herb. Blooms Mar-Apr
Sphaeralcea rusbyi var. *eremicola* Rusby's desert-mallow	None/None G4T2/S2 1B.2	Joshua tree woodland, Mojavean desert scrub. 975 - 1645 m. perennial herb. Blooms Mar-Jun
Sphaerocarpos drewei bottle liverwort	None/None G1/S1 1B.1	Chaparral, Coastal scrub. openings, soil. 90 - 600 m. ephemeral liverwort. Blooms

Scientific Name Common Name	Status	Habitat Requirements
Sphenopholis obtusata prairie wedge grass	None/None G5/S2 2B.2	Cismontane woodland, Meadows and seeps. mesic. 300 - 2000 m. perennial herb. Blooms Apr-Jul
Stemodia durantifolia purple stemodia	None/None G5/S2 2B.1	Sonoran desert scrub (often mesic, sandy). 180 - 300 m. perennial herb. Blooms (Jan) Apr, Jun, Aug, Sep, Oct, Dec
Stipa arida Mormon needle grass	None/None G5/S3? 2B.3	Joshua tree woodland, Pinyon and juniper woodland. carbonate. 500 - 2570 m. perennial herb. Blooms May-Jul
Stipa diegoensis San Diego County needle grass	None/None G4/S4 4.2	Chaparral, Coastal scrub. rocky, often mesic. 10 - 800 m. perennial herb. Blooms Feb-Jun
Stipa divaricata small-flowered rice grass	None/None G5/S2 2B.3	Pinyon and juniper woodland (gravelly, carbonate). 700 - 2950 m. perennial herb. Blooms Jun-Sep
Streptanthus bernardinus Laguna Mountains jewelflower	None/None G3G4/S3S4 4.3	Chaparral, Lower montane coniferous forest. 670 - 2500 m. perennial herb. Blooms May-Aug
Streptanthus campestris southern jewelflower	None/None G3/S3 1B.3	Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland. rocky. 900 - 2300 m. perennial herb. Blooms (Apr) May-Jul
Stylocline citroleum oil neststraw	None/None G3/S3 1B.1	Chenopod scrub, Coastal scrub, Valley and foothill grassland. clay. 50 - 400 m. annual herb. Blooms Mar-Apr
Stylocline masonii Mason's neststraw	None/None G1/S1 1B.1	Chenopod scrub, Pinyon and juniper woodland. sandy. 100 - 1200 m. annual herb. Blooms Mar-May
Stylocline sonorensis mesquite neststraw	None/None G3G5/SX 2A	Sonoran desert scrub (sandy). 425 - 425 m. annual herb. Blooms Apr
Suaeda esteroa estuary seablite	None/None G3/S2 1B.2	Marshes and swamps (coastal salt). 0 - 5 m. perennial herb. Blooms (May) Jul-Oct (Jan)
Suaeda taxifolia woolly seablite	None/None G4/S4 4.2	Coastal bluff scrub, Coastal dunes, Marshes and swamps (margins of coastal salt). 0 - 50 m. perennial evergreen shrub. Blooms Jan-Dec
Symphyotrichum defoliatum San Bernardino aster	None/None G2/S2 1B.2	Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Meadows and seeps, Marshes and swamps, Valley and foothill grassland (vernally mesic). near ditches, streams, springs. 2 - 2040 m. perennial rhizomatous herb. Blooms Jul-Nov (Dec)
Symphyotrichum greatae Greata's aster	None/None G2/S2 1B.3	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Riparian woodland. mesic. 300 - 2010 m. perennial rhizomatous herb. Blooms Jun-Oct
Symphyotrichum lentum Suisun Marsh aster	None/None G2/S2 1B.2	Marshes and swamps (brackish and freshwater). 0 - 3 m. perennial rhizomatous herb. Blooms (Apr) May-Nov
Syntrichopappus lemmonii Lemmon's syntrichopappus	None/None G4/S4 4.3	Chaparral, Joshua tree woodland, Pinyon and juniper woodland. sandy or gravelly. 500 - 1830 m. annual herb. Blooms Apr-May (Jun)
Taraxacum californicum California dandelion	FE/None G1G2/S1S2 1B.1	Meadows and seeps (mesic). 1620 - 2800 m. perennial herb. Blooms May-Aug

Scientific Name Common Name	Status	Habitat Requirements
Tetracoccus dioicus Parry's tetracoccus	None/None G2G3/S2 1B.2	Chaparral, Coastal scrub. 165 - 1000 m. perennial deciduous shrub. Blooms Apr-May
Tetracoccus hallii Hall's tetracoccus	None/None G4/S4 4.3	Mojavean desert scrub, Sonoran desert scrub. 30 - 1200 m. perennial deciduous shrub. Blooms Jan-May
Tetradymia argyraea striped horsebrush	None/None G4?/S4 4.3	Pinyon and juniper woodland (rocky). 1400 - 2230 m. perennial deciduous shrub. Blooms (May) Jun-Sep
Teucrium cubense ssp. *depressum* dwarf germander	None/None G4G5T3T4/S2 2B.2	Desert dunes, Playas margins, Sonoran desert scrub. 45 - 400 m. annual herb. Blooms Mar-May (Sep-Nov)
Teucrium glandulosum desert germander	None/None G4/S2 2B.3	Sonoran desert scrub (rocky). 400 - 790 m. perennial stoloniferous herb. Blooms Apr-May
Texosporium sancti-jacobi woven-spored lichen	None/None G3/S1 3	Chaparral (openings). On soil, small mammal pellets, dead twigs, and on Selaginella spp. 60 - 660 m. crustose lichen (terricolous). Blooms
Thelypodium stenopetalum slender-petaled thelypodium	FE/SCE G1/S1 1B.1	Meadows and seeps (mesic, alkaline). 1600 - 2500 m. perennial herb. Blooms May-Sep
Thelypteris puberula var. *sonorensis* Sonoran maiden fern	None/None G5T3/S2 2B.2	Meadows and seeps (seeps and streams). 50 - 610 m. perennial rhizomatous herb. Blooms Jan-Sep
Thermopsis californica var. *argentata* silvery false lupine	None/None G4T4/S4 4.3	Cismontane woodland, Lower montane coniferous forest, Pinyon and juniper woodland. 665 - 2335 m. perennial rhizomatous herb. Blooms Apr-Oct
Thermopsis californica var. *semota* velvety false lupine	None/None G4T2/S2 1B.2	Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Valley and foothill grassland. 1000 - 1870 m. perennial rhizomatous herb. Blooms Mar-Jun
Thysanocarpus rigidus rigid fringepod	None/None G1G2/S1 1B.2	Pinyon and juniper woodland. Dry rocky slopes. 600 - 2200 m. annual herb. Blooms Feb-May
Tidestromia eliassoniana Eliasson?s woolly tidestromia	None/None G5/S2 2B.2	Mojavean desert scrub. rocky to gravelly volcanic flats, clay. 655 - 2105 m. annual herb. Blooms Jul-Oct
Tiquilia canescens var. *pulchella* Chocolate Mountains tiquilia	None/None G5T3T4/S3 3.2	Sonoran desert scrub. sometimes slopes, ridges, or washes. 250 - 700 m. perennial shrub. Blooms Feb-May
Tortella alpicola alpine crisp-moss	None/None G5?/S1 2B.3	Cismontane woodland (volcanic, rock). 1400 - 1400 m. moss. Blooms
Tortula californica California screw-moss	None/None G2G3/S2S3 1B.2	Chenopod scrub, Valley and foothill grassland. sandy, soil. 10 - 1460 m. moss. Blooms
Tragia ramosa desert tragia	None/None G5/S4 4.3	Chenopod scrub, Pinyon and juniper woodland. rocky. 900 - 1860 m. perennial herb. Blooms Apr-May
Trichocoronis wrightii var. *wrightii* Wright's trichocoronis	None/None G4T3/S1 2B.1	Meadows and seeps, Marshes and swamps, Riparian forest, Vernal pools. alkaline. 5 - 435 m. annual herb. Blooms May-Sep

Scientific Name Common Name	Status	Habitat Requirements
Trichostema austromontanum ssp. *compactum* Hidden Lake bluecurls	FT/None G3G4T1/S1 1B.1	Upper montane coniferous forest (seasonally submerged lake margins). 2400 - 2680 m. annual herb. Blooms Jul-Sep
Trichostema micranthum small-flowered bluecurls	None/None G4/S3 4.3	Lower montane coniferous forest, Meadows and seeps. mesic. 1525 - 2300 m. annual herb. Blooms Jun-Sep
Tripterocalyx micranthus small-flowered sand-verbena	None/None G5/S1 2B.2	Desert dunes, Mojavean desert scrub (sandy). 550 - 855 m. perennial herb. Blooms Apr-May
Triquetrella californica coastal triquetrella	None/None G2/S2 1B.2	Coastal bluff scrub, Coastal scrub. soil. 10 - 100 m. moss. Blooms
Triteleia clementina San Clemente Island triteleia	None/None G2/S2 1B.2	Valley and foothill grassland (rocky). 100 - 445 m. perennial bulbiferous herb. Blooms Mar-Apr
Tropidocarpum capparideum caper-fruited tropidocarpum	None/None G1/S1 1B.1	Valley and foothill grassland (alkaline hills). 1 - 455 m. annual herb. Blooms Mar-Apr
Verbesina dissita big-leaved crownbeard	FT/SCT G1G2/S1 1B.1	Chaparral (maritime), Coastal scrub. 45 - 205 m. perennial herb. Blooms (Mar) Apr-Jul
Viguiera laciniata San Diego County viguiera	None/None G4/S4 4.3	Chaparral, Coastal scrub. 60 - 750 m. perennial shrub. Blooms Feb-Jun (Aug)
Viguiera purisimae La Purisima viguiera	None/None G4/S1 2B.3	Coastal bluff scrub, Chaparral. 365 - 425 m. shrub. Blooms Apr-Sep
Viola pinetorum ssp. *grisea* grey-leaved violet	None/None G4G5T3/S3 1B.2	Meadows and seeps, Subalpine coniferous forest, Upper montane coniferous forest. 1500 - 3400 m. perennial herb. Blooms Apr-Jul
Viola purpurea ssp. *aurea* golden violet	None/None G5T2/S2 2B.2	Great Basin scrub, Pinyon and juniper woodland. sandy. 1000 - 2500 m. perennial herb. Blooms Apr-Jun
Wislizenia refracta ssp. *palmeri* Palmer's jackass clover	None/None G5T3T5/S1 2B.2	Chenopod scrub, Desert dunes, Sonoran desert scrub, Sonoran thorn woodland. 0 - 300 m. perennial deciduous shrub. Blooms Jan-Dec
Wislizenia refracta ssp. *refracta* jackass-clover	None/None G5T5?/S1 2B.2	Desert dunes, Mojavean desert scrub, Playas, Sonoran desert scrub. 600 - 800 m. annual herb. Blooms Apr-Nov
Woodsia plummerae Plummer's woodsia	None/None G5/S2 2B.3	Pinyon and juniper woodland (granitic, rocky). 1600 - 2000 m. perennial rhizomatous herb. Blooms May-Sep
Xanthisma gracile annual bristleweed	None/None G5/S4 4.3	Joshua tree woodland, Mojavean desert scrub. 1220 - 1555 m. annual herb. Blooms Apr-Jul (Sep)
Xanthisma junceum rush-like bristleweed	None/None G5/S4 4.3	Chaparral, Coastal scrub. 240 - 1000 m. perennial herb. Blooms May-Jan
Xylorhiza cognata Mecca-aster	None/None G2/S2 1B.2	Sonoran desert scrub. 20 - 400 m. perennial herb. Blooms Jan-Jun

Scientific Name Common Name	Status	Habitat Requirements
Xylorhiza orcuttii Orcutt's woody-aster	None/None G3?/S2 1B.2	Sonoran desert scrub. Arid canyons; often in washes. 0-365 m. - m. Blooms
Invertebrates		
Aglaothorax longipennis Santa Monica shieldback katydid	None/None G1G2/S1S2	Occur nocturnally in chaparral and canyon stream bottom vegetation, in the Santa Monica Mtns of Southern California. Inhabit introduced iceplant and native chaparral plants.
Ammopelmatus kelsoensis Kelso jerusalem cricket	None/None G1G2/S1S2	Inhabits a limited area of the Kelso Dunes (type locality), San Bernardino County. Found at the north base of a sand declivity, 15-25 ft high; associated plants: sandpaper weed, croton, sand dune grass.
Anomala carlsoni Carlson's dune beetle	None/None G1/S1	Known primarily from creosote scrub in vicinity of Algodones Dunes, Imperial County. Also taken from Borrego, San Diego County. Host preferences unknown.
Assiminea infima Badwater snail	None/None G1/S1	Restricted to saline spring sources in the Death Valley region, Inyo County. Occurs either under a salt-crust roof fringing the water's edge or on moistened vegetation; often found fully submerged.
Atractelmis wawona Wawona riffle beetle	None/None G1G3/S1S2	Aquatic; found in riffles of rapid, small to medium clear mountain streams; 2000-5000 ft elev. Strong preference for inhabiting submerged aquatic mosses
Belostoma saratogae Saratoga Springs belostoman bug	None/None G1/S1	Known only from Saratoga Spring in Death Valley, San Bernardino County. Inhabits the hot spring pool and inlet/outlet channels; have been collected year-round.
Bombus caliginosus obscure bumble bee	None/None G4?/S1S2	Coastal areas from Santa Barabara county to north to Washington state. Food plant genera include Baccharis, Cirsium, Lupinus, Lotus, Grindelia and Phacelia.
Bombus crotchii Crotch bumble bee	None/SCE G3G4/S1S2	Coastal California east to the Sierra-Cascade crest and south into Mexico. Food plant genera include Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia, and Eriogonum.
Bombus morrisoni Morrison bumble bee	None/None G4G5/S1S2	From the Sierra-Cascade ranges eastward across the intermountain west. Food plant genera include Cirsium, Cleome, Helianthus, Lupinus, Chrysothamnus, and Melilotus.
Bombus occidentalis western bumble bee	None/SCE G2G3/S1	Once common & widespread, species has declined precipitously from central CA to southern B.C., perhaps from disease.
Branchinecta conservatio Conservancy fairy shrimp	FE/None G2/S2	Endemic to the grasslands of the northern two-thirds of the Central Valley; found in large, turbid pools. Inhabit astatic pools located in swales formed by old, braided alluvium; filled by winter/spring rains, last until June.
Branchinecta lynchi vernal pool fairy shrimp	FT/None G3/S3	Endemic to the grasslands of the Central Valley, Central Coast mountains, and South Coast mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.
Branchinecta sandiegonensis San Diego fairy shrimp	FE/None G2/S2	Endemic to San Diego and Orange County mesas. Vernal pools.
Brennania belkini Belkin's dune tabanid fly	None/None G1G2/S1S2	Inhabits coastal sand dunes of Southern California.
Calileptoneta oasa Andreas Canyon leptonetid spider	None/None G1/S1	Known only from the type locality, Andreas Canyon, Palm Springs, Riverside County.
Callophrys mossii hidakupa San Gabriel Mountains elfin butterfly	None/None G4T1T2/S1S2	San Gabriel and San Bernardino mountains at elevations of 3,000 to approximately 5,500 ft. Foodplant is Sedum spathulifolium. Type locality is southern mixed evergreen forest.

Scientific Name Common Name	Status	Habitat Requirements
Callophrys thornei Thorne's hairstreak	None/None G1/S1	Associated with the endemic tecate cypress (Cupressus forbesii). Only known from vicinity of Otay Mountain.
Carolella busckana Busck's gallmoth	None/None G1G3/SH	
Ceratochrysis bradleyi Bradley's cuckoo wasp	None/None G1/S1	
Ceratochrysis longimala Desert cuckoo wasp	None/None G1/S1	
Cicindela gabbii western tidal-flat tiger beetle	None/None G2G4/S1	Inhabits estuaries and mudflats along the coast of Southern California. Generally found on dark-colored mud in the lower zone; occasionally found on dry saline flats of estuaries.
Cicindela hirticollis gravida sandy beach tiger beetle	None/None G5T2/S2	Inhabits areas adjacent to non-brackish water along the coast of California from San Francisco Bay to northern Mexico. Clean, dry, light-colored sand in the upper zone. Subterranean larvae prefer moist sand not affected by wave action.
Cicindela latesignata latesignata western beach tiger beetle	None/None G2G4T1T2/S1	Mudflats and beaches in coastal Southern California.
Cicindela senilis frosti senile tiger beetle	None/None G2G3T1T3/S1	Inhabits marine shoreline, from Central California coast south to salt marshes of San Diego. Also found at Lake Elsinore. Inhabits dark-colored mud in the lower zone and dried salt pans in the upper zone.
Cicindela tranquebarica viridissima greenest tiger beetle	None/None G5T1/S1	Inhabits the woodlands adjacent to the Santa Ana River basin. Usually found in open spots between trees.
Coelus globosus globose dune beetle	None/None G1G2/S1S2	Inhabitant of coastal sand dune habitat; erratically distributed from Ten Mile Creek in Mendocino County south to Ensenada, Mexico. Inhabits foredunes and sand hummocks; it burrows beneath the sand surface and is most common beneath dune vegetation.
Coenonycha clementina San Clemente Island coenonycha beetle	None/None G1G2/S1S2	
Danaus plexippus pop. 1 monarch - California overwintering population	None/None G4T2T3/S2S3	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.
Deltaspis ivae marsh-elder long-horned beetle	None/None G1/S1	Found in a few scattered locations in San Diego and Riverside counties; larva breeds in Iva hayesiana root collars.
Dinacoma caseyi Casey's June beetle	FE/None G1/S1	Found only in two populations in a small area of southern Palm Springs. Found in sandy soils; the females live underground and only come to the ground surface to mate.
Diplectrona californica California diplectronan caddisfly	None/None G1G2/S1S2	
Eremarionta immaculata white desertsnail	None/None G1/S1	Known only from the east slope of Riverside Mountains, Riverside County. Found in and around rockslides.
Eremarionta morongoana Morongo (=Colorado) desertsnail	None/None G1G3/S1	Known only from a gulch on the north side of Morongo Pass (type locality), San Bernardino County, near Riverside County line. Found under rocks.
Eremarionta rowelli bakerensis Baker's desertsnail	None/None G3G4T1/S1	Inhabits north slope of a small range of limestone hills, 0.5 miles south of Baker, San Bernardino County. Found in rockslides.

