Initial Study/Mitigated Negative Declaration

Copper Sulfate Application Project

Los Angeles Department of Water and Power
Environmental Affairs
111 North Hope Street, Room 1044
Los Angeles, California 90012

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CEQA Initial Study and Mitigated Negative Declaration

Copper Sulfate Application Project

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Project Description

1.1 Introduction

The Los Angeles Department of Water and Power (LADWP) proposes to implement the Copper Sulfate Application Project (proposed project). The proposed project would apply copper sulfates to treat harmful aquatic vascular plants and algae at Alabama Gates, Merritt Cut, the North and South Haiwee Reservoirs, and other possible areas along its drinking water conveyance system, as necessary, to protect drinking water supplies and its water distribution system from harmful toxic algae blooms. These algae blooms and pondweed growths adversely affect flows at the intake structure to Owens Lake, to which LADWP provides water via the Los Angeles Aqueduct.

1.2 Project Background

LADWP is the nation's largest municipal utility. It provides power and drinking water to approximately four million customers in the City of Los Angeles. LADWP owns and operates a complex water distribution system that includes the Los Angeles Aqueduct, reservoirs, and canals. The system of water conveyances begins in the north in Mono County and terminates at the Los Angeles Filtration Plant in Sylmar. After treatment in Sylmar, drinking water is distributed through a system of pipelines and reservoirs to the end users. LADWP owns and operates its own distribution system.

LADWP also provides water to Owens Lake via the Los Angeles Aqueduct for dust control purposes. Growth of algae on the concrete-lined portions of the Los Angeles Aqueduct and intake screens has significantly affected the ability of water to flow into Owens Lake, and continued algae growth will prevent LADWP from meeting the demand requirements of the Owens Lake Dust Mitigation Project. The current rate of algae growth without algaecide treatment would overcome the mechanical ability to keep the intakes clear. Thus, chemical application in the form of copper sulfate proves a more viable option for LADWP to manage the vegetation growth to ensure adequate water flow to Owens Lake and its overall distribution function.

LADWP has determined through research that algaecides and aquatic herbicides are considered the most effective means of reducing the target algae without adverse effects on non-target organisms over several other alternatives, such as biological methods. Biological methods such as the introduction of ducks or other wildlife are not suitable as there may be impacts to water quality from animal feces, increases in turbidity levels and nutrients, and impacts to other existing, desirable species. Mechanical or physical removal was determined to be ineffective for the targeted vegetation because it removes algae only for a short period of time. Physical removal

requires having to shut down all flows on a daily basis in order to effectively brush the algae off of the intake screens. In the past, removal had to be performed up to three times per night to maintain adequate flows due to all the algae buildup.

1.3 Project Location

The project proposes to apply copper sulfate to concrete-lined areas along the Los Angeles Aqueduct (particularly at Alabama Gates and Merritt Cut) and two reservoir locations (North Haiwee and South Haiwee Reservoirs) in Inyo County, California. **Figure 1** shows the proposed project location. The Alabama Gates (**Figure 2**) is located on the Los Angeles Aqueduct approximately 5 miles north of Lone Pine, in the Owens Valley. Downstream of the Alabama Gates are two spill gates that control flow into the Owens Lake as part of the Owens Lake Dust Mitigation Project. North and South Haiwee Reservoir are located approximately 28 miles south of Lone Pine, and Merritt Cut is located between the two reservoirs (**Figure 3**).

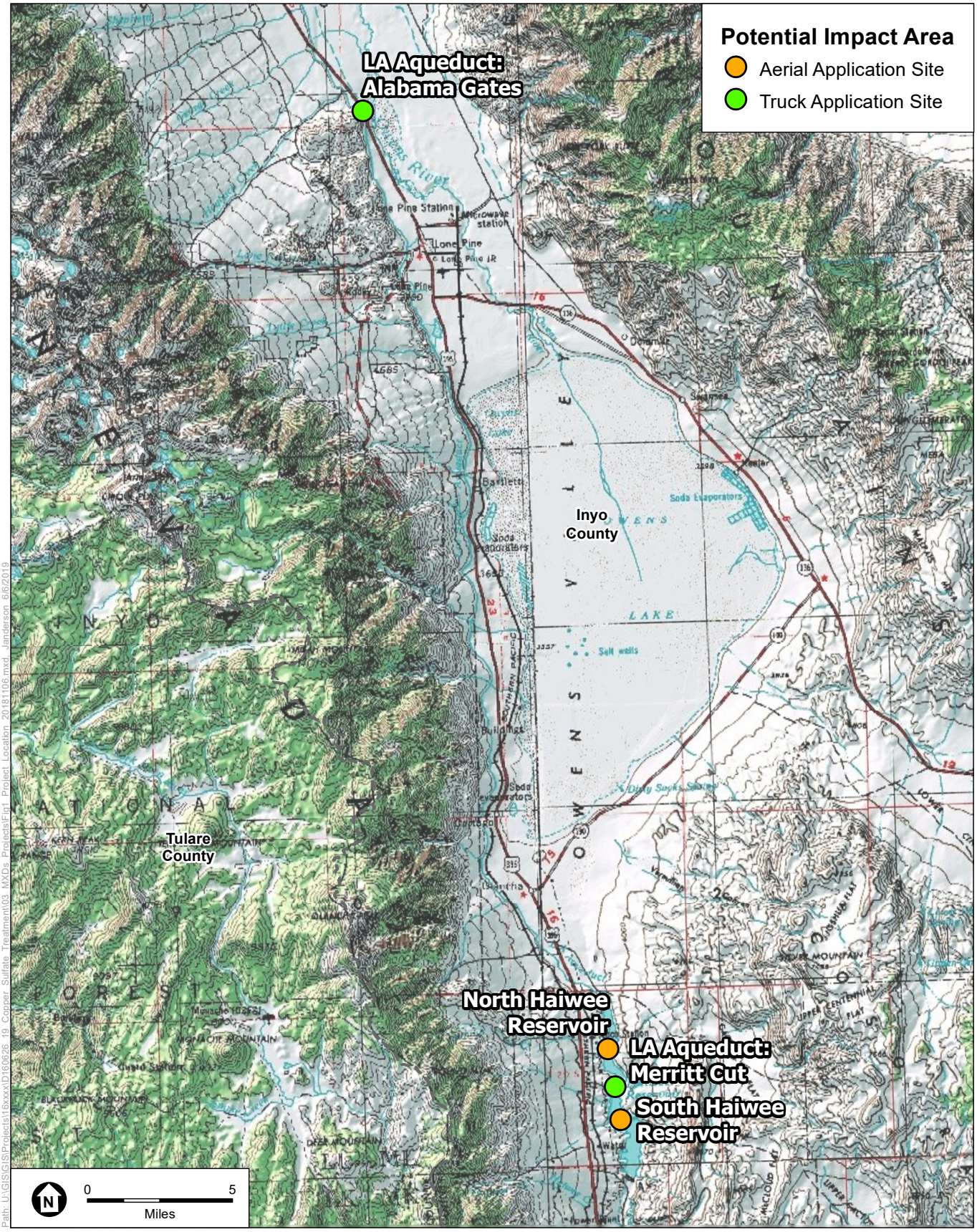
1.4 Project Objectives

The objectives of the proposed project are to:

- Improve obstructed flows of water supply by treatment for aquatic vascular plants and algae growth when necessary.
- Meet demand of flow as required by the Owens Lake Dust Mitigation Project.
- Reduce aquatic algal growth and plant growth without impact to non-target species.

1.5 Project Description

In the past, LADWP has treated portions of their water supply distribution system with copper sulfate. LADWP applied for coverage under a statewide General National Pollution Discharge Elimination System (NPDES) Permit for Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications, Order No. 2013-002-DWQ, NPDES No. CAG990005 from the State Water Resources Control Board (SWRCB) for application of algaecides (copper sulfate) to control weeds and invasive species within LADWP water supply facilities. In addition, applications of copper sulfate within the jurisdiction of the Lahontan Regional Water Quality Control Board (RWQCB) require an exemption to the Basin Plan. The proposed project would administer copper sulfate as an algaecide to treat for aquatic vascular plants and algae growth, such as filamentous green algae, *Cladophora*, and the pond weed, *Potomageton*, which over time have obstructed flows, impairing water supply in LADWP's distribution system. Copper sulfate algaecides have proven to be effective at reducing target algae in water bodies without adverse effects on non-target organisms. Copper sulfate treatment would either be applied aerially by helicopter or be delivered to the site via truck and applied directly to the water from a dry chemical feeder (hopper). Copper sulfate applications would occur up to five times per year. Copper sulfate treatment would usually be scheduled during daylight hours and may continue into the night, if necessary.



SOURCE: USGS Topographic Series (Haiwee Reservoirs, Union Wash, CA).

Copper Sulfate Application Project

Figure 1
Project Location

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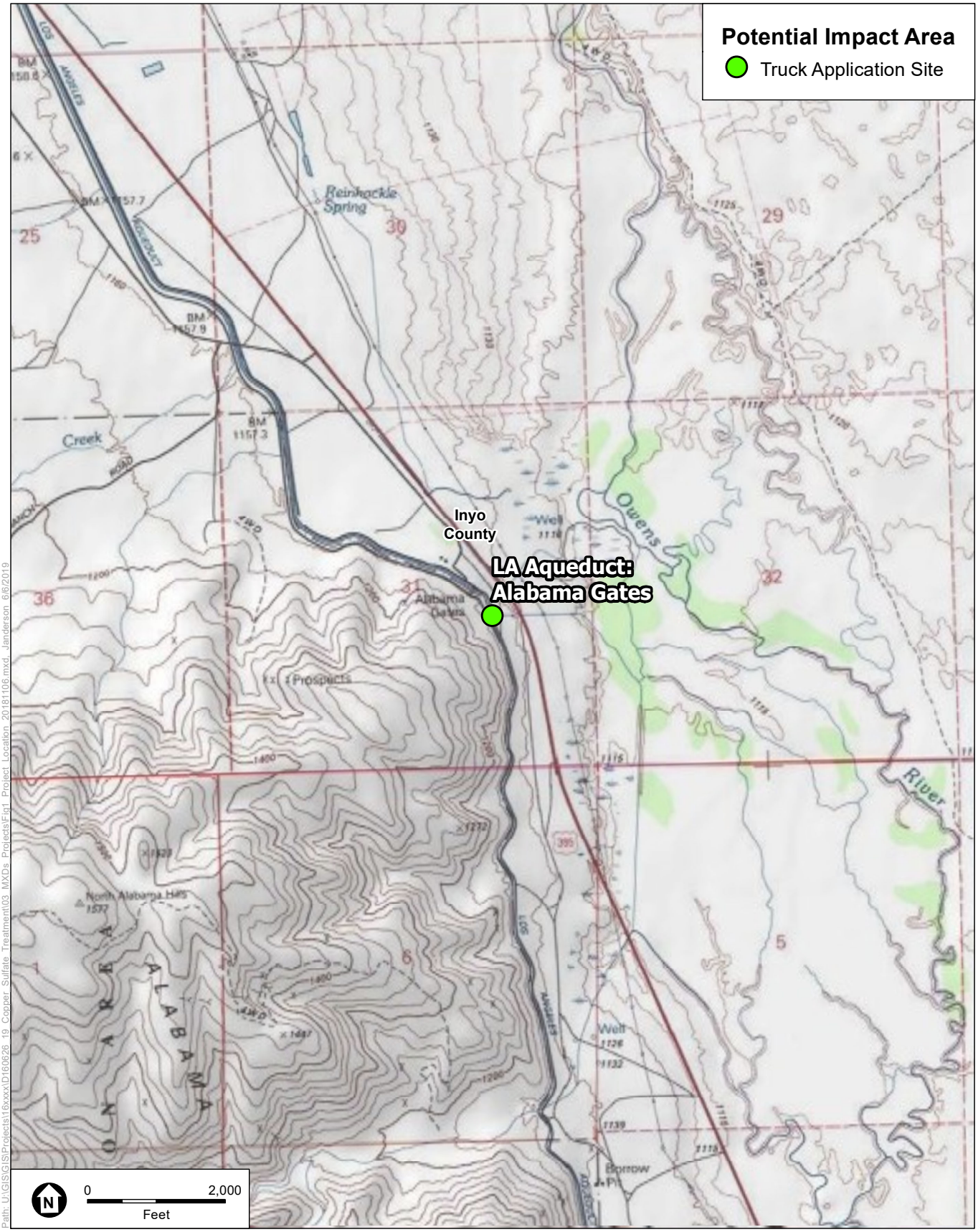
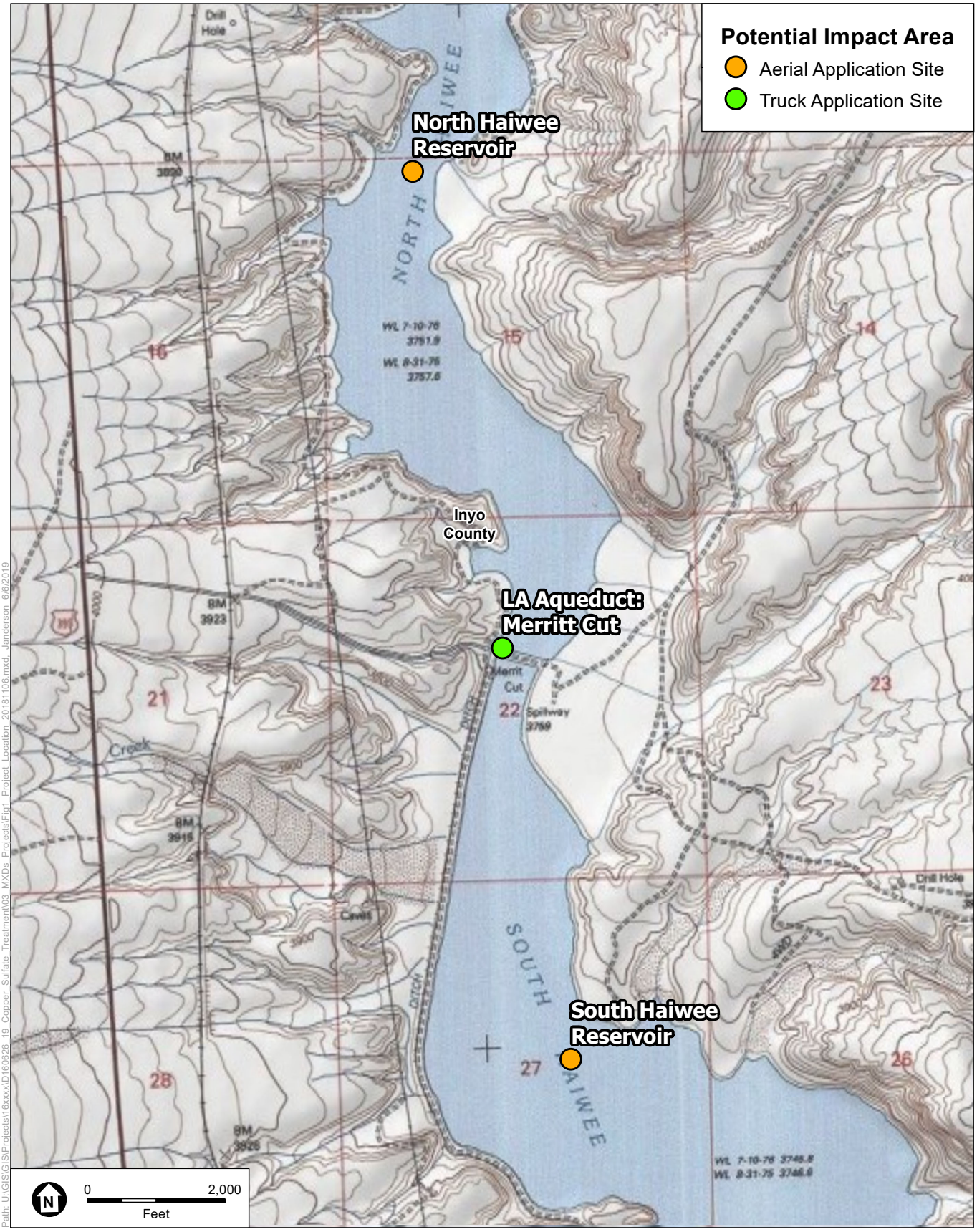


SOURCE: USGS Topographic Series (Haiwee Reservoirs, Union Wash, CA).

Copper Sulfate Application Project

Figure 2
Project Location

ESA



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SOURCE: USGS Topographic Series (Haiwee Reservoirs, Union Wash, CA).

Copper Sulfate Application Project

Figure 3
Project Location

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The amount of copper sulfate to be applied during each application event would differ depending on the area and amount of algae present in the application area. Dosage would be determined based on the manufacturer's recommendation and on the flow in the receiving water body at the time of treatment. LADWP would comply with the threshold concentration of copper in water set by the California Toxics Rule (40 CFR 131.38). Copper sulfate would be stored at LADWP's existing Van Norman Chemical Depot in Sylmar, California.

LADWP has prepared an Aquatic Pesticides Application Plan (APAP) Monitoring Plan (see Appendix A). This plan provides guidance for monitoring before, during, and after each copper sulfate application event and is described further under Section 1.7.

Copper sulfate would be applied by LADWP personnel, contractor, or subcontractor with a Qualified Applicator Certificate or License issued by the State of California Department of Pesticide Regulation (Licensing Certification Program). Certificate and license holders are trained to ensure that algaecides are applied at rates consistent with label requirements and in a manner that avoids potential adverse effects.

Aerial Application

For treatment of the North and South Haiwee Reservoirs, the copper sulfate would be applied aerially via a helicopter and discharged as close as possible to the surface of the water to prevent drift of the crystals. Trained staff would check wind speeds prior to aerial application events to determine if the speeds are low enough to safely and accurately apply the copper sulfate. The copper sulfate would be applied only if wind speeds fall below 10 miles per hour to mitigate any wind-driven transfer of the copper sulfate crystals outside the desired application area. Approximately 2,500 lb of copper sulfate would be applied during each treatment event, with 1,250 lb allocated to each individual reservoir.

The copper sulfate would be transferred via truck from the Van Norman Chemical Depot to the Lone Pine airport, where the helicopter would pick up the copper sulfate. The treatment area of the reservoir is dependent on the location, spread, and type of algae. However, a maximum of 50 percent of the reservoir would be treated at each application event, with a 75-foot clear area near the shorelines. This would equate to a maximum treated area of approximately 0.47 square miles for North Haiwee Reservoir and 0.6 square miles for South Haiwee Reservoir.

Direct Application

For treatment at Merritt Cut, Alabama Gates, or concrete-lined areas along the Los Angeles Aqueduct, small granules of copper sulfate would be applied directly into the treatment area. A truck would transport an LADWP auger feeder from either the Cottonwood or Los Angeles Aqueduct Filtration Plant to the Merritt Cut, Alabama Gates, or other concrete-line areas along the Los Angeles Aqueduct where algae treatment may be required. Copper sulfate would be transferred directly from the feeder into the water. A hose attached to the auger feeder would be lowered to near the surface of the water, which prevents possibility for drift.

Power for the auger feeder would be supplied via an extension cord to nearby facilities, if present, or a power generator or truck engine. Prior to application, valves leading to Owens Lake would be closed to ensure that no water from the Los Angeles Aqueduct treated with copper sulfate would be introduced to the Owens Lake Dust Mitigation Project area.

1.6 Project Construction

The proposed project would not include a construction phase. No new facilities would be required and no construction would occur. Existing facilities would be used for storage of materials and operational activities.

1.7 Operation and Maintenance Activities

Operation

The algaecide would be applied by existing, trained, and certified LADWP personnel using properly maintained and calibrated equipment capable of delivering desired volumes of copper sulfate. However, should a spill occur, staff would follow LADWP's established emergency response procedures and refer to the material safety data sheet (MSDS) for instructions on containing and cleaning up the spill (see **Appendix B**). Emergency response and MSDS procedures would be reviewed regularly by LADWP staff. A copy of the emergency response procedures and material safety data sheets would be available on-site during each treatment. Cleanup equipment would be kept in good working order and would be readily available at each application site.

Monitoring

LADWP has prepared the APAP Monitoring Plan for the proposed project; it is attached as Appendix A. This plan includes monitoring actions to be conducted prior to and after each copper sulfate application event. Monitoring locations would be chosen and monitoring parameters would be delineated as outlined in the APAP Monitoring Plan.

Up to three LADWP staff would conduct 3 days of monitoring for each application event. Monitoring would occur the day before the copper sulfate application event, the day of the event, and within 2 days after the event.

Biological and Sediment Monitoring

Biological and sediment monitoring is designed to evaluate the magnitude and extent of potential impacts to non-target organisms and rare/threated or endangered species during and following copper sulfate applications for algae, and to evaluate post-project recovery of biological communities following discontinuation of all copper sulfate applications. This type of monitoring is proposed for the North and South Haiwee Reservoirs. The Alabama Gates, Merritt Cut, or other concrete-lined areas along the Los Angeles Aqueduct systems are expected to have extremely limited (or absent) biological communities due to the high current conditions within a concrete channel resulting in sediments not being expected to accumulate.

Assessment of benthic macroinvertebrate communities, zooplankton communities, and chlorophyll-a would be assessed annually as delineated in the APAP Monitoring Plan. As per the requirements of the APAP Monitoring Plan, LADWP would submit the results of all water column monitoring to the Lahontan RWQCB within 30 days from the copper sulfate application event, and results of the biological and sediment monitoring no later than 120 days from the date of the annual monitoring event.

1.8 Project Approvals

This Initial Study (IS)/ Mitigated Negative Declaration (MND) has been prepared to meet all of the substantive and procedural requirements of the California Environmental Quality Act (CEQA) (California Public Resources Code Section 21000 et seq.), the State CEQA Guidelines (California Code of Regulations [CCR], Title 14, Section 15000 et seq.). Accordingly, LADWP is the Lead Agency for the proposed project. This IS/MND may be utilized for future project approvals from other agencies.

LADWP applied for coverage under a statewide General NPDES Permit from the SWRCB for application of algaecides (copper sulfate) to control weeds and invasive species within LADWP water supply facilities. The Notice of Applicability, along with approval of the associated APAP, was received from the SWRCB on October 15, 2018. General NPDES Permit No. CAG990005 (Order No. 2013-0002-DWQ) requires strict compliance with the California Toxics Rule (CTR) criteria. The SWRCB implements CTR criteria with the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, also known as the State Implementation Plan (SIP), and applicable Basin Plans. Therefore, any aquatic pesticide that contains a priority pollutant, such as copper, would be prohibited from being applied in concentrations that would exceed applicable water quality criteria outside an established mixing zone.

Section 5.3 of the SIP provides a categorical exemption from the toxics standards where the discharge is necessary to implement control measures: (1) for resource or pest management or (2) to meet statutory requirements under the federal Safe Drinking Water Act or California Health and Safety Code, or for certain maintenance and cleaning activities. LADWP's purposes for applying aquatic algaecides (copper sulfate) to water system facilities are to: (1) improve obstructed flows of water supply by treatment for aquatic vascular plants and algae growth when necessary; (2) meet demand of flow as required by the Owens Lake Dust Mitigation Project; and (3) reduce aquatic algal growth and plant growth without impact to non-target species. Therefore, the proposed applications meet the standards for a categorical exemption to the toxics standards.

SECTION 2
Initial Study/Environmental Checklist

1. Project Title:	Copper Sulfate Application Project
2. Lead Agency Name and Address:	Los Angeles Department of Water and Power
3. Contact Person and Phone Number:	Julie Van Wagner (213) 367-5295
4. Project Location:	Los Angeles Aqueduct: Merritt Cut, Alabama Gates, North Haiwee Reservoir, South Haiwee Reservoir
5. Project Sponsor's Name and Address:	Los Angeles Department of Water and Power 111 N. Hope Street, Los Angeles, CA 90012
6. General Plan Designation(s):	Natural Resources, State and Federal Lands
7. Zoning:	Open Space, Forty-Acre Minimum and Other

8. Description of Project: (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary.)

The Los Angeles Department of Water and Power (LADWP) is proposing to implement the Copper Sulfate Application Project (proposed project). The proposed project would use copper sulfates to treat harmful aquatic vascular plants and algae at Alabama Gates, Merritt Cut, the North and South Haiwee Reservoirs, and other possible areas along concrete-lined area of the Los Angeles Aqueduct, as necessary, to protect drinking water supplies and its water distribution system from harmful toxic algae blooms.

9. Surrounding Land Uses and Setting. (Briefly describe the project's surroundings.)

The proposed project areas are generally surrounded by undeveloped State and Federal Lands.

10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)

- Coverage under the State Water Resources Control Board, National Pollution Discharge Elimination System General Permit for Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications, Order No. 2013-002-DWQ, NPDES No. CAG990005.
- Prohibition Exemption to use Aquatic Pesticides from the Lahontan Regional Water Quality Control Board

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

A list of the California Native American tribes traditionally and culturally affiliated with the proposed project area was received from the Native American Heritage Commission on August 21, 2018.

Letters were sent on October 23, 2018, to the following potentially affiliated tribes:

Tribe	Representative	Title
Big Pine Paiute Tribe of the Owens Valley	Ms. Genevieve Jones	Chairperson
Big Pine Paiute Tribe of the Owens Valley	Ms. Danelle Gutierrez	Tribal Historic Preservation Officer
Bishop Paiute Tribe	Mr. Bill Vega	Chairperson
Fort Independence Indian Community of Paiutes	Mr. Norman Wilder	Chairperson
Lone Pine Paiute-Shoshone Tribe	Ms. Mary Wuester	Chairperson

No responses were received.

Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☒ Biological Resources	☐ Cultural Resources	☐ Energy
☐ Geology/Soils	☐ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials
☐ Hydrology/Water Quality	☐ Land Use/Planning	☐ Mineral Resources
☐ Noise	☐ Population/Housing	☐ Public Services
☐ Recreation	☐ Transportation	☐ Tribal Cultural Resources
☐ Utilities/Service Systems	☐ Wildfire	☒ Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial study:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

_____ _____

Signature Date

_____ _____

Signature Date

2.1 Aesthetics

Issues (and Supporting Information Sources):		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
I.	**AESTHETICS — Except as provided in Public Resources Code Section 21099, would the project:**				
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c)	In non-urbanized areas, 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 point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☐	☒
d)	Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area?	☐	☐	☒	☐

Discussion

a) **Less than Significant.** The proposed project would not require any new structures or facilities and no ground disturbance would be required. The proposed project would be composed of operational activities involving the periodic application of copper sulfate to reservoirs and portions of the Los Angeles Aqueduct that are impacted by the growth of vascular aquatic plants and algae. The proposed application areas are located in remote areas. Application processes would require a helicopter or truck to apply the copper sulfate to the remediation area. These would be visible only during application of the copper sulfate, which would only take place up to five times a year. A less than significant impact would occur.

b) **Less than Significant.** The nearest scenic highway to the proposed project would be State Route (SR) 190, located approximately 16 miles east of the North Haiwee Reservoir (Caltrans 2018). This portion of SR 190 is an Officially Designated State Scenic Highway and National Scenic Byway. In addition, a portion of US Highway 395 located approximately 300 feet east of the Alabama Gates application area considered an Eligible State Scenic Highway, not yet officially designated as is another portion of US Highway 395 approximately 3,000 feet from the North and South Haiwee Reservoir. The proposed project does not include any construction or new facilities; the proposed project involves periodic operational activities which would occur only up to five times per year. The application of copper sulfate along the proposed project areas would not degrade scenic resources within a scenic highway. Impacts are considered less than significant.

c) **No Impact.** The proposed project areas would be located within non-urbanized areas. However, the proposed project would not include construction activities or implementation of new facilities. Additionally, trucks and helicopters would use existing LADWP facilities as landing pads and truck routes. Therefore, the proposed project would not alter or degrade the visual character of the proposed project area or its surroundings. No impact would occur.

d) **Less than Significant.** The proposed project would not result in any new sources of substantial light or glare. Application of copper sulfate is generally scheduled during the daytime, extending into the night if necessary. If nighttime activities are required, normal lighting associated with truck usage and helicopter lighting could be used. However, lighting would be shielded if possible and pointed away from open space areas. The periodic use of lighting would not adversely affect daytime or nighttime view in the area, and impacts would be considered less than significant.

References

California Department of Transportation (Caltrans). 2018. California Scenic Highway Mapping System. Available online at: http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/. Accessed on October 16, 2018.

2.2 Agriculture and Forestry Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
II. AGRICULTURE AND FORESTRY RESOURCES — In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. **Would the project:**				
a) 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 non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) 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))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) 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?	☐	☐	☐	☒

Discussion

a) **No Impact.** The proposed project area is not within the vicinity of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. As such, the operations of the proposed project would not convert any agricultural lands for non-agricultural use. No impact would occur (DOC 2018a).

b) **No Impact.** Inyo County does not offer Williamson Act contracts (DOC 2018b). In addition, the proposed project area would be located within or near reservoirs or the Los Angeles Aqueduct, on land owned and operated by LADWP and not land zoned for agricultural use. Therefore, implementation of the proposed project would not conflict with existing zoning for agricultural use or a Williamson Act contract. No impact would occur.

c,d) **No Impact.** The proposed project would include operational activities related to the application of copper sulfate into existing facilities owned and operated by LADWP. In addition, there are no forest lands near the proposed project vicinity (Inyo County 2013).

No timberland or forest land would be impacted by implementation of the proposed project. No impact would occur.

e) **No Impact**. As discussed above, the proposed project area is not located on land designated as Prime Farmland, Unique Farmland, Farmland of Statewide Importance, timberland, or forest land. Therefore, implementation of the proposed project would not convert farmland or forestland, and no impact would occur.

References

California Department of Conservation (DOC). 2018a. California Important Farmland Finder. Available online at: https://maps.conservation.ca.gov/DLRP/CIFF/. Accessed on October 16, 2018.

DOC. 2018b. Land Conservation (Williamson) Act Questions and Answers. Available online at: http://www.conservation.ca.gov/dlrp/wa/Pages/LCA_QandA.aspx. Accessed on October 16, 2018.

Inyo County. 2013. Inyo County General Plan, Zoning Code Maps. Available online at: http://inyoplanning.org/projects/GPandZoningUpdates.htm. Accessed on October 16, 2018.

2.3 Air Quality

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
III. AIR QUALITY — Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. **Would the project:**				
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?	☐	☐	☒	☐

Discussion

The proposed project site is located within the Great Basin Valleys Air Basin (Air Basin), which is an approximately 13,975-square-mile area encompassing all of Alpine, Mono, and Inyo Counties. The terrain and geographical location determine the distinctive climate of the Air Basin, as it is a basin with surrounding mountains that trap the air and its pollutants within the basin.

The ambient concentrations of air pollutants are determined by the amount of emissions released by sources and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and sunlight. Therefore, existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources.

The climate of the Air Basin is influenced by the Sierra Nevada mountains. The climate is generally semiarid to arid with low precipitation, abundant sunshine, frequent winds, moderate to low humidity, and a high potential for evapotranspiration. The extent and severity of pollutant concentrations in the Air Basin is a function of the area's natural physical characteristics (weather and topography) and man-made influences (development patterns and lifestyle). Factors such as wind, sunlight, temperature, humidity, rainfall, and topography all affect the accumulation and dispersion of pollutants throughout the Air Basin, making it an area of high pollution potential. The Air Basin's meteorological conditions, in combination with regional topography, are conducive to the formation and retention of ozone, which is a secondary pollutant that forms through photochemical reactions in the atmosphere. The greatest air pollution impacts throughout the Air Basin typically occur from June through September. Pollutant concentrations in the Air Basin vary with location, season, and time of day.

Regulatory Framework

The Clean Air Act (CAA) establishes Federal air quality standards and specifies future dates for achieving compliance. The CAA also mandates that the State submit and implement a SIP for areas not meeting these standards. SIPs must include pollution control measures that demonstrate how the National Ambient Air Quality Standards (NAAQS) will be met. The 1990 amendments to the CAA identify specific emission reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or to meet interim milestones. Title I (Nonattainment Provisions) is the section of the CAA that is most applicable to the proposed project.

Title I requirements are implemented for the purpose of attaining NAAQS for the following primary and secondary criteria pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter with an aerodynamic diameter of 10 micrometers or less (PM10), and lead. Primary pollutants such as CO, NO2, SO2, and PM are emitted directly from the sources, where secondary pollutants, such as ozone, are pollutants that are formed in the atmosphere through a chemical reaction between gases. Ozone is formed in the atmosphere through a chemical reaction between oxides of nitrogen (NOx) and volatile organic compounds (VOCs) in the presence of sunlight under favorable meteorological conditions such as high temperatures and stagnation episodes. The NAAQS were amended in July 1997 to include an 8-hour standard for ozone and to adopt a NAAQS for fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less (PM2.5). The NAAQS were also amended in September 2006 to include an established methodology for calculating PM2.5 as well as revoking the annual PM10 threshold.

Table 2-1 shows the NAAQS currently in effect for each criteria pollutant. The Air Basin is an area designated as non-attainment as it does not currently meet NAAQS for certain pollutants regulated under the CAA.

TABLE 2-1
AMBIENT AIR QUALITY STANDARDS AND INYO COUNTY ATTAINMENT STATUS

Pollutant	Averaging Time	State Standard	Attainment Status for California Standard	Federal Primary Standard	Attainment Status for Federal Standard
Ozone	8 Hour	0.070 ppm	Non-Attainment	0.070 ppm	Attainment
	1 Hour	0.09 ppm		---	
Carbon Monoxide	8 Hour	9.0 ppm	Attainment	9 ppm	Attainment
	1 Hour	20 ppm		35 ppm	
Nitrogen Dioxide	Annual Average	0.030 ppm	Attainment	0.053 ppm	Attainment
	1 Hour	0.18 ppm		0.100 ppm	
Sulfur Dioxide	Annual Average	---	Attainment	0.030 ppm	Attainment
	24 Hour	0.04 ppm		0.14 ppm	
	1 Hour	0.25 ppm		0.075 ppm	
Respirable Particulate Matter (PM10)	Annual Arithmetic Mean	20 $\mu g/m^3$	Non-Attainment	---	Non-Attainment
	24 Hour	50 $\mu g/m^3$		150 $\mu g/m^3$	
Fine Particulate Matter (PM2.5)	Annual Arithmetic Mean	12 $\mu g/m^3$	Attainment	12.0 $\mu g/m^3$	Attainment
	24 Hour	---		35 $\mu g/m^3$	
Sulfates	24 Hour	25 $\mu g/m^3$	Attainment	---	---
Lead	Calendar Quarter	---	Attainment	1.5 $\mu g/m^3$	Attainment
	30-Day Average	1.5 $\mu g/m^3$		---	
	3-Month Rolling Average	---		0.15 $\mu g/m^3$	
Hydrogen Sulfide	1 Hour	0.03 ppm	Attainment	No Federal Standard	---
Vinyl Chloride	24 Hour	0.010 ppm	No information available	---	---
Visibility Reducing Particles	8 Hour	Extinction of 0.23/km; visibility of 10 miles or more	Unclassified	No Federal Standard	---

ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter

SOURCE: CARB 2016; CARB 2017.