Scientific Name Common Name	Status	Habitat Requirements
Eremarionta rowelli mccoiana California Mccoy snail	None/None G3G4T1/S1	Found in various sites in the McCoy Mountains and the Big Maria Mountains. Inhabits rockslides in gullies.
Eucerceris ruficeps redheaded sphecid wasp	None/None G1G3/S1S2	Central California interior dunes. Nest in hard-packed sand utilizing abandoned halictine bee burrows.
Euchloe hyantis andrewsi Andrew's marble butterfly	None/None G3G4T1/S1	Inhabits yellow pine forest near Lake Arrowhead and Big Bear Lake, San Bernardino Mtns, San Bernardino Co, 5000-6000 ft. Hostplants are Streptanthus bernardinus & Arabis holboellii var pinetorum; larval foodplant is Descurainia richardsonii.
Eucosma hennei Henne's eucosman moth	None/None G1/S1	Endemic to the El Segundo Dunes (type locality), Los Angeles County. Larval foodplant is Phacelia ramosissima var austrolitoralis; larvae can be found on woody stems and upper root parts.
Euparagia unidentata Algodones euparagia	None/None G1G2/S1S2	Endemic to the Algodones Dunes in Imperial County.
Euphilotes battoides allyni El Segundo blue butterfly	FE/None G5T1/S1	Restricted to remnant coastal dune habitat in Southern California. Host plant is Eriogonum parvifolium; larvae feed only on the flowers and seeds; used by adults as major nectar source.
Euphydryas editha quino quino checkerspot butterfly	FE/None G5T1T2/S1S2	Sunny openings within chaparral & coastal sage shrublands in parts of Riverside & San Diego counties. Hills and mesas near the coast. Need high densities of food plants Plantago erecta, P. insularis, and Orthocarpus purpurescens.
Euproserpinus euterpe Kern primrose sphinx moth	FT/None G1G2/S1	Found in the Walker Basin, Kern County, and several other scattered locations (Carrizo Plain, Pinnacles NM). Host plant is Camissonia contorta epilobioides (evening primrose).
Glaresis arenata Kelso Dunes scarab glaresis beetle	None/None G2/S2	Known only from the Kelso Dunes.
Glaucopsyche lygdamus palosverdesensis Palos Verdes blue butterfly	FE/None G5T1/S1	Restricted to the cool, fog-shrouded, seaward side of Palos Verdes Hills, Los Angeles County. Host plant is Astragalus trichopodus var. lonchus (locoweed).
Glyptostoma gabrielense San Gabriel chestnut	None/None G2/S2	Terrestrial.
Gonidea angulata western ridged mussel	None/None G3/S1S2	Primarily creeks & rivers & less often lakes. Originally in most of state, now extirpated from Central & Southern Calif.
Halictus harmonius haromonius halictid bee	None/None G1/S1	Known only from the foothills of the San Bernardino Mts., possibly also the San Jacinto Mts.
Haliotis cracherodii black abalone	FE/None G3/S1S2	Mid to low rocky intertidal areas.
Haplotrema catalinense Santa Catalina lancetooth	None/None G1/S1	Occurs only on Santa Catalina Island.
Hedychridium argenteum Riverside cuckoo wasp	None/None G1G2/S1S2	This species appears to be endemic to eastern Riverside County. External parasite of bee larva.
Helminthoglypta ayresiana sanctaecrucis Ayer's snail	None/None G1G2T1T2/S1S2	Restricted to Santa Cruz Island, occupying diverse habitats; sea level to 2000 ft elevation. Found in rock slides, beneath logs and leaves in wooded localities, in clumps of cacti and other dense vegetation.
Helminthoglypta coelata mesa shoulderband	None/None G1/S1	Known only from a few locations in western San Diego County. Found in rock slides, beneath bark and rotten logs, and among coastal vegetation.
Helminthoglypta milleri peak shoulderband	None/None G1/S1	Known only from the type locality at Cuyamaca Peak in San Diego County. Found in rock piles.

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Helminthoglypta mohaveana Victorville shoulderband	None/None G1/S1	Known only from along the Mojave River in San Bernardino County. Found among granite boulders and at the base of rocky cliffs.
Helminthoglypta taylori westfork shoulderband	None/None G1/S1	Vicinity of the Mojave River. Under logs and leaves.
Helminthoglypta traskii traskii Trask shoulderband	None/None G1G2T1/S1	Known from Ventura, Los Angeles, Orange, and San Diego counties. Also reported from northwestern Baja California.
Helminthoglypta vasquezi Vasquez shoulderband	None/None G1/S1	Terrestrial.
Hydroporus simplex simple hydroporus diving beetle	None/None G1?/S1?	Known from aquatic habitats in Tuolumne and San Bernardino counties.
Hygrotus curvipes curved-foot hygrotus diving beetle	None/None G1/S1	Aquatic; known only from Alameda & Contra Costa counties.
Juniperella mirabilis juniper metallic wood-boring beetle	None/None G1/S1	Larvae develop in juniper in Santa Rosa Mts. in Southern California.
Linderiella occidentalis California linderiella	None/None G2G3/S2S3	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Water in the pools has very low alkalinity, conductivity, and total dissolved solids.
Linderiella santarosae Santa Rosa Plateau fairy shrimp	None/None G1G2/S1	Found only in the vernal pools on Santa Rosa Plateau in Riverside County. Southern basalt flow vernal pools.
Lycaena hermes Hermes copper butterfly	FC/None G1/S1	Found in southern mixed chaparral and coastal sage scrub at western edge of Laguna Mountains. Host plant is Rhamnus crocea. Although R. crocea is widespread throughout the coast range, Lycaena hermes is not.
Macrobaenetes kelsoensis Kelso giant sand treader cricket	None/None G2/S2	Known only from the Kelso Dunes, San Bernardino County; 2500 ft elevation. Found on bare, hard-packed sand ridges, 0.5 mile inland from margin.
Macrobaenetes valgum Coachella giant sand treader cricket	None/None G1G2/S1S2	Known from the sand dune ridges in the vicinity of Coachella Valley. Population size regulated by amount of annual rainfall; some spots favor permanent habitation where springs dampen sand.
Melitta californica California mellitid bee	None/None G4?/S2?	Desert regions of SW Arizona, SE California, and Baja California, Mexico. Also collected from Torrey Pines, San Diego Co. Earlier records of M. wilmattae pertain to this species; species was synonymized with M. californica in 1981.
Micrarionta feralis San Nicolas islandsnail	None/None G1/S1	Known only from San Nicolas Island, Ventura County. Fossilized shells from San Clemente Island, but none living.
Micrarionta gabbi San Clemente islandsnail	None/None G1/S1	Known only from San Clemente Island, Los Angeles County.
Micrarionta opuntia pricklypear islandsnail	None/None G1/S1	Known only from NE San Nicolas Island, in areas of isolated Opuntia littoralis and in Lycium patches among annual grass. Occurs beneath the surface, either covered by soil or clinging to sides of depressions or small burrows.
Miloderes nelsoni Nelson's miloderes weevil	None/None G2/S2	Known from Mojave Desert in Inyo and San Bernardino counties.
Minymischa ventura Ventura cuckoo wasp	None/None GU/SU	

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Neolarra alba white cuckoo bee	None/None GH/SH	Known only from 6 historical localities in Southern California; has not been collected since 1946. Cleptoparasitic in the nests of perdita bees.
Oliarces clara cheeseweed owlfly (cheeseweed moth lacewing)	None/None G1G3/S2	Inhabits the lower Colorado River drainage. Found under rocks or in flight over streams. Larrea tridentata is the suspected larval host.
Onychobaris langei Lange's El Segundo Dune weevil	None/None G1/S1	Known from El Segundo Dunes.
Panoquina errans wandering (=saltmarsh) skipper	None/None G4G5/S2	Southern California coastal salt marshes. Requires moist saltgrass for larval development.
Paranomada californica California cuckoo bee	None/None G1/S1	
Parnopes borregoensis Borrego parnopes cuckoo wasp	None/None G1G2/S1S2	Known from San Diego, San Bernardino, and Inyo counties.
Pelocoris shoshone Amargosa naucorid bug	None/None G1G3/S1S2	Endemic to the Amargosa River drainage in Death Valley, Inyo County, and San Bernardino County.
Perdita scitula antiochensis Antioch andrenid bee	None/None G1T1/S1	Known only from Antioch Dunes and Oakley. Visits flowers of Eriogonum, Gutierrezia californica, Heterotheca grandiflora, Lessingia glandulifera.
Plebejus saepiolus aureolus San Gabriel Mountains blue butterfly	None/None G5T1/S1	Type locality is a wet meadow seep in yellow pine forest. Foodplant is Trifolium wormskioldii.
Plebulina emigdionis San Emigdio blue butterfly	None/None G1G2/S1S2	Found in desert canyons & along riverbeds in Inyo, Kern, Los Angeles, and San Bernardino counties. Host plant is Atriplex canescens; maybe Lotus purshianus also.
Polyphylla erratica Death Valley June beetle	None/None G1G2/S1S2	Halophytic species. Larva, pupae and adults found in moist, salt-encrusted soil in the Amargosa River system. Larvae taken at roots of Distichlis divaricata.
Pristiloma shepardae Shepard's snail	None/None G1/S1	Known only from Santa Catalina and Santa Cruz islands. Usually found in moist leaf litter.
Psychomastax deserticola desert monkey grasshopper	None/None G1G2/S1S2	Occurs in very arid environments in the vicinity of the San Bernardino Mtns. Known to occur on chamise (Adenostoma fasciculatum).
Pyrgus ruralis lagunae Laguna Mountains skipper	FE/None G5T1/S1	Only in a few open meadows in yellow pine forest between 5,000 & 6,000 ft. in the vicinity of Mt Laguna & Palomar Mtn. Eggs laid on leaves of Horkelia bolanderi clevelandi. Larvae feed on leaves and overwinter on the host plant.
Radiocentrum avalonense Catalina mountainsnail	None/None G1/S1	Known only from southeast end of Santa Catalina Island. Coastal sage scrub habitats dominated by Salvia and Opuntia.
Rhaphiomidas terminatus abdominalis Delhi Sands flower-loving fly	FE/None G1T1/S1	Found only in areas of the Delhi Sands formation in southwestern San Bernardino & northwestern Riverside counties. Requires fine, sandy soils, often with wholly or partly consolidated dunes & sparse vegetation. Oviposition req. shade.
Rhaphiomidas terminatus terminatus El Segundo flower-loving fly	None/None G1T1/S1	Presumed extinct but recently discovered on Malaga Dunes, Los Angeles County. Perched dunes.
Rhopalolemma robertsi Roberts' rhopalolemma bee	None/None G1/S1	Known only from the type locality 8 km south of Twentynine Palms.

Scientific Name Common Name	Status	Habitat Requirements
Rothelix warnerfontis Warner Springs shoulderband	None/None G1/S1	Known only from two localities near Warner Springs, San Diego County. Found in wood rat nests; as development eliminates rat nests, snail has become scarce.
Socalchemmis gertschi Gertsch's socalchemmis spider	None/None G1/S1	Known from only 2 localities in Los Angeles County: Brentwood (type locality) and Topanga Canyon.
Socalchemmis icenoglei Icenogle's socalchemmis spider	None/None G1/S1	Known only from the type locality in the vicinity of Winchester, Riverside County.
Stenopelmatus cahuilaensis Coachella Valley jerusalem cricket	None/None G1G2/S1S2	Inhabits a small segment of the sand and dune areas of the Coachella Valley, in the vicinity of Palm Springs. Found in the large, undulating dunes piled up at the north base of Mt San Jacinto.
Sterkia clementina San Clemente Island blunt-top snail	None/None G1/S1S2	Known only from San Clemente, San Nicolas, Santa Catalina, and Santa Barbara islands. Inhabits the undersides of rocks or the soil beneath iceplant.
Streptocephalus woottoni Riverside fairy shrimp	FE/None G1G2/S1S2	Endemic to Western Riverside, Orange, and San Diego counties in areas of tectonic swales/earth slump basins in grassland and coastal sage scrub. Inhabit seasonally astatic pools filled by winter/spring rains. Hatch in warm water later in the season.
Texella kokoweef Kokoweef Crystal Cave harvestman	None/None G1/S1	Known only from the type locality, Kokoweef Crystal Cave, San Bernardino County. Specimens were collected under decaying wood debris.
Trigonoscuta brunnotesselata brown tassel trigonoscuta weevil	None/None G1G2/S1S2	Known only from the Kelso Dunes, San Bernardino County.
Trigonoscuta dorothea dorothea Dorothy's El Segundo Dune weevil	None/None G1T1/S1	Coastal sand dunes in Los Angeles County.
Trimerotropis occidentiloides Santa Monica grasshopper	None/None G1G2/S1S2	Known only from the Santa Monica Mountains. Found on bare hillsides and along dirt trails in chaparral.
Tryonia imitator mimic tryonia (=California brackishwater snail)	None/None G2/S2	Inhabits coastal lagoons, estuaries and salt marshes, from Sonoma County south to San Diego County. Found only in permanently submerged areas in a variety of sediment types; able to withstand a wide range of salinities.
Xerarionta intercisa horseshoe snail	None/None G1/S1	San Clemente Island. Found around rocks and Opuntia cactus.
Xerarionta redimita wreathed cactussnail	None/None G1G2/S1	Known only from San Clemente Island.
Xerarionta tryoni Bicolor cactussnail	None/None G1/S1	
Fish		
Catostomus latipinnis flannelmouth sucker	None/None G3G4/S1	Colorado River bordering California. Spawns in riffles, usually over a substrate of coarse gravel.
Catostomus santaanae Santa Ana sucker	FT/None G1/S1	Endemic to Los Angeles Basin south coastal streams. Habitat generalists, but prefer sand-rubble-boulder bottoms, cool, clear water, and algae.
Cyprinodon macularius desert pupfish	FE/SE G1/S1	Desert ponds, springs, marshes and streams in Southern California. Can live in salinities from freshwater to 68 ppt; can withstand temps from 9 - 45 C and dissolved oxygen levels down to 0.1 ppm.
Cyprinodon nevadensis amargosae Amargosa pupfish	None/None G2T1T2/S1S2	Permanent water sections of the lower Amargosa River. Two types of habitat: broad marshes fed by hot springs, and a narrow, steep-sided canyon area with swift flows.

Scientific Name Common Name	Status	Habitat Requirements
Cyprinodon nevadensis nevadensis Saratoga Springs pupfish	None/None G2T1/S1	Only known from Saratoga Springs and its outflow in Death Valley. A series of marshes and shallow lakes. Water temps vary from 10 to 49 C.
Eucyclogobius newberryi tidewater goby	FE/None G3/S3	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River. Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels.
Gasterosteus aculeatus williamsoni unarmored threespine stickleback	FE/SE G5T1/S1	Weedy pools, backwaters, and among emergent vegetation at the stream edge in small Southern California streams. Cool (<24 C), clear water with abundant vegetation.
Gila elegans bonytail	FE/SE G1/SH	Found in the Colorado River bordering California. Adapted for swimming in swift water, but both adults and young need backwaters and eddies. Needs gravel riffles for spawning.
Gila orcuttii arroyo chub	None/None G2/S2	Native to streams from Malibu Creek to San Luis Rey River basin. Introduced into streams in Santa Clara, Ventura, Santa Ynez, Mojave & San Diego river basins. Slow water stream sections with mud or sand bottoms. Feeds heavily on aquatic vegetation and associated invertebrates.
Hypomesus transpacificus Delta smelt	FT/SE G1/S1	Sacramento-San Joaquin Delta. Seasonally in Suisun Bay, Carquinez Strait & San Pablo Bay. Seldom found at salinities > 10 ppt. Most often at salinities < 2ppt.
Oncorhynchus mykiss irideus pop. 10 steelhead - southern California DPS	FE/None G5T1Q/S1	Federal listing refers to populations from Santa Maria River south to southern extent of range (San Mateo Creek in San Diego County). Southern steelhead likely have greater physiological tolerances to warmer water and more variable conditions.
Oncorhynchus mykiss irideus pop. 11 steelhead - Central Valley DPS	FT/None G5T2Q/S2	Populations in the Sacramento and San Joaquin rivers and their tributaries.
Ptychocheilus lucius Colorado pikeminnow	FE/SE G1/SX	Was native to the Colorado River bordering California. Adults found in deep pools in the main river channel, smaller fish are found in shallow and quiet waters.
Rhinichthys osculus ssp. *1* Amargosa Canyon speckled dace	None/None G5T1Q/S1	Found only in Amargosa Canyon and tributaries of the Amargosa River, esp. Willow Creek & Willow Creek Reservoir. Prefers pools with relatively deep water (0.5 - 0.75 m) and slow water velocity.
Rhinichthys osculus ssp. *3* Santa Ana speckled dace	None/None G5T1/S1	Headwaters of the Santa Ana and San Gabriel rivers. May be extirpated from the Los Angeles River system. Requires permanent flowing streams with summer water temps of 17-20 C. Usually inhabits shallow cobble and gravel riffles.
Siphateles bicolor mohavensis Mohave tui chub	FE/SE G4T1/S1	Endemic to the Mojave River basin, adapted to alkaline, mineralized waters. Needs deep pools, ponds, or slough-like areas. Needs vegetation for spawning.
Spirinchus thaleichthys longfin smelt	FC/ST G5/S1	Euryhaline, nektonic & anadromous. Found in open waters of estuaries, mostly in middle or bottom of water column. Prefer salinities of 15-30 ppt but can be found in completely freshwater to almost pure seawater.
Xyrauchen texanus razorback sucker	FE/SE G1/S1S2	Found in the Colorado River bordering California. Adapted for swimming in swift currents but also need quiet waters. Spawn in areas of sand/gravel/rocks in shallow water.

Scientific Name Common Name	Status	Habitat Requirements
Amphibians		
Anaxyrus californicus arroyo toad	FE/None G2G3/S2S3	Semi-arid regions near washes or intermittent streams, including valley-foothill and desert riparian, desert wash, etc. Rivers with sandy banks, willows, cottonwoods, and sycamores; loose, gravelly areas of streams in drier parts of range.
Batrachoseps gabrieli San Gabriel slender salamander	None/None G2G3/S2S3	Known only from the San Gabriel Mtns. Found under rocks, wood, and fern fronds, and on soil at the base of talus slopes. Most active on the surface in winter and early spring.
Batrachoseps major aridus desert slender salamander	FE/SE G4T1/S1	Known only from Hidden Palm Canyon and Guadalupe Creek, Riverside County, in barren, palm oasis, desert wash, and desert scrub. Occurs under limestone sheets, rocks, and talus, usually at the base of damp, shaded, north and west-facing walls.
Batrachoseps pacificus Channel Islands slender salamander	None/None G4/S3S4	Found only on San Miguel, Santa Rosa, Santa Cruz, and Anacapa islands. Found in a variety of habitats from forest to chaparral to grassland.
Ensatina eschscholtzii croceater yellow-blotched salamander	None/None G5T3/S3	Forests and well-shaded canyons, as well as oak woodlands and old chaparral. Needs surface objects, such as logs, boards, and rocks. Also needs old rodent burrows or other underground retreats.
Ensatina eschscholtzii klauberi large-blotched salamander	None/None G5T2?/S3	Found in conifer and woodland associations. Found in leaf litter, decaying logs and shrubs in heavily forested areas.
*Incilius a*lvarius Sonoran desert toad	None/None G5/SH	Breeds in temporary pools and irrigation ditches along the Colorado River and southern Imperial Valley.
Lithobates yavapaiensis lowland leopard frog	None/None G4/SX	Were found along the Colorado River and in streams near the Salton Sea.
Rana boylii foothill yellow-legged frog	None/SCT G3/S3	Partly-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Needs at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis.
Rana draytonii California red-legged frog	FT/None G2G3/S2S3	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.
Rana muscosa southern mountain yellow-legged frog	FE/SE G1/S1	Federal listing refers to populations in the San Gabriel, San Jacinto and San Bernardino mountains (southern DPS). Northern DPS was determined to warrant listing as endangered, Apr 2014, effective Jun 30, 2014. Always encountered within a few feet of water. Tadpoles may require 2 - 4 yrs to complete their aquatic development.
Scaphiopus couchii Couch's spadefoot	None/None G5/S2	Temporary desert rainpools that last at least 7 days, with water temps > 15 C, and with subterranean refuge sites close by. An insect food base, especially termites, must be available.
Spea hammondii western spadefoot	None/None G3/S3	Occurs primarily in grassland habitats but can be found in valley-foothill hardwood woodlands. Vernal pools are essential for breeding and egg-laying.
Taricha torosa Coast Range newt	None/None G4/S4 CDFW_SSC-Species of Special Concern	Coastal drainages from Mendocino County to San Diego County. Lives in terrestrial habitats & will migrate over 1 km to breed in ponds, reservoirs & slow-moving streams.

Scientific Name Common Name	Status	Habitat Requirements
Reptiles		
Anniella pulchra northern California legless lizard	None/None G3/S3	Sandy or loose loamy soils under sparse vegetation. Soil moisture is essential. They prefer soils with a high moisture content.
Anniella spp. California legless lizard	None/None G3G4/S3S4 CDFW_SSC-Species of Special Concern	Contra Costa County south to San Diego, within a variety of open habitats.This element represents California records of Anniella not yet assigned to new species within the Anniella pulchra complex. Variety of habitats; generally in moist, loose soil. They prefer soils with a high moisture content.
Anniella stebbinsi southern California legless lizard	None/None G3/S3	Generally south of the Transverse Range, extending to northwestern Baja California. Occurs in sandy or loose loamy soils under sparse vegetation. Disjunct populations in the Tehachapi and Piute Mountains in Kern County. Variety of habitats; generally in moist, loose soil. They prefer soils with a high moisture content.
Arizona elegans occidentalis California glossy snake	None/None G5T2/S2 CDFW_SSC-Species of Special Concern	Patchily distributed from the eastern portion of San Francisco Bay, southern San Joaquin Valley, and the Coast, Transverse, and Peninsular ranges, south to Baja California. Generalist reported from a range of scrub and grassland habitats, often with loose or sandy soils.
Aspidoscelis hyperythra orange-throated whiptail	None/None G5/S2S3	Inhabits low-elevation coastal scrub, chaparral, and valley-foothill hardwood habitats. Prefers washes and other sandy areas with patches of brush and rocks. Perennial plants necessary for its major food: termites.
Aspidoscelis tigris stejnegeri coastal whiptail	None/None G5T5/S3 CDFW_SSC-Species of Special Concern	Found in deserts and semi-arid areas with sparse vegetation and open areas. Also found in woodland & riparian areas. Ground may be firm soil, sandy, or rocky.
Charina umbratica southern rubber boa	None/ST G2G3/S2S3	Known from the San Bernardino and San Jacinto mtns; found in a variety of montane forest habitats. Snakes resembling C. umbratica reported from Mt. Pinos and Tehachapi mtns group with C. bottae based on mtDNA. Further research needed. Found in vicinity of streams or wet meadows; requires loose, moist soil for burrowing; seeks cover in rotting logs, rock outcrops, and under surface litter.
Chelonia mydas green turtle	FT/None G3/S1	Marine. Completely herbivorous; needs adquate supply of seagrasses and algae.
Coleonyx switaki barefoot gecko	None/ST G4/S1	Found only in areas of massive rock & rock outcrops at the heads of canyons. Occurs in rock cracks and crevices.
Coleonyx var*iegatus abbotti* San Diego banded gecko	None/None G5T3T4/S1S2 CDFW_SSC-Species of Special Concern	Coastal & cismontane Southern California. Found in granite or rocky outcrops in coastal scrub and chaparral habitats.
Crotalus ruber red-diamond rattlesnake	None/None G4/S3	Chaparral, woodland, grassland, & desert areas from coastal San Diego County to the eastern slopes of the mountains. Occurs in rocky areas and dense vegetation. Needs rodent burrows, cracks in rocks or surface cover objects.
Diadophis punctatus modestus San Bernardino ringneck snake	None/None G5T2T3/S2?	Most common in open, relatively rocky areas. Often in somewhat moist microhabitats near intermittent streams. Avoids moving through open or barren areas by restricting movements to areas of surface litter or herbaceous veg.

Scientific Name Common Name	Status	Habitat Requirements
Diadophis punctatus regalis regal ringneck snake	None/None GNR/S2S3 CDFW_SSC-Species of Special Concern	Variety of habitats in higher elevation desert mountains. In California known from the Clark, Providence, and Grapevine mountain ranges. Often in somewhat moist microhabitats such as springs and intermittant streams.
Diadophis punctatus similis San Diego ringneck snake	None/None G5T2T3/S2?	Open, fairly rocky areas. Use boards, flat rocks, woodpiles, stable talus, rotting logs & small ground holes for cover. Prefer areas with surface litter or herbaceous vegetation. Often in somewhat moist areas near intermittent streams.
Emys marmorata western pond turtle	None/None G3G4/S3	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation. Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.
Gambelia copeii Cope's leopard lizard	None/None G5/S1S2	Restricted in California to Southeastern San Diego County. Occurs in desert scrub, coastal sage scrub, oak woodland, and chaparral. Open flat areas within vegetation.
Gambelia sila blunt-nosed leopard lizard	FE/SE G1/S1	Resident of sparsely vegetated alkali and desert scrub habitats, in areas of low topographic relief. Seeks cover in mammal burrows, under shrubs or structures such as fence posts; they do not excavate their own burrows.
Gopherus agassizii desert tortoise	FT/ST G3/S2S3	Most common in desert scrub, desert wash, and Joshua tree habitats; occurs in almost every desert habitat. Require friable soil for burrow and nest construction. Creosote bush habitat with large annual wildflower blooms preferred.
Heloderma suspectum cinctum banded Gila monster	None/None G4T4/S1	Inhabits the lower slopes of rocky canyons and arroyos but is also found on desert flats among scrub and succulents. Eggs are laid in soil in excavated nests; thus, soil must be sandy or friable. Found in areas moister than surroundings.
Kinosternon sonoriense Sonoran mud turtle	None/None G4/SH	The lower Colorado River system in southeastern California. Permanent slackwater habitats along intermittent or perennial streams with abundant submergent vegetation and benthic inverts.
Masticophis fuliginosus Baja California coachwhip	None/None G5/S1S2 CDFW_SSC-Species of Special Concern	In California restricted to southern San Diego County, where it is known from grassland and coastal sage scrub. Open areas in grassland and coastal sage scrub
Phrynosoma blainvillii coast horned lizard	None/None G3G4/S3S4	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.
Phrynosoma mcallii flat-tailed horned lizard	None/None G3/S2	Restricted to desert washes and desert flats in central Riverside, eastern San Diego, and Imperial counties. Critical habitat element is fine sand, into which lizards burrow to avoid temperature extremes; requires vegetative cover and ants.
Plestiodon skiltonianus interparietalis Coronado skink	None/None G5T5/S2S3	Grassland, chaparral, pinon-juniper and juniper sage woodland, pine-oak and pine forests in Coast Ranges of Southern California. Prefers early successional stages or open areas. Found in rocky areas close to streams and on dry hillsides.
Salvadora hexalepis virgultea coast patch-nosed snake	None/None G5T4/S2S3 CDFW_SSC-Species of Special Concern	Brushy or shrubby vegetation in coastal Southern California. Require small mammal burrows for refuge and overwintering sites.

Scientific Name Common Name	Status	Habitat Requirements
Thamnophis gigas giant gartersnake	FT/ST G2/S2	Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches. This is the most aquatic of the gartersnakes in California.
Thamnophis hammondii two-striped gartersnake	None/None G4/S3S4	Coastal California from vicinity of Salinas to northwest Baja California. From sea to about 7,000 ft elevation. Highly aquatic, found in or near permanent fresh water. Often along streams with rocky beds and riparian growth.
Thamnophis sirtalis pop. 1 south coast gartersnake	None/None G5T1T2/S1S2 CDFW_SSC-Species of Special Concern	Southern California coastal plain from Ventura County to San Diego County, and from sea level to about 850 m. Marsh and upland habitats near permanent water with good strips of riparian vegetation.
Uma inornata Coachella Valley fringe-toed lizard	FT/SE G1Q/S1	Limited to sandy areas in the Coachella Valley, Riverside County. Requires fine, loose, windblown sand (for burrowing), interspersed with hardpan and widely-spaced desert shrubs.
Uma notata Colorado Desert fringe-toed lizard	None/None G3/S2	Colorado Desert region; in sand dunes, dry lakebeds, sandy beaches or riverbanks, desert washes, or sparse desert scrub. Requires fine, loose, windblown sand (for burrowing); shrubs or annuals for arthropod production.
Uma scoparia Mojave fringe-toed lizard	None/None G3G4/S3S4	Fine, loose, wind-blown sand in sand dunes, dry lakebeds, riverbanks, desert washes, sparse alkali scrub and desert scrub. Shrubs or annual plants may be necessary for arthropods found in the diet.
Xantusia gracilis sandstone night lizard	None/None G1/S1	Known only from the Truckhaven Rocks in the eastern part of Anza-Borrego State Park. Found in fissures or under slabs of exfoliating sandstone and rodent burrows in compacted sandstone and mudstone.
Xantusia riversiana island night lizard	FD/None G3/S3	Found in a wide variety of habitats on three of the Channel Islands: Santa Barbara, San Clemente, and San Nicolas. Main habitat requirement is available cover, from prostrate plants (Opuntia and ice plant) to rocks, logs, and rubble.
Birds		
Accipiter cooperii Cooper's hawk	None/None G5/S4	Woodland, chiefly of open, interrupted or marginal type. Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river floodplains; also, live oaks.
Agelaius tricolor tricolored blackbird	None/ST G2G3/S1S2	Highly colonial species, most numerous in Central Valley & vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony.
Aimophila ruficeps canescens southern California rufous-crowned sparrow	None/None G5T3/S3 CDFW_WL-Watch List	Resident in Southern California coastal sage scrub and sparse mixed chaparral. Frequents relatively steep, often rocky hillsides with grass and forb patches.
Ammodramus savannarum grasshopper sparrow	None/None G5/S3	Dense grasslands on rolling hills, lowland plains, in valleys and on hillsides on lower mountain slopes. Favors native grasslands with a mix of grasses, forbs and scattered shrubs. Loosely colonial when nesting.
Aquila chrysaetos golden eagle	None/None G5/S3	Rolling foothills, mountain areas, sage-juniper flats, and desert. Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.
Ardea alba great egret	None/None G5/S4	Colonial nester in large trees. Rookery sites located near marshes, tide-flats, irrigated pastures, and margins of rivers and lakes.

Scientific Name Common Name	Status	Habitat Requirements
Ardea herodias great blue heron	None/None G5/S4	Colonial nester in tall trees, cliffsides, and sequestered spots on marshes. Rookery sites in close proximity to foraging areas: marshes, lake margins, tide-flats, rivers and streams, wet meadows.
Artemisiospiza belli belli Bell's sage sparrow	None/None G5T2T3/S3	Nests in chaparral dominated by fairly dense stands of chamise. Found in coastal sage scrub in south of range. Nest located on the ground beneath a shrub or in a shrub 6-18 inches above ground. Territories about 50 yds apart.
Artemisiospiza belli clementeae San Clemente sage sparrow	FT/None G5T1Q/S1	Resident of dry brushlands of San Clemente Island. Inhabits scrubby brush on mesas, thorny brush growing in clumps and patches interspersed with cactus.
Asio flammeus short-eared owl	None/None G5/S3	Found in swamp lands, both fresh and salt; lowland meadows; irrigated alfalfa fields. Tule patches/tall grass needed for nesting/daytime seclusion. Nests on dry ground in depression concealed in vegetation.
Asio otus long-eared owl	None/None G5/S3?	Riparian bottomlands grown to tall willows and cottonwoods; also, belts of live oak paralleling stream courses. Require adjacent open land, productive of mice and the presence of old nests of crows, hawks, or magpies for breeding.
Athene cunicularia burrowing owl	None/None G4/S3	Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.
Baeolophus inornatus oak titmouse	None/None G4/S4	Oak woodlands. Cavity nester
Buteo regalis ferruginous hawk	None/None G4/S3S4	Open grasslands, sagebrush flats, desert scrub, low foothills and fringes of pinyon and juniper habitats. Eats mostly lagomorphs, ground squirrels, and mice. Population trends may follow lagomorph population cycles.
Buteo swainsoni Swainson's hawk	None/ST G5/S3	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, & agricultural or ranch lands with groves or lines of trees. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.
Campylorhynchus brunneicapillus sandiegensis coastal cactus wren	None/None G5T3Q/S3	Southern California coastal sage scrub. Wrens require tall opuntia cactus for nesting and roosting.
Cardinalis cardinalis northern cardinal	None/None G5/S1	Extremely rare resident along the Colorado River. Dense, brushy river bottom thickets, well-vegetated dry washes and dense desert scrub.
Charadrius alexandrinus nivosus western snowy plover	FT/None G3T3/S2S3	Sandy beaches, salt pond levees & shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.
Charadrius montanus mountain plover	None/None G3/S2S3	Short grasslands, freshly plowed fields, newly sprouting grain fields, & sometimes sod farms. Short vegetation, bare ground, and flat topography. Prefers grazed areas and areas with burrowing rodents.
Circus hudsonius northern harrier	None/None G5/S3	Coastal salt & freshwater marsh. Nest and forage in grasslands, from salt grass in desert sink to mountain cienagas. Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.
Coccyzus americanus occidentalis western yellow-billed cuckoo	FT/SE G5T2T3/S1	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.

Scientific Name Common Name	Status	Habitat Requirements
Colaptes chrysoides gilded flicker	None/SE G5/S1	Sonoran desert habitat and riparian woodlands along the Colorado River. Uses willows, cottonwood, tree yucca and, when available, saguaro cactus.
Coturnicops noveboracensis yellow rail	None/None G4/S1S2	Summer resident in eastern Sierra Nevada in Mono County. Freshwater marshlands.
Cypseloides niger black swift	None/None G4/S2	Coastal belt of Santa Cruz and Monterey counties; central & southern Sierra Nevada; San Bernardino & San Jacinto mountains. Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea-bluffs above the surf; forages widely.
Dendragapus fuliginosus howardi Mount Pinos sooty grouse	None/None G5T2T3/S2S3 CDFW_SSC-Species of Special Concern	Inhabitant of southern Sierra Nevada mountains, in small islands of populations. Mainly inhabits white fir covered slopes. Also found in other conifer types and open, brushy areas adjacent to forest.
Egretta thula snowy egret	None/None G5/S4	Colonial nester, with nest sites situated in protected beds of dense tules. Rookery sites situated close to foraging areas: marshes, tidal-flats, streams, wet meadows, and borders of lakes.
Elanus leucurus white-tailed kite	None/None G5/S3S4	Rolling foothills and valley margins with scattered oaks & river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.
Empidonax traillii extimus southwestern willow flycatcher	FE/SE G5T2/S1	Riparian woodlands in Southern California.
Eremophila alpestris actia California horned lark	None/None G5T4Q/S4	Coastal regions, chiefly from Sonoma County to San Diego County. Also main part of San Joaquin Valley and east to foothills. Short-grass prairie, bald hills, mountain meadows, open coastal plains, fallow grain fields, alkali flats.
Falco columbarius merlin	None/None G5/S3S4	Seacoast, tidal estuaries, open woodlands, savannahs, edges of grasslands & deserts, farms & ranches. Clumps of trees or windbreaks are required for roosting in open country.
Falco mexicanus prairie falcon	None/None G5/S4	Inhabits dry, open terrain, either level or hilly. Breeding sites located on cliffs. Forages far afield, even to marshlands and ocean shores.
Falco peregrinus anatum American peregrine falcon	FD/SD G4T4/S3S4	Near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; also, human-made structures. Nest consists of a scrape or a depression or ledge in an open site.
Gelochelidon nilotica gull-billed tern	None/None G5/S1	Only known breeding colonies at San Diego Bay and the Salton Sea. Nests on low, sandy islets. Known to feed on fishes at mouth of Colorado River and on grasshoppers in alfalfa fields.
Gymnogyps californianus California condor	FE/SE G1/S1	Require vast expanses of open savannah, grasslands, and foothill chaparral in mountain ranges of moderate altitude. Deep canyons containing clefts in the rocky walls provide nesting sites. Forages up to 100 miles from roost/nest.
Haliaeetus leucocephalus bald eagle	FD/SE G5/S3	Ocean shore, lake margins, and rivers for both nesting and wintering. Most nests within 1 mile of water. Nests in large, old-growth, or dominant live tree with open branches, especially ponderosa pine. Roosts communally in winter.
Icteria virens yellow-breasted chat	None/None G5/S3	Summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses. Nests in low, dense riparian, consisting of willow, blackberry, wild grape; forages and nests within 10 ft of ground.

Scientific Name Common Name	Status	Habitat Requirements
Ixobrychus exilis least bittern	None/None G4G5/S2	Colonial nester in marshlands and borders of ponds and reservoirs which provide ample cover. Nests usually placed low in tules, over water.
Junco hyemalis caniceps gray-headed junco	None/None G5T5/S1 CDFW_WL-Watch List	Summer resident of Clark Mountain (eastern San Bernardino County) and Grapevine Mountains (Inyo County). Inhabits white fir association at 7300 ft (Clark Mountain); also, from dense pinyons above 6700 ft (Grapevine Mountains).
Lanius ludovicianus loggerhead shrike	None/None G4/S4	Broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub & washes. Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.
Lanius ludovicianus mearnsi San Clemente loggerhead shrike	FE/None G4T1Q/S1	Resident of San Clemente Island. Inhabits washes, ravines, and mesas, in vicinity of scattered tall bushes (toyon, wild cherry) or low thorny scrub or cactus.
Laterallus jamaicensis coturniculus California black rail	None/ST G3G4T1/S1	Inhabits freshwater marshes, wet meadows and shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat.
Melanerpes uropygialis Gila woodpecker	None/SE G5/S1	In California, inhabits cottonwoods and other desert riparian trees, shade trees, and date palms. Cavity nester in riparian trees or saguaro cactus.
Melospiza melodia song sparrow ("Modesto" population)	None/None G5/S3? CDFW_SSC-Species of Special Concern	Only in Sacramento Valley, Sacramento–San Joaquin River Delta, and northern San Joaquin Valley. Occurs in emergent freshwater marshes, riparian willow thickets, riparian forests of valley oak, and irrigation cannals and levees. Requires moderately dense vegetation to supply cover for nest sites.
Melospiza melodia graminea Channel Island song sparrow	None/None G5T1/S1	Only on San Miguel and Santa Rosa Islands. Need moderately dense scrubby vegetation for nesting, a water source & exposed ground for foraging.
Micrathene whitneyi elf owl	None/SE G5/S1	In California, nesting area limited to cottonwood-willow & mesquite riparian zone along the Colorado River. Nests in deserted woodpecker holes, often in larger trees which offer insulation from high daytime temperatures.
Myiarchus tyrannulus brown-crested flycatcher	None/None G5/S3	Inhabits desert riparian areas along the Colorado River, as well as other desert oases and riparian areas NW to Victorville. Requires riparian thickets, trees, snags, and shrubs for foraging perches, nesting cavities, and cover.
Nycticorax nycticorax black-crowned night heron	None/None G5/S4	Colonial nester, usually in trees, occasionally in tule patches. Rookery sites located adjacent to foraging areas: lake margins, mud-bordered bays, marshy spots.
Oceanodroma homochroa ashy storm-petrel	None/None G2/S2	Colonial nester on off-shore islands. Usually nests on driest part of islands. Forages over open ocean. Nest sites on islands are in crevices beneath loosely piled rocks or driftwood, or in caves.
Oreothlypis luciae Lucy's warbler	None/None G5/S2S3	Primarily along lower Colorado River Valley and the washes & arroyos emptying into it, with occasional occurrences throughout the Sonoran and Mojave deserts. Partial to thickets of mesquite, riparian scrub and even stands of tamarisk.
Oreothlypis virginiae Virginia's warbler	None/None G5/S2	East slope of Southern Sierra Nevada to San Bernardino Mountains. In arid, shrubby, mixed-conifer, pinyon-juniper, montane-chaparral. 7000-9000 ft. Nests on arid slopes with stands of tall shrubs/scattered trees; also, riparian thickets of willow/wild rose along streams.