The California Clean Air Act (CCAA), 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 apply to the same criteria pollutants as the CAA but also include state-identified criteria pollutants, which include sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride. The California Air Resources Board (CARB) has primary responsibility for ensuring the implementation of the CCAA,[1] responding to the CAA planning requirements applicable to the state, and regulating emissions from motor vehicles and consumer products within the state. Table 2-1 shows the CAAQS currently in effect for each of the criteria pollutants as well as the other pollutants recognized by the state. As shown in Table 2-1, the CAAQS include more stringent standards than the NAAQS for most of the criteria air pollutants. Currently CO, NO_2, SO_2, PM2.5 and Lead are in attainment for both CAAQS and NAAQS. However, ozone and PM10 are designated as non-attainment for CAAQS. PM10 is designated as non-attainment for NAAQS.

The Great Basin Unified Air Pollution Control District (GBUAPCD) maintains a network of air quality monitoring stations located throughout the Air Basin to measure ambient pollutant concentrations. The Bishop-line station, which is approximately 60 miles north of the proposed project site, is the monitoring station most representative of the proposed project site. This station monitors ozone, PM10, and PM2.5. There are no monitoring stations representative of the proposed project site that monitor for CO, NO_2, or SO_2. The pollutant ambient concentration data for 2015 to 2017 are summarized in **Table 2-2.** As shown, there were days that ozone, PM10, and PM2.5 exceeded the CAAQS and/or NAAQS standards.

Sensitive Receptors and Locations

Certain population groups, such as children, elderly, and acutely and chronically ill persons (especially those with cardio-respiratory diseases), are considered more sensitive to the potential effects of air pollution than others. Sensitive receptors are defined as any residence, including single-family homes, condominiums, apartments, and living quarters, schools, preschools, daycare centers, and health facilities such as hospitals or retirement and nursing homes. Sensitive receptors also include long-term care hospitals, hospices, prisons, and dormitories or similar live-in housing. The closest sensitive receptors appear to be scattered residences approximately 600 feet south of the South Haiwee Reservoir, 600 feet north of the North Haiwee Reservoir, greater than 3,000 feet west of the North Haiwee Reservoir, and 1,000 feet north of the Alabama Gates. All other air quality sensitive receptors are located at greater distances from the proposed project site.

[1] Chapter 1568 of the Statutes of 1988.

TABLE 2-2
AMBIENT AIR QUALITY DATA

Pollutant/Standard [a]	2015	2016	2017
O_3 (1-hour)			
Maximum Concentration (ppm)	0.076	0.070	0.077
Days > CAAQS (0.09 ppm)	0	0	0
O_3 (8-hour)			
Maximum Concentration (ppm)	0.070	0.066	0.072
4th High Concentration (ppm)	0.063	0.065	0.065
Days > CAAQS (0.070 ppm)	0	0	1
Days > NAAQS (0.070 ppm)	0	0	1
PM10 (24-hour)			
Maximum Concentration (µg/m^3)	289	74.9	215.7
Days > CAAQS (50 µg/m^3)	*	*	*
Days > NAAQS (150 µg/m^3)	1	0	2
PM10 (Annual Average)	16.3	16.5	18.5
Annual Arithmetic Mean (20 µg/m^3)	*	*	*
PM2.5 (24-hour)			
Maximum Concentration (µg/m^3)	97.1	19.8	21.0
4th High Concentration (µg/m^3)	31	14.4	16.4
Days > NAAQS (35 µg/m^3)	3	0	0
PM2.5 (Annual)	*	4	4.7
Annual Arithmetic Mean (CAAQS/NAAQS 12 µg/m^3)	*	*	*

[a] ppm = parts per million; µg/m^3 = micrograms per cubic meter; *Data not available

SOURCES: CARB; 2019

Thresholds of Significance

Pursuant to the State CEQA Guidelines (Section 15064.7), a lead agency may consider using, when available, the significance criteria established by the applicable air quality management district or air pollution control district when making determinations of significance. The GBUAPCD does not have adopted thresholds or methodologies for determining significance of projects within its jurisdiction. As such, it permits the Lead Agency to determine the appropriate methodology and thresholds by which to analyze projects. Because the South Coast Air Quality Management District's (SCAQMD's) thresholds are more conservative than those of the nearest Air Districts, the analysis itself is more conservative. As such, the SCAQMD's Guidance and thresholds will be used to determine the significance of this project. The potential air quality impacts of the proposed project are, therefore, evaluated according to the most recent thresholds adopted by the SCAQMD in connection with its CEQA Air Quality Handbook, Air Quality Analysis Guidance Handbook, and subsequent SCAQMD guidance as discussed previously.[2]

[2] While the SCAQMD CEQA Air Quality Handbook contains significance thresholds for lead, project construction and operation would not include sources of lead emissions and would not exceed the established thresholds for lead. Unleaded fuel and unleaded paints have virtually eliminated lead emissions from commercial and residential

Construction Emissions

The proposed project does not have construction-related activities.

Operational Emissions

As discussed above, the GBUAPCD does not have adopted thresholds or methodologies for determining significance of projects within its jurisdiction. The SCAQMD's thresholds are the more conservative than those of the nearest Air Districts and are thus used to determine significance of this project. The SCAQMD has established numerical emission indicators of significance for operations in part based on Section 182(e) of the Clean Air Act, which identifies 10 tons per year of VOC as a significance level for stationary source emissions in extreme non-attainment areas for ozone (SCAQMD 1993). As shown in Table 2-1 the Inyo County attainment status, which is part of the Great Basin Valley Air Basin, is designated as non-attainment for the state ozone standard and attainment for the federal ozone standard. Thus, since Inyo County has a lesser non-attainment designation than the South Coast Air Basin, the use of the SCAQMD significance level for the proposed project is conservative and health protective. The SCAQMD converted the 10 tons per year of VOC significance level to pounds per day for ozone precursor emissions (10 tons per year × 2,000 pounds per ton ÷ 365 days per year = 55 pounds per day). The numeric indicators for other pollutants are also based on federal stationary source significance levels. Based on the thresholds in the SCAQMD CEQA Air Quality Handbook, the proposed project would potentially cause or contribute to an exceedance of an ambient air quality standard if the following would occur:

- Regional operational emissions exceed any of the following SCAQMD prescribed daily regional emissions thresholds (SCAQMD 2015):
  - 55 pounds a day for VOC
  - 55 pounds per day for NOx
  - 550 pounds per day for CO
  - 150 pounds per day for SO2
  - 150 pounds per day for PM10
  - 55 pounds per day for PM2.5

In addition, the SCAQMD has developed a methodology to assess the potential for localized emissions to cause an exceedance of applicable ambient air quality standards. Impacts would be considered significant if the following were to occur:

- Maximum daily localized emissions of NOx and/or CO during operation are greater than the applicable localized significance thresholds, resulting in predicted ambient concentrations in the vicinity of the proposed project site greater than the most stringent ambient air quality standards for NO_2 and/or CO (SCAQMD 2015).

land use projects such as the proposed project. As a result, lead emissions are not further evaluated in this document.

- Maximum daily localized emissions of PM10 and/or PM2.5 during operation are greater than the applicable localized significance thresholds, resulting in predicted ambient concentrations in the vicinity of the proposed project site to exceed 2.5 µg/m^3 over 24 hours.

Carbon Monoxide Hotspots

With respect to the formation of CO hotspots, the proposed project would be considered significant if the following would occur within one-quarter mile of a sensitive receptor:

- The proposed project would cause or contribute to an exceedance of the CAAQS 1-hour or 8-hour CO standards of 20 or 9.0 parts per million (ppm), respectively.

Toxic Air Contaminants

Based on criteria set forth by the SCAQMD, the proposed project would expose sensitive receptors to substantial concentrations of toxic air contaminants if any of the following were to occur (SCAQMD 1993; SCAQMD 2015):

- The proposed project would emit carcinogenic materials or toxic air contaminants that exceed the maximum incremental cancer risk of ten in one million or a cancer burden greater than 0.5 excess cancer cases (in areas greater than or equal to one in one million) or an acute or chronic hazard index of 1.0.

Odors

With respect to odors, the proposed project would be considered significant if it created objectionable odors affecting a substantial number of people.

Air quality assumptions, emissions calculation, and emissions summaries used for this analysis can be found in **Appendix C**.

a) **Less than Significant.** The 2016 Owens Valley SIP was prepared to accommodate growth, reduce the levels of pollutants within the areas under the jurisdiction of GBUAPCD, return clean air to the region, and minimize the impact on the economy. Projects that are considered consistent with the SIP would not interfere with attainment because this growth is included in the projections used in the formulation of the SIP.

The proposed project site is located in Inyo County and is subject to the County General Plan. The proposed project is the application of copper sulfate to control algae and does not include housing or long-term employment. As such, the proposed project would not generate growth beyond the range of development anticipated within the regional forecast for Inyo County. The proposed project would not increase or induce residential density growth or employment.

As the proposed project would not induce a growth increase and regional emission would be less than regulatory thresholds (as detailed under b) below), the proposed project would not conflict with or obstruct implementation of the 2016 Owens Valley SIP, and impacts would be less than significant.

b) **Less than Significant.** The proposed project is in non-attainment for ozone (state) and PM10 (state and federal). Therefore, to determine if the proposed project would conflict with attainment of the 2016 Owens Valley SIP and have the potential to exceed NAAQS or CAAQS, operational emissions of VOC, NOx, and PM10 are compared to the SCAQMD's regulatory thresholds.

Operational criteria pollutant emissions were calculated for helicopter application, direct application, monitoring, and commuting. Results of the non-attainment criteria pollutant calculations are presented in **Table 2-3**. The analysis assumes 3 days of monitoring, 1 day of application, and assumes as a worst-case scenario that the commute to the site is daily and comes from Sylmar. Distances for chemicals and feeders are assumed to come from the furthest identified potential location. It is anticipated that a full 8 hours would be used for direct application, while application via aircraft would take approximately 30 minutes per application with a total of eight take-offs and landings lasting approximately 10 minutes each. As shown, the operational daily emissions for the non-attainment criteria and precursor pollutants (VOC, NOx, and PM10) would be below the SCAQMD thresholds of significance.

TABLE 2-3
MAXIMUM UNMITIGATED REGIONAL OPERATIONAL EMISSIONS (POUNDS PER DAY)[a]

Source	VOC	NOx	CO	SOx	PM10	PM2.5
Helicopter Application	1	9	13	2	-[b]	-[b]
Direct application	1	8	12	<1	<1	<1
Monitoring	4	21	18	5	1	1
Commuting	2	6	50	<1	1	<1
Maximum Daily Emissions	***8***	***43***	***93***	***6***	***2***	***1***
SCAQMD Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

[a] Totals may not add up exactly due to rounding in the modeling calculations. Combined rows account for overlapping emissions from the listed activities. Detailed emissions calculations are provided in Appendix C

[b] The Aviation Environmental Design Tool does not calculate particulate matter emissions for helicopters.

SOURCE: ESA 2019

Future operations would generate ozone precursors (i.e., VOCs and NOx), and PM10. As shown in Table 2-3 and discussed under Section 2.3 (c) below, the proposed project would not exceed the regional significance thresholds nor would it result in significant localized impacts. Therefore, emissions are not expected to result in ground-level concentrations that exceed the NAAQS or CAAQS. Based on SCAQMD methodology, for projects that do not exceed regulatory thresholds, the proposed project would not result in cumulative impacts. Since the proposed project is less than significant on a project level, the proposed project would not result in a cumulatively considerable net

increase for non-attainment pollutants or ozone precursors and would result in a less than significant impact for construction emissions.

c) **Less than Significant.**

Localized Emissions

As stated above, the nearest sensitive receptor is approximately 600 feet from the proposed project site. Emissions disperse with distance and their impacts on nearby receptors are minimized. Additionally, the proposed project would occur over several distinct areas and therefore any one receptor would be impacted by proposed project emission for only the amount of time the activities occurred near that receptor. Because of the minimal emissions (see Table 2-3) from operational activities and the distance from the proposed project site to the nearest receptors, localized impacts from operation would be less than significant.

The SCAQMD's Localized Significance Threshold (LST) Methodology (June 2003, revised July 2008) (SCAQMD 2008) uses screening criteria to determine if a project has the potential to result in a localized impact. Localized impacts are only concerned with emissions occurring on-site; the proposed project includes mainly on-site emissions with only commute trips accounting for off-site emissions. To further show that the proposed project emissions would not result in localized impacts, they are compared against the SCAQMD's most restrictive emissions limits associated with a 1-acre site and at a distance of 100 meters (328 feet) from the proposed project site. As shown in **Table 2-4**, proposed project's emissions would be below these highly conservative emissions limits.

TABLE 2-4
MAXIMUM UNMITIGATED LOCALIZED EMISSIONS (POUNDS PER DAY)

Source	NOx	CO	PM10	PM2.5
Operational				
Maximum Daily Emissions	38	43	1	1
Screening Thresholds	54	632	6	2
Exceed Threshold?	No	No	No	No

Source: ESA 2019

Based on distance from on-site activities to nearby receptors, dispersion associated with distance and the comparison to the most conservative SCAQMD LST screening criteria, the proposed project's emissions would not expose receptors to substantial pollutant concentrations during construction. Therefore, project-related localized emissions would result in a less than significant impact.

Carbon Monoxide Hotspots

The potential for the proposed project to cause or contribute to CO hotspots is evaluated based on vehicle traffic through localized intersections. The proposed project would result in limited operational trips, up to 36 per day during peak activity times. This peak activity could occur up to five times per year, with traffic from the application of copper sulfate occurring up to 15 days per year, including monitoring, which would occur just before and just after application. This results in minimal impacts to local intersections even assuming all vehicle travel would occur at peak hours and all would pass through the same intersections. SCAQMD methodology compares project intersections (both intersection geometry and traffic volumes) with prior studies conducted by SCAQMD in support of their Air Quality Management Plans (AQMPs) and considering existing background CO concentrations. This comparison demonstrates that the proposed project would not cause or contribute considerably to the formation of CO hotspots where daily vehicles through any one intersection are less than 100,000 vehicles per day. Given the remote location of the proposed project (east of Lone Pine, California) and the minimal amount of operational traffic (36 round trips) through a single intersection, CO concentrations at proposed-project-impacted intersections would remain well below the ambient air quality standards, and no further CO analysis is warranted or required.

Toxic Air Contaminants

Operation of the proposed project would result in short-term emissions of diesel PM, a known toxic air contaminant. Diesel PM poses a carcinogenic health risk that is measured using an exposure period of 70 years. However, it is anticipated that the majority of the vehicles would be gasoline operated, with the exception of the trucks for hauling the copper sulfate, which would occur up to five times annually. According to the guidance for air toxics hot spots by the Office of Environmental Health Hazards Association (OEHHA), because of the uncertainty in assessing cancer risk from very-short-term exposures, they do not recommend assessing cancer risks for projects lasting less than 2 months (OEHHA 2015). The operation of the proposed project would last, at most, 15 days per year (this assumes 3 days per application and a maximum of five applications per year). As the activities would be sporadic, would not require the disturbance of more than 1 acre of ground, and would not occur for more than 2 months within 1 year, a quantitative health risk assessment is not warranted, and risk to sensitive receptors would be minimal. Impacts are less than significant.

d) **Less than Significant.** The proposed project is in attainment/maintenance for CO, SOx and PM2.5: however, the SCAQMD has thresholds of significance for these criteria pollutants to ensure that regional emissions remain below ambient air quality standards. Therefore, to determine if the proposed project would result in emissions that would adversely affect a substantial number of people, construction and operational emissions of CO, SOx and PM2.5 are compared to the appropriate SCAQMD's regulatory thresholds.

Table 2-3 identifies emissions of CO, SOx and PM2.5 associated with the operation of the proposed project. The analysis evaluated emissions from helicopter application, direct

application, monitoring, and commuting. As shown, operational-related daily emissions for these criteria pollutants would be below SCAQMD significance thresholds.

As emissions of criteria pollutants of concern that are in attainment or maintenance within the Air Basin do not exceed regional emissions thresholds, the proposed project would not result in emissions that would greatly affect a substantial number of people. Therefore, impacts from the proposed project would be less than significant.

Land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed project does not include any uses identified as being associated with substantial odors. Odors associated with proposed project operations would be limited to the operation of vehicles to apply the copper sulfate and monitor the application. As a result, the proposed project is not expected to discharge contaminants into the air in quantities that would cause a nuisance, injury, or annoyance to the public or property. Therefore, the proposed project would not create adverse odors affecting a substantial number of people and impacts would be less than significant.

References

California Air Resources Board (CARB). 2019. *Top 4 Summary*. Available: https://www.arb.ca.gov/adam/topfour/topfour1.php. Accessed January 2019.

CARB. 2017. Area Designations Maps/ State and National. https://www.arb.ca.gov/desig/adm/adm.htm. Accessed January 2019.

CARB. 2016. Ambient Air Quality Standards. Available: https://www.arb.ca.gov/desig/desig.htm. Accessed January 2019.

Office of Environmental Health Hazard Assessment (OEHHA). 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February.

South Coast Air Quality Management District, CEQA Air Quality Handbook (1993)

South Coast Air Quality Management District, Final Localized Significance Threshold Methodology, (2008). Available: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed December 2018.

South Coast Air Quality Management District, SCAQMD Air Quality Significance Thresholds, (March 2015), http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed December 2018.

United States Environmental Protection Agency, California Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants, https://www3.epa.gov/airquality/greenbook/anayo_ca.html. Accessed January 2019.

2.4 Biological Resources

Issues (and Supporting Information Sources):		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
IV.	**BIOLOGICAL RESOURCES — Would the project:**				
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?	☐	☐	☐	☒
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?	☐	☐	☐	☒

Discussion

This section is based entirely on the analysis included in the *Copper Sulfate Treatment Project – Biological Resources Technical Report*, attached to this report as **Appendix D** (ESA 2018).

Report Methodology

Literature Review

A review of biological resources and environmental setting data applicable to the proposed project was conducted by ESA and included, but was not limited to the following:

- California Department of Fish and Wildlife (CDFW) California Natural Diversity Data Base (CNDDB) records search of Owens Valley, Rose Valley, and the surrounding foothills (CDFW 2018a). The CNPS search area included the project area (Haiwee Reservoirs and Union Wash) and the 16 adjacent United States Geological Survey (USGS) quadrangles (CNPS 2018). (CDFW 2018a).
- California Native Plant Society (CNPS) *Inventory of Rare and Endangered Vascular Plants of California* rare plant records search of the USGS 7.5-minute quadrangles that include the project area (Haiwee Reservoirs and Union Wash) and the 16 adjacent USGS quadrangles (CNPS 2018).

Biological Resource Reconnaissance

A biological resources field reconnaissance was conducted to identify vegetation communities and habitats present within and adjacent to the proposed project area and to assess the occurrence potential for special-status species. The reconnaissance was conducted by ESA biologist Julie Stout at the North and South Haiwee Reservoirs, Merritt Cut, and Alabama Gates on December 7, 2018.

The reconnaissance was conducted by driving the LADWP access road along the west-side of the reservoirs and visiting aqueduct infrastructure locations where previous treatments have occurred along the aqueduct, including at Merritt Cut and Alabama Gates. During the reconnaissance, the biologist ground-checked the aerial imagery-based mapping of vegetation communities and cover types and reviewed the proposed project area for special-status species' habitats and occurrence potential.

a) **Less than Significant with Mitigation.**

Special-Status Plants

Aquatic plants describe free floating, submerged, and emergent plants that require standing water; shoreline plants describe plants that occur in wetland, riparian, shoreline, and playa habitats that do not require persistent standing water; and upland plants describe plants that occur in habitats lacking a high water table, periodic flooding, or inundation. Potential impacts to special-status plant are analyzed below.

Aquatic Plants

Copper sulfate would be applied directly to aquatic habitat within the proposed project area. There are no aquatic special-status plant species with potential to occur in the aquatic habitats of the proposed project area. No impact would occur.

Shoreline Plants

Special-status species with the potential to occur within wetlands, mesic sites, alkaline pools and plays, and sandy shorelines along the reservoir margins and aqueduct outflow locations include the Inyo County star-tulip, short-pedicelled cleomella, Parish's popcornflower, Owen's Valley checkerbloom, foxtail thelypodium, Bailey's greasewood, and Mojave tarplant. While not exclusively wetland species, these plants are tied to locations with periodic inundation.

The use of copper sulfate would be limited to aquatic environments and affected vegetation generally includes algae and submerged and floating broadleaf plants (DiTomaso 2012). The United States Environmental Protection Agency (USEPA) ascertains that their assessment of the ecological effects of copper sulfate "does not indicate a risk of concern to freshwater vascular plants or estuarine/marine plants" (USEPA 2008).

Only plant tissues present in water would potentially come in contact with copper sulfate. The special-status plant species with potential to occur in shoreline areas are more likely

to occur in areas with saturated soils but no standing water, based on the habitat preferences of these species. These areas would generally be outside of the areas where applications would be targeted. Copper sulfate is not likely to be taken up through roots in soil substrate. Copper is generally considered to be biologically inactive in sediments (Gettys et al. 2009) because it becomes strongly adsorbed to the soil (DiTomaso et al. 2013). Therefore, even in inundated areas, plants rooted in soil are unlikely to take up toxic levels of copper via the root system.

Wetland and shoreline special-status plant species, if present, are unlikely to be negatively affected by the application of copper sulfate because the majority of the above-ground tissue is typically present outside of the water column and limited plant tissue would come in contact with copper sulfate resulting in limited exposure. Non-aquatic plant species growing along the reservoir margins are unlikely to be exposed to enough copper sulfate to result in toxicity. As a result, potential impacts to special-status shoreline plants potentially occurring in shoreline areas would be less than significant.

Upland Plants

Copper sulfate would be applied to the reservoirs by aircraft with all loading, unloading, take-off, and landing activities located in previously developed or disturbed areas. Additionally, all ground-based applications would use existing maintained access roads. No copper sulfate would be dispersed directly within upland habitat areas where special-status plants could be present. Potential impacts to special-status plants that may occur in upland areas would be less than significant.

To further reduce the potential for impacts to upland plant species resulting from accidental drift outside of intended application areas, copper sulfate applications would not be conducted by helicopter if continuous wind velocity exceeds 10 miles per hour.

Special-Status Wildlife

Aquatic Wildlife

Impacts to aquatic wildlife could occur through immediate exposure and toxicity, long-term exposure and bioaccumulation, and post-application decreases in dissolved oxygen (DO). Studies have shown that the application of copper sulfate to surface waters for nuisance algae control in reservoirs has no apparent negative effects for most adult game fish (Anderson et al. 2001). However, copper sulfate has been shown to be toxic to larval fish and aquatic invertebrates (Diamond et al. 1997; TOXNET 1975-1986). CDFW laboratory tests have shown that concentrations of 1,000 parts per billion (ppb) are many times below the toxicity values for delta smelt (California Department of Boating and Waterways [DBW] 2001). Salmonids tend to be more sensitive to copper sulfate than other fish species, but tests for rainbow trout have also shown toxicity values many times higher than the application concentrations that would occur with this proposed project (DBW 2001). Copper concentrations would be applied according to the manufacturer's label to achieve a maximum concentration of 1,000 ppb, well below any known concentrations that may be toxic to fish in the proposed project area. However, this refers

to the concentration of copper suspended in the water column and does not account for direct interactions with copper-laden sediments and algae.

While not associated with direct copper toxicity, aquatic herbicides, including copper sulfate, have the potential to result in temporary decreases in DO concentrations in water if large blooms of algae are treated at one time or through frequent treatments that occur over a relatively short duration. Low DO concentrations (below 5 to 6 mg/L) can occur when the decomposition of organic matter (dead algal matter) results in high biological oxygen demand. Sudden increases in biological oxygen demand and associated decreases in DO (below 5 to 6 mg/L for warm-water fish and below 6 to 8 mg/L for cold-water fish) can result in conditions that are unsuitable for fish and lead to fish kills (SWRCB 2004). Substantial decreases in DO are not expected to result from copper sulfate applications because LADWP will follow the procedures outlined in the APAP, including best management practices. The water quality monitoring program includes DO measurements to verify that DO concentrations remain at acceptable levels.

Based on a review of copper concentration toxicities to fish and other aquatic species, the concentrations of copper that would be achieved with applications of copper, and bioavailability of copper in reservoir sediments, impacts resulting from copper sulfate exposure would be less than significant. In addition, no aquatic special-status wildlife species are known or expected to occur within the proposed project area; therefore, no impact would occur.

Shoreline Wildlife

The following special-status shoreline wildlife species have potential to occur in the proposed project area or vicinity: long-eared owl, western snowy plover, northern harrier, bald eagle, yellow-breasted chat, least bittern, southwestern willow flycatcher, least Bell's vireo, and Owen's Valley vole. Shoreline wildlife species are not likely to come in direct contact with applications because they do not directly inhabit aquatic habitats. Shoreline species that inhabit riparian and wetland areas and forage predominantly on non-aquatic prey are not expected to be subject to significant copper sulfate exposure.

However, shoreline species that consume aquatic prey, including the bald eagle and least bittern, may be exposed to copper sulfates. Impacts to shoreline wildlife that feed directly on aquatic prey species could occur through bioaccumulation and immediate exposure and toxicity through consumption of contaminated prey species. These potential exposure alternatives are described below.

Immediate Exposure and Toxicity

Wildlife species that utilize aquatic habitats for foraging could be exposed to copper sulfate if they consume prey species that are present in the application areas during periods when applications are taking place or if they consume prey species that interact with the water or sediments following applications.

Copper sulfate exposure poses less of a threat to birds than to other animals, with the lowest lethal dose for this material in pigeons and ducks being 1,000 parts per million (ppm) (Tucker and Crabtree 1970). This toxicity value is many times higher than the target application concentrations that would occur for this proposed project. However, if copper sulfate applications inadvertently exceed target concentrations, immediate exposure and toxicity could occur, resulting in potentially significant impacts to shoreline wildlife species.

Because the potential for special-status species' exposure to copper sulfate applications is low and because targeted application concentrations of copper sulfate are substantially lower than toxicity thresholds for special-status wildlife, with implementation of Mitigation Measures BIO-1 and BIO-2, impacts associated with immediate exposure and toxicity would be less than significant.

Long-term Exposure and Bioaccumulation

Although copper sulfate is highly water soluble; that is, it dissolves very easily in water, the copper ions are strongly adsorbed by soil (lake-bottom sediment) particles following applications (TOXNET 1975-1986). Copper compounds, or precipitates, also settle out of solution in a process called precipitation. Copper that is adsorbed by sediments and copper precipitates are biologically inactive, meaning that they do not undergo further biological changes (Gangstad 1986). Additionally, copper that is not in a soluble form (i.e., adsorbed by sediment or copper precipitate) is less available for uptake into the food web and less toxic (Moffett et al. 1998). Because copper sulfate applications are expected to be rapidly adsorbed by sediments (TOXNET 1975-1986) and/or form precipitates and fall out of solution, and these forms are much less bio-available, and toxic impacts associated with long-term exposure and bioaccumulation of copper would be less than significant.

Upland Wildlife

As discussed above for special-status plants, copper sulfate would not be applied to uplands; therefore, copper sulfate applications are not anticipated to affect upland special-status wildlife species. However, activities associated with applications would occur adjacent to upland habitat and have the potential to result in potentially significant impacts to upland special-status species. Vehicles traveling on access roads could result in mortalities to special-status species, such as the desert tortoise and Mohave ground squirrel, during copper sulfate applications. With implementation of Mitigation Measure BIO-4, impacts to upland special-status species would be less than significant.

Application activities have the potential to disturb nesting special-status birds in adjacent native habitats, including loggerhead shrikes, burrowing owls, and Le Conte's thrashers. Implementation of Mitigation Measure BIO-5 would reduce potential impacts to nesting birds to less than significant levels.

Mitigation Measures

BIO-1: If levels of copper sulfate measured during monitoring conducted under the APAP exceed those recommended in manufacturer application guidelines, remedial measures shall be implemented, such as the addition of coagulant additives and a refinement of application procedures.

BIO-2: In addition to monitoring activities specified under the APAP, monitoring shall include visual fish and wildlife monitoring during and up to at least 7 days after applications. If distressed wildlife is observed during monitoring with the cause of distress potentially associated with the copper sulfate applications, application procedures would be refined in order to avoid any potential harm. If deceased wildlife is detected during or after applications with an unknown cause of death, necropsies would be conducted to determine the cause of death.

BIO-3: All vehicles associated with copper sulfate applications and monitoring shall travel at posted speed limits or at speeds of 15 miles per hour or less on unpaved access roads where no speed limit is posted. Vehicles associated with the proposed project shall remain on existing roads at all times.

BIO-4: When vehicles are parked along dirt access roads for more than 5 minutes, the vehicle operator shall inspect beneath the tires for wildlife prior operating the vehicle to ensure that wildlife are not in harm's way.

BIO-5: All ground activities shall remain on access roads and in established work areas. If ground activities will occur in undisturbed areas that provide habitat for nesting birds, a qualified biologist shall conduct a bird nest survey within in areas that will be disturbed no more than 3 days prior to those activities occurring. If active nests are found, buffers and/or nest monitoring shall be implemented around each nest based on the species, location of the nest, and type of activity occurring, as determined by a qualified biologist.

b) **Less than Significant.** Potential sensitive natural communities present in the proposed project vicinity include Black Willow Thickets, Fourwing Saltbush Scrub, Fremont Cottonwood Forest, Hardstem Bulrush Marsh, Joshua Tree Woodland, Rubber Rabbitbrush Scrub, Shadscale Scrub, and Spiny Menodora Scrub. Because copper sulfates and associated activities would avoid upland natural communities, no impact would occur to upland sensitive natural communities, including Fourwing Saltbush Scrub, Joshua Tree Woodland, Rubber Rabbitbrush Scrub, Shadscale Scrub, and Spiny Menodora Scrub. However, wetland and riparian sensitive natural communities, including Black Willow Thickets, Fremont Cottonwood Forest, and Hardstem Bulrush Marsh may experience minor exposure to copper sulfates where they are exposed to water from the reservoirs.

While not expected to result in direct wetland or riparian plant mortality, copper sulfates reaching riparian and wetland habitats have the potential to disrupt certain ecological processes within those habitats and reduce the overall ecological health of the community, leaving some plants more susceptible to disease. Because copper sulfates are

toxic to bacteria and fungi, it is expected that they could result in negative impacts to mycorrhizae. Mycorrhiza is a fungus that has a symbiotic association with a vascular host plant, assisting the host plant with nutrient exchanges, disease resistance, drought tolerance, and salinity resistance (Zeng 2006; Porcel et al. 2012). However, because of the limited amount of copper sulfate exposure that these communities would experience, these impacts would be less than significant.

c) **No Impact.** The North and South Haiwee Reservoirs contain wetland features that may be considered jurisdictional by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act, the RWQCB under Section 401 of the Clean Water Act, and CDFW under California Fish and Game Code (including riparian habitat, and/or other vegetation communities considered sensitive by CDFW). Additionally, Alabama Gates includes an outfall draining directly into wetlands along the Owen's River floodplain. No loss of wetland features that may be considered jurisdictional by the USACE, RWQCB, or CDFW, nor the loss of riparian habitat or other communities considered sensitive by CDFW, would occur as a result of the proposed project. The proposed project does not propose to remove, fill, or alter the existing wetland or riparian features within any of the water bodies. In addition, no water releases to adjacent wetland or riparian areas outside of the closed aqueduct system would occur during or immediately after copper sulfate applications. Therefore, no impact would occur.

d) **Less than Significant with Mitigation.** The proposed project area is not expected to function as a significant movement corridor for terrestrial species because the aqueduct and reservoirs impede terrestrial wildlife movement. Because the reservoirs and aqueduct are part of a largely isolated water supply system with only fixed intake locations and outlets, these features are not expected to provide habitat connectivity for aquatic species.

The reservoir's open water habitat provides important habitat for migrating shorebirds and waterfowl along the Eastern Sierra route of the greater Pacific Flyway. Small patches of wetland and riparian habitat surrounding the reservoirs may also provide important stopover habitat for migrating bird species; however, as described above, these habitats would not be impacted. Additionally, during aerial applications, migrating waterfowl or other avian species utilizing the water bodies would be able to use other areas of the reservoirs located away from the noise of the aircraft. Therefore, impacts to wildlife movement corridors would be less than significant.

The proposed project area may provide wildlife nursery habitat in nearby potential roost structures and trees for bat maternity colonies; however, the aerial applications would not target shoreline areas, and the proposed project would not disturb structures or trees along the reservoir shorelines; therefore, impacts to bat maternity colonies are not expected to occur.

The proposed project area may provide wildlife nursery habitat in the form of shallow waters for fish and amphibian maturation. Potential impacts to fish and aquatic wildlife nursery sites could result from direct toxicity and post-application decreases in DO.

Studies have shown that the application of copper sulfate to surface waters for nuisance algae control in reservoirs have no apparent negative effects for most adult game fish (Anderson et al. 2001). However, copper sulfate has been shown to be toxic to larval fish and aquatic invertebrates (Diamond et al. 1997; TOXNET 1975-1986). CDFW laboratory tests have shown that concentrations of 1,000 ppb are many times below the toxicity values for delta smelt (DBW 2001). Salmonids tend to be more sensitive to copper sulfate than other fish species, but tests for rainbow trout have also shown toxicity values many times higher than the application concentrations that would occur with this proposed project (DBW 2001). Copper concentrations would be applied according to the label to achieve a maximum concentration of 1,000 ppb, well below any known concentrations that may be toxic to fish in the proposed project area. However, this refers to the concentration of copper suspended in the water column and does not account for direct interactions with copper-laden sediments and algae.

While not associated with direct copper toxicity, aquatic herbicides, including copper sulfate, have the potential to result in temporary decreases in DO concentrations in water if large blooms of algae are treated at one time or through frequent treatments that occur over a relatively short duration. Low DO concentrations (< 5 to 6 mg/L) can occur when the decomposition of organic matter (dead algal matter) results in high biological oxygen demand. Sudden increases in biological oxygen demand and associated decreases in DO (below 5 to 6 mg/L for warm-water fish and below 6 to 8 mg/L for cold-water fish) can result in conditions that are unsuitable for fish and lead to fish kills (SWRCB 2004). Substantial decreases in DO are not expected to result from copper sulfate applications because LADWP has developed an APAP describing their copper sulfate applications, including best management practices, and water quality monitoring programs.

Based on this review of copper concentration toxicities to fish, the concentrations of copper that would be achieved with applications of copper, and bioavailability of copper in reservoir sediments, significant impacts to aquatic nursery sites are not expected to result from copper sulfate exposure. Additionally, the proposed project area does not provide uniquely valuable nursery habitat for these species, and habitat provided by the reservoirs is artificial with fish species introduced for recreational purposes. Therefore, impacts would be less than significant. Implementation of Mitigation Measure BIO-2 would further reduce the potential for impacts to aquatic wildlife nursery sites.

e) **No Impact.** The proposed project would not conflict with the Inyo County General Plan because the goal and policies of this plan are not applicable to the activities occurring under the proposed project. No impact would occur.

f) **No Impact.** No adopted Natural Community Conservation Plan, Habitat Conservation Plan, or other conservation plans occur within the proposed project area; therefore, the proposed project would not conflict with any provisions of such adopted plans or other approved local, regional, or state habitat conservation plan. No impact would occur.

References

Anderson, M. A., M. S. Giusti and W. D. Taylor. 2001. Hepatic Copper Concentrations and Condition Factors of Largemouth Bass (*Micropterus salmoides*) and Common Carp (*Cyprinus carpio*) from Copper Sulfate-Treated and Untreated Reservoirs. *Lake and Reserv. Manage*. 17(2): 97-104.

California Department of Boating and Waterways (DBW). 2001. *Final Environmental Impact Report for the* Egeria densa *Control Program*. Sacramento, CA.

California Native Plant Society (CNPS). 2018. Inventory of Rare and Endangered Plants (online edition, v8-03 0.39). California Native Plant Society. Sacramento, CA. Accessed in October 2018 at http://www.rareplants.cnps.org.

California Department of Fish and Wildlife (CDFW) 2018a. California Natural Diversity Database (CNDDB). BIOs Selection. Accessed in October 2018.

_____. 2018b. California Natural Community List. October 15. Accessed at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153609

California Native Plant Society (CNPS). 2018a. Inventory of Rare and Endangered Plants (online edition, v8-03 0.39). California Native Plant Society. Sacramento, CA. Accessed in October 2018 at http://www.rareplants.cnps.org.

Danskin, W.R., 1998. *Evaluation of the hydrologic system and selected water-management alternatives in the Owens Valley, California: U.S. Geological Survey Water-Supply Paper 2370-H, 175 p.* http://ca.water.usgs.gov/owens/report/reporthome.html

Diamond, J.M., C. Gerardi, E. Leppo, and T. Miorelli. 1997. Using a Water-Effect Ratio Approach to Establish Effects of an Effluent-Influenced Stream on Copper Toxicity to the Fathead Minnow. *Environmental Toxicology and Chemistry*, Vol.16, No. 7, pp. 1480-1486, 1997.

DiTomaso, J.M. 2012. *Mode of Action and Degradation of Aquatic Herbicides. Presentation. Aquatic Weed School.* Weed Research and Information Center, University of California, Davis. September 5-6, 2012.

DiTomaso, J.M., G.B. Kyser et al. 2013. *Weed Control in Natural Areas in the Western United States*. Weed Research and Information Center, University of California. 544pp.

Environmental Science Associates (ESA). 2018. *Copper Sulfate Treatment Project – Biological Resources Technical Report*.

Gangstad, E. O. 1986. *Freshwater vegetatigettyson management.* Fresno, CA: Thomson Publications.

Gettys, L.A, W.T. Haller, and M. Bellaud, editors. 2009. *Biology and Control of Aquatic Plants: A Best Management Practices Handbook.* Aquatic Ecosystem Restoration Foundation, Marietta, Georgia, USA.

Inyo County. 2001. Inyo County General Plan, Goals and Policies Report, Chapter 8 Conservation/Open Space Element. December. Accessed at: http://inyoplanning.org/general_plan/goals/ch8.pdf, accessed November 4, 2015.

Leitner, Barbara M., Philip Leitner. 2017. *Diet of the Mohave Ground Squirrel (Xerospermophilus mohavensis) in Relation to Season and Rainfall: Western North America Naturalist 77(1), 2017, pp. 1-13.*

Los Angeles Department of Water and Power (LADWP). 2015. Habitat Conservation Plan for Los Angeles Department of Water and Power's Operations, Maintenance, and Management Activities on Its Land in Mono and Inyo Counties, California. August. Accessed at https://www.fws.gov/carlsbad/HCPs/HCP_Docs.html

_____. 2018. *Aquatic Pesticides Application Plan (APAP)*. Order No. 2013-0002-DWQ NPDES No. CAG990005 Statewide General National Discharge Pollutant Discharge Elimination System (NPDES) Permit for Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications. August 6. City of Los Angeles, Environmental Affairs, Wastewater Quality and Compliance Group, Los Angeles, CA. August 6.

Moffett, J., P. Paquin, and L. Mayer. 1998. Copper Bioavailability, In: *Chemistry, Toxicity, and Bioavailability of Copper and Its Relationship to Regulation in the Marine Environment.* P. F. Seligman and A. Zirino, Editors. Technical Document 304. Office of Naval Research Workshop Report.

Nafis, G. 2018. A Guide to the Amphibians and Reptiles of California. Accessed at http://www.californiaherps.com/ in October 2018.

Porcel R, Aroca, R, Ruiz-Lozano J.M. 2012. "Salinity stress alleviation using arbuscular mycorrhizal fungi. A review" Agronomy for Sustainable Development 32: 181-200

Santos, N.R., J.V.E Katz, PB Moyle, and J.D. Viers. 2018. A programmable information system for management and analysis of aquatic species range data in California. Accessed at http://calfish.ucdavis.edu/location/ in October 2018.

Sawyer, J.O. and T. Keeler-Wolf. 2009. *A Manual of California Vegetation, 2nd Edition.* California Native Plant Society. United Sates of America.

Tucker, R. and D.G. Crabtree. 1970. Handbook of Toxicity of Pesticides to Wildlife. U.S. Department of Agriculture, Fish and Wildlife Service. Bureau of Sport Fisheries and Wildlife.

Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. Life history accounts for species in the California Wildlife Habitat Relationships System. California Depart. of Fish and Game, Sacramento, California.

Zeng, R.S. 2006. Disease Resistance in Plants Through Mycorrhizal Fungi Induced Allelochemicals. Allelochemicals: Biological Control of Plant Pathogens and Diseases. Disease Management of Fruits and Vegetables, vol 2. Springer, Dordrecht

2.5 Cultural Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
V. CULTURAL RESOURCES — Would the project:				
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 pursuant to §15064.5?	☐	☐	☐	☒
c) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒

Discussion

a,b,c) **No Impact.** There are no listed California Historical Resources at any of the potential project sites per the California State Parks Office of Historical Preservation (CSPOHP 2018). The proposed project would include the operational activities related to the application of copper sulfate into existing facilities owned and operated by LADWP. The proposed project would not require ground disturbance or construction activities. As such, no impact would occur to historical or archaeological resources nor would it adversely impact any existing human remains that might be within the proposed project area as a result of the implementation of the proposed project. No impact would occur.

References

California State Parks Office of Historic Preservation (CSPOHP). 2018. Listed California Historical Resources, Inyo County. Available online at: http://ohp.parks.ca.gov/ListedResources/?view=county&criteria=14. Accessed on October 19, 2018.

2.6 Energy

Issues (and Supporting Information Sources):		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
VI.	**ENERGY — Would the project:**				
a)	Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b)	Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

Discussion

Energy associated with the proposed project would be limited to transportation energy, and the potential for a minimal usage of electricity to run the hopper for a day at the Alabama Gates or Merritt Cut. However, it is most likely that a portable generator or the truck transporting the hopper would be used to power the hopper during the direct application of copper sulfate. There would be no natural gas consumption for the proposed project; therefore, natural gas is not discussed. The proposed project is an operational only project and therefore construction is not addressed.

a) **Less than Significant.** The proposed project does not include construction activities and therefore there are no construction impacts related to energy. The proposed project's limited operational energy impacts are discussed below.

Electricity

In the event electrical power would be consumed, the consumption would last a up to 8 hours on up to five potential annual applications. Electricity would be used to power an 18-horsepower hopper that would distribute copper sulfate to the surface of the water at the Alabama Gates or Merritt Cut. The demand would be supplied from existing electrical facilities adjacent to the proposed project site. Overall, activities would require minimal electricity consumption and would not be expected to have any adverse impact on available electricity supplies and infrastructure. Therefore, impacts on electricity supply and infrastructure associated with the proposed project's short-term activities would be less than significant.

Transportation Energy

The estimated fuel usage for the proposed project is based on the number and type of equipment and vehicles that would be used, hour usage estimates, the total duration of application activities, and hourly equipment fuel consumption factors. A summary of the annual fuel consumption during application activities is provided in **Table 2-5**. As shown in Table 2-5, one application would consume an estimated annual maximum of 128 gallons of diesel fuel, 824 gallons of gasoline, and 236 gallons of aviation fuel.

TABLE 2-5
PROJECT FUEL USAGE

Source	Gallons of Diesel	Gallons of Gasoline	Gallons of Aviation Fuel
Helicopter	-	-	236
Direct	128	76	-
Monitoring (including boat activity)	-	110	-
Commute	-	638	-
Usage per application	**128**	**824**	**236**
Max Annual (5 applications)	**642**	**4,120**	**1,178**
% State Usage	**<0.001%**	**<0.001%**	**0.002%**

Source: ESA 2019 (See Appendix C)

Compliance with the anti-idling regulation (discussed in Section 2.8) would reduce the proposed project's annual average diesel fuel usage.

Based on the available data, operational activities would use energy for necessary activities and to transport materials and people to and from the proposed project site as well as apply the copper sulfate. As mentioned above, idling restrictions would result in less fuel combustion and energy consumption and thus minimize the proposed project's energy use. Additionally, the proposed project's transportation fuel consumption would be minimal as compared to overall state consumption. Therefore, the proposed project would not result in the wasteful, inefficient, or unnecessary consumption of energy. The proposed project would result in a less than significant impact.

b) **Less than Significant.**

Electricity

The proposed project would not result in the construction of any new buildings or facilities that would require energy use. However, the proposed project may result in a limited consumption of electricity during the few days a year the proposed project would operate. Electricity would be obtained from existing infrastructure at the Alabama Gates or Merritt Cut. Overall, if electricity is consumed it would be negligible and would not require any new infrastructure. Additionally, the proposed project would not conflict with or obstruct the local utility provider from meeting applicable local or statewide renewable energy targets, including the targets required in the California Renewables Portfolio Standard, as updated in September 2018 pursuant to Senate Bill (SB) 100 (refer to the Greenhouse Gas section below for additional information regarding SB 100). Therefore, the proposed project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency and impacts would be less than significant.

Transportation Energy

The proposed project would not result in a permanent growth in vehicle trips and would result in a maximum of 36 trips per day for up to 15 days per year. The vehicles used to access the site would comply with applicable Corporate Average Fuel Economy standards, the Pavley vehicle tailpipe emissions standards, and would use fuel that meets the Low Carbon Fuel Standards, all of which are designed to achieve more efficient use of transportation fuels and reduced emissions. Additionally, as there is no permanent growth in vehicle trips and the proposed project would generate a minimal number trips, the proposed project would not conflict with the Regional Transportation Plan (RTP) or contribute to congestion and therefore would not conflict with local plans for energy efficiency (refer to the Transportation section below for additional information regarding the 2015 Inyo County Regional Transportation Program and congestion impacts). Impacts are considered less than significant.

References

California Department of Tax and Fee Administration. 2018. Fuel Taxes and Statistics & Reports. Available: https://www.cdtfa.ca.gov/taxes-and-fees/spftrpts.htm. Accessed February 2019.

California Department of Transportation. 2018 Aviation in California Fact Sheet. Available: http://dot.ca.gov/hq/planning/aeronaut/documents/AeroFactSheet.pdf. Accessed February 2019.

California Energy Commission. 2018. California Retail Fuel Outlet Annual Reporting (CEC-A15) Results. Available: http://listserver.energy.ca.gov/almanac/transportation_data/gasoline/piira_retail_survey.html. Accessed February, 2019.

2.7 Geology and Soils

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
VII. GEOLOGY AND SOILS — Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) 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.)	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☐	☒
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒
c) 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?	☐	☐	☐	☒
d) 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?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒

Discussion

a.i-iv) **No Impact.** The Alabama Gates application site would be located along the fault zone of the Owens Valley Fault that runs through the city of Lone Pine (DOC 2018a). Alabama Gates can be viewed in proximity to the Owens Valley Fault in the Union Wash Quadrangle (DOC 2018b). However, the proposed project does not include any new construction, new structures, or ground disturbance. The proposed project would include operational activities associated with the application of copper sulfate along existing water infrastructure facilities owned and operated by LADWP. Operational activities would occur up to five times per year. The proposed project would not cause adverse effects including the risk of loss, injury, or death involving rupture of an earthquake fault, strong seismic ground shaking, seismic-related ground failure, or landslides. No impact would occur.

b,c,d,e) **No Impact.** The proposed project consists of the application of copper sulfate to various locations along the Los Angeles Aqueduct. Operational activities would not require ground disturbance or the construction of new facilities. As such, the proposed project would not impact soils within the proposed project area and would not result in on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse. The proposed project would not have any effect on expansive soil and would not require new septic or wastewater systems. Workers would use existing facilities. No impact would occur.

f) **No Impact.** The proposed project would include the operational activities related to the application of copper sulfate into existing facilities owned and operated by LADWP. The proposed project would not require ground disturbance or construction activities. As such, no impact would occur to paleontological resources nor would it adversely impact any existing unique geologic features that might be within the proposed project area as a result of the implementation of the proposed project. No impact would occur.

References

DOC. 2018a. Earthquake Zones of Required Investigation Map. Available online at: https://maps.conservation.ca.gov/cgs/EQZApp/app/. Accessed on October 16, 2018.

DOC. 2018b. Union Wash Quadrangle. Available online at: http://gmw.conservation.ca.gov/SHP/EZRIM/Maps/UNIONWASH.PDF. Accessed on October 16, 2018.

2.8 Greenhouse Gas Emissions

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
VIII. GREENHOUSE GAS EMISSIONS — Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Discussion

Global climate change refers to changes in average climatic conditions on Earth as a whole, including changes in temperature, wind patterns, precipitation, and storms. Historical records indicate that global climate changes have occurred in the past due to natural phenomena; however, data indicates that the current global conditions differ from past climate changes in rate and magnitude. The current increased changes in global climate have been attributed to anthropogenic (i.e., human-caused) activities by the Intergovernmental Panel on Climate Change (IPCC) (IPCC 2013). Greenhouse gases (GHG) trap long-wave radiation or heat in the atmosphere, which heats Earth's surface of the. Without human intervention, Earth maintains an approximate balance between the GHG emissions in the atmosphere and the storage of GHGs in the oceans and terrestrial ecosystems. GHGs are the result of both natural and anthropogenic activities. Forest fires, decomposition, industrial processes, landfills, manure, and consumption of fossil fuels for power generation, transportation, heating, and cooking, are the primary sources of GHG emissions.

The Federal Government and State of California recognized that anthropogenic GHG emissions are contributing to changes in the global climate, and such changes are having and would have adverse effects on the environment, the economy, and public health. While worldwide contributions of GHG emissions are expected to have widespread consequences, it is not possible to link particular changes to the environment of California or elsewhere to GHGs emitted from a particular source or location. In other words, emissions of GHGs have the potential to cause global impacts rather than local impacts. Increased concentrations of GHGs in Earth's atmosphere have been linked to global climate change and conditions such as rising surface temperatures, melting icebergs and snowpack, rising sea levels, and the increased frequency and magnitude of severe weather conditions. Existing climate change models also show that climate warming portends a variety of impacts on agriculture, including loss of microclimates that support specific crops, increased pressure from invasive weeds and diseases, and loss of productivity due to changes in water reliability and availability. In addition, rising temperatures and shifts in microclimates associated with global climate change are expected to increase the frequency and intensity of wildfires. California law defines GHGs to include the following

compounds: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).[3]

The most common GHG that results from human activity is CO_2, which represents 76 percent of total anthropogenic GHG emissions in the atmosphere (as of 2010 data) (IPCC 2013), followed by CH_4 and N_2O. Scientists have established a Global Warming Potential (GWP) to gauge the potency of each GHG's ability to absorb and re-emit long-wave radiation. The GWP of a gas is determined using CO_2 as the reference gas with a GWP of one over a given period of time, which is usually 100 years. For example, a gas with a GWP of 10 is 10 times more potent than CO_2 over 100 years. The sum of each GHG multiplied by its associated GWP is referred to as carbon dioxide equivalents (CO_2e). The measurement unit of CO_2e is used to report the combined potency of GHG emissions.

Executive Order S-3-05 and Executive Order B-30-15

California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following GHG emission reduction targets:

- By 2010, California shall reduce GHG emissions to 2000 levels.
- By 2020, California shall reduce GHG emissions to 1990 levels.
- By 2050, California shall reduce GHG emissions to 80 percent below 1990 levels.

In accordance with Executive Order S-3-05, the Secretary of California Environmental Protection Agency (CalEPA) is required to coordinate efforts of various agencies to collectively and efficiently reduce GHGs. Some of the agency representatives involved in the GHG reduction plan include the Secretary of the Business, Transportation, and Housing Agency; the Secretary of the Department of Food and Agriculture; the Secretary of the Resources Agency; the Chairperson of CARB; the Chairperson of California Energy Commission (CEC); and the President of the Public Utilities Commission. Representatives from these agencies comprise the California Climate Action Team (CCAT).

The CCAT provides biennial reports to the governor and legislature on the state of GHG reductions in the state as well as strategies for mitigating and adapting to climate change. The first CCAT Report to the governor and the legislature in 2006 contained recommendations and strategies to help meet the targets in Executive Order S-3-05 (CalEPA 2006). The 2010 CCAT Report, finalized in December 2010, expanded on the policy-oriented 2006 assessment (CalEPA 2010). The new information detailed in the CCAT Report included development of revised climate and sea-level projections using new information and tools that had become available in the previous 2 years and an evaluation of climate change within the context of broader social changes, such as land-use changes and demographic shifts.

[3] State CEQA Guidelines Section 15364.5; Health and Safety Code, Section 38505(g).

On April 29, 2015, California Governor Brown issued Executive Order B-30-15. Therein, Governor Brown:

- Established a new interim statewide reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030.
- Ordered all state agencies with jurisdiction over sources of GHG emissions to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 reduction targets.
- Directed CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of $MMTCO_2e$.

In response to the 2030 GHG reduction target, CARB adopted the 2017 Climate Change Scoping Plan at a public meeting held in December 2017 (CARB 2017). The 2017 Scoping Plan outlines the strategies the State will implement to achieve the 2030 GHG reduction target, which build on the Cap-and-Trade Regulation, the Low Carbon Fuel Standard (LCFS), improved vehicle, truck and freight movement emissions standards, increasing renewable energy, and strategies to reduce CH_4 emissions from agricultural and other wastes by using it to meet our energy needs. The 2017 Scoping Plan also comprehensively addresses GHG emissions from natural and working lands of California, including the agriculture and forestry sectors. The 2017 Scoping Plan considered a number of different alternatives to achieve the 2030 GHG reduction goal. The "Scoping Plan Scenario" was ultimately adopted and relies on the continuation of ongoing and statutorily required programs and continuation of the Cap-and-Trade Program. The Scoping Plan Scenario was modified from the January 2017 Proposed Scoping Plan to reflect Assembly Bill (AB) 398, including removal of the 20 percent GHG reduction measure for refineries (CARB 2017).

CARB states that the Scoping Plan Scenario "is the best choice to achieve the State's climate and clean air goals" (CARB 2017). Under the Scoping Plan Scenario, the majority of the reductions would result from continuation of the Cap-and-Trade regulation. Additional reductions are achieved from electricity sector standards (i.e., utility providers to supply 50 percent renewable electricity by 2030), doubling the energy efficiency savings at end uses, additional reductions from the LCFS, implementing the short-lived GHG strategy (e.g., HFCs), and implementing the mobile source strategy and sustainable freight action plan.[4] The alternatives are designed to consider various combinations of these programs as well as consideration of a carbon tax in the event the Cap-and-Trade regulation is not continued. However, in July 2017, the California Legislature voted to extend the Cap-and-Trade regulation to 2030.

Senate Bill 100

On September 10, 2018, Governor Jerry Brown signed SB 100, which further increased California's Renewables Portfolio Standard and requires retail sellers and local publicly owned electric utilities to procure eligible renewable electricity for 44 percent of retail sales by December 31, 2024, 52 percent by December 31, 2027, and 60 percent by December 31, 2030,

[4] Short-lived GHG strategy refers to reduction strategies aimed at reducing GHGs that have a much shorter half-life than CO_2 and therefore remain in the atmosphere for a shorter duration than CO_2. While they remain in the atmosphere for a short time they have a greater impact (sometimes tens, hundreds, or even thousands of time greater than CO_2.

and that CARB should plan for 100 percent eligible renewable energy resources and zero-carbon resources by December 31, 2045.

Executive Order S-01-07

Executive Order S-01-07 was enacted by the governor on January 18, 2007. The order mandates the following: (1) that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020, and (2) that an LCFS for transportation fuels be established in California. In September 2015, CARB approved the re-adoption of the LCFS, which became effective on January 1, 2016, to address procedural deficiencies in the way the original regulation was adopted. In the proposed 2017 Climate Change Scoping Plan Update, CARB's preferred recommendation includes increasing the stringency of the LCFS by reducing the carbon intensity of transportation fuels by 18 percent by 2030, up from the current target of 10 percent by 2020 (CARB 2017). In April 2017, the LCFS was brought before the Court of Appeal challenging the analysis of potential nitrogen dioxide impacts from biodiesel fuels. The Court directed CARB to conduct an analysis of nitrogen dioxide impacts from biodiesel fuels and froze the carbon intensity targets for diesel and biodiesel fuel provisions at 2017 levels until CARB has completed this analysis (Biodiesel 2017). In 2018 CARB proposed changes to the LCFS to incorporate the potential increase in NOx emissions from biofuels. The Proposed Amendments to the LCFS and to regulation of commercialization of alternative diesel fuels was approved by the Office of Administrative Law on January 4th, 2019. With the amendments, the potential future NOx emissions increase due to bio-mass based diesel use attributed to the LCFS would be mitigated.

Senate Bill 375 (Steinberg) (Chapter 728, Statutes of 2008)

SB 375 (Chapter 728, Statutes of 2008), which establishes mechanisms for the development of regional targets for reducing passenger vehicle GHG emissions, was adopted by the State on September 30, 2008. Under SB 375, CARB is required, in consultation with the Metropolitan Planning Organization (MPO) in the state, to set regional GHG reduction targets for the passenger vehicle and light-duty truck sector for 2020 and 2035. Of note, the proposed reduction targets explicitly exclude emission reductions expected from AB 1493 and the low carbon fuel standard regulations.

The Inyo County Local Transportation Commission (LTC) is the designated Regional Transportation Agency for Inyo County. On September 16, 2015, the Inyo County LTC adopted the 2015 RTP. Using growth forecasts and economic trends, the RTP provides a coordinated, 20-year vision of the regionally significant transportation improvements and policies needed to efficiently move goods and people within the region.

According to CARB, the initial GHG reduction targets established under SB 375 apply to approximately 95 percent of the state's population, vehicle miles traveled, and passenger vehicle GHG emissions (CARB 2010). Some of the smaller MPOs had relatively small or zero GHG reduction requirements in the initial target setting. CARB has indicated it would reevaluate the targets for future updates. As such, the Inyo County LTC, along with the other 20 county LTCs that are not within an MPO, comprise less than 5 percent of the state's GHG emissions from the

portion of the transportation sector that is the subject of SB 375. As a result, Inyo County is exempt from the GHG reduction requirements of SB 375.

The RTP acknowledges that overall traffic volumes on Inyo state highways have generally decreased over the last decade (LSC 2015). Regardless, the RTP identifies improvements to bicycle and pedestrian facilities that encourage residents and visitors to use alternative transportation methods and thereby reduce GHG emissions. As part of the RTP, Inyo County includes strategies to reduce GHG emissions. These strategies include: Implement Active Transportation Project Improvements, Implement Transit System Improvements, and Expand Vanpool/Rideshare Programs.

CARB Anti-Idling Measure

In 2004, CARB adopted a control measure to limit commercial heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel particulate matter and other air contaminants (CCR Title 13). The measure applies to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds that are licensed to operate on highways, regardless of where they are registered. In general, it prohibits idling for more than 5 minutes at any location. While this measure is aimed primarily at reducing air pollution, it has a co-benefit of limiting GHG emissions from unnecessary idling.

a) **Less than Significant.** GHG emissions associated with operation of the proposed project were estimated using EMFAC2014 emission rates for on-road vehicles, CARB emission factors for boat emissions, and the Aviation Environmental Design Tool for helicopter emissions. There are no permanent structures or area lighting associated with the proposed project; therefore, no energy associated with building operations are anticipated. Operational emissions are limited to the vehicle trips associated with the application of copper sulfate and the monitoring activities before, during, and subsequent to the applications.

Maximum annual net GHG emissions resulting from motor vehicles, application, and monitoring activities were conservatively calculated for 2019. It is anticipated that there could be up to five applications per year. The maximum GHG emissions from operation of the proposed project are shown in **Table 2-6**. Table 2-6 shows GHG emissions associated with helicopter application, direct application, monitoring, and commuting activities. The table provides the maximum annual emissions given both one and five applications per year.

TABLE 2-6
UNMITIGATED OPERATIONAL ANNUAL GREENHOUSE GAS EMISSIONS

Emissions Sources	CO_2e (Metric Tons per Year) [a,b]
Helicopter Application	2
Direct application	2
Monitoring	1
Commute Emissions	6
Emissions per application	11
Emissions per five applications	53

[a] Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Appendix C.

[b] CO_2e emissions are calculated using the global warming potential values from the Intergovernmental Panel on Climate Change Fourth Assessment Report.

SOURCE: ESA 2019

As shown in Table 2-6, the majority of the emissions would occur from vehicles traveling over regional roadways. Using CARB's EMFAC2014 tool, for buildout year 2019, mobile source emissions for the Great Valley Air Basin would respectfully result in 1,081,095 MT CO_2 annually. The proposed project's GHG emissions from mobile sources would represent less than 0.005 percent of the Air Basin's annual mobile source GHG emissions.

Proposed project emissions would decline from the values presented in Table 2-6 in future years since passenger vehicles, the primary emission sources of the proposed project, would be replaced with newer, more efficient vehicles. Newer fleets result in a greater percentage of the vehicle fleet meeting more stringent combustion emissions standards, such as the model year 2017–2025 Pavley Phase II standards.

There is no appropriate numerical threshold to compare proposed project emissions. Therefore, this analysis is presented for information purposes and does not independently result in a significance impact for GHG emissions. This analysis quantifies the proposed project's potential GHG emissions in order to correlate to the Climate Change Scoping Plan and supplement the primary threshold of significance below that demonstrates consistency with plans and policies adopted for the purpose of reducing GHG emissions. Impact would be less than significant

b) **Less than Significant.** A significant impact would occur if the proposed project would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment by conflicting with applicable regulatory plans and policies to reduce GHG emissions as discussed within CARB's Climate Change Scoping Plan.

CARB's Climate Change Scoping Plan

In support of Health and Safety Code Division 25.5, the State has promulgated specific laws aimed at GHG reductions applicable to the proposed project. The primary focus of many of the statewide and regional mandates, plans, policies, and regulations is to address worldwide climate change. Due to the complex physical, chemical, and atmospheric mechanisms involved in global climate change, there is no basis for concluding that the proposed project's increase in annual GHG emissions would cause a measurable change in global GHG emissions necessary to influence global climate change. The GHG emissions of a project alone would not likely cause a direct physical change in the environment. According to California Air Pollution Control Officers Association (CAPCOA), "GHG impacts are exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective" (CAPCOA 2008). It is global GHG emissions in their aggregate that contribute to climate change, not any single source of GHG emissions alone.

Table 2-7 contains a list of GHG-reducing strategies potentially applicable to the proposed project. The analysis describes the consistency of the proposed project with these strategies that support the State's strategies in the Climate Change Scoping Plan to reduce GHG emissions. The Climate Change Scoping Plan relies on a broad array of GHG reduction actions, which include direct regulations, alternative compliance mechanisms, incentives, voluntary actions, and market-based mechanisms such as the Cap-and-Trade program. As shown in Table 2-7, the proposed project would not conflict with applicable Climate Change Scoping Plan strategies and regulations to reduce GHG emissions.

TABLE 2-7
CONSISTENCY WITH APPLICABLE GREENHOUSE GAS REDUCTION STRATEGIES

Sector / Source	Category / Description	Consistency Analysis
Mobile Sources		
AB 1493 (Pavley Regulations)	Reduces GHG emissions in new passenger vehicles from model year 2012 through 2016 (Phase I) and model years 2017-2025 (Phase II). Also reduces gasoline consumption to a rate of 31% of 1990 gasoline consumption (and associated GHG emissions) by 2020.	**Consistent.** The proposed project would be consistent with this regulation and would not conflict with implementation of the vehicle emissions standards.
Low Carbon Fuel Standard (Executive Order S-01-07)	Establishes protocols for measuring life-cycle carbon intensity of transportation fuels and helps to establish use of alternative fuels.	**Consistent.** The proposed project would be consistent with this regulation and would not conflict with implementation of the transportation fuel standards.

Sector / Source	Category / Description	Consistency Analysis
Advanced Clean Cars Program	In 2012, CARB adopted the Advanced Clean Cars (ACC) program to reduce criteria pollutants and GHG emissions for model year vehicles 2015 through 2025. ACC includes the Low-Emission Vehicle (LEV) regulations that reduce criteria pollutants and GHG emissions from light- and medium-duty vehicles, and the Zero-Emission Vehicle (ZEV) regulation, which requires manufacturers to produce an increasing number of pure ZEVs (meaning battery electric and fuel cell electric vehicles), with provisions to also produce plug-in hybrid electric vehicles (PHEV) in the 2018 through 2025 model years.	**Consistent.** The proposed project would be consistent with this regulation and would not conflict with implementation of the transportation fuel standards.
SB 375	SB 375 establishes mechanisms for the development of regional targets for reducing passenger vehicle GHG emissions. Under SB 375, CARB is required, in consultation with the State's Metropolitan Planning Organizations, to set regional GHG reduction targets for the passenger vehicle and light-duty truck sector for 2020 and 2035.	**Consistent.** The proposed project would not result in growth within the region; instead it provides algae control for drinking water infrastructure.
Solid Waste		
California Integrated Waste Management Act (IWMA) of 1989 and Assembly Bill (AB) 341	The IWMA mandated that State agencies develop and implement an integrated waste management plan which outlines the steps to be taken to divert at least 50 % of their solid waste from disposal facilities. AB 341 directs CalRecycle to develop and adopt regulations for mandatory commercial recycling and sets a statewide goal for 75 % disposal reduction by the year 2020.	**Consistent.** The proposed project would not generate more than four cubic yards[1] of solid waste annually and would not be required to comply with AB 341 as AB 341 only applies to facilities that generate more than four or more cubic yards per week. Therefore, the proposed project would not conflict with implementation of AB 341.
Other Sources		
Climate Action Team	Reduce diesel-fueled commercial motor vehicle idling.	**Consistent.** The proposed project would be consistent with the CARB Air Toxics Control Measure to limit heavy duty diesel motor vehicle idling to no more than 5 minutes at any given time.
	Achieve California's 50% waste diversion mandate (Integrated Waste Management Act of 1989) to reduce GHG emissions associated with virgin material extraction.	**Consistent.** Waste generated on-site would be transported offsite for disposal. The proposed project would meet this requirement as part of its compliance with the CALGreen Code through complying with local waste collection guidelines and responsibilities.

1. Solid waste generation was determined based on CalEEMod to equal 0.52 tons per year. Using 300 lb per cubic yard (un-compacted mixed solid waste), the proposed project would result in approximately 3.5 cubic yards annually.

Source: ESA 2019.

Furthermore, not only is the proposed project consistent with currently applicable GHG emission reduction strategies as described in Table 2-7, but the proposed project also would not conflict with or impede the future statewide GHG emission reductions goals. CARB has outlined a number of potential strategies for achieving the 2030 reduction target of 40 percent below 1990 levels. These potential strategies include renewable resources for half of the State's electricity by 2030, increasing the fuel economy of vehicles and the number of zero-emission or hybrid vehicles, reducing the rate of growth in vehicle miles traveled, supporting other alternative transportation options, and use of high efficiency appliances, water heaters, and HVAC systems (Energy and

Environmental Economics 2015). The proposed project would benefit from statewide efforts toward increasing the fuel economy standards of vehicles. While CARB is in the process of developing a framework for the 2030 reduction target in the Scoping Plan, the proposed project would support or not impede implementation of these potential reduction strategies identified by CARB.

Consistency with Executive Orders S-3-05 and B-30-15

Executive Orders S-3-05 and B-30-15 establish goals for reducing GHG emissions. Executive Order S-3-05's goal to reduce GHG emissions to 1990 levels by 2020 was codified by the Legislature as AB 32. As analyzed above, the proposed project would be consistent with AB 32. Therefore, the proposed project does not conflict with the 2020 component of Executive Orders S-3-05 and B-30-15.

Executive Orders S-3-05 and B-30-15 also establish goals to reduce GHG emissions to 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050. SB 32 established the 2030 goal as law but the 2050 goal has not yet been codified by the legislature. However, studies have shown that, to meet the 2030 and 2050 targets, aggressive technologies in the transportation and energy sectors, including electrification and the decarbonization of fuel, will be required. In its Climate Change Scoping Plan, CARB acknowledged that the "measures needed to meet the 2050 goal are too far in the future to define in detail" (CARB 2008). In the First Update, however, CARB generally described the type of activities required to achieve the 2050 target: "energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings, and industrial machinery; decarbonizing electricity and fuel supplies; and rapid market penetration of efficiency and clean energy technologies that requires significant efforts to deploy and scale markets for the cleanest technologies immediately" (CARB 2014). Due to the technological shifts required and the unknown parameters of the regulatory framework in 2030 and 2050, quantitatively analyzing the proposed project's impacts further relative to the 2030 and 2050 goals currently is speculative for purposes of CEQA.

Although the proposed project's emissions levels in 2030 and 2050 cannot yet be reliably quantified, statewide efforts are underway to facilitate the State's achievement of those goals and it is reasonable to expect the proposed project's emissions level to decline as the regulatory initiatives identified by CARB in the First Update are implemented, and other technological innovations occur. Stated differently, the proposed project's emissions during the first operational year of 2019 represents the maximum emissions inventory for the proposed project as California's emissions sources are being regulated (and foreseeably expected to continue to be regulated in the future) in furtherance of the State's environmental policy objectives. The proposed project's emissions would decline as Scoping Plan emissions reductions strategies are codified into law, particularly with respect to vehicle emissions standards and marine vessel emissions standards. As a result, the proposed project would not conflict with the Executive Orders' goals.