Scientific Name Common Name	Status	Habitat Requirements
Pandion haliaetus osprey	None/None G5/S4	Ocean shore, bays, freshwater lakes, and larger streams. Large nests built in tree-tops within 15 miles of a good fish-producing body of water.
Passerculus sandwichensis beldingi Belding's savannah sparrow	None/SE G5T3/S3	Inhabits coastal salt marshes, from Santa Barbara south through San Diego County. Nests in Salicornia on and about margins of tidal flats.
Pelecanus occidentalis californicus California brown pelican	FD/SD G4T3T4/S3	Colonial nester on coastal islands just outside the surf line. Nests on coastal islands of small to moderate size which afford immunity from attack by ground-dwelling predators. Roosts communally.
Phalacrocorax auritus double-crested cormorant	None/None G5/S4	Colonial nester on coastal cliffs, offshore islands, and along lake margins in the interior of the state. Nests along coast on sequestered islets, usually on ground with sloping surface, or in tall trees along lake margins.
Piranga flava hepatic tanager	None/None G5/S1	White fir-pinyon forest on desert peaks, 5300-8100 ft elevation. Understory of xerophytic shrubs.
Piranga rubra summer tanager	None/None G5/S1	Summer resident of desert riparian along lower Colorado River, and locally elsewhere in California deserts. Requires cottonwood-willow riparian for nesting and foraging; prefers older, dense stands along streams.
Plegadis chihi white-faced ibis	None/None G5/S3S4	Shallow freshwater marsh. Dense tule thickets for nesting, interspersed with areas of shallow water for foraging.
Polioptila californica californica coastal California gnatcatcher	FT/None G4G5T2Q/S2	Obligate, permanent resident of coastal sage scrub below 2500 ft in Southern California. Low, coastal sage scrub in arid washes, on mesas and slopes. Not all areas classified as coastal sage scrub are occupied.
Polioptila melanura black-tailed gnatcatcher	None/None G5/S3S4	Primarily inhabits wooded desert wash habitats; also occurs in desert scrub habitat, especially in winter. Nests in desert washes containing mesquite, palo verde, ironwood, acacia; absent from areas where salt cedar introduced.
Progne subis purple martin	None/None G5/S3	Inhabits woodlands, low elevation coniferous forest of Douglas-fir, ponderosa pine, and Monterey pine. Nests in old woodpecker cavities mostly; also in human-made structures. Nest often located in tall, isolated tree/snag.
Psiloscops flammeolus flammulated owl	None/None G4/S2S4	Need montane forests with some understory brush for breeding. In California the breeding range is closely associated with the presence of ponderosa pine and Jeffery pine.
Pyrocephalus rubinus vermilion flycatcher	None/None G5/S2S3	During nesting, inhabits desert riparian adjacent to irrigated fields, irrigation ditches, pastures, and other open, mesic areas. Nest in cottonwood, willow, mesquite, and other large desert riparian trees.
Rallus obsoletus levipes light-footed Ridgway's rail	FE/SE G5T1T2/S1	Found in salt marshes traversed by tidal sloughs, where cordgrass and pickleweed are the dominant vegetation. Requires dense growth of either pickleweed or cordgrass for nesting or escape cover; feeds on molluscs and crustaceans.
Rallus obsoletus yumanensis Yuma Ridgway's rail	FE/ST G5T3/S1S2	Nests in freshwater marshes along the Colorado River and along the south and east ends of the Salton Sea. Prefers stands of cattails and tules dissected by narrow channels of flowing water; principle food is crayfish.
Riparia riparia bank swallow	None/ST G5/S2	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.
Rynchops niger black skimmer	None/None G5/S2	Nests on gravel bars, low islets, and sandy beaches, in unvegetated sites. Nesting colonies usually less than 200 pairs.

Scientific Name Common Name	Status	Habitat Requirements
Setophaga petechia yellow warbler	None/None G5/S3S4	Riparian plant associations in close proximity to water. Also nests in montane shrubbery in open conifer forests in Cascades and Sierra Nevada. Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.
Setophaga petechia sonorana Sonoran yellow warbler	None/None G5T2T3/S2	Summer resident of Colorado River Valley, in riparian deciduous habitat. Below 600 ft elevation. Inhabits cottonwoods and willows, particularly the crown foliage; nests in understory, usually 2-16 ft above ground.
Spinus lawrencei Lawrence's goldfinch	None/None G3G4/S3S4	Nests in open oak or other arid woodland and chaparral, near water. Nearby herbaceous habitats used for feeding. Closely associated with oaks.
Sternula antillarum browni California least tern	FE/SE G4T2T3Q/S2	Nests along the coast from San Francisco Bay south to northern Baja California. Colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, landfills, or paved areas.
Synthliboramphus scrippsi Scripps's murrelet	FC/ST G3/S2	Open ocean except during breeding season. Breeds on offshore islands in Southern California. Nests in rock crevices, under bushes, in old burrows and among man-made debris.
Toxostoma bendirei Bendire's thrasher	None/None G4G5/S3	Migratory; local spring/summer resident in flat areas of desert succulent shrub/Joshua tree habitats in Mojave Desert. Nests in cholla, yucca, palo verde, thorny shrub, or small tree, usually 0.5 to 20 feet above ground.
Toxostoma crissale Crissal thrasher	None/None G5/S3	Resident of southeastern deserts in desert riparian and desert wash habitats. Nests in dense vegetation along streams/washes; mesquite, screwbean mesquite, ironwood, catclaw, acacia, arrowweed, willow.
Toxostoma lecontei Le Conte's thrasher	None/None G4/S3	Desert resident; primarily of open desert wash, desert scrub, alkali desert scrub, and desert succulent scrub habitats. Commonly nests in a dense, spiny shrub or densely branched cactus in desert wash habitat, usually 2-8 feet above ground.
Vireo bellii arizonae Arizona bell's vireo	None/SE G5T4/S1S2	Summer resident along Colorado River. Chiefly inhabits willow thickets with undergrowth of Baccharis glutinosa. Nests in willow, mesquite, or other small tree/shrub, within 8 ft (usually 2-3 ft) of ground.
Vireo bellii pusillus least Bell's vireo	FE/SE G5T2/S2	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.
Vireo vicinior gray vireo	None/None G4/S2	Dry chaparral; west of desert, in chamise-dominated habitat; mountains of Mojave Desert, associated with juniper & Artemisia. Forage, nest, and sing in areas formed by a continuous growth of twigs, 1-5 ft above ground.
Xanthocephalus xanthocephalus yellow-headed blackbird	None/None G5/S3	Nests in freshwater emergent wetlands with dense vegetation and deep water. Often along borders of lakes or ponds. Nests only where large insects such as Odonata are abundant, nesting timed with maximum emergence of aquatic insects.

Scientific Name Common Name	Status	Habitat Requirements
Mammals		
Ammospermophilus nelsoni Nelson's antelope squirrel	None/ST G2/S2S3	Western San Joaquin Valley from 200-1200 ft elev. On dry, sparsely vegetated loam soils. Dig burrows or use k-rat burrows. Need widely scattered shrubs, forbs and grasses in broken terrain with gullies and washes.
Antrozous pallidus pallid bat	None/None G5/S3	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.
Arctocephalus townsendi Guadalupe fur-seal	FT/ST G1/S1	Breeds on Isla de Guadalupe off of Mexico, occasionally found on San Miguel, San Nicolas, and San Clemente islands. Prefers shallow, nearshore island water, with cool and sheltered rocky areas for haul-outs.
Canis lupus gray wolf	FE/SE G4/S1	Habitat generalists, historically occupying diverse habitats including tundra, forests, grasslands, and deserts. Primary habitat requirements are the presence of adequate ungulate prey, water, and low human contact.
Chaetodipus californicus femoralis Dulzura pocket mouse	None/None G5T3/S3 CDFW_SSC-Species of Special Concern	Variety of habitats including coastal scrub, chaparral & grassland in San Diego County. Attracted to grass-chaparral edges.
Chaetodipus fallax fallax northwestern San Diego pocket mouse	None/None G5T3T4/S3S4 CDFW_SSC-Species of Special Concern	Coastal scrub, chaparral, grasslands, sagebrush, etc. in western San Diego County. Sandy, herbaceous areas, usually in association with rocks or coarse gravel.
Chaetodipus fallax pallidus pallid San Diego pocket mouse	None/None G5T34/S3S4 CDFW_SSC-Species of Special Concern	Desert border areas in eastern San Diego County in desert wash, desert scrub, desert succulent scrub, pinyon-juniper, etc. Sandy, herbaceous areas, usually in association with rocks or coarse gravel.
Choeronycteris mexicana Mexican long-tongued bat	None/None G4/S1	Occasionally found in San Diego County, which is on the periphery of their range. Feeds on nectar and pollen of night-blooming succulents. Roosts in relatively well-lit caves, and in and around buildings.
Corynorhinus townsendii Townsend's big-eared bat	None/None G3G4/S2	Throughout California in a wide variety of habitats. Most common in mesic sites. Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.
Dipodomys merriami collinus Earthquake Merriam's kangaroo rat	None/None G5T2?/S1S2	Known only from San Diego & Riverside Co. Associated with riversidean sage scrub, chaparral, & non-native grassland. Need sandy loam substrates for digging of burrows.
Dipodomys merriami parvus San Bernardino kangaroo rat	FE/SCE G5T1/S1 CDFW_SSC-Species of Special Concern	Alluvial scrub vegetation on sandy loam substrates characteristic of alluvial fans and flood plains. Needs early to intermediate seral stages.
Dipodomys stephensi Stephens' kangaroo rat	FE/ST G2/S2	Primarily annual & perennial grasslands, but also occurs in coastal scrub & sagebrush with sparse canopy cover. Prefers buckwheat, chamise, brome grass and filaree. Will burrow into firm soil.
Enhydra lutris nereis southern sea otter	FT/None G4T2/S2	Nearshore marine environments from about Ano Nuevo, San Mateo Co. to Point Sal, Santa Barbara Co. Needs canopies of giant kelp & bull kelp for rafting & feeding. Prefers rocky substrates with abundant invertebrates.

Scientific Name Common Name	Status	Habitat Requirements
Erethizon dorsatum North American porcupine	None/None G5/S3	Forested habitats in the Sierra Nevada, Cascade, and Coast ranges, with scattered observations from forested areas in the Transverse Ranges. Wide variety of coniferous and mixed woodland habitat.
Euderma maculatum spotted bat	None/None G4/S3	Occupies a wide variety of habitats from arid deserts and grasslands through mixed conifer forests. Feeds over water and along washes. Feeds almost entirely on moths. Needs rock crevices in cliffs or caves for roosting.
Eumops perotis californicus western mastiff bat	None/None G5T4/S3S4	Many open, semi-arid to arid habitats, including conifer & deciduous woodlands, coastal scrub, grasslands, chaparral, etc. Roosts in crevices in cliff faces, high buildings, trees and tunnels.
Glaucomys oregonensis californicus San Bernardino flying squirrel	None/None G5T1T2/S1S2	Known from black oak or white fir dominated woodlands between 5200 - 8500 ft in the San Bernardino and San Jacinto ranges. May be extirpated from San Jacinto range. Needs cavities in trees/snags for nests and cover. Needs nearby water.
Lasionycteris noctivagans silver-haired bat	None/None G5/S3S4	Primarily a coastal and montane forest dweller, feeding over streams, ponds & open brushy areas. Roosts in hollow trees, beneath exfoliating bark, abandoned woodpecker holes, and rarely under rocks. Needs drinking water.
Lasiurus blossevillii western red bat	None/None G5/S3	Roosts primarily in trees, 2-40 ft above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.
Lasiurus cinereus hoary bat	None/None G5/S4	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.
Lasiurus xanthinus western yellow bat	None/None G5/S3	Found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. Roosts in trees, particularly palms. Forages over water and among trees.
Leptonycteris yerbabuenae lesser long-nosed bat	FD/None G4/S1	Arid regions such as desert grasslands and shrub land. Suitable day roosts (caves & mines) and suitable concentrations of food plants (columnar cacti & agaves) are critical resources. No maternity roosts known from California; may only be vagrant. Caves and mines are used as day roosts. Caves, mines, rock crevices, trees and shrubs, and abandoned buildings are used as night roosts for digesting meals. Nectar, pollen, and fruit eating bat; primarily feeding on agaves, saguaro, and organ pipe cactus.
Lepus californicus bennettii San Diego black-tailed jackrabbit	None/None G5T3T4/S3S4 CDFW_SSC-Species of Special Concern	Intermediate canopy stages of shrub habitats & open shrub/herbaceous & tree/herbaceous edges. Coastal sage scrub habitats in Southern California.
Lontra canadensis sonora southwestern river otter	None/None G5T1/S1 CDFW_SSC-Species of Special Concern	Aquatic habitats along the Colorado River. Needs abundant food sources and sufficient water for shelter and foraging.
Macrotus californicus California leaf-nosed bat	None/None G4/S3	Desert riparian, desert wash, desert scrub, desert succulent scrub, alkali scrub and palm oasis habitats. Needs rocky, rugged terrain with mines or caves for roosting.

Scientific Name Common Name	Status	Habitat Requirements
Microtus californicus mohavensis Mohave river vole	None/None G5T1/S1 CDFW_SSC-Species of Special Concern	Occurs only in weedy herbaceous growth in wet areas along the Mojave River. May be found in some irrigated pastures. Burrows into soft soil. Feeds on leafy parts of grasses, sedges and herbs. Clips grasses to form runways from burrow.
Microtus californicus stephensi south coast marsh vole	None/None G5T1T2/S1S2 CDFW_SSC-Species of Special Concern	Tidal marshes in Los Angeles, Orange and southern Ventura counties.
Myotis ciliolabrum western small-footed myotis	None/None G5/S3	Wide range of habitats mostly arid wooded & brushy uplands near water. Seeks cover in caves, buildings, mines, and crevices. Prefers open stands in forests and woodlands. Requires drinking water. Feeds on a wide variety of small flying insects.
Myotis evotis long-eared myotis	None/None G5/S3	Found in all brush, woodland and forest habitats from sea level to about 9000 ft. Prefers coniferous woodlands and forests. Nursery colonies in buildings, crevices, spaces under bark, and snags. Caves used primarily as night roosts.
Myotis occultus Arizona Myotis	None/None G4/S1	Lowlands of the Colorado River and adjacent desert mountain ranges. Needs roosting areas in tree hollows, rock crevices, under bridges, etc.
Myotis thysanodes fringed myotis	None/None G4/S3	In a wide variety of habitats, optimal habitats are pinyon-juniper, valley foothill hardwood & hardwood-conifer. Uses caves, mines, buildings or crevices for maternity colonies and roosts.
Myotis velifer cave myotis	None/None G5/S1	Lowlands of the Colorado River and adjacent mountain ranges. Require caves or mines for roosting.
Myotis volans long-legged myotis	None/None G5/S3	Most common in woodland and forest habitats above 4000 ft. Trees are important day roosts; caves and mines are night roosts. Nursery colonies usually under bark or in hollow trees, but occasionally in crevices or buildings.
Myotis yumanensis Yuma myotis	None/None G5/S4	Optimal habitats are open forests and woodlands with sources of water over which to feed. Distribution is closely tied to bodies of water. Maternity colonies in caves, mines, buildings or crevices.
Neotamias panamintinus acrus Kingston Mountain chipmunk	None/None G4T1T2/S1S2	Arid pinyon-juniper woodlands in the Kingston Mountains of northeastern San Bernardino County. Occupies nests among rocks in fissured cliffs and ledges.
Neotamias speciosus callipeplus Mount Pinos chipmunk	None/None G4T1T2/S2	Open forests with a mix of shrubs and trees on the upper slopes and summit of Mt. Abel and Mt. Frazier. Arboreal habits - rarely ventures far from tree cover.
Neotamias speciosus speciosus lodgepole chipmunk	None/None G4T2T3/S2S3	Summits of isolated Piute, San Bernardino, & San Jacinto mountains. Usually found in open-canopy forests. Habitat is usually lodgepole pine forests in the San Bernardino Mts & chinquapin slopes in the San Jacinto Mts.
Neotoma albigula venusta Colorado Valley woodrat	None/None G5T3T4/S1S2	Low-lying desert areas in southeastern California. Closely associated with beaver-tail cactus & mesquite. Intolerant of cold temps. Eats mainly succulent plants. Distribution influenced by abundance of nest building material
Neotoma lepida intermedia San Diego desert woodrat	None/None G5T3T4/S3S4 CDFW_SSC-Species of Special Concern	Coastal scrub of Southern California from San Diego County to San Luis Obispo County. Moderate to dense canopies preferred. They are particularly abundant in rock outcrops, rocky cliffs, and slopes.

Scientific Name Common Name	Status	Habitat Requirements
Nyctinomops femorosaccus pocketed free-tailed bat	None/None G4/S3	Variety of arid areas in Southern California; pine-juniper woodlands, desert scrub, palm oasis, desert wash, desert riparian, etc. Rocky areas with high cliffs.
Nyctinomops macrotis big free-tailed bat	None/None G5/S3	Low-lying arid areas in Southern California. Need high cliffs or rocky outcrops for roosting sites. Feeds principally on large moths.
Onychomys torridus ramona southern grasshopper mouse	None/None G5T3/S3 CDFW_SSC-Species of Special Concern	Desert areas, especially scrub habitats with friable soils for digging. Prefers low to moderate shrub cover. Feeds almost exclusively on arthropods, especially scorpions and orthopteran insects.
Ovis canadensis nelsoni desert bighorn sheep	None/None G4T4/S3	Widely distributed from the White Mtns in Mono Co. to the Chocolate Mts in Imperial Co. Open, rocky, steep areas with available water and herbaceous forage.
Ovis canadensis nelsoni pop. 2 Peninsular bighorn sheep DPS	FE/ST G4T3Q/S1	Eastern slopes of the Peninsular Ranges below 4,600 ft elevation. This DPS of the subspecies inhabits the Peninsular Ranges in southern California from the San Jacinto Mountains south to the US-Mexico International Border. Optimal habitat includes steep walled canyons and ridges bisected by rocky or sandy washes, with available water.
Perognathus alticola alticola white-eared pocket mouse	None/None G1G2TH/SH	Ponderosa and Jeffrey pine habitats; also in mixed chaparral and sagebrush habitats in the San Bernardino Mountains. Burrows are constructed in loose soil.
Perognathus alticola inexpectatus Tehachapi pocket mouse	None/None G1G2T1T2/S1S2	Arid annual grassland and desert shrub communities, but also taken in fallow grain fields and in Russian thistle. Burrows for cover and nesting. Aestivates and hibernates during extreme weather. Forages on open ground and under shrubs.
Perognathus inornatus San Joaquin Pocket Mouse	None/None G2G3/S2S3	Grassland, oak savanna and arid scrubland in the southern Sacramento Valley, Salinas Valley, San Joaquin Valley and adjacent foothills, south to the Mojave Desert. Associated with fine-textured, sandy, friable soils.
Perognathus longimembris bangsi Palm Springs pocket mouse	None/None G5T2/S2	Desert riparian, desert scrub, desert wash and sagebrush habitats. Most common in creosote-dominated desert scrub. Rarely found on rocky sites. Occurs in all canopy coverage classes.
Perognathus longimembris brevinasus Los Angeles pocket mouse	None/None G5T1T2/S1S2 CDFW_SSC-Species of Special Concern	Lower elevation grasslands and coastal sage communities in and around the Los Angeles Basin. Open ground with fine, sandy soils. May not dig extensive burrows, hiding under weeds and dead leaves instead.
Perognathus longimembris internationalis Jacumba pocket mouse	None/None G5T2T3/S2 CDFW_SSC-Species of Special Concern	Desert riparian, desert scrub, desert wash, coastal scrub and sagebrush. Rarely found on rocky sites; uses all canopy coverages.
Perognathus longimembris pacificus Pacific pocket mouse	FE/None G5T1/S1 CDFW_SSC-Species of Special Concern	Inhabits the narrow coastal plains from the Mexican border north to El Segundo, Los Angeles County. Seems to prefer soils of fine alluvial sands near the ocean, but much remains to be learned.
Peromyscus maniculatus anacapae Anacapa Island deer mouse	None/None G5T1T2/S1S2 CDFW_SSC-Species of Special Concern	Restricted to East, Middle & West Anacapa islands. Live in all terrestrial habitats & also forage in the intertidal zone.

Scientific Name Common Name	Status	Habitat Requirements
Sigmodon arizonae plenus Colorado River cotton rat	None/None G5T2T3/S1S2 CDFW_SSC-Species of Special Concern	Colorado River floodplain from the Nevada border to about Bard. Distribution is spotty. Isolated sections of alluvial bottom along the Colorado River in areas supporting sedges, rushes, and other marsh plants.
Sorex ornatus salicornicus southern California saltmarsh shrew	None/None G5T1?/S1 CDFW_SSC-Species of Special Concern	Coastal marshes in Los Angeles, Orange and Ventura counties. Requires dense vegetation and woody debris for cover.
Sorex ornatus willetti Santa Catalina shrew	None/None G5T1/S1 CDFW_SSC-Species of Special Concern	Santa Catalina Island. Larger stream-bearing canyons of valley foothill riparian. Prefers moist areas. Uses stumps, logs, and litter for cover.
Taxidea taxus American badger	None/None G5/S3	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.
Urocyon littoralis catalinae Santa Catalina Island fox	FT/ST G1T1/S1	Found only on Santa Catalina Island. Mixed chaparral, coastal scrub and shrubby woodland. Prefers more complex, layered vegetation with a high density of woody, perennial fruiting shrubs, and rocky places for cover.
Urocyon littoralis clementae San Clemente Island fox	None/ST G1T1/S1	Found only on San Clemente Island. Mixed chaparral, coastal scrub & shrubby woodland. Prefers more complex, layered vegetation with a high density of woody, perennial fruiting shrubs, & rocky places for cover.
Urocyon littoralis dickeyi San Nicolas Island fox	None/ST G1T1/S1	Found only on San Nicolas Island. Mixed chaparral, coastal scrub & shrubby woodland. Prefers more complex, layered vegetation with a high density of woody, perennial fruiting shrubs, & rocky places for cover.
Xerospermophilus mohavensis Mohave ground squirrel	None/ST G2G3/S2S3	Open desert scrub, alkali scrub & Joshua tree woodland. Also feeds in annual grasslands. Restricted to Mojave Desert. Prefers sandy to gravelly soils, avoids rocky areas. Uses burrows at base of shrubs for cover. Nests are in burrows.
Xerospermophilus tereticaudus chlorus Palm Springs round-tailed ground squirrel	None/None G5T2Q/S2	Restricted to the Coachella Valley. Prefers desert succulent scrub, desert wash, desert scrub, alkali scrub, and levees. Prefers open, flat, grassy areas in fine-textured, sandy soil. Density correlated with winter rainfall.

Appendix D

Cultural Resources Background

Climate Action Plan

Cultural Resources Background

prepared by

The Metropolitan Water District of Southern California
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Los Angeles, California 90012

prepared with the assistance of

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October 2021

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Table of Contents

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1 Cultural Resources Background

1.1 Pre-Contact History

Colorado Desert/Southern Mojave Desert

The first recognizable human use of the Colorado Desert was by highly mobile hunter-gatherers at the end of the Pleistocene Epoch, between 12,000 and 10,000 years ago. The settlement patterns of the Late Pleistocene and Early Holocene inhabitants suggest that they preferred to live along the shores of prehistoric lakes and on mesas near perennial washes (Schaefer and Laylander 2007). The San Dieguito complex during the Paleoindian Period (10,000 – 5000 BCE) is characterized entirely by sites with flaked stone tools such as choppers, scrapers, blades, projectile points and distinctive crescent-shaped items interpreted as amulets found around now-dry inland lakes, old desert terraces, and notably Ventana Cave in southern Arizona (Rogers 1939, 1966; Warren 1967). If the Lake Mojave and San Dieguito complexes are contemporaneous, then this highly mobile, hunting-focused use of the land ended early in the Holocene as ancient pluvial lakes contracted and large mammals became scarce.

Although evidence of occupation of the Colorado Desert during the Archaic Period (5000 BCE – 500 CE) is scarce, developments during this time can be inferred from the development trajectories of adjacent areas. Regional culture complexes of this time are defined by distinct projectile point types. The Colorado Desert falls into the Pinto Complex during the early Archaic ca. 5000 – 1500 BCE. (Crabtree 1980; Rogers 1939), then the Amargosa complex during the later Archaic ca. 1500 BCE – 500 CE (Rogers 1939; Rogers 1966). Few open-air sites date to the Archaic. Rockshelter deposits at Indian Hill Rockshelter in Anza-Borrego Desert State Park and at Tahquitz Canyon near Palm Springs contain dart-sized projectile points, ground stone implements, rock-lined cache pits, and non-cremated inhumations (McDonald 1992; Wilke et al. 1986; Schaefer 1994b). The materials at the rockshelter sites and others outside of the Colorado Desert suggest that the Archaic period inhabitants of southern California were a mobile and diversified group of hunters and gatherers who exploited seasonally variable resources and focused increasingly on processing and storing seed and nut foods (Schaefer 1994b).

The Late Prehistoric/Protohistoric Period consists of the Patayan complex and dates from approximately 500 CE until the American expansion into the area at the turn of the nineteenth century. The Patayan complex is characterized by marked changes in the artifact assemblage, economic system, and settlement patterns of the region. This included the introduction of paddle-and-anvil pottery, either from Mexico or from the Ancestral Pueblo groups of the United States Southwest (Rogers 1945; Schaefer 2003; Schroeder 1975, 1979); floodplain horticulture, featuring maize, beans, squash, and other crops; bow-and-arrow technology, possibly from desert hunter-gatherer groups moving in from the west and north; smaller, arrow-sized projectile point types of the Cottonwood Triangular and Desert Side-notched series are common; new burial cremations and partial cremations; artistic expression on rock (petroglyphs) and land (intaglios); expanding trade and trail networks; and increasingly elaborate kinship systems tying together extensive territories (McGuire and Schiffer 1982). It is likely warfare also increased at this time and was well documented in the Protohistoric and Historical periods. By all accounts, most of the archaeological materials in the Colorado Desert date to the Late Prehistoric and Protohistoric periods (e.g., Rogers 1945; Schaefer 1994b, 2003). Most sites in the area consist of ceramic sherds and a limited variety of stone tools and tool-making debris.

Coastal and Inland Southern California

The prehistoric chronological sequence for southern California presented here is a composite based on Wallace (1955) and Warren (1968) as well as later studies, including Koerper and Drover (1983). This sequence is broken into three horizons. Early Man Horizon (10,000 – 6000 BCE) sites are generally associated with a greater emphasis on hunting than later horizons. Recent data indicate that the Early Man economy was a diverse mixture of hunting and gathering, including a significant focus on aquatic resources in coastal areas (e.g., Jones et al. 2002) and on inland Pleistocene lakeshores (Moratto 1984). Numerous pre-8000 BCE sites have been identified along the mainland coast and Channel Islands of southern California (c.f., Erlandson 1991; Johnson et al. 2002; Jones and Klar 2007; Moratto 1984; Rick et al. 2001:609). One of them, the Arlington Springs site on Santa Rosa Island, produced human femurs dating to approximately 13,000 years ago (Arnold et al. 2004; Johnson et al. 2002). On nearby San Miguel Island, human occupation at Daisy Cave (SMI-261) has been dated to nearly 12,000 years ago (Arnold et al. 2004). A warm and dry 3,000-year period called the Altithermal began around 6000 BCE. The conditions of the Altithermal are likely responsible for the change in human subsistence patterns during Early Man Horizon, including a greater emphasis on plant foods and small game.

The Milling Stone Horizon (6000 – 3000 BCE) showed an increase in use of milling stone and other processing tools (Wallace 1955). The dominance of such artifact types indicates subsistence relied heavily on collecting plant foods and hunting small terrestrial and littoral animals (Kowta 1969). Lithic artifacts associated with Milling Stone Horizon sites are dominated by locally available tool stone and ground stone tools, such as manos and metates, chopping, scraping, and cutting tools are very common. The mortar and pestle, associated with acorns or other foods processed through pounding, were first used during the Milling Stone Horizon and increased dramatically in later periods (Wallace 1955, 1978; Warren 1968). Wallace (1955) notes a decrease in well-made projectile points and an increase of burials with rock cairns also occurred during this horizon.

The Intermediate Horizon (3000 BCE – 500 CE) is characterized by a shift toward a hunting and maritime subsistence strategy, as well as greater use of plant foods and adaptation to local resources. Tool kits for hunting, fishing, and processing food and materials reflect this increased diversity, with flake scrapers, drills, various projectile points, and shell fishhooks being manufactured. Mortars and pestles became more common during this transitional period, gradually replacing manos and metates as the dominant milling equipment. Many archaeologists believe this change in milling stones signals a change from the processing and consuming of hard seed resources to the increasing reliance on acorn (e.g., Glassow et al. 1988). Mortuary practices during the Intermediate typically included fully flexed burials oriented toward the north or west (Warren 1968).

The Late Prehistoric Horizon (500 CE – Historic Contact) had an increase in the diversity of plant food resources and land and sea mammal hunting. More classes of artifacts were observed during this period and high quality exotic lithic materials were used for small, finely worked projectile points associated with the bow and arrow. Steatite containers were made for cooking and storage and an increased use of asphalt for waterproofing is noted. More artistic artifacts were recovered from Late Prehistoric sites, and cremation became a common mortuary custom. Larger, more permanent villages supported an increased population size and social structure (Wallace 1955).

Southern Central Coast

Chronological sequence for the southern central coast is separated into three distinct time periods: the Early Holocene, the Middle Holocene, and the Late Holocene. Evidence of Paleo-Indian occupation of southern California remains very limited during the Early Holocene (9600 – 5600 BCE). Approximately 75 sites on the southern and central California coast are known that date to 7500 BCE (Erlandson and Colten 1991). The earliest accepted dates for human occupation of the California coast are from the Northern Channel Islands, off the Santa Barbara coast. Daisy Cave, located on San Miguel Island, dates to as early as 9600 BCE (Erlandson et al. 1996). At the Arlington Springs site on Santa Rosa Island human remains yielded a date of approximately 10,000 BCE (Johnson et al. 2002). San Diego and Orange counties and the Southern Channel Islands have not produced dates as early as these. However, radiocarbon evidence has dated early occupation of the coastal region between ca. 8000 and 7000 BCE (Byrd and Raab 2007). Leaf-shaped points and knives, crescents, and scrapers characterize the artifact assemblages throughout the region (Byrd and Raab 2007).

The Middle Holocene (5600 – 1650 BCE) is generally viewed as a time of cultural transition. During this time, the cultural adaptations of the Early Holocene gradually altered. Use of milling stone tools began to appear across most of central and southern California around 6000 – 5000 BCE, indicating a focus on the collection and processing of hard-shelled seeds. Environmental changes in the Southern Bight are thought to have been the key factor in these changing adaptations (Byrd and Raab 2007). Occupation patterns indicated semi-sedentary populations focused on bays and estuaries, with shellfish and plant resources as the most important dietary components (Warren 1968). Sometime around 2000 BCE, extensive estuarine silting began to cause a decline in shellfish and thus a depopulation of the coastal zone. Settlement shifted to river valleys, and resource exploitation focused on hunting small game and gathering plant resources (Warren 1968; Byrd and Raab 2007).

The Late Holocene (1650 BCE – 1769 CE) witnessed numerous cultural adaptations. The bow and arrow were adopted sometime after 500 CE, and ceramics appeared in the area circa 1000 CE. Populations were sustained by food surpluses, especially acorns (Byrd and Raab 2007; Kroeber 1925). Other exploited food resources include shellfish, fish, small terrestrial mammals, and small-seeded plants. Settlement patterns of the Late Holocene are characterized by large residential camps linked to smaller specialized camps for resource procurement (Byrd and Raab 2007).

Sacramento-San Joaquin River Delta

California prehistory in the Sacramento-San Joaquin River Delta (Central Valley) is generally divided into three broad time periods: Paleoindian period (ca. 11,550 – 8550 BCE), Archaic Period (8550 BCE – 1100 CE) and Emergent Occupation (1000 CE – European Contact) (Fredrickson 1973, 1994; Moratto 1984; Rosenthal et al. 2007).

Little is known about the Paleoindian period (11,550 – 8550 BCE) in the Central Valley. Geoarchaeological studies have demonstrated that erosion and deposition have likely buried or destroyed early archaeological deposits. The only known Paleoindian site in the Sacramento Valley is a single possible fluted point from near Thomes Creek (Rosenthal et al. 2007).

The Archaic period (8550 BCE – 1100 CE) breaks into three subsections: lower, middle, and upper. The Lower Archaic (8550 – 5550 BCE), like the Paleoindian Period, is represented only by limited isolated finds. No other Lower Archaic sites have been identified within the Sacramento Valley.

The Middle Archaic (5550 – 550 BCE) began with substantial climate change to much warmer, drier conditions. The late Middle Archaic is relatively well-represented in the Sacramento Valley and Delta. Late Middle Archaic sites typically include extended burials oriented to the west and more sophisticated technology, including: fishing technologies, such as bone gorges, hooks, and spears; the mortar and pestle, which become more widespread suggesting a shift toward intensive subsistence practices; baked-clay impressions of twined basketry, simple pottery, and other baked clay; and personal adornment items (Rosenthal et al. 2007). Trade with outside groups is evidenced by the presence of obsidian, shell beads, and ornaments (Rosenthal et al. 2007; Moratto 1984).

The Upper Archaic (550 BCE – 1100 CE) began with the onset of the Late Holocene, marked by a cooler, wetter climate. Cultural diversity was more pronounced and is marked by contrasting material cultures throughout the valley (Rosenthal et al. 2007). Numerous specialized technologies were developed such as bone tools and implements, manufactured goods such as *Olivella* and *Haliotis* beads and ornaments, well-made ceremonial blades, and ground-stone plummets. Beginning after circa 2,700 years ago, lower Sacramento Valley settlements shifted to a pattern of large, mounded villages, now identified as the Berkeley Pattern, which typically contain large amounts of habitation debris and features suggestive of long-term occupation (Rosenthal et al. 2007).

The stable climatic conditions of the Upper Archaic continued into the Emergent Period (1100 CE – Historic). After 1000 CE, many of the technologies identified during the Archaic disappeared to be replaced by cultural traditions recorded at European contact. The bow and arrow replaced the atlatl as the preferred hunting method sometime between 1000 and 1300 CE. Increased social complexity is evidenced by increased variation in burial types and offerings such as shell beads, ornaments, and ritually “killed” mortars and pestles. Pottery was produced at several sites in the lower Sacramento Valley, known as Cosumnes brownware, including baked clay human and animal effigies. New fishing technology like harpoons, fishhooks, gorges, and netting suggest an increased reliance on fishing for subsistence and economy. After circa 1000 CE, the mortar and pestle become the dominant tool type and small seeds increase in archaeological deposits over time (Rosenthal et al. 2007).

1.2 Post-Contact Historic Overview

The Post-European contact history of California is generally divided into three periods: the Spanish Period (1769 – 1822), the Mexican Period (1822 – 1848), and the American Period (1848 – present). Each of these periods is briefly described below.

Spanish Period (1769 – 1822)

Spanish exploration of what was then known as Alta (upper) California began when Juan Rodríguez Cabrillo led the first European expedition into the region in 1542. For more than 200 years after his initial expedition, Spanish, Portuguese, British, and Russian explorers sailed the Alta California coast and made limited inland expeditions, but they did not establish permanent settlements (Bean 1968: 16-21; Rolle 2003).

In 1769, Gaspar de Portolá and Franciscan Father Junípero Serra established the first Spanish settlement at Mission San Diego de Alcalá. This was the first of 21 missions erected by the Spanish between 1769 and 1823. Elsewhere in the Plan Area, missions were established at San Gabriel (1771), San Juan Capistrano (1776), San Buenaventura (1782), San Fernando (1797), and San Luis Rey (1798). The establishment of the missions marks the first sustained occupation of Alta California by the Spanish. In addition to the missions, four presidios and three pueblos (towns) were established throughout the state (State Lands Commission 1982). Within the Plan Area, these included a presidio at San Diego (1769) and the pueblo of Los Angeles (1781).

During this period, Spain also deeded ranchos to prominent citizens and soldiers, though very few in comparison to the subsequent Mexican Period. To manage and expand their herds of cattle on these large ranchos, colonists enlisted the labor of the surrounding Native American population (Engelhardt 1927a). The missions were responsible for administrating to the local Indians as well as converting the population to Christianity (Engelhardt 1927b). The influx of European settlers brought the local Native American population in contact with European diseases which they had no immunity against, resulting in catastrophic reduction in native populations throughout the state (McCawley 1996).

Mexican Period (1822 – 1848)

The Mexican Period commenced when news of the success of the Mexican War of Independence (1810 – 1821) against the Spanish crown reached California in 1822. This period saw the privatization of mission lands in California with the passage of the Secularization Act of 1833. This act federalized mission lands and enabled Mexican governors in California to distribute former mission lands to individuals in the form of land grants. Successive Mexican governors made approximately 700 land grants between 1833 and 1846, putting most of California lands into private ownership for the first time (Shumway 2007). During this era, a class of wealthy landowners known as rancheros worked large ranches based on cattle hide and tallow production.

The beginnings of a profitable trade in cattle hide and tallow exports opened the way for larger, commercially driven farms. Land grants owned by the Spanish crown and clergy were distributed to mostly Mexican settlers born in California, or the “Californios.” While this shift marked the beginning of the rancho system that would “dominate California life for nearly half a century” (Poole 2002), the rural character of emerging cities in and around Los Angeles remained intact. Ranchos were largely self-sufficient enterprises (partly out of necessity, given California’s geographic isolation), producing goods to maintain their households and operations.