Consistency with Other Plans, Policies, Regulations, or Recommendations to Reduce GHG Emissions

The proposed project would also be consistent with other statewide, regional and local plan, policies, regulations, and recommendations to reduce GHG emissions from development. The primary focus of many of the statewide and regional mandates, plans, policies and regulations is to address worldwide climate change. According to CAPCOA, "GHG impacts are exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective" (CAPCOA 2008). Due to the complex physical, chemical and atmospheric mechanisms involved in global climate change, there is no basis for concluding that the proposed project's annual GHG emissions would cause a measurable change in global GHG emissions sufficient to create a significant proposed project level impact on global climate change. The GHG emissions of the proposed project alone are not expected to cause a direct physical change in the environment. It is global GHG emissions in their aggregate that contribute to climate change, not any single source of GHG emissions alone. Because of the lack of evidence indicating that the proposed project's GHG emissions would cause a measurable change in global GHG emissions sufficient to create a significant proposed project-level impact on global climate change, proposed project emissions are not anticipated to contribute considerably to global climate change. The proposed project is also considered to be consistent with the GHG reduction goals of Health and Safety Code Division 25.5 and associated GHG reduction plans, and it is not expected that proposed project development would impede their goals.

As detailed above, the proposed project would either be consistent, or would not conflict with, statewide and regional climate change mandates, plans, policies, and recommendations. Therefore, impacts would be less than significant.

References

Biodiesel Magazine, Court rules against CARB on LCFS, preserves 2017 status quo, April 17, 2017.

California Air Pollution Control Officers Association (CAPCOA), CEQA & Climate change: Evaluating and Addressing Greenhous Gas Emissions from projects Subject to the California Environmental Quality Act (2008).

California Air Resources Board (CARB), 2020 Business-as-Usual (BAU) Emissions Projection, 2014 Edition. Available at: http://www.arb.ca.gov/cc/inventory/data/bau.htm. Accessed May 2017.

California Air Resources Board (CARB). 2017b. California's 2017 Climate Change Scoping Plan, November 2017. Available at: https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed January 2018.

California Code of Regulations Title 13, Section 2485. See CARB, ATCM to Limit Diesel-Fueled Commercial Motor Vehicle Idling, http://www.arb.ca.gov/regact/idling/idling.htm, accessed December 2018.

California Environmental Protection Agency, Climate Action Team, Climate Action Team Report to Governor Schwarzenegger and the Legislature (2006).

California Environmental Protection Agency, California Climate Action Team Report to the Governor and the Legislature (2010).

Energy + Environmental Economics, Summary of the California State Agencies' PATHWAYS project: Long-term Greenhouse Gas Reduction Scenarios, April 6, 2015. Available at: https://www.arb.ca.gov/html/fact_sheets/e3_2030scenarios.pdf. Accessed May 2017.

Intergovernmental Panel on Climate Change IPCC. 2013. Fifth Assessment Report: The Physical Science Basis, Summary for Policy Makers (2013).

2.9 Hazards and Hazardous Materials

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
IX. HAZARDS AND HAZARDOUS MATERIALS — Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) 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?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) 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, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) 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, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	☐	☐	☐	☒

Discussion

a) **Less than Significant.** The proposed project involves the application of copper sulfate pentahydrate (a successful algaecide) by chemical dry hopper and helicopter to reservoirs and sections of the Los Angeles Aqueduct impacted by the growth of algae and pondweed, disrupting water conveyance. Copper sulfate pentahydrate contains components that are considered hazardous by the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard. There are potential health risks associated with the ingestion, inhalation, and physical contact to skin or eyes with this compound.

To minimize risk associated with the use of copper sulfate the proposed project would follow the guidelines developed in the APAP, attached as Appendix A.

In addition to the procedures detailed in the APAP, all staff on-site would follow procedures laid out on the copper sulfate label and MSDS, attached as Appendix B. Such procedures include the use of personal protective equipment and clothing, including

powder-free vinyl gloves to avoid contamination associated with latex gloves. Additionally, the APAP contains best management practices to ensure safety when handling copper sulfate. The APAP requires that herbicide be applied by LADWP personnel, contractors, or subcontracts who have either a Qualified Applicator Certificate or License issued by the State of California Department of Pesticide Regulation (Licensing Certification Program). Application would be limited to up to five times per year. Implementation of the APAP, compliance with the MSDS label for the applicable of copper sulfate, and use of trained personal would reduce any impacts related to the routine, transport, use, or disposal of hazardous materials to a less than significant level.

b) **Less than Significant.** The APAP includes measures and best management practices to ensure that the public would not be adversely affected by the application of copper sulfate to the waters within the proposed project area. The amount of copper sulfate would be minimized with dosage determined based on manufacturer's recommendation and on the flow in the receiving body of water at the time of treatment. Additionally, the valves near the receiving body of water would be closed to ensure that treated water does not travel to places where it could cause adverse effects to the public. The copper sulfate would be applied according to label instruction to prevent spills. Should a spill occur the staff would follow the field division's established emergency response procedures and refer to the MSDS for instructions on containing and cleaning up the spill. In addition, staff would follow and comply with measures detailed in the APAP. Compliance with the field division's emergency response procedures, MSDS instructions, and the APAP would ensure that impacts to the environment would be less than significant.

c) **No Impact.** The nearest school to the Alabama Gates site is Lo-Inyo Elementary School approximately 5.5 miles away. The nearest school to the Haiwee Reservoirs and Merritt Cut Sites is Lone Pine High School, which is approximately 30 miles north of the site. There are no schools within a 0.25-mile radius of any of the potential application sites. No impact would occur.

d) **No Impact.** Government Code Section 65962.5, amended in 1992, requires CalEPA to develop and update annually the Cortese List, which is a list of hazardous waste sites and other contaminated sites. According to the most recently published Cortese List, and DTSC EnviroStor and SWRCB GeoTracker datatbases, no hazardous waste sites are located on or in close proximity to the proposed project (DTSC 2018). Therefore, no impact would occur.

e) **No Impact.** The Lone Pine Airport is the closest airport to any of the proposed project sites, approximately 6.5 miles south of the Alabama Gates site and 30 miles north of the Haiwee Reservoirs and Merritt Cut sites. Additionally, the Independence Airport is roughly 11 miles north of the Alabama Gates site. Inyo County has incorporated Airport Hazard Overlay Districts into its code in order to protect the lives and property of users of the various county airports as well as the occupants of the land in the vicinity of county airports (Inyo County 2018). All of the proposed project sites lie outside of this area. Therefore, no impact would occur.

f) **No Impact.** The Inyo County RTP identifies evacuation routes applicable to the proposed project area. The primary evacuation route for Lone Pine is US Highway 395, which is the north-south arterial traversing Inyo County, directly adjacent to all potential application sites (Inyo County 2015). The proposed project is an operational copper sulfate application proposed project involving up to five applications per year. Activities would include helicopter and truck usage for delivering and applying copper sulfate to portions of the aqueduct or reservoirs. Proposed project activities would not require road closures or activities that would impair or physically interfere with an adopted emergency response plan or emergency evacuation plan. No impact would occur

g) **No Impact.** The proposed project sites are located in areas designated by the California Department of Forestry and Fire Protection's (CAL FIRE's) Fire Resource and Protection Program (FRAP). Alabama Gates is located in an area designated as "High" in the State Responsibility Area (SRA) mapping, and as "Other High" in the Local Responsibility Area (LRA) mapping (CAL FIRE 2007). The Haiwee Reservoirs and Merritt Cut sites are located in an area designated as "LRA Unincorporated" and are surrounded by Federal Responsibility Areas (FRAs) in the SRA mapping, and are designated as "LRA Moderate" in the LRA mapping. These hazard areas are described according to their potential to cause fire hazards due to relevant factors such as fuels, terrain, and weather, and provide the basis for application of various mitigation strategies to reduce risks to buildings associated with wildfires (CAL FIRE 2007). The proposed project is not proposing any new construction and the operations of the proposed project would not do anything to increase exposure to wildfire in either urban or natural settings. Trucks and helicopters would travel to and from the proposed project sites using existing maintenance roads and designated helicopter landing pads. Truck and helicopters would not fuel within the proposed project impact areas. Copper sulfate does not have a flash point nor is it flammable according to its MSDS. No impact would occur.

References

California Department of Forestry and Fire Protection (CAL FIRE). 2007. Wildland Hazard and Building Codes, Inyo County Fire Hazard Severity Zones. Adopted by CAL FIRE on November 7, 2007. Available online at: http://www.fire.ca.gov/fire_prevention/fhsz_maps_inyo. Accessed on October 17, 2018.

Department of Toxic Substance Control (DTSC). 2018. DTSC's Hazardous Waste and Substances Site List- Site Cleanup (Cortese List). Available online at: https://www.dtsc.ca.gov/SiteCleanup/Cortese_List.cfm. Accessed on October 17, 2018.

Inyo County. 2015. Regional Transportation Plan 2015. Available online at: http://www.inyoltc.org/pdfs/rtp/frtpwhole.pdf. Accessed on October 17, 2018.

Inyo County. 2018. Inyo County Code Title 18: Zoning, Chapter 18.62: "AH Districts" — Airport Hazard Overlay. Available online at: http://www.qcode.us/codes/inyocounty/?view=desktop&topic=18. Accessed on October 17, 2018.

2.10 Hydrology and Water Quality

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
X. HYDROLOGY AND WATER QUALITY — Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☒	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☐	☒
c) 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:				
i) result in substantial erosion or siltation on- or off-site;	☐	☐	☐	☒
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☐	☒
iii) create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☐	☒
iv) impede or redirect flood flows?	☐	☐	☐	☒
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☒
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

Discussion

a) **Less than Significant.** The proposed project seeks to reduce algae and aquatic vascular plants along the Los Angeles Aqueduct through the aerial and direct application of copper sulfate. The algae and aquatic vascular plants are of concern due to their inhibition of adequate water conveyance along the aqueduct. Both USEPA and the California Department of Pesticide Regulation have approved copper sulfate as a proposed treatment material for algae and aquatic vascular plants in California.

State water quality regulators require persons using aquatic pesticides to apply for coverage under the general NPDES permit, Order No. 2013-0002-DWQ. To obtain coverage under this NPDES permit, applicants are required to demonstrate either that its discharges comply with the water quality criteria for priority pollutants under the California Toxics Rule and National Toxics Rule or that it qualifies for an exemption from compliance with such criteria, pursuant to Section 5.3 of the SWRCB's SIP. The NPDES permit for which this IS/MND is made, provides for the categorical exception from numeric water quality criteria and objectives for priority pollutants for the

application of aquatic pesticides by public entities in the exercise of resource or algae management activities. As a Water System, LADWP is eligible and has coverage under the NPDES permit relating to the application of aquatic pesticides directly to its aqueduct and other areas. Furthermore, the permit requires applicants to submit an APAP describing their pesticide application and water quality monitoring programs and have it approved by the SWRCB. LADWP has submitted an APAP along with their permit application to the SWRCB. A Notice of Applicability, along with APAP approval, was received from the SWRCB on October 15, 2018. The APAP is attached as Appendix A. The APAP includes an explanation of the application program, information regarding each application location, best management practices, and monitoring protocol for each site, as well as information regarding amounts of herbicide and pesticide used and measures to ensure treatment is controlled. The APAP also includes a monitoring plan (see Appendix A) with water quality monitoring requirements.

LADWP has applied copper sulfate to the proposed facilities in past years under the NPDES permit with an emergency exemption from the SIP and Basin Plan. The amount applied to the receiving body of water would be based on the copper sulfate label, the flow rate of the receiving body of water, and would be applied in accordance with the project-specific APAP.

The application of copper sulfate along the aqueduct might temporarily raise dissolved copper levels above approved receiving water limitations. However, this proposed project would comply with the NPDES permit and exemption conditions and APAP Monitoring Plan, and implement best management practices. With adherence to the appropriate permit conditions, impacts would be considered less than significant.

b) **No Impact.** The proposed project includes the application of copper sulfate to existing locations along the concrete-lined Los Angeles Aqueduct and two reservoirs; it would not decrease groundwater supplies or interfere with groundwater recharge. Therefore, no impact would occur.

c) **No Impact.** The proposed project includes the application of copper sulfate to existing locations along the concrete-lined Los Angeles Aqueduct and two reservoirs; it would not include construction of new facilities or modification to existing facilities. The proposed project would not alter existing drainage patterns of the site or area, and no impact would occur.

d) **No Impact.** The proposed project includes the application of copper sulfate to existing locations along the concrete-lined Los Angeles Aqueduct and two reservoirs; it would not include construction of new facilities or modification to existing facilities. While the immediate perimeter of the North and South Haiwee Reservoirs can be subject to flooding with a 0.2 to 1 percent chance of annual flood, depending on application location, the proposed project otherwise takes place in an area of minimal flood hazard (FEMA 2019) and no impact would occur.

e) **Less than Significant.** The proposed project includes the application of copper sulfate to existing locations along the concrete-lined Los Angeles Aqueduct and two reservoirs. Implementation of the proposed project would not obstruct implementation of a water control plan or impact groundwater management in any way. The proposed project would be in compliance with existing permit conditions and would not impact the implementation of any water quality control plans for the area with implementation of the NPDES permit and adherence to the approved APAP, and impacts would be considered less than significant.

References

Federal Emergency Management Agency (FEMA). 2019. FEMA Flood Map Service Center. Available online at: https://msc.fema.gov/portal/home. Accessed on March 16, 2019.

2.11 Land Use and Planning

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XI. LAND USE AND PLANNING — Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) 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?	☐	☐	☐	☒

Discussion

a) **No Impact.** The physical division of an established community typically refers to the construction of a linear feature, such as a highway or railroad, or removal of a means of access, such as a road or bridge that would impact mobility within or between existing communities. The proposed project does not include the construction of any facilities and would not impact mobility within or between existing communities; therefore, no impact would occur.

b) **No Impact.** The proposed would include operational activities within existing facilities currently owned and operated by LADWP. The proposed project would not cause a change to the current land use or create a significant impact to its land use designation. Therefore, the proposed project would be compatible with existing land use designations and zoning. The proposed project would not conflict with any other land use plan, policy, or regulation; therefore, no impact would occur.

References

Inyo County, 2013. Inyo County Zoning Code. Chapter 8: Development Standards, Section 18.08.220, last updated May, 2013. Available at http://inyoplanning.org/documents/Chapter8-DevelopmentStandards.pdf; accessed October 17, 2018.

2.12 Mineral Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XII. MINERAL RESOURCES — Would the project:				
a) 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?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

Discussion

a) **No Impact.** The proposed project areas have not been identified as areas with significant mineral deposits by Mineral Land Classification Maps prepared pursuant to the pursuant to the Surface Mining and Reclamation Act (SMARA) (DOC 1993). Specifically, the proposed project treatment sites are located in an area with a mineral land classification of MRZ-4, which indicates that current geologic information cannot rule out either the presence or absence of mineral resources (DOC 1987; DOC 2018). However, no ground-disturbing activities would occur as a result of the proposed project. Since the proposed project would not include ground-disturbing activities, no impacts to mineral resources would occur.

b) **No Impact.** No mineral resources have been identified by the Inyo County General Plan, the Inyo County Zoning Code, or any other land use plans applicable to the proposed project area (Inyo County 2013). In addition, no ground-disturbing activities would occur as a result of the proposed project; therefore, no impact would occur.

References

California Department of Conservation, 2018. Guidelines for Classification and Designation of Mineral Lands. Available at http://www.conservation.ca.gov/smgb/Guidelines/Documents/ClassDesig.pdf; accessed October 17, 2018/=.

DOC, 1993. Mineral Land Classification of the Eureka-Saline Valley Area, Inyo and Mono Counties, California. Available at ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sr/SR_166/SR_166_Text.pdf; accessed October 17, 2018.

DOC, 1987. Mineral Land Classification Map. South Half of the Eureka-Saline Valley SMARA Study Area. Available at ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sr/SR_166/Plate%203B.pdf; accessed October 17, 2018.

Inyo County, 2013. Inyo County Zoning Code and General Plan, last updated May, 2013. Available at http://inyoplanning.org/projects/GPandZoningUpdates.htm; accessed October 17, 2018.

2.13 Noise

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XIII. NOISE — Would the project result in:				
a) 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?	☐	☐	☒	☐
b) Generation of 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, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Discussion

a,b) **Less than Significant.** The proposed project would include several noise-generating activities, namely the hauling and dispersal of copper sulfate using trucks, helicopter, or boat, which would temporarily increase noise levels above ambient levels. Application of copper sulfate could occur up to five times per year, meaning up to 5 days of helicopter use, and 15 days of boat and vehicle use. Helicopter noise would be heard coming and going; however, the total operation time for the helicopter would be 1 hour at the dam and would be transient for coming and going. These activities, however, occur during daytime hours and in areas that are closed to public use. Therefore, their operation would not expose nearby persons to significant levels of noise or ground-borne vibration. Likewise, since there is no permanent footprint to this project, there would not be a permanent increase in noise above ambient levels. Impact would be less than significant.

c) **No Impact.** The Lone Pine Airport would be the closest airport to the proposed project sites, approximately 6.5 miles south of the Alabama Gates site and 30 miles north of the Haiwee Reservoirs and Merritt Cut sites. Additionally, the Independence Airport is roughly 11 miles north of the Alabama Gates site. Therefore, the proposed project is not located within 2 miles of a public airport or public use airport and not located within the vicinity of a private airstrip. No impacts would occur.

2.14 Population and Housing

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XIV. POPULATION AND HOUSING — Would the project:				
a) 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)?	☐	☐	☐	☒
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion

a) **No Impact.** The proposed project would include copper sulfate treatment within existing LADWP facilities to help reduce aquatic algal growth and plant growth currently obstructing water flows from the LA Aqueduct to the Owens Lake Dust Mitigation Project. Treatment would improve obstructed flows of water to meet flow demands required by the Owens Lake Dust Mitigation Project. No new construction or expansion of existing facilities would occur as a result of the proposed project and the project would not induce population growth directly or indirectly. No impact would occur.

b) **No Impact.** The proposed project would include operational activities of existing water infrastructure facilities and would not displace housing or require construction of new housing. No impact would occur.

2.15 Public Services

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XV. PUBLIC SERVICES —				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered government 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:				
i) Fire protection?	☐	☐	☐	☒
ii) Police protection?	☐	☐	☐	☒
iii) Schools?	☐	☐	☐	☒
iv) Parks?	☐	☐	☐	☒
v) Other public facilities?	☐	☐	☐	☒

Discussion

a.i) **No Impact.** Volunteer fire departments would provide fire protection services to the proposed project treatment areas located in Inyo County. The fire protection districts (FPD) present within Inyo County include Bishop FPD, Big Pine FPD, Independence FPD, Lone Pine FPD, and Southern Inyo FPD. Additionally, federal land management agencies are responsible for fire protection on lands they manage. These agencies include the following: CAL FIRE, Bureau of Land Management, and US Forest Service. Since no construction activity would occur as a result of the proposed project, and operational activities would occur up to five times per year, the proposed project would not substantially alter the existing fire service demands. The service provides above would not be required to expand or construct new fire station locations to serve the proposed project area. No impact would occur.

a.ii) **No Impact.** The California Highway Patrol, Inyo County Sheriff's Department, and the Bishop Police Department would provide law enforcement services to the proposed project treatment areas located in Inyo County. There would be no construction associated with the proposed project, and the proposed project would not include building new houses or bringing new businesses to the area that would require additional police protections services. Therefore, police protection needs would not increase and the law enforcement providers listed above would not be required to expand or construct new police stations to serve the proposed project area. No impact would occur.

a.iii) **No Impact.** The proposed project would not change existing demand for school services, as the proposed project would not directly or indirectly result in an increase in population. Therefore, the proposed project would have no impact related to school services.

a.iv) **No Impact.** The proposed project would not result in an increase in population, and would not prompt the need for new parks. Therefore, the proposed project would have no impact related to parks.

a.v) **No Impact.** The proposed project would not include new housing or businesses to the area that would require any additional services or public facilities, including libraries. Therefore, the proposed project would have no impact related to other public facilities.

2.16 Recreation

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XVI. RECREATION:				
a) Would the project 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?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

Discussion

a) **No Impact.** The proposed project includes operational activities at existing LADWP water infrastructure facilities would not include the construction of any new facilities. The proposed project would not induce any population growth or bring large numbers of people to the proposed project area. Therefore, no increase of use to neighborhood parks, regional parks, or recreational facilities would result from implementation of the proposed project. No impact would occur.

b) **No Impact.** The proposed project would not include construction or expansion of recreational facilities. No impact would occur.

2.17 Transportation

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XVII. TRANSPORTATION — Would the project:				
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☐	☒
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☐	☒
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d) Result in inadequate emergency access?	☐	☐	☐	☒

Discussion

a) **No Impact.** LADWP plans to apply copper sulfate on an as-needed basis in the proposed project area in Inyo County that runs parallel to a nearby north-south highway, US Highway 395. These treatments would be applied both aerially and through direct application as deemed appropriate based on the needs of each site. As such, traffic impacts associated with these project sites would vary depending on the determined method of application.

Direct Application

Direct auger feeder application of copper sulfate by qualified LADWP personnel, a subconsultant, or contractor would require the use of trucks. Trucks would receive copper sulfate crystals from Van Norman Chemical Depot in Sylmar and travel 160–190 miles to the proposed project site to deliver the copper sulfate directly to Merritt Cut or Alabama Gates, or other concrete-lined portions of the Los Angeles Aqueduct. It is anticipated that these truck trips would involve driving on US Highway 395 and/or connected highways (i.e., SR 136 and SR 190).

The proposed project would be required to comply with the state-mandated Congestion Management Plan (CMP). The CMP is a program enacted by the State legislature to address the impacts that urban congestion has on local communities and the region as a whole. Inyo County Local Transportation Commission is the local agency responsible for implementing the requirements of the CMP for the project region. The proposed project would also be required to comply with local policy regarding traffic and congestion. The 2015 Inyo County Regional Transportation Program states that a junction near the proposed project's application areas, the US 395–SR 136 junction, is one of the most heavily impacted junctions in the County (Inyo County Public Works 2018).

The proposed project would require up to three staff in personal vehicles during monitoring activities and truck trips associated with the delivery of the auger feeder to the proposed project site. In addition, copper sulfate application would only occur up to five

times per year. It is estimated that one to two material transport trucks would be required. Due to the small volume of vehicle traffic associated with this project, truck trips would have a negligible impact on traffic congestion at the US 395–SR 136 junction or nearby intersections, streets, highways and freeways, pedestrian and bicycle paths, or mass transit. Therefore, no impacts would occur to any plans, ordinances, or policies concerning traffic circulation or congestion management.

Aerial Application

Aerial application of copper sulfate to the proposed project areas would not have any impact to traffic congestion at nearby intersections, streets, highways and freeways, pedestrian and bicycle paths, or mass transit. Therefore, no impacts would occur to any plans, ordinances, or policies concerning traffic circulation or congestion management.

b) **No Impact.** "Vehicle miles traveled" refers to the amount and distance of automobile travel attributed to a proposed project. A total up to 11 workers could be required during operation of the proposed project. These trips would be temporary, only happening as needed one to five times a year and would not result in any perceivable increase in vehicle miles traveled that would exceed a city or county threshold of significance. There are no new permanent vehicle trips associated with the proposed project. Vehicle miles generated during operation of the proposed project would be minimal and sporadic and would not cause a substantially decrease in the performance of existing roadways within the regional circulation system. As a result, the proposed project would be consistent with State CEQA Guidelines Section 15064.3 subdivision (b), and no impacts would occur.

c) **No Impact.** The proposed project would not include construction or modifications to existing facilities. In addition, trucks required for direct application of copper sulfate would not be incompatible with local roadways. No impact would occur.

d) **No Impact.** Vehicles parking at LADWP facilities or other locations near treatment areas (i.e., public parking lots) are routine and would occur in designated areas. No construction would be required as part of the proposed project and no road closures would be required. Therefore, no impact to emergency access or evacuation would occur.

References

Inyo County Public Works, 2018. "Inyo County Regional Transportation Plan." Inyoltc.org. Available at http://www.inyoltc.org/pdfs/rtp/frtpwhole.pdf; accessed October 18, 2018.

2.18 Tribal Cultural Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XVIII. TRIBAL CULTURAL RESOURCES — Would the project:				
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:				
i) 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	☐	☐	☐	☒
ii) 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.	☐	☐	☐	☒

Discussion

California Assembly Bill (AB) 52, through its implementing regulations, requires that lead agencies consult with California Native American tribes that are traditionally and culturally affiliated with the geographic area of the proposed project and who have requested in writing to be informed by the lead agency of proposed projects in the tribe's geographic area (PRC Section 21080.3.1(b) and (d)).

LADWP requested a Sacred Lands File (SLF) search and a list of Native American contacts from the California Native American Heritage Commission (NAHC). The NAHC responded on August 21, 2018 stating that the SLF search returned negative results. The NAHC's response also included a list of four tribes with traditional lands or cultural places located within the project area including: Big Pine Paiute Tribe of the Owens Valley, Bishop Paiute Tribe, Fort Independence Indian Community of Paiutes, and Lone Pine Paiute-Shoshone Tribe.

On October 23, 2018 LADWP sent formal notification letters to the tribes appearing on the NAHC-provided list. The letters notified the tribes of the proposed project, provided project description and location information, assured the tribes of LADWP's commitment to confidentiality under PRC Section 21082.3(c), LADWP's contact information, and invited the tribes to respond within 30 days with their interest in AB 52 consultation.

To date, LADWP has not received any tribal responses. **Table 2-8** summarizes LADWP's consultation efforts.

TABLE 2-8
SUMMARY OF AB 52 CONSULTATION

Tribe	Representative	Title	Date Letter Sent	Response
Big Pine Paiute Tribe of the Owens Valley	Ms. Genevieve Jones	Chairperson	10/23/2018	No response
Big Pine Paiute Tribe of the Owens Valley	Ms. Danelle Gutierrez	Tribal Historic Preservation Officer	10/23/2018	No response
Bishop Paiute Tribe	Mr. Bill Vega	Chairperson	10/23/2018	No response
Fort Independence Indian Community of Paiutes	Mr. Norman Wilder	Chairperson	10/23/2018	No response
Lone Pine Paiute-Shoshone Tribe	Ms. Mary Wuester	Chairperson	10/23/2018	No response

a.i-ii) **No Impact.** A search of the SLF and outreach to California Native American tribes identified by the NAHC as traditionally and culturally affiliated with the proposed project area did not identify any tribal cultural resources within the project area. No impact would occur.

2.19 Utilities and Service Systems

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XIX. UTILITIES AND SERVICE SYSTEMS — Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	☒
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☐	☒
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
d) 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?	☐	☐	☒	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒

Discussion

a) **No Impact.** The proposed project does not propose the construction of any facilities and includes operational activities associated only with copper sulfate application at existing LADWP facilities. No impact would occur.

b) **No Impact.** The proposed project is an operational copper sulfate application project and does not relate to water entitlements or require new or expanded entitlements. Operation of the proposed project would not require water supplies to serve the project. No impact would occur.

c) **No Impact.** The proposed project treatment areas are located within the California Water Quality Control Board's Lahontan Basin Region, or Region 6. However, the proposed project is an operational copper sulfate application project and would not involve wastewater or wastewater treatment. No impact would occur.

d) **Less than Significant.** Waste management services for the proposed project site are provided by the Inyo County Waste Management Department. The proposed project would not include construction or require the disposal of materials. Maintenance activities could result in minimal waste disposal needs; however, it is not anticipated that significant solid waste generation would occur as a result of the proposed project. If waste disposal is required during any of the operational application activities (up to five

per year), nearby waste management facilities, such as the Lone Pine Landfill, would have sufficient capacity to accommodate the proposed project (CalRecycle 2018). Impacts would be considered less than significant.

e) **No Impact.** The proposed project would comply with all federal, state, and local requirements relevant to solid waste management, such as the California Integrated Waste Management Act of 1989. However, since the proposed project does not include any construction, it is not anticipated that significant amounts of solid waste would be generated during copper sulfate application. No impact would occur.

References

CalRecycle. 2018. Facility/Site Summary Detail: Savage Canyon Landfill. Available at http://www.calrecycle.ca.gov/SWFacilities/Directory/19-AH-0001/Detail/. Accessed January 9, 2018.

2.20 Wildfire

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XX. WILDFIRE — If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
b) 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?	☐	☐	☐	☒
c) 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?	☐	☐	☐	☒
d) 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?	☐	☐	☐	☒

Discussion

The proposed project sites are located in areas designated by CAL FIRE's FRAP. Alabama Gates is located in an area designated as "High" in the SRA mapping, and as "Other High" in the LRA mapping (CAL FIRE 2007). The Haiwee Reservoirs and Merritt Cut sites are located in an area designated as "LRA Unincorporated" and are surrounded by FRAs in the SRA mapping, and are designated as "LRA Moderate" in the LRA mapping. These hazard areas are described according to their potential to cause fire hazards due to relevant factors such as fuels, terrain, and weather and provide the basis for application of various mitigation strategies to reduce risks to buildings associated with wildfires (CAL FIRE 2007).

a) **No Impact.** The proposed project is not proposing any new construction and the operations of the proposed project would not do anything to increase exposure to wildfire in either urban or natural settings. Trucks and helicopters would travel to and from the proposed project sites using existing maintenance roads and designated helicopter landing pads. Truck and helicopters would not fuel within the proposed project impact areas. Copper sulfate does not have a flash point nor is it flammable according to its MSDS. As discussed in Section 8f, proposed project activities would not require road closures or activities that would impair or physically interfere with an adopted emergency response plan or emergency evacuation plan. No impact would occur.

b) **No Impact.** The proposed project would not take place on a significantly sloped area nor would it expose people to fire risk based on prevailing wind. The proposed project would not expose people to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. No impact would occur.

c) **No Impact.** The proposed project does not propose construction of any kind. Therefore, the proposed project would have no impact on exacerbating fire risk due to the construction of new facilities. No impact would occur.

d) **No Impact.** The operation of the proposed project would not expose people or structures to any flooding or landslides as a result of post-fire slope instability or drainage channels. The Merritt Cut and Alabama Gate locations are portions of the Los Angeles Aqueduct and in the event of a flooding event application would not occur. The Haiwee Reservoir application sites would require the use of aircraft to apply the copper sulfate and would not expose people to flooding or landslide. Additionally, application would only happen one to five times a year as needed. No impact would occur.

References

California Department of Forestry and Fire Protection (CAL FIRE). 2007. Wildland Hazard and Building Codes, Inyo County Fire Hazard Severity Zones. Adopted by CAL FIRE on November 7, 2007. Available online at: http://www.fire.ca.gov/fire_prevention/fhsz_maps_inyo. Accessed on October 17, 2018.

2.21 Mandatory Findings of Significance

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XXI. MANDATORY FINDINGS OF SIGNIFICANCE —				
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☒	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

Discussion

a) **Less than Significant with Mitigation.** The proposed project includes the application of copper sulfate along the Los Angeles Aqueduct and two reservoirs to treat overgrowth of aquatic vascular plants with copper sulfate. Mitigation Measures BIO-1 through BIO-6 would ensure that operation of the proposed project would not result in significant impact to wildlife populations or habitat for fish and wildlife species. The impact would be less than significant with mitigation.

b) **Less than Significant with Mitigation.** The proposed project sites are each located within properties owned and operated by LADWP. The proposed project consists of routine maintenance activity to maintain existing infrastructure effectivity and maintain water quality along the Los Angeles Aqueduct. Application events would be conducted a maximum of five times per year on an as-needed basis. Impacts related to the bioaccumulation of copper within the North and South Haiwee Reservoirs could result in potential cumulative impacts related to biological resources. The following outlines impacts as they pertain to special-status plants, special-status wildlife, riparian and natural communities, wetland habitat, and wildlife movement and nursery sites.

Special-Status Plants

Aquatic Plants. No aquatic special-status plants are expected to occur in the proposed project vicinity; therefore, no cumulative effects would occur.

Shoreline Plants. Cumulative effects to shoreline plants could result from additional facilities maintenance activities along the aqueduct and around the reservoirs. These

activities could include vegetation removal and use of other additives and treatments within the reservoir and aqueduct system. The addition of copper sulfates from the proposed project is not expected to contribute to incremental effects in a way that would be cumulatively considerable. Therefore, cumulative effects would be less than significant.

Upland Plants. Cumulative effects to upland plants could result from additional facilities maintenance activities along the aqueduct and around the reservoirs. These activities could include vegetation removal or development of natural habitats. However, the proposed project is located in a relatively undeveloped area, and the addition of copper sulfates contributed by the proposed project is not expected to contribute to incremental effects in a way that would be cumulatively considerable. Therefore, cumulative effects would be less than significant.

Special-Status Wildlife

Shoreline Wildlife. Cumulative effects to special-status shoreline wildlife could occur as a result of bioaccumulation related to previous copper sulfate treatments, as well as due to the effects of ongoing operations and maintenance activities at the reservoirs and aqueduct.

While it is expected that copper sulfate applied in the aqueduct would be largely carried downstream and become continually more diluted, it is also expected that copper applications in the reservoirs would likely accumulate in the bottom sediments of the reservoirs. Because copper sulfate could result in wildlife toxicity due to bioaccumulation or direct toxicity from exposure to accumulated copper sulfates in bottom sediments from repeat applications, including previous applications that are not part of the proposed project, cumulative effects to shoreline wildlife species could be potentially significant, depending on the existing levels of copper sulfates within sediments. With implementation of Mitigation Measure BIO-6, cumulative effects to shoreline special-status wildlife would be less than significant.

Upland Wildlife. Ongoing operations and maintenance activities that occur at the reservoirs and aqueduct in addition to the proposed project are assumed to be relatively low impact; therefore, with implementation of Mitigation Measures BIO-3 and BIO-4 to reduce the proposed project's contribution to cumulative vehicle-related mortalities to wildlife species such as desert tortoise; implementation of Mitigation Measure BIO-5 to reduce the proposed project's contribution to cumulative effects to nesting upland birds; and implementation of an aquatic pesticide monitoring program under Mitigation Measure BIO-6 to reduce the proposed project's contribution to potential cumulative effects to upland wildlife through bioaccumulation within the food chain, overall cumulative effects to upland special-status wildlife would be less than significant.

Riparian Habitat and Sensitive Natural Communities

Cumulative impacts to riparian habitat and sensitive natural communities could occur due to copper sulfate accumulation in the sediments and shorelines of reservoirs from applications prior to those under the proposed project. Accumulation of copper sulfate could disrupt ecological processes and decrease the health of these communities. However, with implementation of a pesticide monitoring program under Mitigation Measure BIO-6, cumulative impacts would be less than significant.

Federal Wetlands

The proposed project would not result in direct impacts to federal wetlands or the loss of federal wetlands. Ecological impacts to federal wetlands would be the same as those described under riparian habitat and sensitive natural communities. Accumulation of copper sulfate from the proposed project in combination with copper sulfate from previous applications could disrupt ecological processes and decrease the health of these communities. However, with implementation of a pesticide monitoring program as outlined in Mitigation Measure BIO-6, cumulative impacts would be considered less than significant.

Wildlife Movement and Nursery Sites

The proposed project site generally does not provide a corridor for the movement of terrestrial or aquatic wildlife species. Migratory waterfowl and shorebirds may use the reservoirs as stopover habitat during migration, but in combination with additional past, current, and reasonably foreseeable future projects, the proposed project is not expected to cumulatively constrain the use of this habitat. Cumulative impacts to wildlife movement would be less than significant.

The proposed project area may provide wildlife nursery habitat in the form of shallow waters for fish and amphibian maturation and nearby potential roost structures and trees for bat maternity colonies. However, the proposed project area does not provide uniquely valuable nursery habitat for these species and the provided aquatic habitat is artificial with fish species introduced for recreational purposes. Cumulative impacts to wildlife nursery sites would be less than significant.

Mitigation Measures

> **BIO-6:** LADWP shall develop a plan to assess the current and future levels of copper sulfate accumulation in reservoir sediments and/or aquatic organisms and determine whether future copper sulfate applications could result in the introduction of toxic levels of copper sulfates into the food chain. This monitoring program may be conducted as part of monitoring under the APAP, but shall also assess the potential for compounding (or mitigating) effects if multiple types chemical applications are occurring or have previously occurred within the same water body. The monitoring program shall include a biological sampling component to ensure that bioaccumulation of copper sulfates within the ecosystem is not reaching levels of concern, as determined by the USEPA Office of Pesticide Programs. A level of concern exceedance or other indication of

toxicity risks would trigger further investigations and potential modifications to treatment procedures.

c) **Less than Significant.** With implementation of the best management practices outlined in the APAP and APAP Monitoring Plan, impacts to human beings would be less than significant. The proposed project may cause limited and temporary noise disturbance during application, which would be considered less than significant. Therefore, the effects of the proposed project on human beings would be less than significant.

SECTION 3
Report Preparers

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Appendix A

Aquatic Pesticides Application Plan

Los Angeles Department of Water and Power

Aquatic Pesticides Application Plan (APAP)

Order No. 2013-0002-DWQ
NPDES No. CAG990005

Statewide General National Discharge Pollutant Discharge Elimination System (NPDES) Permit For Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications

August 6, 2018

Department of Water and Power
City of Los Angeles
Environmental Affairs
Wastewater Quality and Compliance Group
111 North Hope Street, Room 1213
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APPENDICES

I. INTRODUCTION AND LOCATIONS

The Los Angeles Department of Water and Power (LADWP) has applied for a statewide general National Pollutant Discharge Elimination System (NPDES) Permit from the State Water Resources Control Board (SWRCB) to continue application of aquatic herbicides (glyphosate, imazapyr, and triclopyr based products) and algaecides (copper sulfate) to control weeds and invasive species at the LADWP facilities listed in Table 1.

TABLE 1. LADWP Aquatic Weed Control Programs

Facility/Site	Region (RWQCB)	City/ County	Problem Biota	Associated Problems	Aquatic Herbicides (active ingredients)
Van Norman Complex	4	Granada Hills / Los Angeles	Invasive plant species (Arundo, Salt Cedar, Castor Bean, Tree Tobacco; other invasive species with potential to occur: perennial pepper-weed, fennel, eucalyptus, pampas grass, Brazilian peppertree, Mexican fan palm, Peruvian peppertree, stinkwort, tocalote, mustard)	To maintain debris basin functions(provide sediment collection and flood control) to the site and site structures; removal of invasive species; routine maintenance.	Glyphosate (Roundup or Roundup Custom)
Lower Franklin Reservoir Facility	4	Los Angeles / Los Angeles	Arundo, bulrush/cattails, castor bean, acacia, smartweed	Uncontrolled growth of weeds/invasive species could impede water flow; could result in standing water that attracts mosquitos.	Glyphosate (Roundup or Roundup Custom)
Barren Ridge Renewable Transmission Project (BRRTP)	4	Angeles National Forest / Los Angeles	Weeds, mustard species, flowering tocolote, reproductive parts of smilo grass, tree tobacco, blessed thistle, Eurasian watermilfoil	Required by Forest Service to aid in eradication of invasive, non-native plant species; for fire protection near planned transmission towers and switching station	Glyphosate (Roundup or Roundup Custom) and triclopyr (Garlon)
Castaic Creek	4	Castaic / Los Angeles	Weeds	Required for routine facility maintenance	Glyphosate (Roundup Custom)
Big Tujunga and Little Tujunga Canyons	4	Angeles National Forest / Los Angeles	Invasive weeds (Arundo donax)	Arundo donax impacts water resources through transpiration, ignition source for wildfires, leads to flood damage and reduced stream flow, causes high level of debris	Glyphosate (Aquamaster), imazapyr (Habitat), triclopyr (Renovate 3)
Alabama Gates	6	Lone Pine/Inyo County	Algae, pondweed	Uncontrolled growth of algae along the Los Angeles Aqueduct affects flows at the intake structures to Owens Lake	Copper-sulfate

II. PROJECT BACKGROUND

LADWP is the nation's largest municipal utility. It provides power and drinking water to approximately 4 million customers in the City of Los Angeles. LADWP owns and operates a complex water distribution system that includes the Los Angeles Aqueduct, reservoirs, canals, streams and the Owens River. The system of water conveyances begins in the north at Mono Lake and terminates at the Los Angeles Filtration Plant in Sylmar. After treatment in Sylmar, drinking water is distributed through a system of pipelines and reservoirs to the end users. LADWP owns and operates its own generation, transmission and distribution systems.

Need for Pesticides (Herbicide) Applications

LADWP applies aquatic herbicides for these purposes: 1) to remove vegetation (primarily invasive species) that can impair the ability of debris basins to collect sediment and/or provide flood control protection; 2) to eliminate impediments to stormwater flow, thus avoiding standing water that could serve as breeding grounds for mosquitoes and/or encourage unwanted vegetation growth; and 3) for the removal of weeds/vegetation including invasive species as part of routine facility maintenance and operational control; weeds/vegetation can attract burrowing rodents that can undermine slopes/structures and can also attract snakes. Note that aquatic herbicides are not applied to drinking water.

Following is detailed information about each LADWP facility where aquatic herbicides will or may be utilized.

A. VAN NORMAN COMPLEX

1. Site Description

The Van Norman Complex (VNC) is located within the Granada Hills area of Los Angeles. It includes a Lower Detention Basin and other facilities, as well as two debris basins. The Upper Debris Basin (UDB) is approximately three (3) acres in size, while the Middle Debris Basin is 15 acres in size. The basins provide sediment collection and flood control to the adjacent facilities. The low-flow channels of the basins must periodically be cleaned of sediment and vegetation to maintain their functions and hydraulic capacity.

Prior to 1994, both basins were approaching their capacity but were functioning properly. However, following the 1994 Northridge Earthquake, the UDB and MDB were subjected to large sediment loads which filled them beyond their capacities. Beginning in 1997, both debris basins were cleared of debris and vegetation and a new channel was created to channel storm water through the center of the basins. The project was completed in 2000.

Maintenance of the UDB and MDB is permitted under California Department of Fish and Game (CDFG) Streambed Alteration Agreement (SAA) # 1600-2004-0288-R5 2010-2022 (CDFG 2010) and California Regional Water Quality Control board (RWQCB) Water Quality Certification (WQC) No. 12-128 (RWQCB 2012). Both the SAA and the WQC require the removal from the basins of Arundo (Arundo donax), also referred to as giant reed, in addition to other invasive species

after each sediment removal activity. Vegetation/invasive species removal is not conducted on a regular schedule; the amount of rain and sediment accumulation dictates when removal will occur.

Stormwater from Weldon Creek enters the Complex at the north end of the UDB and passes southward into the MDB. Grapevine Creek and Bee Canyon ultimately drain into the MDB. After sand and gravel settles out of the stormwater in the UDB and MDB, the stormwater ultimately flows into Bull Creek via a concrete channel at the southern end of the MDB. Bull Creek ultimately discharges to concrete lined portions of the Los Angeles River.

2. Treatment Area

The treatment area consists of portions of the channel that direct storm water through the center of the basins. This runs roughly through the center of the north end of the facility, and along the southeastern portion of the facility. See map of treatment area in Appendix A, Figure 1. Red lines/shading indicate the treatment areas.

3. Aquatic Weeds and Rationale

Both the SAA and WQC require the removal from the basins, after each sediment removal activity, of Arundo, also referred to as giant reed, in addition to other invasive species (including but not limited to, salt cedar, castor bean, tree tobacco, all of which have been observed on site). LADWP consulted with a firm whose biologists surveyed the site to identify invasive species. The firm produced an "Arundo and Invasive Species Removal Plan (Plan)" for the VNC (See Attachment 1). The Plan describes treatment options for each invasive species: the preferred treatment method, timing of treatment, and the most effective aquatic herbicide/active ingredient. It also provided treatment options for invasive species with a high potential for occurring on site, including but not limited to: perennial pepperweed, fennel, eucalyptus, pampas grass, and Brazilian peppertree.

The Plan excludes species that are from northern California or are found in mountains or rangelands, as these are not likely to occur at the site.

4. Aquatic Herbicides Applied and Method of Application

Aquatic Herbicide: Roundup or Roundup Custom ("Roundup"), which contains glyphosate.

Application Method: The Roundup is stored in a stainless steel tank which is trailer-mounted or placed on a flat-bed and then transported to treatment areas. A hose from the tank is used to apply the pesticide; the tank remains secured on the trailer/flat-bed so that no spilling occurs. LADWP will apply pesticides only when there is a low chance of precipitation per the seven (7) day forecast and will endeavor to apply pesticides only the application/treatment areas are dry.

5. Decision to Select Herbicides

LADWP contracted with a consulting firm to produce an invasive species removal plan for the Van Norman complex. A team of biologists conducted a site survey to identify vegetation, whether native, non-native, and invasive. The team's report indicated that treatment options include a combination of manual removal and herbicide treatments. Mechanical removal was determined to be ineffective for the targeted vegetation because it does not remove the entire root systems and could even increase infestations of some species. An aquatic herbicide with glyphosate was identified as the most effective. Mechanical removal therefore can be used only

for areas that do not include the targeted species and where the terrain is sufficiently flat. Manual removal is primarily intended for minor infestations of new Arundo plants.

6. Herbicide Dose and Determination
Roundup is applied consistent with product labeling instructions for control of aquatic weeds.

7. Gates and Control structures
Not applicable.

8. Exception period.
Not applicable.

9. Monitoring Plan
See Appendix B.

10. Procedures to Prevent Sample Contamination from Persons, Equipment, and Vehicles Associated with Algaecide and Aquatic Herbicide Application
Water quality sampling is conducted by trained LADWP staff following established procedures designed to prevent contamination of samples. Procedures that prevent sample contamination include:

- Use clean sample bottles that are non-reactive. Glass and polyethylene bottles are used for water samples.
- Wear gloves that are powder-free vinyl to avoid the contamination associated with latex gloves.
- Samples are immediately placed in an ice chest away from contaminants as soon as the samples are taken.

11. Best Management Practices Implemented
Application: The herbicide is applied by LADWP personnel, contractor, or subcontractor who have either a Qualified Applicator Certificate or License issued by the State of California Department of Pesticide Regulation (Licensing Certification Program). These individuals are trained to ensure that algaecides and aquatic herbicides are applied at rates consistent with label requirements and in a manner that avoids potential adverse effects.

Notification: Not applicable.

Treatment: Correctly mixed aquatic herbicides are applied during daylight hours by certified personnel using properly-maintained and calibrated equipment capable of delivering desired volumes. Whenever feasible, localized applications are utilized (e.g., direct painting of herbicide on cut stumps), rather than foliar applications, to limit the possibility for drift and impacts to neighboring native species. However, for plants that are less than 4 feet tall, foliar application is less labor intensive and more effective. It is easier to minimize overspray or drift when treating smaller plants. Drift management requirements are also followed through techniques such as controlling droplet size, nozzle orientation, and avoiding spray applications when wind speed exceeds 10 miles per hour. The team of biologists specifically recommended cutting of Arundo to a height of 6 inches or less and “painting” the remaining stumps with the herbicide with a cloth-covered wand

or sponge, or by spraying with a hand mister. Manual removal is primarily intended for minor infestation of new Arundo plants. Because plant rhizome materials may remain, manual removal is generally not recommended.

Spill Prevention and Cleanup: The Roundup Custom is stored in a stainless steel tank which is trailer-mounted or placed on a flat-bed and then transported to treatment areas. A hose from the tank is used to apply the pesticide; the tank remains secured on the trailer/flatbed so that no spilling occurs. Spray nozzles are attached to the hose that runs from the tank. Spray nozzles cannot dispense the herbicide unless the nozzle is activated (squeezed/triggered) by treatment personnel. When crews utilize backpack-style tanks, hose and nozzle connections and all caps/lids are inspected for tight/complete connections and closure prior to use to prevent leaks and spills.

However, should a spill occur, staff will follow the field division's established emergency response procedures and refer to the material safety data sheet (MSDS) for instructions on containing and cleaning up the spill. Emergency response and MSDS procedures will be reviewed regularly. A copy of the emergency response procedures and material safety data sheets will be available during each treatment. Cleanup equipment will be kept in good working order and will be readily available at each application site.

Water Quality Monitoring: Should the application/treatment areas contain water at the time of application, water quality monitoring will follow in accordance with permit requirements; see Appendix B.

Access: The entire Van Norman Complex has locked access gates that prevent entry by other than authorized personnel. Public access is not allowed.

Post-Treatment: The efficacy of the treatment is evaluated at the conclusion of the growing season during which treatment took place, and again at the commencement of the new growing season.

12. Possible Alternatives to Algaecides and Aquatic Herbicide Use

a. Evaluation of Management Options

(1) No Action

Typically, a "no action" approach is utilized until a certain threshold is reached, whereby excessive weed and plant growth begin to block channels and prevent stormwater from exiting the site. When stormwater cannot leave the site, the debris basins and channel would become congested with vegetation and their ability to collect sediment and/or provide flood control protections would be impaired. A "no action" option is therefore not acceptable after the threshold has been reached.

(2) Prevention

Nutrient Control. For this site, the vegetation already exists and must be eradicated. It is hoped that the eradication program may prevent the regrowth of vegetation, but this cannot be determined until the beginning of the next new growth season.

(3) Mechanical or Physical Methods
Mechanical removal was determined to be ineffective for the targeted vegetation because it does not remove the entire root systems and could even increase infestations of some species. An aquatic herbicide with glyphosate was identified as the most effective. Mechanical removal therefore can be used only for areas that do not include the targeted species and where the terrain is sufficiently flat. It is also infeasible for the majority of the site due to the following: lack of access for heavy equipment, uneven terrain, areas that are too wet or rocky for equipment or too dangerous for personnel to carry the tools required for mechanical removal.

(4) Cultural Method
Methods such as controlled burning are not suitable for aquatic vegetation or this specific site.

(5) Biological Control Agents
Biological methods such as the introduction of ducks or other wildlife are not suitable for a drinking water facility, as there may be impacts to water quality from animal feces, increases in turbidity levels and nutrients, as well as impacts to other existing, desirable species.

(6) Algaecides and Aquatic Herbicides
Aquatic Herbicide Treatment. Glyphosate has been proven to be an environmentally safe herbicide that is effective at reducing targeted aquatic weeds without adverse effects on non-target species. If the Van Norman Complex were not treated, aquatic weeds would negatively impact the ability of the on-site debris basins to collect sediment and stormwater and prevent flooding.

b. Decision Matrix to Select the Most Appropriate Formulation
The decision matrix below evaluates the aquatic weed options identified for the Van Norman Complex (section a: "Evaluation of Management Options" above).

Van Norman Complex						
Decision Making Criteria	**No Action**	**Prevention**	**Mechanical or Physical**	**Cultural Methods**	**Biological Agents**	**Aquatic Herbicides**
Is the impact to the environmental low or easily mitigated?	Yes	Yes	Yes	Yes	Yes	Yes
Is the cost of this option reasonable?	N/A	No	No	No	No	Yes
Has (have) the method(s) been effectively implemented at this site?	No	No	Yes	No	No	Yes
Option(s) selected for Van Norman Complex						X

B. LOWER FRANKLIN RESERVOIR FACILITY

1. Site Description

The Lower Franklin Reservoir Facility includes a surge tank, power house, chlorination station, and a stormwater channel. The 168-acre site is situated in a canyon in the Santa Monica Mountains National Recreation Area, adjacent to the City of Beverly Hills. This Facility has been in service since 1982.

Stormwater enters the facility from all directions, as the facility is lower than (below) all adjacent properties, but in general, the overall site slopes from north to the south and any stormwater in the stormwater channel roughly follows this same path.

The area below the reservoir has a low point that has formed a natural channel that runs generally north to south. Trees and shrubs were observed on the sides of the channel. Invasive species (Arundo and cattails) were observed in the bottom of the stormwater channel. The invasive species must be removed as they are impediments to the flow of stormwater through the channel and into a storm drain located at the southwest corner of the site. This storm drain eventually connects to the Ballona Creek.

There are concrete gutters at the toe of some site hillsides, adjacent to the roadway.

2. Treatment Area

The treatment area consists of the middle section of the natural channel. See map in Appendix A, Figure 2. Red lines indicate the treatment area.

3. Aquatic Weeds and Rationale

Vegetation must be removed so that stormwater can flow unimpeded through the site. The targeted vegetation includes invasive species such as Arundo and bulrush/cattails.

4. Aquatic Herbicides Applied and Method of Application

Aquatic Herbicide: Roundup or Roundup Custom ("Roundup") for Aquatic and Terrestrial Use. This product contains glyphosate.

Application Method: The Roundup is stored in tanks that are transported to the site via a pickup truck. The truck is also equipped with a mounted or spray rig. In the channel bottom, a backpack style tank with a nozzle is used by crew member who is certified to apply pesticides/herbicides. The flow and rate of the herbicide can be controlled via the nozzle. Along the roadway, herbicides can be applied from the truck-mounted rig. LADWP will apply pesticides only when there is a low chance of precipitation per the seven (7) day forecast, and will endeavor to apply pesticides only the application/treatment areas are dry.

5. Decision to Select Herbicides

Most of the treatment area is not accessible to mowers or trucks; mechanical treatment is also infeasible to due to the site characteristics (uneven areas, small drop-offs, soft soil).

6. Herbicide Dose and Determination
Roundup is applied consistent with product labeling instructions for control of aquatic weeds.

7. Gates and Control structures
Not applicable.

8. Exception period.
Not applicable.

9. Monitoring Plan
See Appendix B.

10. Procedures to Prevent Sample Contamination from Persons, Equipment, and Vehicles Associated with Algaecide and Aquatic Herbicide Application
Water quality sampling is conducted by trained LADWP staff following established procedures designed to prevent contamination of samples. Procedures that prevent sample contamination include:

- Use clean sample bottles that are non-reactive. Glass and polyethylene bottles are used for water samples.
- Wear gloves that are powder-free vinyl to avoid the contamination associated with latex gloves.
- Samples are immediately placed in an ice chest away from contaminants as soon as the samples are taken.

11. Best Management Practices Implemented
Application: The herbicide is applied by LADWP personnel, contractor, or subcontractor who have either a Qualified Applicator Certificate or License issued by the State of California Department of Pesticide Regulation (Licensing Certification Program). These individuals are trained to ensure that algaecides and aquatic herbicides are applied at rates consistent with label requirements and in a manner that avoids potential adverse effects.

Notification: Not applicable

Treatment: Correctly mixed aquatic herbicides are applied during daylight hours by certified personnel using properly-maintained and calibrated equipment capable of delivering desired volumes. Whenever feasible, use should be limited to localized applications (e.g., direct painting of herbicide on cut stumps), rather than foliar applications, to limit the possibility for drift and impacts to neighboring native species. However, for plants that are less than 4 feet tall, foliar application is less labor intensive and more effective. Additionally, it is easier to minimize overspray or drift when treating smaller plants. Drift management requirements are also followed, such as controlling droplet size, nozzle orientation, and avoiding spray applications when wind speed exceeds 10 miles per hour. Treatment may entail first cutting the Arundo to a height of 6 inches of less and the painting the remaining stumps with the herbicide. The stumps can be painted with a cloth-covered wand or sponge or spraying with a hand mister. Manual removal is primarily intended for minor infestation of new Arundo plants. But because plant rhizome materials may remain, manual removal is generally not recommended.

Spill Prevention and Cleanup: The Roundup Custom is stored in a stainless steel tank which is trailer-mounted or placed on a flat-bed and then transported to treatment areas. A hose from the tank is used to apply the pesticide; the tank remains secured on the trailer/flatbed so that no spilling occurs. Spray nozzles are attached to the hose that runs from the tank. Spray nozzles cannot dispense herbicide unless the nozzle is activated (squeezed/triggered) by treatment personnel. When crews utilize backpack-style tanks, hose and nozzle connections and all caps/lids are inspected for tight/complete connections and closure prior to use to prevent leaks and spills.

However, should a spill occur, staff will follow the field division's established emergency response procedures and refer to the material safety data sheet (MSDS) for instructions on containing and cleaning up the spill. Emergency response and MSDS procedures will be reviewed regularly. A copy of the emergency response procedures and material safety data sheets will be available during each treatment. Cleanup equipment will be kept in good working order and will be readily available at each application site.

Water Quality Monitoring: Should the application/treatment areas contain water at the time of application, water quality monitoring will follow in accordance with permit requirements; see Appendix B.

Access: The entire Lower Franklin Reservoir Facility has locked access gates that prevent entry by other than authorized personnel. Public access is not allowed.

Post-Treatment: The efficacy of the treatment is evaluated at the conclusion of the growing season.

12. Possible Alternatives to Algaecides and Aquatic Herbicide Use

a. Evaluation of Management Options

(1) No Action

Typically, a "no action" approach is utilized until a threshold is reached, whereby excessive weed and plant growth begin to impede the flow of stormwater; flooding could result. A "no action" option is therefore not acceptable after the threshold has been reached.

(2) Prevention

Nutrient Control. For this site, the vegetation already exists and must be eradicated. It is hoped that the eradication program may prevent the regrowth of vegetation, but this cannot be determined until the beginning of a new growth season.

(3) Mechanical or Physical Methods

Mechanical removal is physically infeasible due to the following: lack of access for heavy equipment, uneven terrain, areas that are too wet or rocky for equipment or too dangerous for personnel to carry the tools required for mechanical removal.

(4) Cultural Method

Methods such as controlled burning are not suitable for aquatic vegetation or this specific site.

(5) Biological Control Agents
Biological methods such as the introduction of ducks or other wildlife are not suitable for a drinking water facility, as there may be impacts to water quality from animal feces, increases in turbidity levels and nutrients, and impacts to other existing, desirable species.

(6) Algaecides and Aquatic Herbicides
Aquatic Herbicide Treatment. Glyphosate has been proven to be an environmentally safe herbicide that is effective at reducing targeted aquatic weeds without adverse effects on non-target species. If the Lower Franklin Reservoir Facility were not treated, aquatic weeds would impede the flow of stormwater through the site, which could lead to flooding.

b. Decision Matrix to Select the Most Appropriate Formulation
The decision matrix below evaluates the aquatic weed options identified for the Lower Franklin Reservoir Facility (section a: "Evaluation of Management Options" above).

Lower Franklin Reservoir Facility						
Decision Making Criteria	**No Action**	**Prevention**	**Mechanical or Physical**	**Cultural Methods**	**Biological Agents**	**Aquatic Herbicides**
Is the impact to the environmental low or easily mitigated?	Yes	Yes	Yes	Yes	Yes	Yes
Is the cost of this option reasonable?	N/A	No	No	No	No	Yes
Has (have) the method(s) been effectively implemented at this site?	No	No	Yes	No	No	Yes
Option(s) selected for Lower Franklin Reservoir Facility						X

C. BARREN RIDGE RENEWABLE TRANSMISSION PROJECT (BRRTP)

1. Site Description

LADWP is undertaking the Barren Ridge Renewable Transmission Project (BRRTP) to carry renewable energy. This electricity project entails construction of transmission lines, towers to support new transmission lines, and a switching station. This document pertains to the portion of the project that lies within the Angeles National Forest (ANF), which is under the jurisdiction of the National Forest Service (NSF).

The site is roughly bounded by the 138 Highway to the north and the northeast, California State Route 14 to the east and southeast, and the Interstate 5 to the west. There are ephemeral streambeds in the site, but none adjacent to identified treatment areas.

Weed control is required at individual locations that fall within three areas: a) along the 13-mile route of the new Barren Ridge-Haskell Canyon transmission line; b) along the13 mile-long existing Barren Ridge-Rinaldi Transmission Line; and along the four mile-long new circuit that will be constructed between Haskell Canyon and the Castaic Power Plant. Construction will take place within designated utility corridors.

2. Treatment Area

Weed treatment is required per the BRRTP Final Environmental Impact Report/Final Environmental Impact Statement (FEIR/FEIS) (LADWP, Bureau of Land Management [BLM], and United States Forest Service [USFS] 2013), and U. S. Fish and Wildlife Service (USFWS) Biological Opinion (USFWS 2012). Treatment is intended to treat invasive plant populations that have a negative ecological impact and/or pose fire hazards.

Treatment will be limited to individual locations where transmission towers (for transmission lines) and a switching station will be constructed and where botanists have identified invasive weeds. See map in Appendix A, Figure 3.

3. Aquatic Weeds and Rationale

Weed treatment is required per the BRRTP Final Environmental Impact Report/Final Environmental Impact Statement (FEIR/FEIS) (LADWP, Bureau of Land Management [BLM], and United States Forest Service [USFS] 2013), and U. S. Fish and Wildlife Service (USFWS) Biological Opinion (USFWS 2012). Treatment is intended to treat invasive plant populations that have a negative ecological impact and/or pose fire hazards.

This is a remote area with rocky, uneven terrain, accessible via dirt fire roads. The Forest Service requires hand removal (pulling) and/or cutting of most weed species. After hand removal, the immediate removal site is spot-treated with an herbicide.

4. Aquatic Herbicides Applied and Method of Application

Aquatic Herbicide: Roundup or Roundup Custom (“Roundup”), which contains glyphosate, or Garlon, which contains triclopyr.

Application Method: The selected herbicide is stored in tanks that are transported to the site via a pickup truck. The truck is also equipped with a mounted or spray rig. The truck can be used for treatment sites in close proximity to fire roads. For treatment sites that are beyond the range of the truck, a backpack style tank with a nozzle will be used by crew member who is certified to apply pesticides/herbicides. The flow and rate of the herbicide can be controlled via the nozzle. LADWP will apply pesticides only when there is a low chance of precipitation per the seven (7) day forecast, and will endeavor to apply pesticides only the application/treatment areas are dry.

5. Decision to Select Herbicides
Treatment protocol is determined by the Forest Service, which mandates hand removal (pulling) and/or cutting of most weeds/invasive species, followed by spot treatment with an herbicide.

6. Herbicide Dose and Determination
Roundup or Garlon is applied consistent with product labeling instructions for control of aquatic weeds.

7. Gates and Control structures
Not applicable.

8. Exception period.
Not applicable.

9. Monitoring Plan
See Appendix B.

10. Procedures to Prevent Sample Contamination from Persons, Equipment, and Vehicles Associated with Algaecide and Aquatic Herbicide Application
Water quality sampling is conducted by trained LADWP staff following established procedures designed to prevent contamination of samples. Procedures that prevent sample contamination include:

- Use clean sample bottles that are non-reactive. Glass and polyethylene bottles are used for water samples.
- Wear gloves that are powder-free vinyl to avoid the contamination associated with latex gloves.
- Samples are immediately placed in an ice chest away from contaminants as soon as the samples are taken.

11. Best Management Practices Implemented

Application: The herbicide is applied by LADWP personnel, contractor, or subcontractor who have either a Qualified Applicator Certificate or License issued by the State of California Department of Pesticide Regulation (Licensing Certification Program). These individuals are trained to ensure that algaecides and aquatic herbicides are applied at rates consistent with label requirements and in a manner that avoids potential adverse effects.

Notification: The Forest Service has approved LADWP's Treatment Plan.

Treatment: Correctly mixed aquatic herbicides are applied – via spot treatment - during daylight hours by certified personnel using properly-maintained and calibrated equipment capable of delivering desired volumes. Drift management requirements are also followed, such as controlling droplet size, and nozzle orientation.

Spill Prevention and Cleanup: The Roundup or Garlon is stored in a stainless steel tank which is trailer-mounted or placed on a flat-bed and then transported to treatment areas. A hose from the tank is used to apply the pesticide; the tank remains secured on the trailer/flat-bed so that no spilling occurs. Nozzles are attached to the hose that runs from the tank. Nozzles cannot dispense herbicide unless the nozzle is activated (squeezed/triggered) by treatment personnel. When crews utilize backpack-style tanks, hose and nozzle connections and all caps/lids are inspected for tight/complete connections and closure prior to use to prevent leaks and spills.

However, should a spill occur, staff will follow the field division's established emergency response procedures and refer to the material safety data sheet/s (MSDS) for instructions on containing and cleaning up the spill. Emergency response and MSDS procedures will be reviewed regularly. A copy of the emergency response procedures and material safety data sheets will be available during each treatment. Cleanup equipment will be kept in good working order and will be readily available at each application site.

Water Quality Monitoring: Should the application/treatment areas contain water at the time of application, water quality monitoring will follow in accordance with permit requirements; see Appendix B.

Access: The fire roads leading to the treatment areas have multiple locked gates that preclude access by other than authorized personnel.

Post-Treatment: The efficacy of the treatment is evaluated at the conclusion of the growing season.

12. Possible Alternatives to Algaecides and Aquatic Herbicide Use

a. Evaluation of Management Options

(1) No Action

Typically, a "no action" approach is utilized. At this site, weed treatment is required by the Forest Service to address invasive plant species and to minimize fire hazards. Because of existing weed infestation, the "no action" option is therefore not feasible.

(2) Prevention

Nutrient Control. For this site, the vegetation already exists and must be eradicated. It is hoped that the eradication program may prevent the regrowth of vegetation, but this cannot be determined until the beginning of a new growth season.

(3) Mechanical or Physical Methods

Mechanical removal is infeasible due to Forest Service requirements.

(4) Cultural Method
Methods such as controlled burning are not allowed within the ANF.

(5) Biological Control Agents
Biological methods are not allowed within the ANF.

(6) Algaecides and Aquatic Herbicides
Aquatic Herbicide Treatment. Glyphosate and triclopyr have been proven to be environmentally safe herbicides that are effective at reducing targeted weeds/species without adverse effects on non-target species.

b. **Decision Matrix to Select the Most Appropriate Formulation**
The decision matrix below evaluates the aquatic weed options identified for the BRRTP (section a: "Evaluation of Management Options" above).

Barren Ridge Renewable Transmission Project						
Decision Making Criteria	**No Action**	**Prevention**	**Mechanical or Physical**	**Cultural Methods**	**Biological Agents**	**Aquatic Herbicides**
Is the impact to the environmental low or easily mitigated?	Yes	Yes	Yes	Yes	Yes	Yes
Is the cost of this option reasonable?	N/A	No	No	No	No	Yes
Has (have) the method(s) been effectively implemented at this site?	No	No	Yes	No	No	Yes
Option(s) selected for Van Norman Complex						X

D. CASTAIC CREEK STORMWATER BYPASS CHANNEL/CHECK BASINS & EMERGENCY SPILLWAY

1. Site Description
The Castaic Creek Stormwater Bypass Channel is adjacent to the hydroelectric Castaic Power Plant in northern Los Angeles County, within the Los Padres National Forest. The Channel includes three debris basins, each with its own "check dams." In addition, also located at the Castaic Power Plant is an Emergency Spillway.

2. Treatment Area
Should it be necessary, the Emergency Spillway allows for the overflow of water from the Elderberry Forebay, immediately adjacent to the Power Plant, into Castaic Lake. An herbicide is occasionally applied, as spot treatment, as vegetation can undermine the Emergency Spillway and attract burrowing rodents. The debris basins provide sediment collection and flood control. Herbicides are applied as needed inside the basins and on their check dams to treat vegetation that could impede stormwater flow and impair flood prevention functions. See map of treatment areas in Appendix A, Figure 4.

3. Aquatic Weeds and Rationale
Mechanical and hand removal are employed when feasible but typically the amount of vegetation in the debris basin determines the need for treatment with herbicides. An aquatic herbicide with glyphosate is used to treat vegetation because of its proven effectiveness.

4. Aquatic Herbicides Applied and Method of Application
Aquatic Herbicide: Roundup or Roundup Custom ("Roundup"), which contains glyphosate.

Application Method: Roundup is stored in a stainless steel tank which is trailer-mounted or placed on a flat-bed truck and then transported to treatment areas. A hose from the tank is used to apply the pesticide; the tank remains secured on the trailer/flat-bed so that no spilling occurs. When the truck cannot be used due to steep embankments or distance from the trailer/flat-bed, crews will utilize backpack-style tanks. LADWP will apply pesticides only when there is a low chance of precipitation per the seven (7) day forecast, and will endeavor to apply pesticides only the application/treatment areas are dry.

5. Decision to Select Herbicides
Mechanical and hand removal are employed whenever feasible, but the steep Emergency Spillway embankment and a large amount of vegetation inside the debris basin often necessitate herbicide treatment. An aquatic herbicide with glyphosate was identified as the most effective eradication method.

6. Herbicide Dose and Determination
Roundup is applied consistent with product labeling instructions for control of aquatic weeds.

7. Gates and Control structures
Not applicable.

8. Exception period.
Not applicable.

9. Monitoring Plan
See Appendix B.

10. Procedures to Prevent Sample Contamination from Persons, Equipment, and Vehicles Associated with Algaecide and Aquatic Herbicide Application
Water quality sampling is conducted by trained LADWP staff following established procedures designed to prevent contamination of samples. Procedures that prevent sample contamination include:

- Use clean sample bottles that are non-reactive. Glass and polyethylene bottles are used for water samples.
- Wear gloves that are powder-free vinyl to avoid the contamination associated with latex gloves.
- Samples are immediately placed in an ice chest away from contaminants as soon as the samples are taken.

11. Best Management Practices Implemented
Application: The herbicide is applied by LADWP personnel, contractor, or subcontractor who have either a Qualified Applicator Certificate or License issued by the State of California Department of Pesticide Regulation (Licensing Certification Program). These individuals are trained to ensure that algaecides and aquatic herbicides are applied at rates consistent with label requirements and in a manner that avoids potential adverse effects.

Notification: Not applicable.

Treatment: Correctly mixed aquatic herbicides are applied during daylight hours by certified personnel using properly-maintained and calibrated equipment capable of delivering desired volumes. Whenever feasible, localized spot applications are utilized rather than foliar applications, to limit the possibility for drift and impacts to neighboring native species. Drift management requirements are also followed through techniques such as controlling droplet size, nozzle orientation, and avoiding spray applications when wind speed exceeds 10 miles per hour.