In the early 1840s, American settlers began migrating overland to Alta California. The Bidwell-Bartelson party was the first to arrive, entering the Central Valley in 1841. American settlement disrupted the established social and economic order in Mexican-era California, as many recent arrivals quickly became prominent in Alta California commerce (Kyle 2003).

In 1846, the Mexican-American War was initiated following the annexation of Texas by the United States and a dispute over the boundary of the state between the United States and Mexico. Governor Pío de Jesús Pico, the last governor of Alta California, began selling off 12 million acres of public land to financially support the war (Los Angeles Almanac 2018a). Mexican forces fought and lost to combined United States Army and Navy forces in the Battle of the San Gabriel River on January 8 and in the Battle of La Mesa on January 9. On January 10, leaders of the pueblo of Los Angeles surrendered peacefully after Mexican General José María Flores withdrew his forces (Nevin 1978). On June 14, Lieutenant Colonel John C. Frémont captured Sonoma and raised the California Republic’s Bear Flag over the town’s plaza (Kyle 2003). Shortly thereafter, newly appointed Mexican Military Commander of California Andrés Pico surrendered all of Alta California to Frémont in the Treaty of Cahuenga (Nevin 1978).

American Period (1848–Present)

The Mexican Period officially ended in early January 1848 with the signing of the Treaty of Guadalupe Hidalgo, formally concluding the Mexican-American War. Per the treaty, the United States agreed to pay Mexico 15 million U.S. dollars for conquered territory, including California, Nevada, Utah, and parts of Colorado, Arizona, New Mexico, and Wyoming. California gained statehood in 1850, and this political shift set in motion a variety of factors that began to erode the rancho system. Given the size of their holdings, the initiation of property taxes proved onerous for many southern California ranchers. In addition, the creation of the United States Land Commission in 1851 required that property owners prove the validity of their property titles, many of which had been granted relatively informally and without the benefit of formal survey. Ranchers often paid for legal debts with portions—or all—of their ranchos. During this period, 40 percent of rancho-held lands in the County of Los Angeles passed to the United States government. The large-scale rancho system also suffered greatly from the 1860s droughts, which decimated the cattle industry upon which southern Californian ranchers depended.

In 1848, the discovery of gold in northern California led to the California Gold Rush, though the first gold was found in 1842 in San Francisquito, about 35 miles northwest of Los Angeles (Workman 1935:107; Guinn 1976). The Gold Rush significantly transformed northern California and also contributed to an exponential increase in California's population overall. During this time, San Francisco became California's first true city, growing from a population of 812 to 25,000 in only a few years (Rolle 1987). By 1853, the population of California exceeded 300,000. Thousands of settlers and immigrants continued to immigrate to the state, particularly after the completion of the First Transcontinental Railroad in 1869.

In the 1880s, a dramatic boom arrived in southern California, fueled by various factors including increasingly accessible rail travel, agricultural development, and favorable advertisement (Dumke 1994). In 1883, the California Immigration Commission designed an advertisement declaring the state as "the Cornucopia of the World" (Poole 2002:36). Characterized as a "second Gold Rush," the emergence of the citrus industry in Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties emerged as one of the leading drivers of Southern California's agricultural boom (Lee 2010). New southern Californian towns were promoted as havens for good health and economic opportunity. Between 1880 and 1890, the population of Los Angeles expanded fivefold, from approximately 11,000 to 50,000 (Los Angeles Almanac 2018b). Following the collapse of the real estate market in 1888, economic stagnancy lasted through the mid-1890s in the region. Despite the economic downturn however, the industrial and commercial transformation of the region was well entrenched, setting the stage for the region's rapid rise in the twentieth century.

Additional details regarding the historical development of specific portions of the Plan Area and Metropolitan facilities are provided below.

Los Angeles County

With the 1849 advent of the Gold Rush and the growing influx of European-Americans to southern California, the population of Los Angeles County expanded rapidly in the early American Period. Much of this growth was concentrated in the city of Los Angeles, where between 1850 and 1860, the city's population grew from approximately 1,600 to 4,300 (Hill 1929). In the mid-to-late nineteenth century, population growth and the rapid decline of the ranchos opened the door to greater economic diversification throughout Los Angeles County. The earliest non-ranching industries to emerge in the region included packing houses adjacent to rail lines, wineries, flour mills, and grain processing plants, among many others (City of Los Angeles 2018a).

In the final quarter of the nineteenth century, the greater Los Angeles region began to shed its predominantly rural character and grew into a major urban industrial center. Central to this transformation was the 1876 completion of the Southern Pacific Railroad, which connected Los Angeles with the East Coast and eventually with harbor facilities in San Pedro Bay. Rail access accelerated population growth in, and tourism to, Southern California. A speculative real estate market and improved rail travel prompted a major real estate boom in the 1880s (Deverell 1994). During that decade the population of Los Angeles County nearly tripled, growing from 33,000 to 101,000. In addition to boosting population growth and tourism throughout Southern California, the advent of the transcontinental railroad was "the most important catalyst for industrial growth" (City of Los Angeles 2018a). This included a wide range of sectors, from agricultural packing and shipping houses to oil extraction and refining. With access to rail and shipping links, the petroleum industry quickly became a regional economic driver, and by 1910, produced upwards of 77 million barrels of oil a year (City of Los Angeles 2018a).

After a lull in the 1890s, rapid, sustained expansion in the region characterized the first three decades of the twentieth century. Over this period the population of Los Angeles County grew from 170,000 to over 2.2 million residents. Additionally, two major events had a lasting influence on growth throughout the Los Angeles region: the selection of San Pedro Harbor as the international Port of Los Angeles and the inauguration of William Mulholland's Los Angeles Aqueduct. Together, these events laid the groundwork for the expansion of the county's residential and industrial areas. Development at the Port of Los Angeles and the neighboring Port of Long Beach helped to spread the establishment of industrial suburbs, in Los Angeles Basin communities such as Vernon and Commerce. The local oil, automotive, and aviation industries all achieved a significant foothold in the county before 1930. This growth was aided further by the network of the Pacific Electric Railway trolley line, also known as the "Big Red Cars," which linked the region's emerging "streetcar suburbs" to increasingly distant workplaces (Caltrans 1982; Nicolaides 1999; City of Los Angeles 2018a). By the 1920s, the growing popularity of the automobile allowed developers to build new suburban subdivisions even farther from downtown Los Angeles and other employment centers (Hise and Gish 2007). In spite of the region's rapid urbanization, however, many areas, such as the San Fernando Valley, remained predominantly rural and agricultural through World War II.

Although the county's growth slowed during the Great Depression, the relative success of the oil, automobile, motion picture, and aviation/aeronautics industries offered some protection from the ill effects of the economic downturn. The onset of World War II ended the depression unequivocally and provided a boost to the region's well-established industrial base. To aid the war effort, aircraft and shipbuilding concerns throughout the region expanded rapidly, producing new types of aircraft and other war materiel. At its high point, nearly 90,000 workers were employed simultaneously at the various shipbuilding yards at the Port of Los Angeles. New factories were established along rail corridors, with an important concentration constructed in the San Fernando Valley. Defense-related industrial expansion during World War II and the emergence of an expansive aeronautics and aerospace industry in Southern California contributed to another population boom during and immediately after the war (City of Los Angeles 2018a). Between 1940 and 1950, Los Angeles County added more than 1.4 million new residents.

By the postwar period, the transformation of Los Angeles County from its place in the nineteenth century as "'Queen of the Cow Counties' to the epicenter of the Aerospace Industry" was complete (City of Los Angeles 2018a). The postwar period brought a sustained boom in all industrial sectors. Aircraft manufacturing in particular, became a significant magnet for new residents and workers, leading to the construction of extensive suburban tracts. Postwar highway projects played an important role in the county's suburban expansion by making it possible to live ever-further from the workplace. One such project included the construction of the Hollywood Freeway, which linked the rapidly urbanizing San Fernando Valley to downtown Los Angeles by means of a modern, multi-lane highway. After decades of success, Los Angeles County's manufacturing sector entered a gradual decline in the late 1960s and 1970s (City of Los Angeles 2018a). Despite this decline, the aerospace, technology, entertainment, and tourism industries experienced continued growth. As of 2010, the county boasted a population of 9.8 million, with 3.8 million living in Los Angeles proper.

Orange County

At the time of California's annexation, what is now Orange County (which originally made up the southern one-third of Los Angeles County) was almost entirely occupied by ranchos dating from the Spanish and Mexican eras. As was the case throughout the region, the local cattle ranching industry boomed with the arrival of new settlers. Starting in the 1850s, settlers founded Orange County's first towns, which were concentrated in the northern portion of the county. The first was Anaheim, established in 1859 by a group of San Francisco-based German immigrants. The failure and eventual subdivision of most of the old ranchos in the 1860s paved the way for the establishment of several more towns, including Santa Ana, Tustin, Orange, Westminster, and Garden Grove. While a handful of large ranches persisted at the southern end of the county—albeit under new ownership—farming emerged as the main sector of the area's economy. Prior to the rise of the county's dominant citrus industry, wine and raisin grapes, wheat, barley, and corn were among the chief crops (Brigandi 2007).

In the latter three decades of the nineteenth century, the area began to boom and matured politically and economically. In 1870, commercial shipping first served Newport Bay, which soon developed as an important local port. Southern Pacific built the area's first railroad in 1875 and held a monopoly until the Santa Fe Railroad arrived in 1885. Rail service was a boon to local agriculturalists, including the area's emerging cohort of citrus growers (Lee 2010). The area's newfound economic vitality contributed to a renewed drive for independence from Los Angeles County, and Orange County was established in 1889 with Santa Ana as the county seat (Brigandi 2007). Following the construction of a new county courthouse downtown, Santa Ana cemented its place as the administrative and political center of the county (Goddard and Goddard 1988). In the following decade, a local oil boom helped to diversify an economy that had been dependent historically on farming. New oil fields were discovered periodically through the second decade of the twentieth century, with important strikes at La Habra, Brea Canyon, Olinda, Placentia, and Huntington Beach (Brigandi 2007).

In the early twentieth century, the establishment of new transportation networks opened more of Orange County to urban development. By 1910, the Pacific Electric Railway had built three new streetcar lines to serve Orange County. The birth and early development of communities such as Seal Beach, Corona del Mar, Stanton, and Cypress was partially dependent on the convenient transit the Pacific Electric's "big red cars" provided. The growing popularity of the automobile in the 1910s and 1920s led to new roadway connections between once-distant Orange County communities. In these years, a state highway was constructed to connect La Habra and San Juan Capistrano, the Coast Highway was completed, and Manchester Boulevard and Beach Boulevard emerged as major thoroughfares. Paired with major investments in roads, the automotive revolution led to new residential and commercial development in communities located near new arterial roadways (Brigandi 2007).

The World War II and the postwar eras brought significant changes to Orange County. The establishment of El Toro Marine Corps Air Station, the Los Alamitos Naval Weapons Station, and the Santa Ana Army Air Base brought an influx of military personnel, many of whom remained in Southern California after the war. The county's once-dominant citrus industry faded as expansive orange groves were rapidly redeveloped as residential tracts and shopping centers. As agriculture's local importance declined, new industries filled the vacuum. The opening of Disneyland in 1955 marked Orange County's embrace of tourism as an important economic sector. In the late 1950s, aerospace, industrial, and service jobs also made up a growing proportion of economic opportunities. In the 1950s and 1960s, the population boom led to a wave of urban annexations and the incorporation of several North County communities, including La Habra, Buena Park, and Los Alamitos. Orange County's population reached one million in 1963. During the 1960s, large swaths of the South County were developed as master-planned communities, including Irvine, Mission Viejo, Laguna Niguel, Aliso Viejo, Rancho Santa Margarita, and Ladera Ranch (Brigandi 2007). Currently, Orange County is home to more than 3 million residents.

Riverside County

Present-day Riverside County consists of parts of the original territory of San Diego and San Bernardino Counties. Like much of the Plan Area, Riverside County's early American-era history was characterized by cattle ranching on large ranchos, such as Rancho Jurupa and Rancho El Rincón. However, the decline of cattle ranching in the region in the 1860s paved the way for the subdivision and sale of the large landholdings and, in turn, the ascent of intensive agriculture.

Development of southern California's citrus industry started in the late nineteenth century in the eventual county seat, Riverside. Under the leadership of John W. North, the community was founded in 1870, when investors from the Southern California Colony Association laid out a mile-square town site, originally named Jurupa. Early farming featured a diversity of crops, including raisin grapes, alfalfa, hay, and stone fruits, but after Eliza Tibbets introduced the navel orange to the county in 1873, the area's farmers turned overwhelmingly to citrus cultivation (City of Riverside 2009). The area's first successful orange orchards were planted in the 1870s, and their success lured a stream of agriculturalists, investors, and immigrants into the area. The California Fruit Growers Exchange, later renamed Sunkist, was founded in the late nineteenth century, and the University of California Citrus Experimentation Station followed in 1907, helping to solidify Riverside's place as a key center of citrus production and marketing (Kyle 2002: 298). The citrus industry dominated local agriculture well into the twentieth century (City of Riverside 2009). In the late nineteenth century, an influx of homesteaders began the transformation of barren desert areas, such as the Coachella and Palo Verde valleys, into productive agricultural regions. Initially watered by artesian wells, Coachella Valley farming centered on citrus and date cultivation, the latter enterprise supported by the United States Department of Agriculture Date Experiment Stations (established 1904) near Mecca. The construction of the All-American Canal in the 1930s provided a new source of irrigation and eventually allowed farms to expand throughout the valley when it became fully operation in the early 1940s (Brown 1985; Conrad 2018).

During World War II, Riverside County's trajectory was shaped by the presence of several permanent and temporary military installations. Most important among these was March Air Force Base, which was founded in 1918 and served as an important training, aircraft repair, and staging facility. Another important development related to military themes, was the establishment of the Desert Training Center in the Mojave Desert in 1942. As was the case across Southern California, Riverside County's military and defense-industry presence remained strong after the war with the presence of companies such as Kaiser Steel and served as a magnet for new settlement. Communities on Riverside County's east side were augmented with vast residential tracts and new commercial strips. In 1953, the city of Riverside recorded the nation's fourteenth fastest growth rate. The postwar popularity of the automobile left an important mark—especially on the more heavily populated area west of the San Jacinto Mountains—as southern California's regional freeway network was expanded to connect the county's far-flung communities (City of Riverside 2009). The freeway system served as the backbone for continued urbanization, and Riverside County grew steadily through the latter quarter of the twentieth century. Moreno Valley, the county's second-largest city, was incorporated in 1984.

San Bernardino County

The Gold Rush of 1849 brought thousands of Americans into what is now San Bernardino County. Departing from near present-day Yuma, miners and other settlers crossed the Colorado River and followed the Mojave River Trail into what is now the western part of the county. After settlers established homesteads in the Mojave River Valley, the United States Army fortified the area to keep trails open. About a decade later, gold was discovered in the Holcomb and Bear valleys and along Lytle Creek. In 1851, amid the influx of settlers to the county, a group of 500 colonists affiliated with the Church of Latter-Day Saints purchased Rancho San Bernardino and established the town of San Bernardino. Two years later, the County of San Bernardino was created from parts of Los Angeles and San Diego Counties. San Bernardino was selected as the county seat and, the following year, incorporated. In 1857, the colonists affiliated with the Church of Latter-Day Saints were recalled to Utah, leaving the city with a population of just 300 (County of San Bernardino 2020).

Between 1860 and 1890, the county's population grew more than six-fold to approximately 25,000. Much of this growth is attributed to the development of agriculture in the western section of the county and the expansion of mining operations in the east, both of which were assisted by the arrival of the Southern Pacific and Santa Fe railroads in the 1870s (County of San Bernardino 2020; CA Genealogy 2020). Grape and, especially, citrus production shaped the development of such West County communities as San Bernardino and Redlands well into the twentieth century. In the late nineteenth and early twentieth centuries, mining emerged as a major economic pursuit in the desert regions of the county. Borax mining began in the 1860s near Searles Lake and in the Calico Mountains. The Calico silver mining district was also first exploited in the 1880s (County of San Bernardino 2020; Legends of America 2020).

San Bernardino County's major population centers remained relatively small agricultural communities well into the twentieth century (Archaeological Associates 2018). Southern California's postwar suburban boom helped to urbanize many towns and cities in the southwest corner of the county, such as San Bernardino, Ontario, Redlands, Rancho Cucamonga, and Fontana. This trend was exemplified by Fontana, where the steady construction of suburban tracts helped to grow the city's population from about 15,000 in 1960 to 87,000 in 1990. Growth on the county's west side contributed to the growth of the wider Inland Empire metropolitan region, which comprises the major urban areas of Riverside and San Bernardino Counties. By 2010, San Bernardino County's population was over 2 million.

San Diego County

The American period in San Diego County began unofficially in 1846 when the United States military occupied the Pueblo of San Diego. With the signing of the Treaty of Guadalupe Hidalgo, the Americans inherited a pueblo whose population had been destabilized by more than a decade of hostilities with local Native American groups (City of San Diego 2007). Outside the pueblo, cattle ranches dominated the local economy, as they would throughout much of southern California until the 1860s (Guinn 1977).

San Diego County was formally organized in February 1850 as one of the original counties of California and grew slowly during the next decade. The mid-nineteenth century saw the gradual urbanization of San Diego, thanks to the development and promotion of the area by Alonzo Horton, who offered free lots to anyone who would build a house worth $500. The Santa Fe Railroad began construction in San Diego in 1880, with the first trains arriving in 1882. Later that decade, branch lines were built to connect such agricultural communities as Escondido, Chula Vista, National City, and Otay (Save Our Heritage Association 2007; City of Chula Vista 2020; Whetstone 1963). After several population booms, the city of San Diego reached a population of

35,000 by 1888. The population fell again to 17,000 in 1890, after a devastating real estate market crash (City of San Diego 2007). The mountain and desert areas of the eastern side of the county remained sparsely populated in comparison. Farming was an economic mainstay in areas such as the inland valley surrounding El Cajon, while mining—first gold and later gemstones—drew settlers and industry to communities in the eastern section of the county (City of El Cajon 2020; San Diego Natural History Museum 2020).

The twentieth century brought further development to the San Diego area and neighboring coastal communities. Intent on modernizing the city, businessman John D. Spreckels oversaw a downtown building campaign that produced a number of multiple-story commercial buildings. Meanwhile, improvements in public transportation connected downtown to outlying areas where residential, commercial, and institutional development flourished. Elsewhere, summer cottage retreats began to develop in the beach communities of Ocean Beach and La Jolla. In 1915, the Panama-California Exposition was held in San Diego in celebration of the opening of the Panama Canal. The exposition was, among other things, a showcase for Spanish Colonial Revival-style architecture, as envisioned by the event's chief architect Bertram Goodhue (City of San Diego 2007). In the wake of the exposition, many local architects adopted the style, reshaping Southern California's residential, commercial, and institutional architecture.

During the 1920s, San Diego County's population grew from 112,248 to 209,659 residents. Much of this growth took place in the city of San Diego, where the population rose by more than 70,000 during the same period. Much of the population and economic growth of the interwar years owed to a rapidly expanding military presence in San Diego. By the eve of World War II, San Diego had been transformed into a "Gibraltar of the Pacific," thanks to the establishment of ten bases and training installations established in the city (City of San Diego 2007: 22-23).