Spill Prevention and Cleanup: The Roundup is stored in a stainless steel tank which is trailer-mounted or placed on a flat-bed and then transported to treatment areas. A hose from the tank is used to apply the pesticide; the tank remains secured on the trailer/flat-bed so that no spilling occurs. Spray nozzles are attached to the hose that runs from the tank. Spray nozzles cannot dispense herbicide unless the nozzle is activated (squeezed/triggered) by treatment personnel. When crews utilize backpack-style tanks, hose and nozzle connections and all caps/lids are inspected for tight/complete connections and closure prior to use to prevent leaks and spills.

However, should a spill occur, staff will follow the field division's established emergency response procedures and refer to the material safety data sheet (MSDS) for instructions on containing and cleaning up the spill. Emergency response and MSDS procedures will be reviewed regularly. A copy of the emergency response procedures and material safety data

sheets will be available during each treatment. Cleanup equipment will be kept in good working order and will be readily available at each application site.

Water Quality Monitoring: Should the application/treatment areas contain water at the time of application, water quality monitoring will follow in accordance with permit requirements; see Appendix B.

Access: The entire Castaic site is fenced; the entryway has security personnel, and all gates into the site are locked.

Post-Treatment: The efficacy of the treatment is evaluated at the conclusion of the growing season during which treatment took place, and again at the commencement of the new growing season.

12. Possible Alternatives to Algaecides and Aquatic Herbicide Use

a. Evaluation of Management Options

(1) No Action

A "no action" is infeasible, as the Emergency Spillway embankments and debris basin must be kept free of weeds for general maintenance purposes, to ensure integrity and to maintain flood control protection.

(2) Prevention

Nutrient Control. For this site, the vegetation already exists and must be eradicated. It is hoped that the eradication program may prevent the regrowth of vegetation, but this cannot be determined until the beginning of the next new growth season.

(3) Mechanical or Physical Methods

Mechanical and hand removal are employed whenever feasible but steep embankments and the amount of vegetation inside the debris basin often necessitate the use of an herbicide. Use of an aquatic herbicide with glyphosate was identified as the most effective method.

(4) Cultural Method

Methods such as controlled burning are not suitable for this specific site.

(5) Biological Control Agents

Biological methods are not suitable for this site; ducks and other wildlife are already present and have no impact on weed growth.

(6) Algaecides and Aquatic Herbicides

Aquatic Herbicide Treatment. Glyphosate has been proven to be an environmentally safe herbicide that is effective at reducing targeted aquatic weeds without adverse effects on non-target species.

b. Decision Matrix to Select the Most Appropriate Formulation

The decision matrix below evaluates the aquatic weed options identified for Castaic (section a: "Evaluation of Management Options" above).

Castaic Creek						
Decision Making Criteria	**No Action**	**Prevention**	**Mechanical or Physical**	**Cultural Methods**	**Biological Agents**	**Aquatic Herbicides**
Is the impact to the environmental low or easily mitigated?	Yes	Yes	Yes	Yes	Yes	Yes
Is the cost of this option reasonable?	N/A	No	No	No	No	Yes
Has (have) the method(s) been effectively implemented at this site?	No	No	Yes	No	No	Yes
Option(s) selected for Castaic Creek						X

E. BIG TUJUNGA AND LITTLE TUJUNGA CANYONS

1. Site Description

Big Tujunga and Little Tujunga canyons are located in the Big Tujunga and Little Tujunga Watersheds, which are the headwaters of the Los Angeles River Watershed that originate high up in the Angeles National Forest. In 2009, the Station Fire burned in the Angeles National Forest for two months and damaged approximately 252 square miles of the forest. The extensive devastation to the surrounding landscapes and allowed Arundo donax to overwhelm habitats and establish larger stands than before the fire.

2. Treatment Area

The treatment area consists of approximately 100 acres of the Big Tujunga and Little Tujunga canyons, and riparian corridors. See map of treatment area in Appendix A, Figure 5.

3. Aquatic Weeds and Rationale

The type of weed being treated is Arundo donax, which is an invasive weed with the greatest impact on water resources in the Los Angeles area. Arundo is a clonal plant that grows in dense stands reaching heights up to 29 feet. It transpires water at 5 times the rate of native vegetation and reduces native habitat. It also provides an ignition source for wildfires, modifies channel dimensions and geomorphology leading the flood damage and reduced stream flow, and leads to high level of debris.

The National Forest Foundation (NFF) is developing the Arundo Eradication Project, which will take 10 years and an estimated $6.6 million to complete, with a water replenishment value of $17.2 million over 20 years. The eradication of 100 acres of Arundo can provide 2,000 acre feet of water per year, which will help to preserve local supplies and restore our watersheds during the ongoing drought.

4. Aquatic Herbicides Applied and Method of Application

Aquatic Herbicide: Only aquatically labeled formulations of glyphosate, imazapyr, and triclopyr (e.g. Habitat, Aquamaster, Renovate 3) will be used. Surfactants may also be used at the time of treatment.

Application Method: The selected herbicide is stored in tanks that are transported to the site via a pickup truck. The truck is also equipped with a mounted or spray rig. The truck is also equipped with a mounted or spray rig. The truck can be used for treatment sites in close proximity to fire roads. A hose from the tank is used to apply the pesticide; the tank remains secured on the trailer/flat-bed so that no spilling occurs. For treatment sites that are beyond the range of the truck or on steep embankments, a backpack style tank with a nozzle will be used by crew member who is certified to apply pesticides/herbicides. The flow and rate of the herbicide can be controlled via the nozzle.

LADWP will apply pesticides only when there is a low chance of precipitation per the seven (7) day forecast, and will endeavor to apply pesticides only the application/treatment areas are dry.

5. Decision to Select Herbicides
Mechanical and hand removal were determined to be ineffective for targeted vegetation because it would spread the plants instead of killing them. Manual removal is primarily intended for minor infestations of new Arundo plants and this infestation is over 100 acres. Because the treatment area is so large and the goal of the Arundo Eradication Project is to completely remove all Arundo, aquatic herbicides are the most efficient and effective method.

6. Herbicide Dose and Determination
Aquatic herbicides will be applied consistent with product labeling instructions for control of aquatic weeds.

7. Gates and Control structures
Not applicable.

8. Exception period.
Not applicable.

9. Monitoring Plan
See Appendix B.

10. Procedures to Prevent Sample Contamination from Persons, Equipment, and Vehicles Associated with Algaecide and Aquatic Herbicide Application
Water quality sampling is conducted by trained LADWP staff following established procedures designed to prevent contamination of samples. Procedures that prevent sample contamination include:

- Use clean sample bottles that are non-reactive. Glass and polyethylene bottles are used for water samples.
- Wear gloves that are powder-free vinyl to avoid the contamination associated with latex gloves.
- Samples are immediately placed in an ice chest away from contaminants as soon as the samples are taken.

11. Best Management Practices Implemented
Application: The herbicide is applied by LADWP personnel, contractor, or subcontractor who have either a Qualified Applicator Certificate or License issued by the State of California Department of Pesticide Regulation (Licensing Certification Program). These individuals are trained to ensure that algaecides and aquatic herbicides are applied at rates consistent with label requirements and in a manner that avoids potential adverse effects.

Notification: The National Forest Foundation (NFF) has asked LADWP to partner with their efforts in implementing the Arundo Eradication Project, since some of the treatment areas in the Big Tujunga and Little Tujunga Canyons are located on LADWP property.

Treatment: Correctly mixed aquatic herbicides are applied during daylight hours by certified personnel using properly-maintained and calibrated equipment capable of delivering desired volumes. Whenever feasible, localized spot applications are utilized rather than foliar applications,

to limit the possibility for drift and impacts to neighboring native species. Drift management requirements are also followed through techniques such as controlling droplet size, nozzle orientation, and avoiding spray applications when wind speed exceeds 10 miles per hour.

Spill Prevention and Cleanup: The herbicide is stored in a stainless steel tank which is trailer-mounted or placed on a flat-bed and then transported to treatment areas. A hose from the tank is used to apply the pesticide; the tank remains secured on the trailer/flat-bed so that no spilling occurs. Spray nozzles are attached to the hose that runs from the tank. Spray nozzles cannot dispense herbicide unless the nozzle is activated (squeezed/triggered) by treatment personnel. When crews utilize backpack-style tanks, hose and nozzle connections and all caps/lids are inspected for tight/complete connections and closure prior to use to prevent leaks and spills.

However, should a spill occur, staff will follow the field division's established emergency response procedures and refer to the material safety data sheet (MSDS) for instructions on containing and cleaning up the spill. Emergency response and MSDS procedures will be reviewed regularly. A copy of the emergency response procedures and material safety data sheets will be available during each treatment. Cleanup equipment will be kept in good working order and will be readily available at each application site.

Water Quality Monitoring: Should the application/treatment areas contain water at the time of application, water quality monitoring will follow in accordance with permit requirements; see Appendix B.

Access: The roads leading to the treatment areas have locked gates that can only be accessed by authorized personnel.

Post-Treatment: The project will take an estimated 10 years to complete Arundo eradication. The efficacy of the treatment is evaluated at the conclusion of the growing season during which treatment took place, and again at the commencement of each new growing season.

12. Possible Alternatives to Algaecides and Aquatic Herbicide Use

a. Evaluation of Management Options

(1) No Action

A "no action" is infeasible, as the invasive Arundo donax will continue to overwhelm habitats and establish larger stands. The transpiration from the Arundo donax has been shown to remove vast quantities of water from ecosystems and thereby limit the amount of water for nature and for groundwater replenishment.

(2) Prevention

Nutrient Control. For this site, the vegetation already exists and must be eradicated. It is hoped that the eradication program may prevent the regrowth of vegetation, but this cannot be determined until the project is complete.

(3) Mechanical or Physical Methods

Mechanical and hand removal were determined to be ineffective for targeted vegetation because

it would spread the plants instead of killing them. Manual removal is primarily intended for only minor infestations of new Arundo plants.

(4) Cultural Method
Methods such as controlled burning are not allowed within the Angeles National Forest.

(5) Biological Control Agents
Biological methods are not allowed within the Angeles National Forest.

(6) Algaecides and Aquatic Herbicides
Glyphosate, imazapyr, and triclopyr have been proven to be environmentally safe herbicides that are effective at reducing targeted aquatic weeds without adverse effects on non-target species.

b. Decision Matrix to Select the Most Appropriate Formulation
The decision matrix below evaluates the aquatic weed options identified for Big Tujunga and Little Tujunga Canyons (section a: "Evaluation of Management Options" above).

Big Tujunga and Little Tujunga Canyons						
Decision Making Criteria	**No Action**	**Prevention**	**Mechanical or Physical**	**Cultural Methods**	**Biological Agents**	**Aquatic Herbicides**
Is the impact to the environmental low or easily mitigated?	Yes	Yes	Yes	Yes	Yes	Yes
Is the cost of this option reasonable?	N/A	No	No	No	No	Yes
Has (have) the method(s) been effectively implemented at this site?	No	No	No	No	No	Yes
Option(s) selected for Big Tujunga and Little Tujunga Canyons						X

F. ALABAMA GATES

1. Site Description
The Alabama Gates is located on the Los Angeles Aqueduct approximately 5 miles north of Lone Pine, in the Owens Valley. The Los Angeles Aqueduct is owned and operated by LADWP, and delivers water from the Owens River to the city of Los Angeles. Downstream of the Alabama Gates are two spill gates that control flow into the Owens Lake as part of the Owens Lake Dust Mitigation Project.

2. Treatment Area
The treatment area is at the location of the Alabama Gates at the start of the concrete-lined portion of the Los Angeles Aqueduct. See Appendix A, Figure 6 for map of the treatment area.

3. Aquatic Weeds and Rationale
The treatment is for filamentous green algae Cladophora and the pond weed Potomageton, that has grown on the intake structures of the spillgates located downstream of the Alabama Gates. These spillgates control flow into Owens Lake, as required by the Owens Lake Dust Mitigation Project. LADWP must meet the demand to provide flows from the Los Angeles Aqueduct to Owens Lake. The growth of algae on the concrete lined portions of the Los Angeles Aqueduct and intake screens has significantly affected the ability of water to flow into the Owens Lake, and continued algae growth will prevent LADWP from meeting the demand requirements. The rate of growth without algaecide treatments overcomes the mechanical ability to keep the intakes clear.

4. Aquatic Herbicides Applied and Method of Application
Aquatic Herbicide: Copper sulfate algaecides have proven to be effective at reducing target algae in water bodies without adverse effects on non-target organisms.

Application Method: Copper sulfate treatment is either applied aerially by helicopter or directly to the water from a dry chemical feeder (hopper). If applied directly to the water, a hose is attached to the dry chemical feeder and lowered to near the surface of the water, and copper sulfate is released at desired flow rate.

5. Decision to Select Herbicides
Mechanical and hand removal were determined to be ineffective for targeted vegetation because the rate of growth overcomes the ability to mechanically remove the algae and weeds. Without algaecide treatment, flows to Owens Lake have to be stopped on a daily basis to allow for the mechanical removal of algae from the intake structures. In the past, removal had to be performed up to 3 times per night in order to maintain adequate flows to Owens Lake due to all the algae buildup. Copper sulfate algaecide is the most effective treatment method in reducing target algae.

6. Herbicide Dose and Determination
Amount of copper sulfate application will depend on the flow in the Los Angeles Aqueduct at the time of treatment. Application will be consistent with product labeling instructions for the control of algae.

7. Gates and Control structures
Valves will be closed to ensure that no water from the Los Angeles Aqueduct treated with copper sulfate will be introduced to the Owens Lake Dust Mitigation Project.

8. Exception period.
Not applicable.

9. Monitoring Plan
See Appendix B.

10. Procedures to Prevent Sample Contamination from Persons, Equipment, and Vehicles Associated with Algaecide and Aquatic Herbicide Application
Water quality sampling is conducted by trained LADWP staff following established procedures designed to prevent contamination of samples. Procedures that prevent sample contamination include:

- Use clean sample bottles that are non-reactive. Glass and polyethylene bottles are used for water samples.
- Wear gloves that are powder-free vinyl to avoid the contamination associated with latex gloves.
- Samples are immediately placed in an ice chest away from contaminants as soon as the samples are taken.

11. Best Management Practices Implemented
Application: The herbicide is applied by LADWP personnel, contractor, or subcontractor who have either a Qualified Applicator Certificate or License issued by the State of California Department of Pesticide Regulation (Licensing Certification Program). These individuals are trained to ensure that algaecides and aquatic herbicides are applied at rates consistent with label requirements and in a manner that avoids potential adverse effects.

Notification: Not applicable.

Treatment: Copper sulfate treatment is usually scheduled during daylight hours and may continue into night, if necessary. Treatment is performed by certified personnel using properly-maintained and calibrated equipment capable of delivering desired volumes. If treatment is applied from a boat, a hose is attached to the dry chemical feeder and lowered to near the surface of the water, which prevents possibility for drift. If treatment is applied aerially by helicopter, wind speeds must be low enough to allow treatment to be performed safely and accurately.

Spill Prevention and Cleanup: Copper sulfate treatment will be applied according to label instruction to prevent spills. However, should a spill occur, staff will follow the field division's established emergency response procedures and refer to the material safety data sheet (MSDS) for instructions on containing and cleaning up the spill. Emergency response and MSDS procedures will be reviewed regularly. A copy of the emergency response procedures and material safety data sheets will be available during each treatment. Cleanup equipment will be kept in good working order and will be readily available at each application site.

Water Quality Monitoring: Water quality monitoring will follow in accordance with permit requirements; see Appendix B.

Access: The roads leading to the treatment areas have locked gates that can only be accessed by authorized personnel.

Post-Treatment: The efficacy of the treatment is evaluated at the conclusion of the growing season.

12. Possible Alternatives to Algaecides and Aquatic Herbicide Use

a. Evaluation of Management Options

(1) No Action

A "no action" is infeasible, as the excessive algae growth on the intake structures at the spill gates will have a significant effect on the ability to provide flows to Owens Lake Dust Mitigation Project to meet regulatory compliance requirements.

(2) Prevention

Nutrient Control. For this site, the vegetation already exists and must be eradicated. It is hoped that the eradication program may prevent the regrowth of vegetation, but this cannot be determined until the project is complete.

(3) Mechanical or Physical Methods

Mechanical or physical removal was determined to be ineffective for the targeted vegetation because it only removes algae for a short period of time. Physical removal requires having to shut down all flows to Owens Lake on a daily basis in order to effectively brush the algae off of the intake screens. In the past, removal had to be performed up to 3 times per night in order to maintain adequate flows to Owens Lake due to all the algae buildup.

(4) Cultural Method

Methods such as controlled burning are not suitable for aquatic vegetation or this specific site.

(5) Biological Control Agents

Biological methods such as the introduction of ducks or other wildlife are not suitable as there may be impacts to water quality from animal feces, increases in turbidity levels and nutrients, and impacts to other existing, desirable species.

(6) Algaecides and Aquatic Herbicides

Copper sulfate algaecides have proven to be effective at reducing target algae in water bodies without adverse effects on non-target organisms.

b. Decision Matrix to Select the Most Appropriate Formulation

The decision matrix below evaluates the algae control options identified for the Alabama Gates (section a: "Evaluation of Management Options" above).

Alabama Gates						
Decision Making Criteria	**No Action**	**Prevention**	**Mechanical or Physical**	**Cultural Methods**	**Biological Agents**	**Aquatic Herbicides**
Is the impact to the environmental low or easily mitigated?	Yes	Yes	Yes	Yes	Yes	Yes
Is the cost of this option reasonable?	N/A	No	No	No	No	Yes
Has (have) the method(s) been effectively implemented at this site?	No	No	No	No	No	Yes
Option(s) selected for Alabama Gates						X

G. MERRITT CUT, NORTH AND SOUTH HAIWEE RESERVOIRS, AND OTHER AREAS OF THE LOS ANGELES AQUEDUCT

1. Site Description
The Los Angeles Aqueduct is owned and operated by LADWP, and delivers water from the Owens River to the city of Los Angeles. The Alabama Gates is located on the Los Angeles Aqueduct approximately 5 miles north of Lone Pine, in the Owens Valley. Downstream of the Alabama Gates are two spill gates that control flow into the Owens Lake as part of the Owens Lake Dust Mitigation Project. North Haiwee Reservoir is located approximately 28 miles south of Lone Pine, and Merritt Cut is located between the North and South Haiwee Reservoirs.

2. Treatment Area
The treatment area is at the North or South Haiwee Reservoirs, at Merritt Cut located between the Haiwee Reservoirs, or any other possible adjacent areas along the Los Angeles Aqueduct requiring treatment. See Appendix A, Figure 7 for a map of the treatment area.

3. Aquatic Weeds and Rationale
The treatment is for aquatic vascular plants and algae growth, such as filamentous green algae Cladophora and the pond weed Potomageton, which has obstructed flows, impairing water supply.

LADWP must meet the demand to provide flows from the Los Angeles Aqueduct to Owens Lake, as required by the Owens Lake Dust Mitigation Project. The growth of algae on the concrete lined portions of the Los Angeles Aqueduct and intake screens has significantly affected the ability of water to flow into the Owens Lake, and continued algae growth will prevent LADWP from meeting the demand requirements. The rate of growth without algaecide treatments overcomes the mechanical ability to keep the intakes clear.

4. Aquatic Herbicides Applied and Method of Application
Aquatic Herbicide: Copper sulfate algaecides have proven to be effective at reducing target algae in water bodies without adverse effects on non-target organisms.

Application Method: Copper sulfate treatment is either applied aerially by helicopter or directly to the water from a dry chemical feeder (hopper). For treatment of the North or South Haiwee Reservoirs, the copper sulfate is applied aerially from an aircraft and discharged as close as possible to the surface of the water to prevent drift of the crystals. For treatment at Merritt Cut or other areas along the drinking water conveyance system, small granules of copper sulfate are applied directly into the treatment area.

5. Decision to Select Herbicides
Mechanical and hand removal were determined to be ineffective for targeted vegetation because the rate of growth overcomes the ability to mechanically remove the algae and weeds. Without algaecide treatment, flows to Owens Lake have to be stopped on a daily basis to allow for the mechanical removal of algae from the intake structures. In the past, removal had to be performed up to 3 times per night in order to maintain adequate flows to Owens Lake due to all the algae buildup. Copper sulfate algaecide is the most effective treatment method in reducing target algae.

6. Herbicide Dose and Determination
The amount of copper sulfate used in the treatment will be minimized. Dosage is determined based on manufacturer's recommendation and on the flow in the receiving water body at the time of treatment.

7. Gates and Control structures
Valves will be closed to ensure that no water from the Los Angeles Aqueduct treated with copper sulfate will be introduced to the Owens Lake Dust Mitigation Project.

8. Exception period.
Not applicable.

9. Monitoring Plan
See Appendix B.

10. Procedures to Prevent Sample Contamination from Persons, Equipment, and Vehicles Associated with Algaecide and Aquatic Herbicide Application
Water quality sampling is conducted by trained LADWP staff following established procedures designed to prevent contamination of samples. Procedures that prevent sample contamination include:

- Use clean sample bottles that are non-reactive. Glass and polyethylene bottles are used for water samples.
- Wear gloves that are powder-free vinyl to avoid the contamination associated with latex gloves.
- Samples are immediately placed in an ice chest away from contaminants as soon as the samples are taken.

11. Best Management Practices Implemented
Application: The herbicide is applied by LADWP personnel, contractor, or subcontractor who has either a Qualified Applicator Certificate or License issued by the State of California Department of Pesticide Regulation (Licensing Certification Program). These individuals are trained to ensure that algaecides and aquatic herbicides are applied at rates consistent with label requirements and in a manner that avoids potential adverse effects.

Notification: Not applicable.

Treatment: Copper sulfate treatment is usually scheduled during daylight hours and may continue into night, if necessary. Treatment is performed by certified personnel using properly-maintained and calibrated equipment capable of delivering desired volumes. If treatment is applied from a boat, a hose is attached to the dry chemical feeder and lowered to near the surface of the water, which prevents possibility for drift. If treatment is applied aerially by helicopter, wind speeds must be low enough to allow treatment to be performed safely and accurately.

Spill Prevention and Cleanup: Copper sulfate treatment will be applied according to label instruction to prevent spills. However, should a spill occur, staff will follow the field division's

established emergency response procedures and refer to the material safety data sheet (MSDS) for instructions on containing and cleaning up the spill. Emergency response and MSDS procedures will be reviewed regularly. A copy of the emergency response procedures and material safety data sheets will be available during each treatment. Cleanup equipment will be kept in good working order and will be readily available at each application site.

Water Quality Monitoring: Water quality monitoring will follow in accordance with permit requirements; see Appendix B.

Access: The roads leading to the treatment areas have locked gates that can only be accessed by authorized personnel.

Post-Treatment: The efficacy of the treatment is evaluated at the conclusion of the growing season.

12. Possible Alternatives to Algaecides and Aquatic Herbicide Use

a. Evaluation of Management Options

(1) No Action

A "no action" is infeasible, as the excessive algae growth in the drinking water conveyance system will have a significant effect on the ability to provide flows for electrical grid reliability or to meet drinking water compliance requirements.

(2) Prevention

Nutrient Control. For this site, the vegetation already exists and must be eradicated. It is hoped that the eradication program may prevent the regrowth of vegetation, but this cannot be determined until the project is complete.

(3) Mechanical or Physical Methods

Mechanical or physical removal was determined to be ineffective for the targeted vegetation because it only removes algae for a short period of time. Physical removal requires having to shut down all flows on a daily basis in order to effectively brush the algae off of the intake screens. In the past, removal had to be performed up to 3 times per night in order to maintain adequate flows due to all the algae buildup.

(4) Cultural Method

Methods such as controlled burning are not suitable for aquatic vegetation or this specific site.

(5) Biological Control Agents

Biological methods such as the introduction of ducks or other wildlife are not suitable as there may be impacts to water quality from animal feces, increases in turbidity levels and nutrients, and impacts to other existing, desirable species.

(6) Algaecides and Aquatic Herbicides

Copper sulfate algaecides have proven to be effective at reducing target algae in water bodies without adverse effects on non-target organisms.

b. Decision Matrix to Select the Most Appropriate Formulation

The decision matrix below evaluates the algae control options identified for the Alabama Gates (section a: "Evaluation of Management Options" above).

Merritt Cut, North and South Haiwee Reservoirs, and other areas along the Los Angeles Aqueduct						
Decision Making Criteria	**No Action**	**Prevention**	**Mechanical or Physical**	**Cultural Methods**	**Biological Agents**	**Aquatic Herbicides**
Is the impact to the environmental low or easily mitigated?	Yes	Yes	Yes	Yes	Yes	Yes
Is the cost of this option reasonable?	N/A	No	No	No	No	Yes
Has (have) the method(s) been effectively implemented at this site?	No	No	No	No	No	Yes
Option(s) selected						X

APPENDIX A

Site Maps of Treatment Areas

Figure 1

Van Norman Complex
Treatment Area

Y:\118190_Van_Norman\Apps\vegetation.mxd

Middle Debris Basin

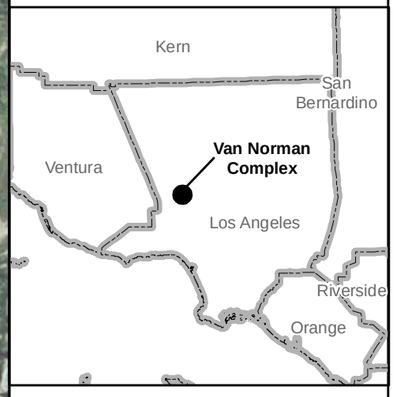
Upper Debris Basin

Balboa Boulevard

Legend

- Coastal Sage Scrub
- Developed
- Disturbed
- Mulefat Scrub
- Ruderal
- Southern Cottonwood Willow Riparian Forest
- Southern Willow Scrub
- Un-Vegetated Channel
- Maintained Free of Vegetation
- Possible Mitigation / Compensation

N E S W



LOS ANGELES DEPARTMENT OF WATER AND POWER

Van Norman Complex
Vegetation Communities

0 150 300 600

Feet

POWER ENGINEERS

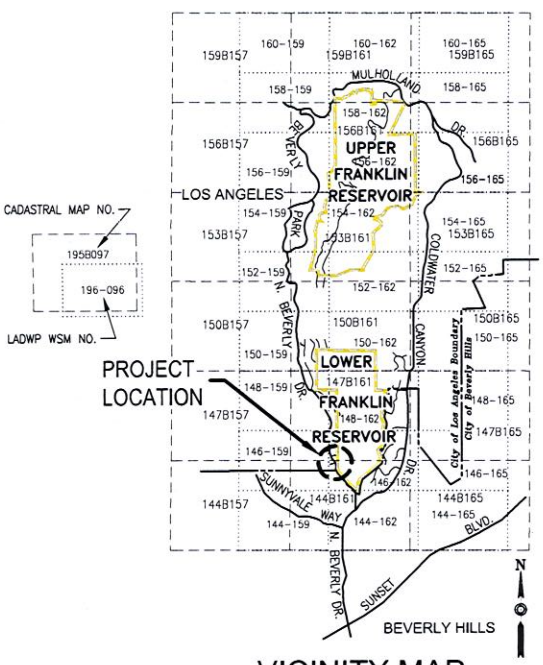
LA DWP

Figure 2

Lower Franklin Reservoir Facility
Treatment Area

Los Angeles Department of Water and Power

CITY OF LOS ANGELES DEPARTMENT OF WATER & POWER
LOWER FRANKLIN RESERVOIR



VICINITY MAP
NOT TO SCALE

SURVEYS & RIGHT-OF-WAY ENGINEERING GROUP

RELEASE DATE: OCT. 2, 2013
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ALL DATA SHOWN ARE FOR INTERNAL USE OF THE LOS ANGELES DEPARTMENT OF WATER AND POWER AND ARE TO BE USED FOR REFERENCE ONLY
TO BE USED FOR AGREEMENT, APPRAISAL, LEASE, LICENSE, AND UNRECORDED EASEMENT PURPOSES ONLY
PREPARED BY WATER SYSTEM RIGHT-OF-WAY ENGINEERING TEAM CITY OF LOS ANGELES DEPARTMENT OF WATER AND POWER

LOWER FRANKLIN RESERVOIR PROPERTY
AERIAL EXHIBIT

1300 N. BEVERLY DRIVE, LOS ANGELES, CA 90210
N/o COLDWATER CANYON DR. AND N. BEVERLY DR.

R/W No.	13448
W.O.	WAR22
WATER SERVICE MAP Nos	150-159, 150-162, 148-159, 148-162, 146-159, AND 146-162
CADASTRAL MAP Nos.	150B157, 150B161, 147B157, 147B161, AND 144B161
THOMAS BROS MAP Nos.	592-E4 TO E5

DEPARTMENT OF WATER AND POWER
WATER ENGINEERING & TECHNICAL SERVICES CITY OF LOS ANGELES

EXHIBIT NUMBER
RW13448-AE-3

ELECTRONIC FILE PATH: \\FileG03\Right-of-Way\RW13448\RW_Drawings\RW13448_AE_FN_Lower_Franklin_Res_WAR22_TBonfiglio_2013-10-02.dwg

Figure 3

Barren Ridge Renewable Transmission Project
Treatment Area

FIGURE 1 BRRTP COMPONENTS AND ACTION AREA

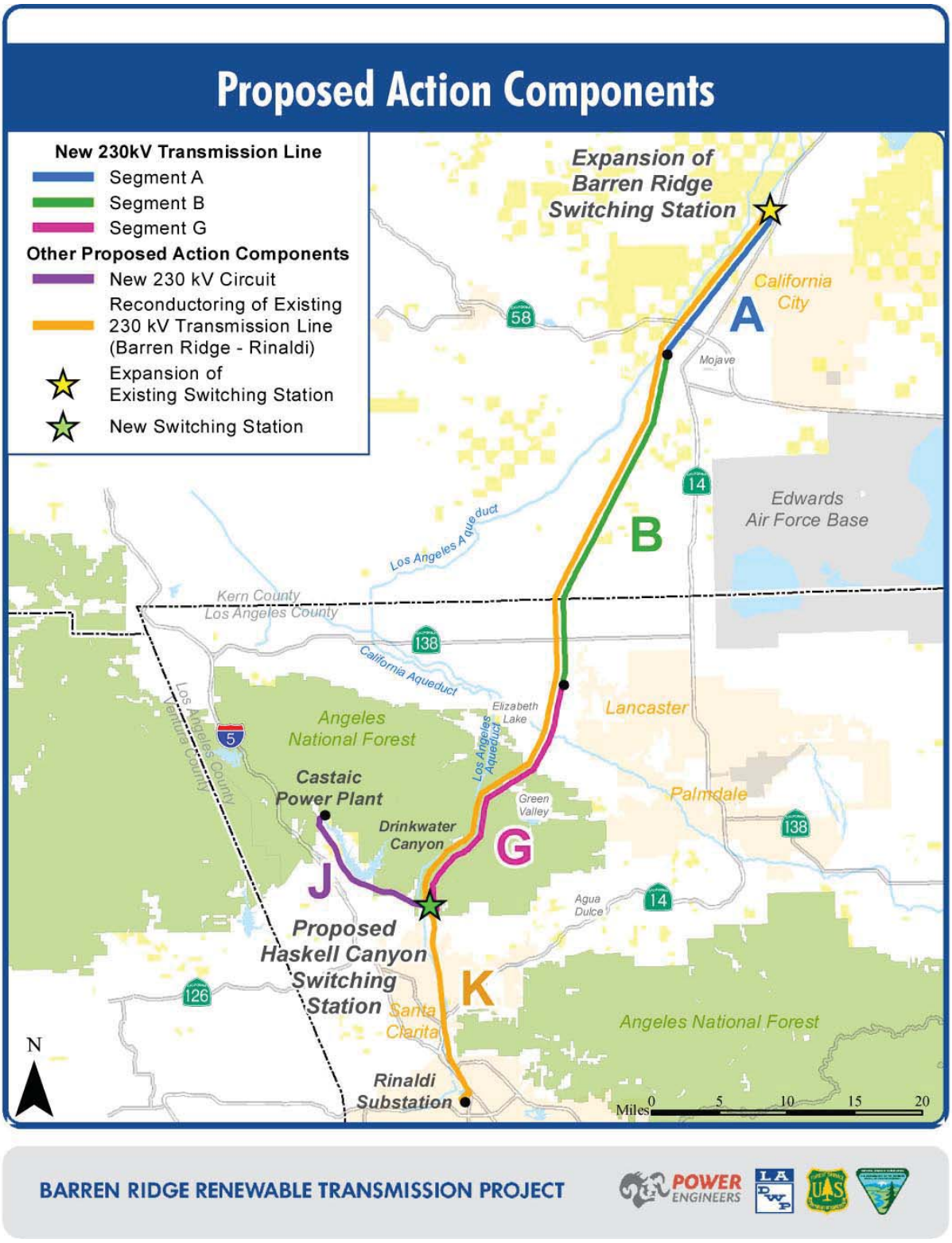
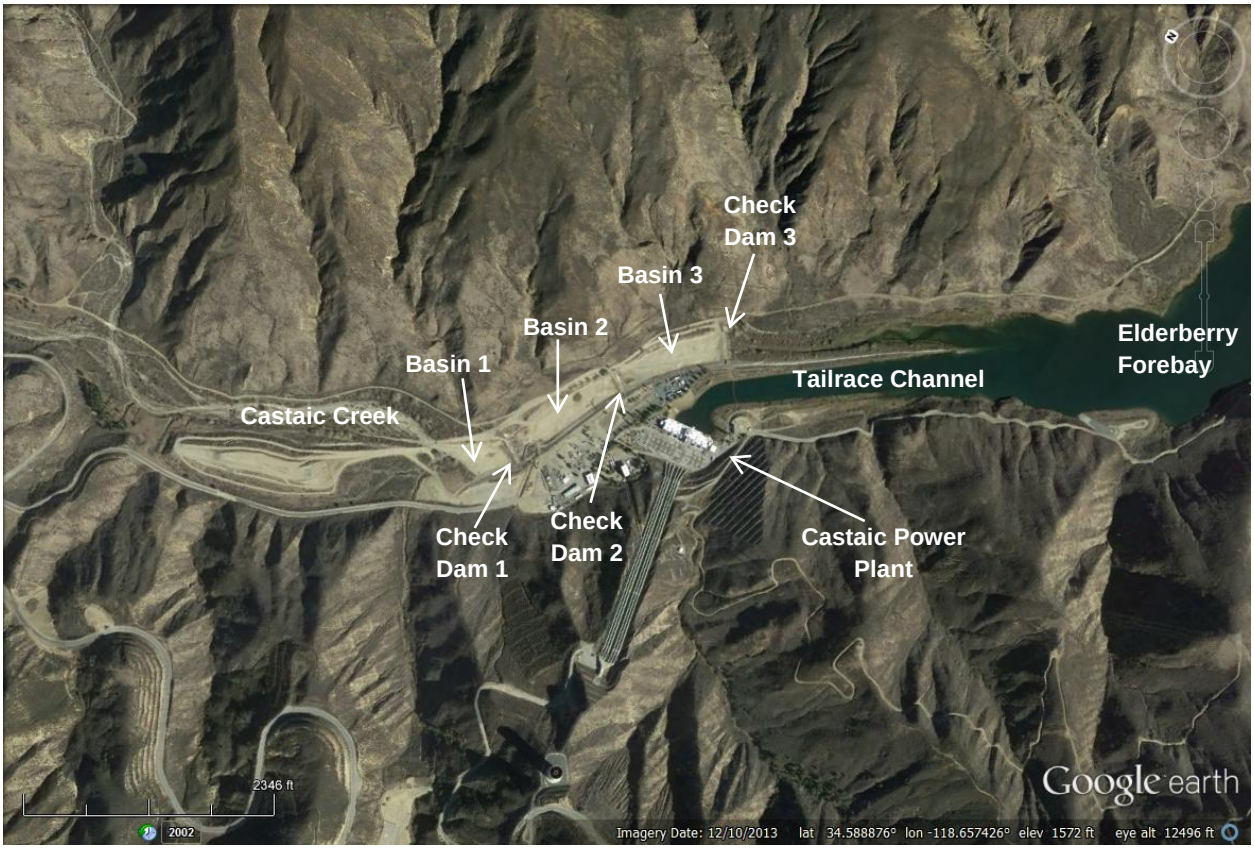