Like much of the rest of California, San Diego County experienced a massive population boom after World War II. As defense workers and decommissioned GIs settled in the county, suburban growth transformed the growing San Diego metropolitan area. New residential and commercial development rapidly filled many of the former farmlands that had separated San Diego from outlying towns and cities (City of San Diego 2007). About three decades after the war's conclusion, the county's 485 miles of interstate freeways had incorporated many former agricultural communities into the San Diego metropolitan area (Smith 2017). Long-established localities of the county's North Inland region, such as Santee and El Cajon, grew into bedroom communities serving San Diego proper (City of Santee 2014; City of El Cajon 2020). Carlsbad, Oceanside and other North Coastal-region communities experienced a similar expansion in the latter half of the twentieth century. Anchored by a large military presence, thriving tourism industry, and proximity to the United States-Mexico border, the county's population multiplied by a factor of six between 1950 and 2010, topping a population of 3 million.

Ventura County

When California's original 18 counties were established in February 1850, present-day Ventura County made up the southernmost potion of Santa Barbara County. The area remained a sparsely populated cattle-ranching region into the 1860s. However, in the aftermath of the drought of the 1860s, most of the ranchos were subdivided and sold to eastern investors who, in turn, sold the land to farmers. Around the time Ventura County was established in 1873, a courthouse and wharf were constructed at the town of Ventura, which had begun to grow around the old Spanish mission. Within a year of the county's formation, towns began to spring up in the coastal and valley areas west of the present Conejo Grade. These included Port Hueneme and Ojai in 1874, and Santa Paula in 1875 (Ventura Weekly 2005).

In 1887, the construction of the Saugus to Santa Barbara Branch (or Santa Paula Branch) of the Southern Pacific Railroad connected Ventura County to the national rail network. The coming of the railroad encouraged settlement of the rural, agricultural Santa Clara River Valley, and provided access to a distribution network for the valley's citrus and other products (Sperry 2006). The establishment of the towns of Piru, Fillmore, and Montalvo accompanied the Southern Pacific's arrival (Ventura Weekly 2005). Service to Ventura was inaugurated in late April 1887. Logistical and financial obstacles slowed the line's construction north of Santa Barbara, but Southern Pacific completed the route to San Francisco in 1900 (Sperry 2006).

Rail service laid the groundwork for the county's two related booms in the early twentieth century. The first of these shaped the oil industry. Although the county's petroleum deposits had long been used by the Chumash and were noted by Americans in the 1850s, the local petroleum industry did not get off the ground until around the end of the nineteenth century. During this period, much of the exploitation of Ventura County's petroleum deposits took place along the Ventura and Santa Clara rivers (Sperry 1906; Ventura Weekly 2005). In 1890, the Union Oil company of California was founded in Santa Paula, and the city was soon regarded as the "center of the [state's] oil industry" (Belknap 1968). In the 1910s, major oil firms, such as Shell and General Petroleum, established a presence in the county. In turn, the growth of the petroleum industry helped to lure an influx of new settlers in the 1920s (Sperry 1906; Ventura Weekly 2005). That decade, the county's population nearly doubled to 55,000 residents. The population boom was particularly beneficial to Ventura, where the population rose by 179 percent in ten years, reaching 11,600 in 1930.

During the 1930s, improvements to the county's commercial shipping facilities laid the groundwork for the establishment of major military installations. The Oxnard Harbor District was established and initiated the construction of a commercial harbor to replace the Hueneme wharf, which was lost to a storm in 1938. After the start of World War II, the United States took control of the entire port, deepened the harbor, and, in 1945, renamed the facility as the Naval Construction Battalion Center. During the war, the Construction Battalion built the first air strip at Point Mugu. The naval installation eventually grew into Naval Base Ventura County, which has been a major economic force in Ventura County for the past eight decades (Scheid 1995).

Ventura County's dramatic growth in the decades following World War II was closely related to the development of the state's freeway network. In the East County region, the upgrading of U.S. Highway 101 to a freeway allowed for the development of 10,000 acres in the Conejo Valley, including master-planned communities in and around Thousand Oaks. Although the northward progress of freeway construction was temporarily stalled outside Camarillo, improvements to U.S. Highway 101 were completed to Ventura in 1962. As industry settled in the region, Ventura County took in unprecedented numbers of new residents and, in 1964, was the fastest growing county in the United States (Triem 1985). Once-sleepy Oxnard was perhaps the biggest beneficiary of the county's population surge. A town of 8,500 in 1940, by 1970, it had grown to a city of about 70,000, becoming the county's largest population center.

Delta Islands

The Plan Area includes four islands and reclamation districts located in the lower Sacramento-San Joaquin River Delta region: Bacon and Bouldin islands and Webb and Holland tracts. In the late nineteenth and early twentieth centuries, these areas were subject to land reclamation projects that converted the often-marshy islands and riverbanks of the Delta region to a productive farming district.

Agricultural development in the Delta region began in earnest in the 1850s, after the federal Swampland Act of 1850 authorized state government to sell wetlands areas owned by the national government to prospective farmers. Land sales under the law began, and the most successful early reclamation efforts were typically in the upper Delta region, where solid soils and the presence of natural levees made flood control comparatively easy (Lund et al. 2007).

Many low-lying islands and riverbanks in the central and lower Delta areas were particularly susceptible to flooding and initially proved resistant to permanent reclamation. In the late 1860s and 1870s, the business of Delta-region reclamation changed dramatically. Improved engineering techniques and the introduction of heavy earth-moving machinery allowed for the dredging of streambeds and building of large earthen levees. Coupled with lifting of the 640-acre limit on swampland land sales, these advances opened the door to large-scale reclamation in the lower Delta. Because the mechanized methods required large capital investments, reclamation by individual operators nearly ceased and most new tracts were established by well-capitalized land companies, who leased the improved land as small farms (Lund et al. 2007).

The early history of Bacon Island illustrates the difficulties even well-financed reclamation efforts faced in the marshy central and lower Delta areas. San Francisco businessman Henry D. Bacon acquired the island by the 1870s and encircled it with the first of many levee systems. The peat soil on which he erected the levels proved vulnerable to land subsidence, however, and in 1873, the barriers required rebuilding with soils excavated from the island's outer rim. These levees, too, eventually failed, and in 1915 the California Delta Farms Company undertook a more robust reclamation program, rebuilding the levees using more sophisticated dredging equipment than Bacon had used. With the completion of this project, flood-prone portions of the island were protected from inundations and made suitable for farming (Anonymous 2009; San Joaquin County Office of Emergency Services 2020; Thompson 1957). California Delta Farms was also responsible for the reclamation of Holland Tract and several additional islands and tracts in the early twentieth century (Thompson 1957).

Even with periodic levee improvements, the Delta region remained vulnerable to seasonal flooding. In the early twentieth century, state and federal programs sought to implement a series of new flood control and navigation improvement measures. These included the dredging of the Sacramento River and other channels, implementation of mandated levee heights and construction of the Yolo Bypass, which allowed for the diversion of flood waters to certain farmlands (Lund et al. 2007). These flood control programs coincided roughly with state investments in bridge and roadway construction in the first three decades of the twentieth century. In the postwar years, economic life in the Delta remained centered mainly on agriculture, but recreational uses on the region's many waterways were of growing importance to the regional economy. To this day, agriculture and recreation are the predominant uses of the northern Delta region (ICF 2016).

Metropolitan Water District

The California Legislature formed Metropolitan in the 1920s to oversee matters related to water supply for southern California's growing population. Introduced in 1925 by state Senators A.B. Johnson and Ralph Swing, Senate Bill 178 would have allowed for the establishment of metropolitan water districts. Although the bill passed the Senate, the Assembly did not adopt it. Two years later, a new bill (S. 132) authorizing the formation of Metropolitan passed the Legislature and was signed into law by Governor Clement C. Young as the Metropolitan Water District Act. Metropolitan was incorporated on December 6, 1928. The Metropolitan's first board of directors represented the cities of Anaheim, Beverly Hills, Burbank, Colton, Glendale, Los Angeles, Pasadena, San Bernardino, San Marino, Santa Ana, and Santa Monica (AECOM 2015).

F.E. Weymouth assumed the dual role of general manager and chief engineer of Metropolitan in July 1929. By the end of the year, Metropolitan's service area covered 600 square miles. In April

1930, under Weymouth's leadership, Metropolitan and the United States Department of the Interior entered a contract for the delivery of water to Metropolitan. The next year, Metropolitan assumed management of the engineering of the Colorado River Aqueduct (AECOM 2015).

The mid-twentieth century was a time of marked expansion for Metropolitan. By the 1940s, Metropolitan had too much water and too few customers, conditions which threatened Metropolitan's financial security. To remedy this, Metropolitan sought new customers, and by the early 1960s forged agreements with the San Diego County Water Authority, Pomona Water District, and several local authorities to manage their water supplies. By 1965, 26 public agencies had joined Metropolitan, and its service area covered more than 4,500 miles (AECOM 2015). Presently Metropolitan operates the Colorado River Aqueduct, sixteen hydroelectric facilities, nine reservoirs, and five water treatment plants. Metropolitan delivers water from the Colorado River and northern California to 19 million customers in southern California (Metropolitan 2020).

1.3 Ethnographic Setting

The Plan Area encompasses the traditional territory of numerous Native American ethnographic groups, including: Cahuilla, Chemehuevi, Chumash, Cupeño, Gabrieleño, Halchidoma, Juaneño, Kumeyaay, Luiseño, Miwok, Mojave, Serrano, Tataviam, Yokuts, and Yuman/Quechan. A brief ethnographic description of each tribe is presented below.

Cahuilla

Traditional Cahuilla ethnographic territory extended west to east from the present-day city of Riverside to the central portion of the Salton Sea in the Colorado Desert, and south to north from the San Jacinto Valley to the San Bernardino Mountains (Heizer 1978; Bean and Smith 1978; Kroeber 1925). The term Cahuilla likely derived from the native word *káwiya,* meaning "master" or "boss" (Bean and Smith 1978:575). The Cahuilla are speakers of a Cupan language, part of the Takic linguistic subfamily of the Uto-Aztecan language family. It is thought that the Cahuilla migrated to southern California approximately 2,000 to 3,000 years ago, most likely from the southern Sierra Nevada mountain ranges of east-central California with other Takic speaking social groups (Moratto 1984:559). Cahuilla social organization was hierarchical and contained three primary levels: cultural nationality, patrimoieties: Wildcats (*tuktum*) and Coyotes (*'istam*), and sibs or patrilineal clan (Bean and Smith 1978:580). Cahuilla villages were usually located in canyons or on alluvial fans near a source of accessible water. Each lineage group maintained their own houses (*kish*) and granaries, and constructed ramadas for work and cooking. Other structures included sweat houses and song houses, and ceremonial houses or *kíš ?ámnawet.* Villages were often spaced out and different resource areas would be controlled by a specific lineage (Bean 1990:2). Cahuilla subsistence included hunting, sometimes communal, various game such as mountain sheep, cottontail, and jackrabbit and birds such as quail, duck, and dove using tools such as bow and arrow, traps, nets, slings and binds. Foodstuffs were processed using stone grinding implements like mortars/pestles and manos/metates then stored in finely woven baskets, large granaries, or pottery vessels. Bean (1978:578) has noted the use of some agricultural techniques and the Romero Expedition (1823-24) noted the Cahuilla growing corn, pumpkins, and beans in small, localized gardens.

Chemehuevi

The Chemehuevi are the southernmost of 16 groups of Southern Paiute peoples (Kelly and Fowler 1986), and the only non-Yuman speakers living along the lower Colorado River at the time of European contact. The traditional territory of the Chemehuevi was an extensive area southwest of Las Vegas, including portions of the eastern Mojave Desert of California. The vast Chemehuevi territory contains some of the driest deserts in the west, and the traditional Chemehuevi subsistence system was the most attuned to desert resources. The desert living Chemehuevi practiced a relatively nomadic hunting/gathering way of life, with larger settlements near reliable water sources, but no permanent villages. Groups moved with the seasons, arriving to harvest plant foods as they matured and hunting primarily small game. Housing was typically of brush erected to protect inhabitants from the harsh sun and wind (Kroeber 1925:597–598; Laird 1976:5). Several foods, including dried meats, dried melon and squash, agave hearts, and various seeds, were stored in specially prepared baskets, earth pits, and caves. In the protohistoric and historical periods, the Chemehuevi traveled extensively through the deserts and as far west as the Pacific coast to exchange goods and obtain marine shell ornaments and raw materials (Kelly and Fowler 1986:377). Traditional Chemehuevi subsistence was based on hunting and gathering, although the groups living along the lower Colorado River adopted floodplain horticulture like that practiced by the Mohave and Quechan (Kroeber 1925; Roth 1976). The Colorado River Chemehuevi, though, retained a greater reliance on hunting and gathering than their Yuman neighbors.

Chumash

The Ventureño Chumash are so called after their historic period association with Mission San Buenaventura (Grant 1978). The Chumash spoke six closely related languages, which have been divided into three branches—Northern Chumash (consisting only of Obispeño), Central Chumash (consisting of Purisimeño, Ineseño, Barbareño, and Ventureño), and Island Chumash (Jones and Klar 2007:80). Early Spanish accounts describe the Santa Barbara Channel region as heavily populated at the time of contact. Coastal Chumash lived in hemispherical dwellings made of tule reed mats, or animal skins in rainy weather. These houses could usually lodge as many as 60 people (Brown 2001). The acorn was an especially important resource. Acorn procurement and processing involved the manufacture of baskets for gathering, winnowing, and cooking and the production of mortars and milling stones for grinding. Bow and arrow, spears, traps and other various methods were used for hunting (Hudson and Blackburn 1979). The tomol, or wooden plank canoe, was an important tool for the procurement of marine resources and for maintaining trade networks between Coastal and Island Chumash. Sea mammals were hunted with harpoons, while deep-sea fish were caught using nets and hooks and lines. Shellfish were gathered from beach sands using digging sticks, and mussels and abalone were pried from rocks using wood or bone wedges. The Chumash also manufactured various other utilitarian and nonutilitarian items. Eating utensils, ornaments, fishhooks, harpoons, and other items were made using bone and shell. Olivella shell beads were especially important for trade (Hudson and Blackburn 1979).

Cupeño

The Cupeño occupied the area surrounding the headwaters of the San Luis Rey River. The name Cupeño likely came from the word *kupa-ngakitom*, meaning Kupa people (Kroeber 1925). Cupeño social organization fell into two moieties (groups), Istam (Coyotes) and Tuktun (Wildcats). These moieties were further separated into seven different patrilinear clans, three Wildcat clans and four Coyote clans (Gifford 1918; Kroeber 1925). Each clan had a hereditary chief of paternal descent and a hereditary assistant who carried messages, supervised food preparation, and received guests for the chief. Further, each of the seven clans were part of one of three “parties” (Gifford 1918). Cupeño religion revolved around the creation myth of two original deities, Tumayowi and Mukat. The Cupeño participate in several religious ceremonies, including: the Toloache initiation, the *morahash* whirling dance, and the girls’ adolescence rite. Mourning ceremonies and eagle killing ceremonies were conducted by the moieties (Kroeber 1925). Subsistence for Cupeño included hunting and gathering of plants and animals respectively.

Processing of food could be with a rectangular metates in a back and forth grinding motion or use of a special club, as for pounding agave or yucca leaves. Meat might be pulverized for the toothless (Schroth 1996).

Gabrieleño/Tongva

The Tongva, also called Gabrieleño by early Spanish explorers due to a connection to the San Gabriel Mission (Kroeber 1925; Bean and Smith 1978:538), occupied the greater Los Angeles Basin and three Channel Islands; San Clemente, San Nicolas, and Santa Catalina. The Tongva language belongs to the Takic branch of the Uto-Aztecan language family, which can be traced to the Great Basin region (Mithun 2004). The Tongva established large, permanent villages in the fertile lowlands along rivers and streams, and in sheltered areas along the coast, stretching from the foothills of the San Gabriel Mountains to the Pacific Ocean. Houses constructed by the Tongva were large, circular, domed structures made of willow poles thatched with tule that could hold up to 50 people (Bean and Smith 1978). Other structures served as sweathouses, menstrual huts, ceremonial enclosures, and probably communal granaries. Cleared fields for races and games, such as lacrosse and pole throwing, were created adjacent to Tongva villages (McCawley 1996: 27). The Tongva subsistence economy was centered on gathering, hunting, and fishing. The tribe utilized mountains, foothills, valleys, deserts, riparian, estuarine, and open and rocky coastal eco-niches. Acorns were the staple food, which were supplemented by the roots, leaves, seeds, and fruits of a wide variety of flora (e.g., islay, cactus, yucca, sages, and agave). These would be processed using hammerstones and anvils, mortars and pestles, manos and metates, and a variety of other tools. Birds, reptiles, insects, and large and small mammals were hunted with bow and arrow, traps, digging sticks and other tools. Fresh water and saltwater fish as well as shellfish were also consumed. The use of oceangoing plank canoes (*ti'at*) allowed for far reaching fishing, travel and trade (Kroeber 1925:631–632; Blackburn 1963; Bean and Smith 1978:546; McCawley 1996: 119–123, 128–131).

Halchidoma

The Halchidhoma (also known as the Panya) are a Yuman-speaking people who, until about 1825, lived along the Colorado River between the present-day cities of Blythe and Needles. The Halchidhoma were known to travel and trade over great distances. The Coco-Maricopa Trail, leading west from a portage point across the Colorado River adjacent to the city of Blythe, linked the Halchidhoma with the Pacific coast (Dobyns et al. 1963). Ceramic seriation and radiocarbon dates from marine shell artifacts indicate that an extensive trade network between the Pacific coast and the lower Colorado River region was established by at least 1100 B.P. (Sample 1950). The Halchidhoma traded with the Cahuilla, Hualapai, Papago, and Pima of Arizona, and were closely allied with the Maricopa (Bean and Vane 1978). The Halchidhoma were frequently in conflict with their Colorado River neighbors, the Quechan and Mohave (e.g., Bean and Vane 1978; Kroeber 1925). The Halchidhoma established strong alliances with the Yuman-speaking Maricopa and Cocopa peoples who lived to the east, along the Gila River. Ultimately, the Halchidhoma went to live with and intermarried with their allies the Maricopa, and are, therefore, poorly documented in the ethnographic literature.

Juaneño

The name Juaneño refers to the people associated with the Mission San Juan Capistrano during Spanish Colonial times (Kroeber 1925; Bean and Shipek 1978; Stever 2017). Acjachemen refers to contemporary Juaneño and coastal Luiseño who identify as descendants of the indigenous people living in the local area. The language of the Juaneño, shares a dialect with the Luiseño, and like the Gabrieleño, was derived from the Takic family; it is part of the larger Uto-Aztecan language stock. Groups of Juaneño resided in permanent, autonomous villages and associated seasonal camps. Villages were composed of a dominant clan who maintained access to hunting and resource collecting areas (Bean and Shipek 1978). The politically independent villages ranged from 35 to 300 in size and were led by a hereditary chief in conjunction with an advisory council that conducted economic, ceremonial and warfare authorities together. Juaneño villages were situated near viable water and food sources. Acorns were a dietary staple and were prepared in various ways. Other important food sources included grass and other seed types, manzanita, chia, pine nuts, and yucca, and wild game such as deer, rabbit, ground squirrel, quail, and other fowl (Stever 2017). The mythological figure Chinigchinich was the center of the Juaneño religion. The religious beliefs of the Juaneño describe the sagas of heroes who originated from the stars. Lake Elsinore is part of the creation myth and religion of the Juaneño and Luiseño. The Elsinore Hot Springs is significant to the Juaneño and Luiseño and is where the religious leader Wiyot became ill and died (Grenda 1997: 22).