Figure 4

Castaic Creek Stormwater Bypass Channel & Emergency Spillway
Treatment Areas


Check
Dam 3
Basin 3
Basin 2
Basin 1
Elderberry
Forebay
Tailrace Channel
Castaic Creek
Check
Dam 1
Check
Dam 2
Castaic Power
Plant
2346 ft
2002
Google earth
Imagery Date: 12/10/2013 lat 34.588876° lon -118.657426° elev 1572 ft eye alt 12496 ft

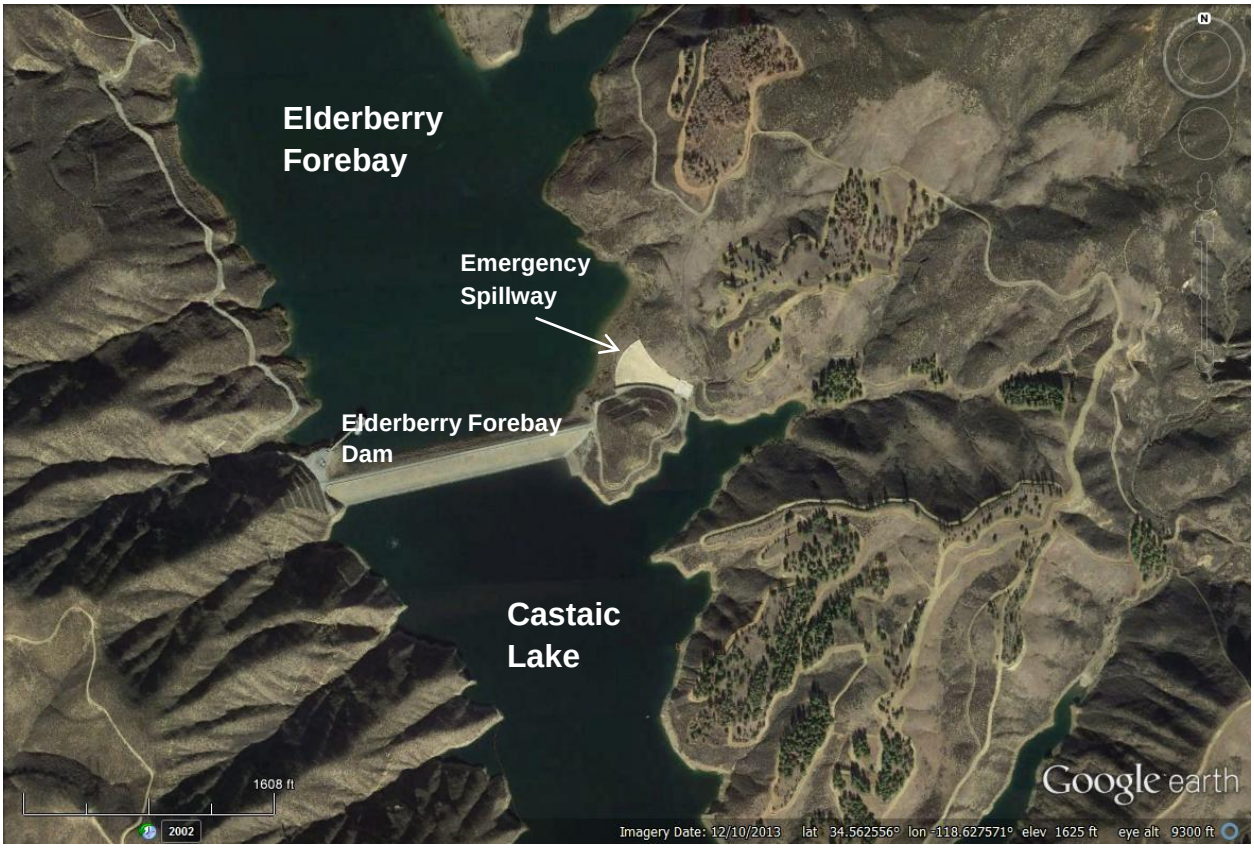

Elderberry
Forebay
Emergency
Spillway
Elderberry Forebay
Dam
Castaic
Lake
1608 ft
2002
Google earth
Imagery Date: 12/10/2013 lat 34.562556° lon -118.627571° elev 1625 ft eye alt 9300 ft

Figure 5

Big Tujunga and Little Tujunga Canyons
Treatment Area


target watersheds
(Arundo acreage)
Arundo donax
Arundo Control Areas
LADWP
Property
LOS ANGELES RIVER
(131.38 ac)
VENTURA CO.
DOMINGUEZ CHANNEL
(2.59 ac)
LOS ANGELES CO.
ORANGE CO.
OR
ID
NV
UT
CA
AZ
AREA OF
INTEREST
0 2 4 Miles
0 2 4 Kilometers

Figure 6

Alabama Gates
Treatment Area

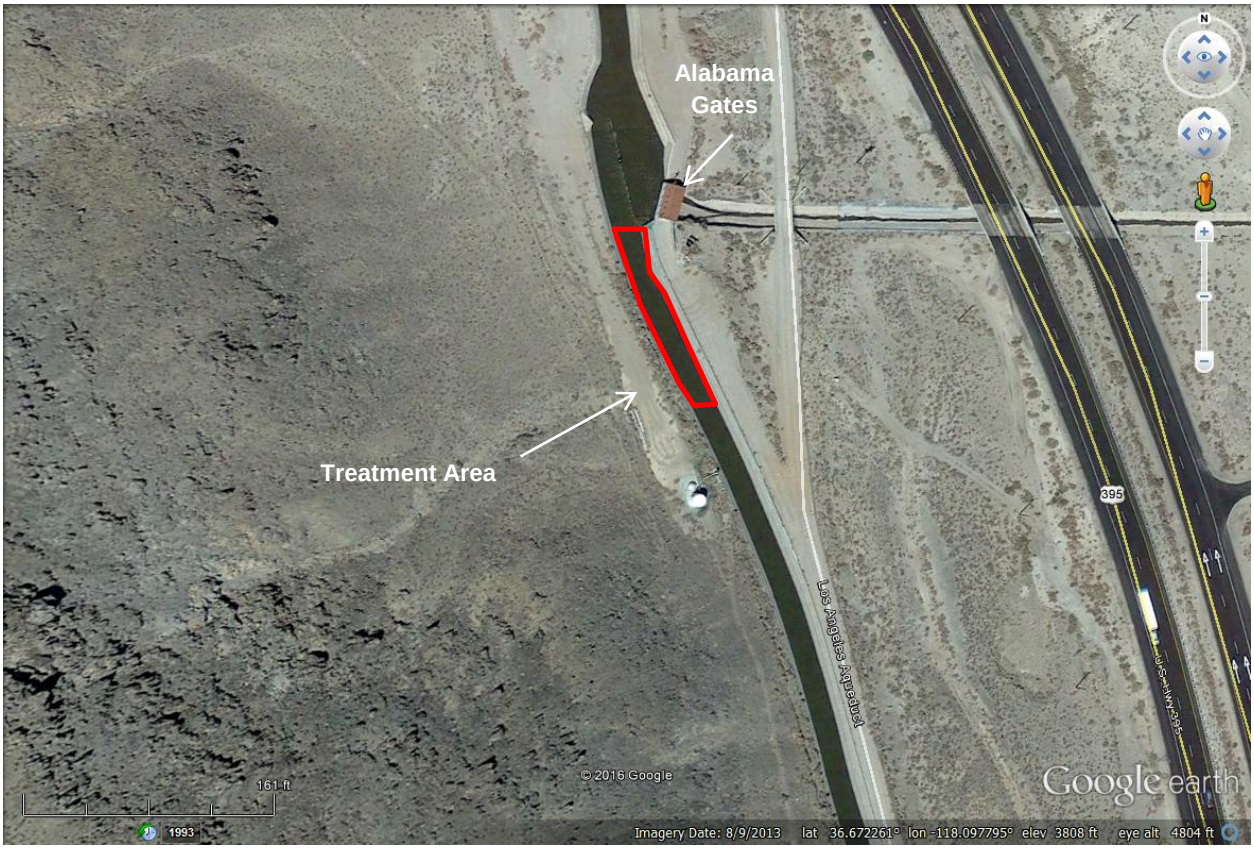


Figure 6. Treatment Area

Figure 7

Merritt Cut, North and South Haiwee Reservoirs,
and Other Areas of the Los Angeles Aqueduct
Treatment Areas

Google Maps Merritt Cut and North and South Haiwee Reservoirs

Imagery ©2018 Google, Map data ©2018 Google 1 mi

APPENDIX B

Monitoring Plan

Los Angeles Department of Water and Power
Aquatic Weed Control Permit
Order No. 2013-0002-DWQ
NPDES No. CAG990005

APAP MONITORING PLAN

I. SELECTION OF MONITORING SITES

The Monitoring and Reporting Program for Water Quality Order No. 2013-0002-DWQ sets the following sampling frequency:

"Collect samples from a minimum of six application events for each active ingredient in each environmental setting (flowing water and non-flowing water) per year, except for glyphosate. If there are less than six application events in a year, collect samples during each application event for each active ingredient in each environmental setting (flowing water and non-flowing water). If the results from six consecutive sampling events show concentrations that are less than the receiving water limitation/trigger for an active ingredient in an environmental setting, sampling shall be reduced to one application event per year for that active ingredient in that environmental setting. If the yearly sampling event shows exceedance of the receiving water limitation/trigger for an active ingredient in an environmental setting, then sampling shall return to six application events for that active ingredient in each environmental setting. For glyphosate, collect samples from one application event from each environmental setting (flowing water and non-flowing water) per year."

LADWP applies aquatic herbicides and algaecides to the flowing and non-flowing sites as shown in the table below.

Site Type	Aquatic Herbicide	Application Sites	Estimated No. of Applications/Year
Van Norman Complex	Glyphosate-based Roundup or Roundup Custom	3	1
Lower Franklin Reservoir Facility	Glyphosate-based Roundup or Roundup Custom	3	1
Barren Ridge Renewable Transmission Project	Glyphosate-based Roundup or Roundup Custom, Garlon (triclopyr)	10-39 (number to be lowered, per Nadia)	1-2
Castaic Creek	Glyphosate-based Roundup or Roundup Custom	2	1
Big Tujunga and Little Tujunga Canyons	Aquamaster (glyphosate), Habitat (imazapyr), Renovate 3 (triclopyr)	Multiple	2
Alabama Gates	Copper sulfate	1	1-5
Merritt Cut, North and South Haiwee Reservoirs, and Other Areas of the Los Angeles Aqueduct	Copper sulfate	Multiple	1-5

Samples will be collected once annually at the Van Norman Complex, the Lower Franklin Reservoir Facility, and Castaic Creek, as these sites are only treated once annually with glyphosate-based herbicides. Samples will be collected during every application at the Barren Ridge, Big Tujunga and Little Tujunga Canyons, Alabama Gates, Merritt Cut, North and South Haiwee Reservoirs, and other areas of the Los Angeles Aqueduct as these sites may be treated over once per year and with herbicides/algaecides other than glyphosate.

II. MONITORING PARAMETERS

The ingredients to be monitored for are glyphosate (the active ingredient in Roundup, Roundup Custom, and Aquamaster), triclopyr (the active ingredient in Garlon and Renovate 3), imazapyr (the active ingredient in Habitat), and copper (the active ingredient in copper sulfate).

Physical, chemical, and visual monitoring parameters are shown in Table 1 and Table 2. Visual observations (Table 2) will be done during all sampling. All laboratory analyses will be conducted by a laboratory certified by the California Department of Public Health to do such analyses. Laboratory results will be reported in the annual report to the appropriate Regional Water Quality Control Board. Records will be maintained for a minimum of three years from the date of sample measurement or report.

Table 1. Physical and Chemical Monitoring Parameters

Constituent/Parameter	Sampling Method	Analytical Method
1. Water Temperature (°F)	Grab[1]	See USEPA Guidelines
2. pH (number)		
3. Turbidity (NTU)		
4. Electrical Conductivity (µmhos/cm)		
5. Active ingredient[2] (µg/L)		
6. Nonylphenol (µg/L)[3]		
7. Hardness (if copper is monitored)		
8. Dissolved Oxygen (mg/L)		

[1]Samples will be collected at 3 feet below the surface of the water body or at mid-water column depth if the depth is less than 3 feet, as stipulated in Table C-1 Monitoring Requirements of Order No. 2013-0002-DWQ.
[2]Glyphosate, imazapyr, triclopyr, and dissolved copper.
[3]Only required when a surfactant is used.

Table 2. Visual Monitoring Parameters

Parameter	Description
1. Monitoring Area	Forebay, stormwater channel, intake channel, natural stream, pond, lake, etc.
2. Appearance of Waterway	Sheen, color, clarity, etc.
3. Weather conditions	Fog, rain, wind, etc.

III. TYPES OF MONITORING REQUIRED

1. Background Monitoring
   Background monitoring samples shall be collected upstream at the time of the application event or in the application area just prior (up to 24 hours in advance of) the application event.

2. Event Monitoring
   Event monitoring samples shall be collected immediately downstream of the treatment area in flowing waters or immediately outside of the treatment area in non-flowing waters. The samples shall be taken immediately after the application event, but after sufficient time has elapsed such that treated water would have exited the treatment area.

3. Post-Event Monitoring
   Post-event samples shall be collected within the treatment area and within one week after the application event.

IV. MONITORING AT LADWP FACILITIES

1. Van Norman Complex
   Aquatic Herbicide Applied: Glyphosate-based Roundup or Roundup Custom for Aquatic and Terrestrial Use.

   Treatment Areas: The treatment area is variable and dependent upon the location of invasive species as determined by monitoring. For each application event, a map will be submitted in the annual report to the Regional Water Quality Control Board showing the application area and treatment area.

   Monitoring: Refer to Table 3 for monitoring sample types, timing of sample collection, and sample location.

2. Lower Franklin Reservoir Facility
   Aquatic Herbicide Applied: Glyphosate-based Roundup or Roundup Custom for Aquatic and Terrestrial Use.

   Treatment Areas: The treatment area is variable and dependent upon the location of invasive species as determined by monitoring. For each application event, a map will be submitted in the annual report to the Regional Water Quality Control Board showing the application area and treatment area.

   Monitoring: Refer to Table 3 for monitoring sample types, timing of sample collection, and sample location.

3. Barren Ridge Renewable Transmission Project
   Aquatic Herbicide Applied: Glyphosate-based Roundup or Roundup Custom for Aquatic and Terrestrial Use and triclopyr-based Garlon.

   Treatment Areas: The treatment area is along the construction path for transmission lines and a switching station. The initial (pre-construction) weed/invasive species treatment is required by the Forest Service. It is unknown if future treatment will be required. If it is, the treatment areas will likely be variable and dependent upon the location of weeds/invasive species as determined by monitoring. For each application event, a map will be submitted in the annual report to the Regional Water Quality Control Board showing the application area and treatment area.

   Monitoring: Refer to Table 3 for monitoring sample types, timing of sample collection, and sample location.

4. Castaic Creek
   Aquatic Herbicide Applied: Glyphosate-based Roundup or Roundup Custom for Aquatic and Terrestrial Use.

   Treatment Areas: The treatment area is the spillway and debris basin. For each application event, a map will be submitted in the annual report to the Regional Water Quality Control Board showing the application area and treatment area.

   Monitoring: Refer to Table 3 for monitoring sample types, timing of sample collection, and sample location.

5. Big Tujunga and Little Tujunga Canyons
   Aquatic Herbicide Applied: Glyphosate-based Aquamaster, imazapyr-based Habitat, and triclopyr-based Renovate 3.

   Treatment Areas: The treatment area consists of approximately 100 acres of the Big Tujunga and Little Tujunga canyons, and riparian corridors. For each application event, a map will be submitted in the annual report to the Regional Water Quality Control Board showing the application area and treatment area.

   Monitoring: Refer to Table 3 for monitoring sample types, timing of sample collection, and sample location.

6. Alabama Gates
   Algaecide Applied: Copper sulfate

   Treatment Areas: The treatment area is at the location of the Alabama Gates at the start of the concrete-lined portion of the Los Angele Aqueduct. For each application event, a map will be submitted in the annual report to the Regional Water Quality Control Board showing the application area and treatment area.

Monitoring: Refer to Table 3 for monitoring sample types, timing of sample collection, and sample location.

7. Merritt Cut, North and South Haiwee Reservoirs, and Other Areas of the Los Angeles Aqueduct
   Algaecide Applied: Copper sulfate

   Treatment Areas: The treatment area is at the North or South Haiwee Reservoirs, at Merritt Cut located between the Haiwee Reservoirs, or any other possible adjacent areas along the Los Angeles Aqueduct requiring treatment. For each application event, a map will be submitted in the annual report to the Regional Water Quality Control Board showing the application area and treatment area.

   Monitoring: Refer to Table 3 for monitoring sample types, timing of sample collection, and sample location.

Table 3. Timing and Location of Monitoring at LADWP Facilities

Sample Type	Timing of Sample Collection	Location
Background	Samples shown in Table 1 and Table 2 will be collected within 24 hours prior to the application event.	Samples shown in Table 1 and Table 2 will be collected within the application area.
Event	Samples shown in Table 1 and Table 2 will be collected after the application event.	Samples shown in Table 1 and Table 2 will be collected outside of the treatment area after the application event.
Post-event	Samples shown in Table 1 and Table 2 will be collected within 7 days after the application event, or when treatment is deemed complete.	Samples shown in Table 1 and Table 2 will be collected within the treatment area.

Appendix B
Material Safety Data Sheet

Material Safety Data Sheet

Material Name: Copper Sulfate Pentahydrate ID: C1-121A

* * * Section 1 - Chemical Product and Company Identification * * *

Chemical Name: Copper Sulfate Pentahydrate

Product Use: For Commercial Use

Synonyms: Copper Sulfate Crystals, Blue Copper, Blue Stone, Blue Vitriol, Copper (II) sulfate, Cupric Sulfate, Copper Sulfate Fine 200, Fine 100, Fine 30, 20, 25 Small, Medium, Large, FCC IV, and Very High Purity

Supplier Information

Chem One Ltd.
14140 Westfair East Drive
Houston, Texas 77041-1104

Phone: (713) 896-9966
Fax: (713) 896-7540
Emergency # (800) 424-9300 or (703) 527-3887

General Comments

NOTE: Emergency telephone numbers are to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure, or accident involving chemicals. All non-emergency questions should be directed to customer service.

* * * Section 2 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
7758-99-8	Copper (II) Sulfate Pentahydrate	> 99

Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Copper (7440-50-8) and inorganic compounds, as Cu, Copper (7440-50-8) dusts and mists, as Cu and Copper fume, Cu.

Component Information/Information on Non-Hazardous Components

This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

* * * Section 3 - Hazards Identification * * *

Emergency Overview

Copper Sulfate Pentahydrate is a blue crystalline or powdered, odorless solid. Potentially fatal if swallowed. May cause irritation to the eyes, respiratory system and skin. Fire may produce irritating, corrosive and/or toxic fumes. Firefighters should use full protective equipment and clothing.

Hazard Statements

HARMFUL OR FATAL IF SWALLOWED. Can cause irritation of eyes, skin, respiratory tract and, in extreme cases, burns. Avoid contact with eyes and skin. Avoid breathing dusts. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. Keep from contact with clothing and other combustible materials.

Potential Health Effects: Eyes

Exposure to particulates or solution of this product may cause redness and pain. Prolonged contact may cause conjunctivitis, ulceration and corneal abnormalities.

Potential Health Effects: Skin

This product can cause irritation of the skin with pain, itching and redness. Severe overexposure can cause skin burns. Prolonged exposure may cause dermatitis and eczema.

Potential Health Effects: Ingestion

Harmful or fatal if swallowed. May cause gastrointestinal irritation with symptoms such as nausea, vomiting, and diarrhea. Ingestion may cause degeneration of liver, kidney, or renal failure. Persons who survive ingestion may develop granulomatous lesions of the kidney. Ingestion of large amounts may lead to convulsions, coma or death.

Potential Health Effects: Inhalation

May irritate the nose, throat and respiratory tract. Symptoms can include sore throat, coughing and shortness of breath. In severe cases, ulceration and perforation of the nasal septum can occur. If this material is heated, inhalation of fumes may lead to development of metal fume fever. This is a flu-like illness with symptoms of metallic taste, fever and chills, aches, chest tightness and cough. Repeated inhalation exposure can cause shrinking of the lining of the inner nose.

HMIS Ratings: Health Hazard: 2* **Fire Hazard:** 0 **Physical Hazard:** 1

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

Immediately flush eyes with large amounts of room temperature water, occasionally lifting the lower and upper lids, for at least 15 minutes. If symptoms persist after 15 minutes of irrigation, seek medical attention.

* * * Section 4 - First Aid Measures (Continued) * * *

First Aid: Skin

Remove all contaminated clothing. For skin contact, wash thoroughly with soap and water for at least 20 minutes. Seek immediate medical attention if irritation develops or persists.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Have victim rinse mouth thoroughly with water, if conscious. Never give anything by mouth to a victim who is unconscious or having convulsions. Contact a physician or poison control center immediately.

First Aid: Inhalation

Remove source of contamination or move victim to fresh air. Apply artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer oxygen if breathing is difficult. Get immediate medical attention.

First Aid: Notes to Physician

Provide general supportive measures and treat symptomatically. Basic Treatment: Establish a patent airway. Suction if necessary. Watch for signs of respiratory insufficiency and assist ventilations if necessary. Administer oxygen by non-rebreather mask at 10 to 15 L/minutes. Monitor for shock and treat if necessary. For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with normal saline during transport. Do not use emetics. For ingestion, rinse mouth and administer 5 mL/kg up to 200 mL of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool. Administer activated charcoal. Advanced Treatment: Consider orotracheal or nasotracheal intubation for airway control in the patient who is unconscious. Start an IV with lactated Ringer's SRP: "To keep open", minimal flow rate. Watch for signs of fluid overload. For hypotension with signs of hypovolemia, administer fluid cautiously. Consider vasopressors if hypotensive with a normal fluid volume. Watch for signs of fluid overload. Use proparacaine, hydrochloride to assist eye irrigation.

* * * Section 5 - Fire Fighting Measures * * *

Flash Point: Not flammable
Method Used: Not applicable
Upper Flammable Limit (UEL): Not applicable
Lower Flammable Limit (LEL): Not applicable
Auto Ignition: Not applicable
Flammability Classification: Not applicable
Rate of Burning: Not applicable

General Fire Hazards

Copper Sulfate Pentahydrate is not combustible, but may decompose in the heat of a fire to produce corrosive and/ or toxic fumes.

Hazardous Combustion Products

Sulfur oxides and copper fumes.

Extinguishing Media

Use methods for surrounding fire.

Fire Fighting Equipment/Instructions

Firefighters should wear full protective clothing including self-contained breathing apparatus. Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

NFPA Ratings: Health: 2 **Fire:** 0 **Reactivity:** 1 **Other:**

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

* * * Section 6 - Accidental Release Measures * * *

Containment Procedures

Stop the flow of material, if this can be done without risk. Contain the discharged material. If sweeping of a contaminated area is necessary use a dust suppressant agent, which does not react with product (see Section 10 for incompatibility information).

Clean-Up Procedures

Wear appropriate protective equipment and clothing during clean-up. Shovel the material into waste container. Thoroughly wash the area after a spill or leak clean-up. Prevent spill rinsate from contamination of storm drains, sewers, soil or groundwater.

Evacuation Procedures

Evacuate the area promptly and keep upwind of the spilled material. Isolate the spill area to prevent people from entering. Keep materials which can burn away from spilled material. In case of large spills, follow all facility emergency response procedures.

Special Procedures

Remove soiled clothing and launder before reuse. Avoid all skin contact with the spilled material. Have emergency equipment readily available.

* * * Section 7 - Handling and Storage * * *

Handling Procedures

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling, when used as a pesticide. Do not breathe dust. Avoid all contact with skin and eyes. Use this product only with adequate ventilation. Wash thoroughly after handling.

Storage Procedures

Keep in original container in locked storage area. Keep container tightly closed when not in use. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers or in a diked area, as appropriate. Store containers away from incompatible chemicals (see Section 10, Stability and Reactivity). Storage areas should be made of fire-resistant materials. Post warning and "NO SMOKING" signs in storage and use areas, as appropriate. Use corrosion-resistant structural materials, lighting, and ventilation systems in the storage area. Floors should be sealed to prevent absorption of this material. Have appropriate extinguishing equipment in the storage area (i.e., sprinkler system, portable fire extinguishers). Empty containers may contain residual particulates; therefore, empty containers should be handled with care. Do not cut, grind, weld, or drill near this container. Never store food, feed, or drinking water in containers that held this product. Keep this material away from food, drink and animal feed. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged. Do not store this material in open or unlabeled containers. Limit quantity of material stored. Store in suitable containers that are corrosion-resistant.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Exposure Guidelines

A: General Product Information

Follow the applicable exposure limits.

B: Component Exposure Limits

The exposure limits given are for Copper & Inorganic Compounds, as Cu (7440-50-8), Copper fume as Cu or Copper dusts and mists, as Cu.

ACGIH:	1 mg/m^3 TWA (dusts & mists)
	0.2 mg/m^3 TWA (fume)
OSHA:	1 mg/m^3 TWA (dusts & mists)
	0.1 mg/m^3 TWA (fume)
NIOSH:	1 mg/m^3 TWA (dusts & mists)
	0.1 mg/m^3 TWA (fume)
DFG MAKs	1 mg/m^3 TWA Peak, 2•MAK 15 minutes, average value, 1-hr interval (copper and inorganic copper compounds)
	0.1 mg/m^3 TWA Peak, 2•MAK15 minutes, average value, 1-hr interval (fume)

Engineering Controls

Use mechanical ventilation such as dilution and local exhaust. Use a corrosion-resistant ventilation system and exhaust directly to the outside. Supply ample air replacement. Provide dust collectors with explosion vents.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132). Please reference applicable regulations and standards for relevant details.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Wear safety glasses with side shields (or goggles) and a face shield, if this material is made into solution. If necessary, refer to U.S. OSHA 29 CFR 1910.133.

Personal Protective Equipment: Skin

Wear chemically-impervious gloves, made of any waterproof material, boots and coveralls to avoid skin contact. If necessary, refer to U.S. OSHA 29 CFR 1910.138.

* * * Section 8 - Exposure Controls / Personal Protection (Continued) * * *

Personal Protective Equipment: Respiratory

If airborne concentrations are above the applicable exposure limits, use NIOSH-approved respiratory protection. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998). The following NIOSH Guidelines for Copper dust and mists (as Cu) are presented for further information.

Up to 5 mg/m^3: Dust and mist respirator.

Up to 10 mg/m^3: Any dust and mist respirator except single-use and quarter mask respirators or any SAR.

Up to 25 mg/m^3: SAR operated in a continuous-flow mode or powered air-purifying respirator with a dust and mist filter(s).

Up to 50 mg/m^3: Air purifying, full-facepiece respirator with high-efficiency particulate filter(s), any powered air-purifying respirator with tight-fitting facepiece and high-efficiency particulate filter(s) or full-facepiece SCBA, or full-facepiece SAR.

Up to 100 mg/ m^3: Positive pressure, full-facepiece SAR.

Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions: Positive pressure, full-facepiece SCBA, or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.

Escape: Full-facepiece respirator with high-efficiency particulate filter(s), or escape-type SCBA.

NOTE: The IDLH concentration for Copper dusts and mists (as Cu) is 100 mg/m^3.

Personal Protective Equipment: General

Wash hands thoroughly after handling material. Do not eat, drink or smoke in work areas. Have a safety shower or eye-wash fountain available. Use good hygiene practices when handling this material including changing and laundering work clothing after use. Discard contaminated shoes and leather goods.

* * * Section 9 - Physical & Chemical Properties * * *

Physical Properties: Additional Information

The data provided in this section are to be used for product safety handling purposes. Please refer to Product Data Sheets, Certificates of Conformity or Certificates of Analysis for chemical and physical data for determinations of quality and for formulation purposes.

Appearance:	Blue crystals or powder	**Odor:**	Odorless
Physical State:	Solid	**pH:**	3.7-4.2 (10% soln.)
Vapor Pressure:	20 torr at 22.5 deg C	**Vapor Density:**	8.6
Boiling Point:	560 deg C (1040 deg F) [decomposes]	**Freezing/Melting Point:**	150 deg C (302 deg F)
Solubility (H2O):	31.6 g/100 cc (@ 0 deg C)	**Specific Gravity:**	2.28 @ 15.6 deg C (H2O = 1)
Softening Point:	Not available	**Particle Size:**	Various
Molecular Weight:	249.68	**Bulk Density:**	Not available
		Chemical Formula:	CuSO4*5H2O

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

Copper Sulfate Pentahydrate is hygroscopic, but stable when kept dry, under normal temperature and pressures.

Chemical Stability: Conditions to Avoid

Avoid high temperatures, exposure to air and incompatible materials.

Incompatibility

Copper Sulfate causes hydroxylamine to ignite and the hydrated salt is vigorously reduced. Solutions of sodium hypobromite are decomposed by powerful catalytic action of cupric ions, even as impurities. . Copper salts, including Copper Sulfate may react to form explosive acetylides when in contact with acetylene or nitromethane. Contact with reducing agents, can cause a vigorous reaction, especially in solution. This product can corrode aluminum, steel and iron. Copper Sulfate Pentahydrate is incompatible with magnesium, strong bases, alkalines, phosphates, acetylene, hydrazine, and zirconium.

Hazardous Decomposition

Sulfur oxides and Copper oxides.

Hazardous Polymerization

Will not occur.

* * * Section 11 - Toxicological Information * * *

Acute and Chronic Toxicity

A: General Product Information

Acute toxicity is largely due to the corrosive (acidic) properties of this material. Harmful or fatal if swallowed. Product is an eye and skin irritant, and may cause burns. Product is a respiratory tract irritant, and inhalation may cause nose irritation, sore throat, coughing, and chest tightness and possibly, ulceration and perforation of the nasal septum.

Chronic: Long term skin overexposure to this product may lead to dermatitis and eczema. Prolonged or repeated eye contact may cause conjunctivitis and possibly corneal abnormalities. Chronic overexposure to this product may cause liver and kidney damage, anemia and other blood cell abnormalities.