Kumeyaay

Kumeyaay occupied the Pacific Coast from central San Diego County southward into Baja California and eastward into Imperial County, a region with tremendous environmental variation and resource zones. The Kumeyaay were referred to by Europeans as the Diegueño (Gifford 1931; Carrico 1987; Shipek 1987). Linguistic studies support the division of the Kumeyaay people into northern (Ipai) and southern (Tipai) dialect groups (Gifford 1931; Luomala 1978). Prior to European contact, the boundary between the Kumeyaay groups was not rigid and the distinction between them likely existed as a gradient rather than a clear division of cultural and political units (Carrico 1987). Kumeyaay territory was divided among bands, and within each band's territory there would be a primary village and several secondary homesteads located along tributary creeks (Shipek 1982:297). Each band was composed of five to 15 kinship groups called *sib* or *shiimul* and had a designated band leader, or *Kwaaypaay*, who directed ceremonies, acted as disciplinary head, and advised on marriage and family matters. The band leader would also have an assistant who acted as a messenger (Kroeber 1925:719; Luomala 1978; Shipek 1982, 1987). Religious mythologies shared by Kumeyaay groups include abstract spiritual concepts and a higher creator-god. Several sacred landmarks were designated for good, healing, and peace, the most important of which was Kuuchama, or Tecate Peak (Shipek 1985). Ceremonies included puberty initiation rites, marriage, naming, cremation, and mourning (keruk). While clothing was minimal, special costumes and adornments were worn during ceremonies (Luomala 1978:599). A main winter village would consist of semi-subterranean and roughly circular structures with wooden pole framework and brush thatch roofs. Other structures included family-owned granaries, a village-owned brush ceremonial enclosure, sweat lodges, and a semi-circular enclosure for the *keruk* mourning ceremony. Summer camps contained ramadas and windbreaks which were built into trees or rock shelters (Luomala 1978). Subsistence activities depended on the season and location. These included fishing, hunting, gathering, and plant cultivation. Acorns and other seeds were gathered, processed, and stored in woven baskets or pottery (Jordan and Shennan 2002). Fishing could be done with hooks or nets and bows from tule boats, while shellfish would be gathered from sandy beaches or rocky shores (Luomala 1978:601). Both birds (doves, quail, and geese) and small game (rabbits and woodrats) were hunted using throwing sticks, bow and arrow, and nets (Luomala 1978:601).

Luiseño

The Luiseño occupied territory in what is currently north San Diego County, southwestern Riverside County, and southern Orange County. Luiseño territory extended along the coast between Aliso Creek and Agua Hedionda Creek and extended inland to Santiago Peak in the north and the east side of Palomar Mountain in the south, including Lake Elsinore and the Valley of San Jose (Bean and Shipek 1978). The term Luiseño was applied to the Native Americans who were administered by the Spanish from Mission San Luis Rey and later used for the Payomkawichum nation that lived in the area where the mission was founded (Mithun 2001:539-540). The Luiseño language belongs to the Cupan group of the Takic subfamily of languages (previously known as Southern California Shoshonean), and the Uto-Aztecan language family from the Great Basin (Driver 1969; Bean and Shipek 1978). The center of the Luiseño religion was Chinigchinich, which centered around sagas of heroes who were originally from the stars. Religious rituals took place in a brush enclosure that housed a representation of Chinigchinich. Ritual ceremonies included puberty initiation rites, burial and cremation ceremonies, hunting rituals, and peace rituals (Bean and Shipek 1978). The Luiseño lived in permanent, politically autonomous villages and associated seasonal camps. Each village controlled a larger resource territory and maintained ties to other villages through trade and social networks. Trespassing within another village's resource area was cause for war (Bean and Shipek 1978). Villages consisted of dome-shaped dwellings (*kish*), sweat lodges, and a ceremonial enclosure (*vamkech*). Leadership within the villages focused on the chief, or Nota, and a council of elders (puuplem). The chief controlled religious, economic, and war-related activities (Bean 1978:109-111; Bean and Shipek 1978). Luiseño subsistence was focused on the acorn and supplemented by the gathering of other plant resources and shellfish, fishing, and hunting. Acorns were leached and served in various ways. Seeds were ground. Prey included deer, antelope, rabbit, quail, ducks and other birds. Fish, sea mammals, and shellfish were taken from the shore or caught in rivers and creeks using dugout canoes (Bean and Shipek 1978).

Miwok

The Plains Miwok are members of the larger Miwokan subgroup of the Utian language family inhabiting an area along the lower reaches of the Mokelumne and Cosumnes rivers and both banks of the Sacramento River roughly from the city of Rio Vista north to Freeport (Levy 1977). Political organization centered on small tribelets and several distinct settlements. Each tribelet was headed by a chief, and each settlement had a representative of the chief overseeing local affairs. Winter settlements included thatched, conical houses and semi subterranean earth-covered dwellings with central hearth and an earth oven for cooking purposes. In summer, a circular brush hut was constructed for use in mourning ceremonies. Other structures included sweathouses for purification, conical menstrual huts, and grinding houses (Levy 1977). Miwok social organization was based on affiliation with one of two spiritual and social categories: land and water. These categories are known as moieties. These groups were not associated specifically with resource procurement. Moieties were typically exogamous and played an important role in many ceremonies (Levy 1977). Plains Miwok subsistence practices centered on the use of acorns and of seeds as primary plant food sources and on hunting of mule deer, tule elk, pronghorn antelope, and various species of waterfowl. Hunting was typically done with a sinew-backed bow and arrow and fishing with various types of nets. Seines were used in large rivers and sloughs where the pace of water flow was slow. Hook and line was typically used to take sturgeon, while harpoons were the most common implement for salmon fishing (Levy 1977). The Plains Miwok made both twined and coiled basketry, usually from willow and redbud. They also manufactured tule mats used as floor covering. Woven blankets were often made of rabbit skin strips or feathers attached to cordage woven from plant fibers. Tule balsa rafts were crafted and used to navigate rivers and sloughs (Levy 1977).

Mojave

Most of the Mojave population lived along both sides of the lower Colorado River from south of Davis Dam to Topock, and also extended their territory south into the Chemehuevi and Colorado valleys, and intermittently controlled areas as far south as the Palo Verde Valley (cf. Kroeber

1959). The Mojave language belonged to the Yuman language family, part of the larger Hokan language phylum (Laylander 2010). According to Kroeber (1925) the Mojave tribes consisted of patrilinear familial clans. During much of the year, the Mojave lived in villages on terraces above the Colorado River, only moving down onto the floodplain in the spring to plant crops after the seasonal floods. Like other lower Colorado River peoples, the Mojave relied on floodplain agriculture, fishing, and gathering for subsistence. The Mojave were hunters of deer, rabbit and other small game, which also were often taken in traps, snares, and communal drives. When the high waters of the Colorado River receded, the Mojave caught a variety of Colorado River fish species by driving them into shallow sloughs or trapping them in seines (Kroeber 1925:737; Stewart 1957). They travelled long-distances, like other Colorado River tribes and they participated in a trade network extending east to the Pueblos of Arizona and west to the Pacific coast (Bean and Vane 1978). Mojave songs seem to act as a means of storing and transferring important landscape knowledge; they are, among other things, a collection of meaningfully constituted mental maps of the Mojave territory and beyond (Stoffle et al. 1997:235).

Serrano

The Serrano occupied an area in and around the San Bernardino Mountains. Their territory extended west of the Cajon Pass, east past Twentynine Palms, north of Victorville, and south to Yucaipa Valley. The Serrano language is part of the Serran division of a branch of the Takic family of the Uto-Aztecan linguistic stock (Mithun 2001:539, 543). The two Serran languages, Kitanemuk and Serrano, are closely related. (Kroeber 1925:611). Most Serrano lived in small villages located near water sources (Bean and Smith 1978a:571). A village was usually composed of at least two lineages. The Serrano were loosely organized along patrilineal lines and associated themselves with one of two exogamous moieties or “clans”—the Wahiyam (coyote) or the Tukum (wildcat) moiety. Houses were circular and domed, constructed of willow branches and tule thatching. Many of the villages had a ceremonial house, used both as a religious center and the residence of the lineage leaders. Additional structures in a village might include granaries and a large circular subterranean sweathouse typically built along streams or pools. The subsistence economy relied on collecting plant goods, especially seeds like acorn nuts, black oak, and piñon nuts, but also roots, shoots, and blooms. Additionally, Serrano would hunt large and small mammals, including mountain sheep, deer, antelope, rabbits, small rodents, and various birds, particularly quail, and occasionally fish (Bean and Smith 1978a:571). The Serrano used fire as a management tool to increase yields of specific plants, particularly chía. Trade and exchange were an important aspect of the Serrano economy. Those living in the lower-elevation, desert floor villages traded foodstuffs with people living in the foothill villages who had access to a different variety of edible resources.

Tataviam

Tataviam territory included the upper Santa Clara River from Piru Creek eastward, extending over the Sawmill Mountains to the southwest edge of the Antelope Valley, making much of their territory situated on sloped areas surrounded by desert (King and Blackburn 1978; Stickel and Weinman-Roberts 1980). Their territory was bounded on the west and north by various Chumash groups; on the south by the Tongva (Gabrieliño and Fernandeño, though some Tataviam were also identified as Fernandeño because of their association with Mission San Fernando); and to the east by the Kitanemuk and Serrano. The Tataviam were not well documented by early ethnographers. However, researchers today generally agree the Tataviam spoke an Uto-Aztecan language, most likely a Takic language (Hudson 1982). Archaeological evidence from Bower’s Cave – located between Newhall and Piru – combined with ethnographic evidence suggest their ritual organization was similar to both the Chumash and Tongva, whose lifestyles were distinct from one another (King and Blackburn 1978). Dwellings would include cool, domed thatch shelters under shady overhanging rocks (Eargle 2008). Rock art around these areas included representational and abstract pictographs, incised pictographs, petroglyphs, and cupules (Knight 2010), with small settlements often ancillary to large villages. The Tataviam were a hunting and gathering society who relied on yucca, which they would roast over a fire or in an earth oven (Garza 2012), and acorns, which they would harvest and grind (Eargle 2008; Garza 2012). Additional food resources included sage seeds, berries, small mammals, deer, and possibly antelope.

Yokuts

The San Joaquin Valley was historically occupied by the Penutian-speaking Yokuts (Kroeber 1925; Wallace 1978; Latta 1999). The Yokut territory can be broken into the Northern Valley, Southern Valley, and Foothill Yokuts (Wallace 1978). The distinction between the three Yokuts groups is primarily based on language dialect (Mithun 2001). The Yokuts established permanent villages. Residential structures were most often of two types: single-family dwellings and larger communal residences that housed ten families or more. Villages frequently included mat-covered granaries and a sweathouse (Mithun 2001). The basic economic unit among the Yokuts was the nuclear family. Totemic lineages were based on patrilineal descent. Totem symbols were passed from father to offspring and families sharing the same totem formed an exogamous lineage. Totems were associated with one of two moieties, a division which played a role during ceremonies and other social events (Wallace 1978). Yokuts were split into self-governing local groups, most often including several villages. Each group had a chief who directed ceremonies, mediated disputes, handled punishment of those doing wrong, hosted visitors, and provided aid to the impoverished (Wallace 1978). Shamans were also an important part of Yokuts village life. The Yokuts' shamans gained power through a dream or vision, providing them the ability to heal the sick and serve as the primary role in religious life (Wallace 1978). Yokuts technology relied primarily on tule, which was used to make baskets cradles, boats, housing, and many other items. Yokuts subsistence also relied on tule. The roots and seeds were gathered, dried, and pounded into a flour. Tule rafts allowed for fishing with nets spears, basket traps, and bow and arrow. Yokuts also gathered mussels and hunted turtles (Wallace 1978). Yokuts also engaged in trade with their neighbors. Since acorns were not readily available in the Yokuts ethnographic territory, some Yokuts tribes journeyed to neighboring groups to trade for them. Marine shells secured through trade with coastal peoples were used in the manufacture of shell money and personal adornment items (Wallace 1978).

Yuman/Quechan

Quechan is a variation on the names Kwichyan or Kuchiana, but this group is also commonly known as the Yuma; today they refer to themselves as Kw'tsan. Quechan language is considered a river dialect of the Yuman Language Family, part of the larger Hokan language phylum (Laylander 2010). The ethnographic territory traditionally associated with the Quechan, now divided between the states of California and Arizona, is centered around the confluence of the Colorado and the Gila rivers, extending several miles north and south along the Colorado and east along the Gila. Settlements consisted of extended hierarchical family groups that were widely dispersed along the riverbanks. These settlements shifted throughout the year. Smaller groups would disperse into lower areas during farming seasons and reconvene into larger groups on higher ground during flood seasons (Bee 1983:86-88). Subsistence patterns included riverine agriculture cultivated in the richly silted river bottomlands following the recession of the spring floods which provided a relatively high yield of corn, beans, and squash (Bee 1983:86– 87; Esquinca 2019:106). The Quechan also relied on the gathering of wild foods, the most important of which were mesquite and screw-bean pods, although a variety of other wild plants also were collected (Bee 1983:87). Fishing would also be done in the river or in the delta (Esquinca 2019).

The Quechan considered warfare to be ceremonial and it was common for small party raids to be conducted against their neighbors. Every few years, there might also be warfare conducted by larger war parties. Tribes were advised by both a war chief and a peace chief (James and Graziani 1975).

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Appendix E

Roadway Construction Noise Model (RCNM)

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 03/02/2020
Case Description: MWD Sample Phase No. 1

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
25 Feet	Residential	65.0	55.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	25.0	0.0
Dozer	No	40		81.7	25.0	0.0
Jackhammer	Yes	20		88.9	25.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	86.7	82.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	87.7	83.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Jackhammer	94.9	87.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	94.9	90.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
50 Feet	Residential	65.0	55.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)

Excavator	No	40	80.7	50.0	0.0
Dozer	No	40	81.7	50.0	0.0
Jackhammer	Yes	20	88.9	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Jackhammer	88.9	81.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	88.9	84.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
100 Feet	Residential	65.0	55.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40	80.7		100.0	0.0
Dozer	No	40	81.7		100.0	0.0
Jackhammer	Yes	20	88.9		100.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	74.7	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	75.6	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Jackhammer	82.9	75.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	82.9	78.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 03/02/2020
Case Description: MWD Sample Phase No. 2

**** Receptor #1 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
25 Feet	Residential	65.0	55.0	45.0

Equipment

Description	Impact Device	Spec Usage (%)	Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	25.0	0.0
Front End Loader	No	40		79.1	25.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	87.7	83.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	85.1	81.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	87.7	85.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
50 Feet	Residential	65.0	55.0	45.0

Equipment

Description	Impact Device	Spec Usage (%)	Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	50.0	0.0
Front End Loader	No	40		79.1	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	81.7	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
100 Feet	Residential	65.0	55.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	100.0	0.0
Front End Loader	No	40		79.1	100.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	75.6	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	73.1	69.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	75.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 03/02/2020
Case Description: MWD Sample Phase No. 3

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
25 Feet	Residential	65.0	55.0	45.0

Equipment

Description	Impact Device	Spec Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	25.0	0.0
Grader	No	40	85.0		25.0	0.0
Dozer	No	40		81.7	25.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	86.7	82.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	91.0	87.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	87.7	83.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	91.0	89.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
50 Feet	Residential	65.0	55.0	45.0

Equipment

Description	Impact Device	Spec Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)

Excavator	No	40		80.7	50.0	0.0
Grader	No	40	85.0		50.0	0.0
Dozer	No	40		81.7	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	85.0	83.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
100 Feet	Residential	65.0	55.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	100.0	0.0
Grader	No	40	85.0		100.0	0.0
Dozer	No	40		81.7	100.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	74.7	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	79.0	75.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	75.6	71.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	79.0	77.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 03/02/2020
Case Description: MWD Sample Phase No. 4

**** Receptor #1 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
25 Feet	Residential	65.0	55.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	25.0	0.0
Generator	No	50		80.6	25.0	0.0
Front End Loader	No	40		79.1	25.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	86.6	78.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	86.7	83.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	85.1	81.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	86.7	86.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
50 Feet	Residential	65.0	55.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)

Crane	No	16	80.6	50.0	0.0	
Generator	No	50	80.6	50.0	0.0	
Front End Loader	No	40	79.1	50.0	0.0	

Total 74.6 74.3 N/A N/A N/A N/A N/A N/A

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	80.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	80.6	77.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.6	80.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

		Baselines (dBA) Daytime	Evening	Night
Description	Land Use	Daytime	Evening	Night
100 Feet	Residential	65.0	55.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16	80.6		100.0	0.0
Generator	No	50	80.6		100.0	0.0
Front End Loader	No	40	79.1		100.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	74.5	66.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	74.6	71.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	73.1	69.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	74.6	74.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 03/02/2020
Case Description: MWD Sample Phase No. 5

**** Receptor #1 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
25 Feet	Residential	65.0	55.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	25.0	0.0
Paver	No	50		77.2	25.0	0.0
Roller	No	20		80.0	25.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	83.2	80.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	83.2	80.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	86.0	79.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	86.0	84.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
50 Feet	Residential	65.0	55.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)

Paver	No	50	77.2	50.0	0.0
Paver	No	50	77.2	50.0	0.0
Roller	No	20	80.0	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	80.0	73.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.0	78.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
100 Feet	Residential	65.0	55.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	100.0	0.0
Paver	No	50		77.2	100.0	0.0
Roller	No	20		80.0	100.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	71.2	68.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	71.2	68.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	74.0	67.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	74.0	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Groundborne Noise and Vibration Modeling

Notes
The reference distance is measured from the nearest anticipated point of construction equipment to the nearest structure.

	Reference Level Inputs			
Equipment	**PPV_{ref} (in/sec)**	**Lv_{ref} (VdB)**	**RMS_{ref} (in/sec)**	**Reference Distance**
Vibratory Roller	0.21	94	0.050	25
Impact Pile Driver (upper range)	1.518	112	0.398	25
Impact Pile Driver (typical)	0.644	104	0.158	25
Large bulldozer	0.089	87	0.022	25
Caisson drilling	0.089	87	0.022	25
Loaded trucks	0.076	83	0.014	25
Jack hammer	0.035	79	0.009	25
Small bulldozer	0.003	58	0.001	25

	Vibration Contours		
	Distance to (feet)		
Equipment	**0.100 PPV**	**0.200 PPV**	**94.0 VdB**
Vibratory Roller	49	26	25
Impact Pile Driver (upper range)	296	158	164
Impact Pile Driver (typical)	136	72	71
Large bulldozer	22	12	12
Caisson drilling	22	12	12
Loaded trucks	19	10	8
Jack hammer	10	5	5
Small bulldozer	1	1	1

Sources

California Department of Transportation (Caltrans). 2020. Transportation and Construction Vibration Guidance Manual. April 2020. Available at: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf

Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment. FTA Report No. 0123. Washington, D.C. September 2018. https://www.transit.dot.gov/regulations-and-guidance/environmental-programs/noise-and-vibration.

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