B: Component Analysis - LD_{50}/LC_{50}

Copper Sulfate Pentahydrate (7758-99-8)

Oral-rat LD50 = 330 mg/kg (testing done June 2006, Consumer Product Testing Co., Inc.); Intraperitoneal-Rat LD_{50}: 18,700 mg/kg; Intraperitoneal-rat LD_{50}: 20 mg/kg; Subcutaneous-rat LD_{50}: 43 mg/kg; Intravenous-rat LD_{50}: 48900 µg/kg; Unreported-rat LD_{50}: 520 mg/kg; Oral-mouse LD_{50}: 369 mg/kg; Intraperitoneal-Mouse LD_{50}: 33 mg/kg; Intraperitoneal-mouse LD_{50}: 7182 µg/kg; Intravenous-mouse LD_{50}: 23300 µg/kg

B: Component Analysis - TDLo/LDLo

Copper Sulfate Pentahydrate (7758-99-8)

Oral-man LDLo: 857 mg/kg; Oral-Human LDLo: 50 mg/kg: Behavioral: somnolence (general depressed activity); Kidney, Urethra, Bladder: changes in tubules (including acute renal failure, acute tubular necrosis); Blood: hemorrhage; Oral-Human TDLo: 11 mg/kg: Gastrointestinal: gastritis; Gastrointestinal: hypermotility, diarrhea, nausea or vomiting; Oral-Human TDLo: 272 mg/kg: liver, kidney, Blood effects; Oral-Human LDLo: 1088 mg/kg; Oral-child : 150 mg/kg: Kidney, Urethra, Bladder: changes in tubules (including acute renal failure, acute tubular ; necrosis); Blood: other hemolysis with or without anemia; unknown-Man LDLo: 221 mg/kg; Oral-Woman TDLo: 2400 mg/kg/day: Gastrointestinal tract effects; DNA Inhibition-Human: lymphocyte 76 mmol/L; Oral-woman LDLo: 100 mg/kg: Vascular: Blood pressure lowering not characterized in autonomic section; Liver: hepatitis (hepatocellular necrosis), diffuse; Kidney, Urethra, Bladder: changes in tubules (including acute renal failure, acute tubular necrosis); Oral-Human LDLo: 143 mg/kg: Pulmonary system effects, Gastrointestinal tract effects ;Oral-rat TDLo: 915 mg/kg/1 year-intermittent: Cardiac: changes in coronary arteries; Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol; Oral-rat TDLo: 157 mg/kg/6 weeks-intermittent: Endocrine: changes in adrenal weight; Nutritional and Gross Metabolic: weight loss or decreased weight gain; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: dehydrogenases; Oral-rat TDLo: 7530 mg/kg/30 days-intermittent: Blood: changes in serum composition (e.g. TP, bilirubin, cholesterol); Blood: changes in erythrocyte (RBC) count; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels:- multiple enzyme effect; Oral-rat TDLo: 2 gm/kg/20 days-intermittent: Liver: other changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: phosphatases, Enzyme inhibition, induction, or change in blood or tissue levels; Intraperitoneal-rat TDLo: 791 mg/kg/18 weeks-intermittent: Nutritional and Gross Metabolic: weight loss or decreased weight gain; Intraperitoneal-rat TDLo: 7500 µg/kg: female 3 day(s) after conception: Reproductive: Fertility: other measures of fertility; Subcutaneousrat TDLo: 12768 µg/kg: male 1 day(s) pre-mating: Reproductive: Paternal Effects: testes, epididymis, sperm duct; Intratesticular-rat TDLo:3192 µg/kg: male 1 day(s) pre-mating: Reproductive: Paternal Effects: spermatogenesis (incl. genetic material, sperm morphology, motility, and count), testes, epididymis, sperm duct; Oral-mouse TDLo: 3 gm/kg/8 weeks-continuous: Blood: changes in spleen; Immunological Including Allergic: decrease in cellular immune response, decrease in humoral immune response; Oral-mouse TDLo: 2 gm/kg/3 weekscontinuous:
Blood: changes in spleen; Immunological Including Allergic: decrease in cellular immune response, decrease in humoral immune response; Subcutaneous-mouse LDLo: 500 µg/kg; Subcutaneous-mouse TDLo: 12768 µg/kg: male 30 day(s) pre-mating: Reproductive: Paternal Effects: testes, epididymis, sperm duct; Intravenous-mouse TDLo: 3200 µg/kg: female 8 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus), Specific Developmental Abnormalities: Central Nervous System, cardiovascular (circulatory) system; Intravenous-mouse TDLo: 3200 µg/kg: female 7 day(s) after conception: Reproductive: Fertility: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants); Oral-Dog, adult LDLo: 60 mg/kg; Intravenous-guinea pig TDLo: 2 mg/kg; Subcutaneous-Guinea Pig, adult LDLo: 62 mg/kg; Oral-Pigeon LDLo: 1000 mg/kg; Oral-Domestic animals (Goat, Sheep) LDLo: 5 mg/kg; Oral-Bird-wild species LDLo: 300 mg/kg; Intravenous-frog LDLo: 25 mg/kg; Parenteral-chicken TDLo: 10 mg/kg: Tumorigenic: equivocal tumorigenic agent by RTECS criteria; Endocrine: tumors; Oral-pig TDLo: 140 mg/kg: female 1-15 week(s) after conception, lactating female 4 week(s) post-birth: Reproductive: Effects on Newborn: biochemical and metabolic; Intravenous-hamster TDLo: 2130 µg/kg: female 8 day(s) after conception: Reproductive: Fertility: postimplantation
mortality (e.g. dead and/or resorbed implants per total number of implants), Specific Developmental Abnormalities: Central Nervous System, body wall

* * * Section 11 - Toxicological Information (Continued) * * *

Carcinogenicity

A: General Product Information

Copper Sulfate Pentahydrate (7758-99-8)

Cytogenetic Analysis-Rat/ast 300 mg/kg

B: Component Carcinogenicity

Copper dusts and mists, as Cu (7440-50-8)

EPA: EPA-D (Not Classifiable as to Human Carcinogenicity - inadequate human and animal evidence of carcinogenicity or no data available)

Epidemiology

No information available.

Neurotoxicity

Has not been identified.

Mutagenicity

Human and animal mutation data are available for Copper Sulfate Pentahydrate; these data were obtained during clinical studies on specific human and animal tissues exposed to high doses of this compound.

Teratogenicity

There are no reports of teratogenicity in humans. Animal studies indicate that a deficiency or excess of copper in the body can cause significant harm to developing embryos. The net absorption of copper is limited and toxic levels are unlikely from industrial exposure.

Other Toxicological Information

Individuals with Wilson's disease are unable to metabolize copper. Thus, persons with pre-existing Wilson's disease may be more susceptible to the effects of overexposure to this product.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Harmful to aquatic life in very low concentrations. Copper Sulfate Pentahydrate is toxic to fish and marine organisms when applied to streams, rivers, ponds or lakes.

B: Ecotoxicity

Copper Sulfate Pentahydrate (7758-99-8)

LC_{50} (*Lepomis machochirus* bluegill) wt 1.5 g = 884 mg/L at 18°C, static bioassay (95% confidence limit 707-1,100 mg/L) (technical material, 100% (about 25% elemental copper); LC_{50} (*Leopmis cyanellus*, Green Sunfish) = 1.1 g, 3,510 µg/L at °C; LC_{50} (*Pimephales promelas*, Fat-head minnow) = 1.2 g, 838 µg/L at 18°C; LC_{50} (*Crassius auratus*, Goldfish) = 0.9 g, 1380 µg/L at 18°C; LC_{50} (*Crassius auratus*, Goldfish) = 0.1-2.5 mg/L; LC_{50} (*EEL*) = 0.1-2.5 mg/L; LC_{50} (*Salmo gairdneri*, Rainbow trout) = 1.6 g, 135 µg/L at 18°C; LC_{50} (*Salmo gairdneri*, Rainbow trout) 48 hours =0.14 ppm; LC_{50} (*Daphnia magna*) no time specified = 0.182 mg/L; LC_{50} (*Salmo gairdneri*, Rainbow trout) no time specified = 0.17 mg/L; LC_{50} (*Lepomis machochirus*, Blue gill) no time specified = 1.5 g, 884 µg/L at 18°C; LC_{50} (Stripped Bass) 96 hours = 1 ppm or lower; LC_{50} (Prawn) 48 hours = 0.14; LC_{50} (Shrimp) 96 hours = 17.0 ppm copper; LC_{50} (Blue Crab) 96 hours = 28 ppm copper; LC_{50} (Oyster) 96 hours = 5.8 ppm copper; LC_{50} (*Viviparus bengalensis* snail) 96 hours = 0.060 ppm copper (at 32.5°C; 0.066 ppm copper static bioassay); LC_{50} (*Viviparus bengalensis* snail) 96 hours = 0.09 ppm copper (at 27.3°C; 0.066 ppm copper static bioassay); LC_{50} (*Viviparus bengalensis* snail) 96 hours = 0.39 ppm copper (at 20.3°C; 0.066 ppm copper static bioassay)

Environmental Fate

If released to soil, copper sulfate may leach to groundwater, be partly oxidized or bind to humic materials, clay or hydrous oxides of iron and manganese. In water, it will bind to carbonates as well as humic materials, clay and hydrous oxides of iron and manganese. Copper is accumulated by plants and animals, but it does not appear to biomagnify from plants to animals. In air, copper aerosols have a residence time of 2 to 10 days in an unpolluted atmosphere and 0.1 to greater than 4 days in polluted, urban areas.

* * * Section 13 - Disposal Considerations * * *

US EPA Waste Number & Descriptions

A: General Product Information

This product is a registered pesticide.

B: Component Waste Numbers

No EPA Waste Numbers are applicable for this product's components.

Disposal Instructions

All wastes must be handled in accordance with local, state and federal regulations or with regulations of Canada and its Provinces. This material can be converted to a less hazardous material by weak reducing agents followed by neutralization. Do not reuse empty containers. Do not rinse unless required for recycling. If partly filled, call local solid waste agency for disposal instructions. Never pour unused product down drains or on the ground.

Pesticide Disposal

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticides, spray mixtures, or rinsate is a violation of U.S. Federal and Canadian Law. If these wastes cannot be disposed of by use, according to product label instruction, contact your U.S. State, or Canadian Province Pesticide or Environmental Control Agency, or the hazardous waste representative at the nearest U.S. EPA Regional Office, or the offices of Environment Canada for guidance.

* * * Section 14 – Transportation Information Ground * * *

NOTE: The shipping classification information in this section (Section 14) is meant as a guide to the overall classification of the product. However, transportation classifications may be subject to change with changes in package size. Consult shipper requirements under 49 CFR, IATA and IMDG to assure regulatory compliance.

US DOT 49 CFR 100-185 Revised July 24, 2009 Information

UN/NA #: UN 3077

Shipping Name: Environmentally Hazardous Substance, solid, n.o.s. (cupric sulfate)

Hazard Class: 9

Packing Group: III

Required Label(s): Class 9

Special Provision: 8, 146, IB8, IP2, N20

Packaging: 172.213

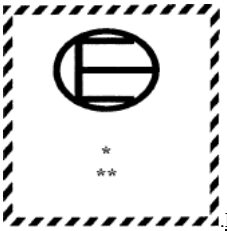
RQ Quantity: For a single package less than the RQ of 10lb (4.54 kg), the RQ designation should be not be used.

Additional Shipping Information

Limited Quantity Shipments: Shipments, except for air, need not be marked with the Proper Shipping Name of the contents, but shall be marked with the UN Number (3077) of the contents, preceded by the letters "UN", placed within a diamond. The width of the line forming the diamond shall be at least 2 mm; the number shall be at least 6 mm high. The total weight of each outer packaging cannot exceed 30 kg (66 pounds.) .

Small Quantities for Highway and Rail: The maximum quantity of this material per inner receptacle is limited to 30 g (1 ounce) per receptacle. The inner receptacles must be securely packed in an inside packaging with cushioning material to prevent movement of the inner receptacles and packed in a strong outer box with a gross mass not to exceed 29kg (64 pounds). The completed package must meet the drop test requirements of 173.4(6) (i). The outside of the package must be marked with the statement "**This package conforms to 49 CFR 173.4 for domestic highway or rail transport only."**

Excepted Quantities: The maximum quantity of this material per inner receptacle is limited to 30 g (1 ounce) per receptacle and the aggregate quantity of this material per completed package does not exceed 1kg (2.2 pounds). The inner receptacles must be securely packed in an inside packaging with cushioning material to prevent movement in the inner receptacles and packed in a strong outer box with a gross mass not to exceed 29kg (64 pounds). The completed package must meet a drop test. The requirements are found in 173.4(6) (i). The package must not be opened or otherwise altered until it is no longer in commerce. For highway or rail transportation no shipping paper is required. The package must be legibly marked with the following marking:



NOTE: The "*" must be replaced by the primary hazard class, or when assigned, the division of each of the hazardous materials contained in the package. The "**" must be replaced by the name of the shipper or consignee if not shown elsewhere on the package. The symbol shall be not less than 100 mm (3.9 inches) x 100 mm (3.9 inches), and must be durable and clearly visible.

De minimis Exceptions: The maximum quantity of this material per inner receptacle is limited to 1g (0.04 ounce) per receptacle and the aggregate quantity of this material per completed package does not exceed 100 g (0.22 pounds). The inner receptacles must be securely packed in an inside packaging with cushioning material to prevent movement in the inner receptacles and packed in a strong outer box with a gross mass not to exceed 29kg (64 pounds). The completed package must meet the drop test. The requirements are found in 173.4(6) (i). The package must not be opened or otherwise altered until it is no longer in commerce and may be transported by aircraft. If all of the above requirements are met, then this material is not regulated.

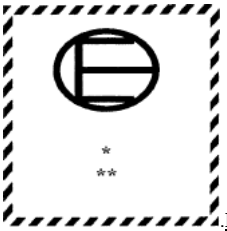
* * * Section 14 – Transportation Information Air * * *

50th Edition International Air Transport Association (IATA):

For Shipments by Air transport: This information applies to air shipments both within the U.S. and for shipments originating in the U.S., but being shipped to a different country.

UN/NA #: UN 3077
Proper Shipping Name: Environmentally Hazardous Substance, solid, n.o.s. (cupric sulfate)
Hazard Class: 9 (Miscellaneous Dangerous Goods)
Packing Group: III
Passenger & Cargo Aircraft Packing Instruction: 911
Passenger & Cargo Aircraft Maximum Net Quantity: 400 kg
Limited Quantity Packing Instruction (Passenger & Cargo Aircraft): Y911
Limited Quantity Maximum Net Quantity (Passenger & Cargo Aircraft): 30 kg G
Cargo Aircraft Only Packing Instruction: 911
Cargo Aircraft Only Maximum Net Quantity: 400 kg
Excepted Quantities: E1
Special Provisions: A97, A158
ERG Code: 9L
Limited Quantity Shipments: Shipments for air must be marked with the Proper Shipping Name, Environmentally Hazardous Substance, solid, n.o.s. (cupric sulfate), and shall be marked with the UN Number (3077) preceded by the letters "UN", placed within a diamond. The width of the line forming the diamond shall be at least 2 mm; the number shall be at least 6 mm high. The total weight of each outer packaging cannot exceed 30 kg.

Excepted Quantities: The maximum quantity of this material per inner receptacle is limited to 30 g per receptacle and the aggregate quantity of this material per completed package does not exceed 1kg. The inner receptacles must be securely packed in an intermediate packaging with cushioning material to prevent movement in the inner receptacles and packed in a strong outer box with a gross mass not to exceed 29kg. The completed package must meet a drop test. The requirements are found in 2.7.6.1. The package must not be opened or otherwise altered until it is no longer in commerce. For air transportation no shipping paper is required. The package must be legibly marked with the following marking:



NOTE: The "*" must be replaced by the primary hazard class, or when assigned, the division of each of the hazardous materials contained in the package. The "**" must be replaced by the name of the shipper or consignee if not shown elsewhere on the package. The symbol shall be not less than 100 mm x 100 mm and must be durable and clearly visible.

* * * Section 14 – Transportation Information Vessel * * *

Amendment 34-08 International Maritime Dangerous Goods (IMDG) Code
For shipments via marine vessel transport, the following classification information applies.

UN/NA #: UN 3077
Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Cupric sulfate)
Hazard Class: Class 9 (Miscellaneous Dangerous Goods)
Packing Group: III
Special Provisions: 179,274,335,909
Limited Quantities 5 kg
Excepted Quantities: E1
Packing Instructions: P002/LP02
Provisions: PP12
IBC Instructions IBC08
IBC Provisions: B2
EmS: F-A, S-S
Stowage and Segregation: Category A.

Marine Pollutant: This material is considered a marine pollutant by the IMO and shipments of the material must carry the new marking

Refer to IMO Amendment 34-08 Chapter 2.9 and 2.10.

Limited Quantity Shipments: Shipments need not be marked with the Proper Shipping Name of the contents, but shall be marked with the UN Number (3077) of the contents, preceded by the letters "UN", placed within a diamond. The width of the line forming the diamond shall be at least 2 mm; the number shall be at least 6 mm high. The total weight of each outer packaging cannot exceed 30kg.

Excepted Quantities: The maximum quantity of this material per inner receptacle is limited to 30g per receptacle and the aggregate quantity of this material per completed package does not exceed 1,000g. Maximum number of packages per Cargo Transport Unit (CTU) shall not exceed 1,000 packages. The inner receptacles must be securely packed in an intermediate packaging with cushioning material to prevent movement in the inner receptacles and packed in a strong outer box with a gross mass not to exceed 29 kg. The completed package must meet a drop test. The requirements are found in 3.5.3.1. Packages must not be opened or otherwise altered until it is no longer in commerce and a shipping paper is required. The package must be legibly marked with the following marking:

NOTE: The "*" must be replaced by the primary hazard class, or when assigned, the division of each of the hazardous materials contained in the package. The "**" must be replaced by the name of the shipper or consignee if not shown elsewhere on the package. The symbol shall be not less than 100 mm x 100 mm and must be durable and clearly visible.

* * * Section 15 - Regulatory Information * * *

US Federal Regulations

A: General Product Information

Copper Sulfate Pentahydrate (CAS # 7758-99-8) is listed as a Priority and Toxic Pollutant under the Clean Water Act.

B: Component Analysis This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4):

Copper Compounds (7440-50-8)
SARA 313: final RQ = 5000 pounds (2270 kg) Note: No reporting of releases of this substance is required if the diameter of the pieces of the solid metal released is equal to or greater than 0.004 inches.

Cupric Sulfate (7758-98-7)
CERCLA: final RQ = 10 pounds (4.54 kg)

* * * Section 15 - Regulatory Information (Continued) * * *

C: Sara 311/312 Tier II Hazard Ratings:

Component	CAS #	Fire Hazard	Reactivity Hazard	Pressure Hazard	Immediate Health Hazard	Chronic Health Hazard
Copper Sulfate Pentahydrate	7758-99-8	No	No	No	Yes	Yes

State Regulations

A: General Product Information

California Proposition 65

Copper Sulfate Pentahydrate is not on the California Proposition 65 chemical lists.

B: Component Analysis - State

The following components appear on one or more of the following state hazardous substance lists:

Component	CAS #	CA	FL	MA	MN	NJ	PA
Copper	7440-50-8	Yes	No	Yes	No	Yes	Yes
Copper, fume, dust and mists	N/A	No	Yes	No	Yes	No	Yes
Copper Sulfate Pentahydrate	7758-99-8	No	No	No	No	Yes	Yes

Other Regulations

A: General Product Information

When used as a pesticide, the requirements of the U.S. Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), or requirements under the Canadian Pest Control Act, are applicable.

B: Component Analysis - Inventory

Component	CAS #	TSCA	DSL	EINECS
Copper Sulfate Pentahydrate	7758-99-8	Excepted	No	Yes

Although this compound is not on the TSCA Inventory, it is excepted as a hydrate of a listed compound, Copper Sulfate (CAS # 7758-98-7), per 40 CFR 710.4 (d)(3) and 40 CFR 720.30 (h)(3). Under this section of TSCA, any chemical substance which is a hydrate of a listed compound is excepted.

C: Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Copper Sulfate Pentahydrate	7758-99-8	1 percent

ANSI Labeling (Z129.1):

WARNING! MAY BE HARMFUL OR FATAL IF SWALLOWED. CAUSES SKIN AND EYE IRRITATION. HARMFUL IF INHALED. Keep from contact with clothing. Do not taste or swallow. Do not get on skin or in eyes. Avoid breathing dusts or particulates. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear gloves, goggles, faceshields, suitable body protection, and NIOSH-approved respiratory protection, as appropriate. **FIRST-AID:** In Case of Contamination of Skin or Clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. In Case of Contamination of Eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue to rinse eye. If Inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth to mouth, if possible. If Ingested: Call poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person. Call a poison control center or doctor for treatment advice. Have the product container or label with you when calling a poison control center or doctor, or going for treatment. In the event of a medical emergency, you may also contact The National Pesticide Information Center at 1-800-858-7378. **IN CASE OF FIRE:** Use water fog, dry chemical, CO_2, or "alcohol" foam. **IN CASE OF SPILL:** Absorb spill with inert material. Place residue in suitable container. Consult Material Safety Data Sheet for additional information.

Labeling Information for Pesticide Use of Product:

DANGER! HAZARD TO HUMANS AND DOMESTIC ANIMALS.

DANGER: CORROSIVE: Causes eye damage and irritation to the skin and mucous membrane. Harmful or fatal if swallowed. Do not get in eyes, on skin or on clothing. Do not breathe dust or spray mist. May cause skin sensitization reactions to certain individuals.

PERSONAL PROTECTIVE EQUIPMENT: Applicators and other handlers must wear long-sleeved shirt and long pants, chemical-resistant gloves, made of any water-proof material, shoes, plus socks and protective eyewear. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this solutions of this product. Do not reuse such contaminated items. Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for reusable items exist, wash using detergent and hot water. Keep and wash PPE separately for other laundry.

USER SAFETY RECOMMENDATIONS: Persons using this product should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove clothing immediately if contaminated by the pesticide. Wash contaminated clothing thoroughly and put on clean clothing. Remove PPE immediately after use with this product. Wash outside of gloves and other equipment before removing. After removal of PPE, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS: This product is toxic to fish. Direct application of Copper Sulfate to water may cause a significant reduction in populations of aquatic invertebrates, plants and fish. Do not treat more than one-half of lake or pond at one time in order to avoid depletion of oxygen from decaying vegetation. Allow 2 weeks between treatments for oxygen levels to recover. Trout and other species of fish may be killed at application rates recommended on this label, especially in soft or acid waters. However, fish toxicity generally decreases when the hardness of the water increases. Do not contaminate water by cleaning of equipment of disposal of wastes. Consult local State Fish and Game Agency before applying this product to public waters. Permits may be required before treating such waters.

STORAGE AND DISPOSAL: PROHIBITIONS: Do not contaminate water, food or feed by storage or disposal. Open burning and dumping is prohibited. Do not re-use empty containers. Keep pesticide in original container. Do not put concentrate or dilutions of concentrate in food or drink containers. Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use, according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance. Completely empty bag of product into application equipment. Dispose of empty bag in a sanitary landfill or by incineration, or if allowed by State and local authorities, by burning. If burned, avoid smoke.

DIRECTIONS FOR USE: It is a violation of Federal Law to use this product inconsistent with its labeling. Do not apply this product in a way that will contaminate workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For requirements specific to your State, consult the agency responsible for your pesticide regulations.

AGRICULTURAL USE REQUIREMENTS: Use this product only in accordance with its labeling and with the Worker Protection Standard, CFR Part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries and greenhouses, and handlers of agricultural pesticides. The Standard contains requirements for the training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. These requirements only apply to uses of this product that are covered under the Worker Protection Standard. Do not apply this product in a way that will contaminate workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. Do not allow worker entry into treated areas during the restricted interval (REI) of 48 hours. PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil or water, is" Coveralls, waterproof gloves, shoes, plus socks and protective eyewear.

Labeling Information for Pesticide Use of Product (continued):

GENERAL USE INSTRUCTIONS: Water hardness, temperature of the water, the type and amount of vegetation to be controlled and the amount of water flow, are to be considered in using Copper Sulfate to control algae. Begin treatment soon after plant growth has started. If treatment is delayed until a large amount of algae is present, larger quantities of Copper Sulfate will required. Algal growth is difficult to control with Copper Sulfate when water temperatures are low or when water is hard. Larger quantities of Copper Sulfate will be required to kill and control algae in water which is flowing than in a body of stagnant water. If possible, curtail the flow of water before treatment and hold dormant until approximately three days after treatment or until the algae have begun to die. When preparing a Copper Sulfate solution in water, the mixing container should be made of plastic or glass, or a painted, enameled, or copper-lined metal container. It is usually best to treat algae on a sunny day when the heavy mats of filamentous algae are most likely to be floating on the surface, allowing the solution to be sprayed directly on the algae. If there is some doubt about the concentration to apply, it is generally best to start with a lower concentration and to increase this concentration until the algae are killed.

ENDANGERED SPECIES RESTRICTION: It is a violation of Federal Law to use any pesticide in a manner that results in the death of an endangered species or adverse modification to their habitat. The use of this product may pose a hazard to certain Federally Designated species known to occur in specific areas. Contact the EPA for information on these areas. Obtain a copy of the EPA Bulletin specific to your area. This bulletin identifies areas within specific State counties where the use of this pesticide is prohibited, unless specified otherwise. The EPA Bulletin is available from either your County Agricultural Extension Agent, the Endangered Species Specialist in your State Wildlife Agency Headquarters, or the appropriate Regional Office of the U.S. Fish and Wildlife Service. THIS BULLETIN MUST BE REVIEWED PRIOR TO PESTICIDE USE.

EPA REG. NO. 56576- EPA EST. NO. 52117-MX-001

* * * Section 16 - Other Information * * *

Other Information

Chem One Ltd. ("Chem One") shall not be responsible for the use of any information, product, method, or apparatus herein presented ("Information"), and you must make your own determination as to its suitability and completeness for your own use, for the protection of the environment, and for health and safety purposes. You assume the entire risk of relying on this Information. In no event shall Chem One be responsible for damages of any nature whatsoever resulting from the use of this product or products, or reliance upon this Information. By providing this Information, Chem One neither can nor intends to control the method or manner by which you use, handle, store, or transport Chem One products. If any materials are mentioned that are not Chem One products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be observed. Chem One makes no representations or warranties, either express or implied of merchantability, fitness for a particular purpose or of any other nature regarding this information, and nothing herein waives any of Chem One's conditions of sale. This information could include technical inaccuracies or typographical errors. Chem One may make improvements and/or changes in the product (s) and/or the program (s) described in this information at any time. If you have any questions, please contact us at Tel. 713-896-9966 or E-mail us at Safety@chemone.com.

Key/Legend

EPA = Environmental Protection Agency; TSCA = Toxic Substance Control Act; ACGIH = American Conference of Governmental Industrial Hygienists; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration

Contact: Sue Palmer-Koleman, PhD **Contact Phone:** (713) 896-9966

Revision log 07/24/00 4:24 PM SEP Changed company name, Sect 1 and 16, from Corporation to Ltd.
07/27/00 2:49 PM SEP Added “Fine 200, FCC IV, Very High Purity” to synonyms, Section 1
08/23/00 3:15 PM SEP Added “Copper Sulfate Crystals” to synonyms, Section 1
05/31/01 9:31 AM HDF Checked exposure limits; made changes to Sect 9; overall review, add SARA 311/312 Haz Ratings.
06/01/01 7:28 AM HDF Added text to label information from EPA Approved Label
07/24/01 4:31 AM CLJ Add Shipments by Air information to Section 14, Changed contact to Sue, non-800 Chemtrec Num.
09/18/01 11:34 AM SEP Added Domestic Transportation Exception, Sect 14
10/05/01 3:30 PM SEP Deleted Alternate Shipping Name, Sect 14
02/15/02 11:01 AM: HDF Revision of SARA Chronic Hazard Rating to “Yes”.
2/21/02 4:21 PM HDF Added more information on Marine Pollutant Markings and Limited Quantity Shipments
9/16/03: 3:45 PM HDF Addition of chronic health hazard information. Addition of inhalation hazard information, Section 3. Section 4. expansion of information on Information for Physicians. Up-graded Section 10 Reactivity Information. Up-dated DFG MAK exposure limits. Up-Dated entire Section 14 Transportation Information to include IATA, IMO and current Canadian transport information.
06/22/05 2:24PM SEP Update IATA Section 14
01/06/2006 10:12 am SEP Corrected Section 14 DOT domestic transport exception to read 49 CFR 172.322 (d) (3).
09/08/06 2:52PM SEP Updated DOT and IMO Section 14 SEP
09/25/06 08:43 HDF Review of new toxicological data and addition of data to Section 11.
10/17/06 12:15 pm SEP Updated Section 11.
10/16/07 9:48am SEP Updated Section 14- IATA
10/10/08 3:48 PM DLY Changed Chem One Physical Address, Section 1
09/18/09 MMK Updated Section 14 limited &excepted quantities and exceptions, updated REI and treatment interval per EPA label RED
04 /07/ 11 SEP Add “F 25” Section 1
This is the end of MSDS # C1-121A

Appendix C

Air Quality, Greenhouse Gas, And Energy Appendix

Air Quality, Greenhouse Gas, And Energy Appendix

1. Assumptions
2. Emissions Calculations
   A. Ground Emissions
   B. Boat Emissions
   C. Helicopter Emissions
3. Air Quality Emissions Summary
4. Greenhouse Gas Emissions Summary
5. Energy Summary

Air Quality, Greenhouse Gas, And Energy Appendix

1. Assumptions

Copper Sulfate Application Project

Project Assumptions

Analyst: Heather Dubois

Thresholds:

Jan Sudoimer of the Great Basin Unified Air Pollution Control District stated that it was up to the project to determine what was most appropriate to the project area with respect to signicance thresholds. Becasue of the nature, scale, and location of the project the conservative SCAQMD thresholds will be used for analyzing significance.

Note: Emission estimates will be modeled using EMFAC2014 emission rates for onroad vehicles and ADET Emission rates for air craft (to obtain emission rates or emissions from Chris and will update this statement accordingly).

Construction

The proposed project would not require the construction of any facilities. The proposed project would be conducted by the operation of trucks and helicopters to deliver the copper sulfate to the proposed project locations. There are no structures associated with the proposed project.

Copper Sulfate Application Project

Project Assumptions

Operational

LADWP plans to apply copper sulfate pentahydrate (copper sulfate) on an as-needed basis to control aquatic weeds and algal blooms so that the blooms do not degrade drinking water through elevated tastes and odors, production of algal toxins, clogging of filters, and reduction in water flows. LADWP will apply the treatment both aerially and terrestrially depending on the needs of each site. Applications will occur between 1-5 times per year.

Applications per year 1-5. Assumes all applications occur on the same day.

Mobile Source Emissions - per application

Employees

	# Employees	# Days	Distance traveled (miles) One-way[2]	Vehicle Type
Copper Sulfate Application				
water biologist	1	3	193	LDA
Water Treatement Operator	1	1	193	LDA
Watershed Resource Specalist	1	1	193	LDA
Boat Operator	2	3	193	LDT1/2
Regulatory Compliance Group	2	2	193	LDT1/2
Supervisor/coordinators	2	1	193	LDT1/2
Monitoring				
Before	3	1	193	LDA
During	3	1	193	LDA
After	3	1	193	LDA

Total daily one-way Employee Trips[1]	36
Average daily one-way trip distance	193

Copper Sulfate Application Project
Project Assumptions

Notes:

1. Assumes no off-site trips for lunch/supplies during the average work day.

2. Staff for the application are anticipated to come from either Bishop, Sylmar or Lone Pine. Because the location is unknown, the analysis assumes that all staff originates at the furthest location to represent a worst case scenario. In this instance, the furthest location would be Sylmar.

To/From	Sylmar	Bishop	Lone Pine
Alabama Gates	193 miles	52 miles	5
Merritt Cut	159 miles	89 miles	35
Haiwee Reservoirs	155 miles	92 miles	40

Chemical Delivery

The project will employe direct application at the Alabama Gates and Merrit Cut and helicopter application for North Haiwee and South Haiwee. The helicporter would take off and land at the damn associated with each site. The analysis shows the emissions comparisons for each option.

This Assumes the use of a Heavy Duty Truck

Van Norman Chemical Depot to Alabama Gates	193	miles per one-way trip
	2	Total # one-way trips
Chemical Depot to Dam and Merriut	159	miles per one-way trip
	2	Total # one-way trips

Helicopter Application

The project will employe either a crop dustor plane or a helicopter at each location. The analysis shows the emissions comparisons for each option.

The analysis assumes 2,500 lb application of copper sulfate

Helicopter

Type of Helicopter:	Bell 206 L3 Long Ranger
Commute time:	1 hr, one-way
Air Time (total):	1 hrs
Air time (per trip);	10 minutes
Take-offs and landings:	8

Copper Sulfate Application Project

Project Assumptions

Direct application

The project will employe direct application of copper sulfate to both the alabama gates and merrit cut locations.

Delivery of hopper	350	miles - per hopper (one way)
	MDV	Vehicle to deliver (i.e. pick-up truck, heavy duty tractor trailer)

Tecweigh 5 auger Feeder Operations[9]

* Assumes use of a small, portable, gasoline engine or powered from truck. No diesel fuel needed. Gasoline not modeled. If powered by truck engine, emissions are covered in truck operation.

18	hp generator (gasoline)
8	# hrs of operation at Alabama Gates
8	# hrs of operation at Merrit Cut

Application Monitoring

3	# Monitors
3	# days of monitoring
8	hrs of activity per day. Assumes 1/2 day in boat and 1/2 day in pick-up truck
155	miles to resivour
LDT1	Vehicle Class

Other Equipment:		**Hrs of operation**	**#**	**hp**
	boat	4	2	500

Biological and Sediment (Same staff/equipment as application monitors)

3	# Monitors
3	# days of monitoring
8	hrs of activity per day. Assumes 1/2 day in boat and 1/2 day in pick-up truck
155	miles to resivour
LDT1	Vehicle Class

Other Equipment:		**Hrs of operation**	**#**	**hp**
	boat	4	2	500

Air Quality, Greenhouse Gas, And Energy Appendix

2. Emissions Calculations

A. Ground Emissions

Copper Sulfate Application Project
Ground Vehicle Emissions Calculations

Emission Rates for onroad Vehicles

ROG	NOx	CO	SOx	PM10	PM2.5	CO_2	CH_4	
			LDA/LDT1/LDT2					
0.090268	0.372868	3.221243	0.00409	0.04847	0.021174	407.6107	2.038054	g/mile
6.938648	0.481378	9.806212	0.000963	0.006569	0.006053	88.39805	0.44199	g/trip
0	0	0	0	0	0	0	0	g/day
			HHDT					
0.133822	4.241062	0.598745	0.01516	0.121173	0.058247	1589.04	7.9452	g/mile
0	0	0	0	0	0	0	0	g/trip
3.271012	4.241062	11.74909	0.199568	0.159204	0.152317	20918.04	104.5902	g/day

Terresterial Application

Assumptions:

Chemical Deliveries:

193	miles to Alabama Cut area
159	miles to Resivour and Merrit Cut area
1	delivery to each location
HHDT	Vehicle Type

Delivery of Hopper:

350	miles Assumes delivers one day, returns the following.
2	deliveries (one to Alabama Cut, one to Merrit Cut)
LDA/LDT1/LDT2	Vehicle Type

Application:

2	Drivers
2	Application vehicles
2	LDA/LDT1/LDT2 vehicles
8	hrs of operation
15	mph (max)
120	miles per truck, per day (max)
240	miles total

Additional staff Onsite Travel:

7	# staff
3	hrs per day driving onsite
25	mph (average)
75	miles per day per vehicle
525	miles per day total
LDA/LDT1/LDT2	Vehicle Type

Copper Sulfate Application Project

Ground Vehicle Emissions Calculations

Max Daily Emissions:

LDA/LDT1/LDT2:	Miles	Trips	Vehicles
Hopper:	700	2	2
Application:	240	8	2
Staff Travel:	525	28	7
Total:	1465	38	11

	ROG	NOx	CO	SOx	PM10	PM2.5	CO_2	CH_4
g/mile	132.2425	546.2522	4719.122	5.991593	71.00834	31.01932	597149.7	2985.748
g/trip	263.6686	18.29237	372.6361	0.036592	0.249612	0.230016	3359.126	16.79563
g/vehicle	0	0	0	0	0	0	0	0
g/day	395.9111	564.5446	5091.758	6.028185	71.25796	31.24934	600508.8	3002.544
lbs/day	0.87	1.24	11.23	0.01	0.16	0.07	N/A	N/A
MT/day	N/A	N/A	N/A	N/A	N/A	N/A	0.60	0.003

HHDT:	Miles	Trips	Vehicles
Chemical Delivery:	704	4	2

	ROG	NOx	CO	SOx	PM10	PM2.5	CO_2	CH_4
g/mile	94.2105	2985.708	421.5164	10.67277	85.30558	41.00609	1118684	5593.421
g/trip	0	0	0	0	0	0	0	0
g/vehicle	6.542024	8.482125	23.49818	0.399136	0.318409	0.304635	41836.08	209.1804
g/day	100.7525	2994.19	445.0146	11.07191	85.62398	41.31072	1160520	5802.601
lbs/day	0.22	6.60	0.98	0.02	0.19	0.09	N/A	N/A
MT/day	N/A	N/A	N/A	N/A	N/A	N/A	1.16	0.006

Copper Sulfate Application Project
Ground Vehicle Emissions Calculations

Commute Emissions

Assumptions:

	Miles (one way)	#	Days
water biologist	193	1	3
Water Treatement Operator	193	1	1
Watershed Resource Specalist	193	1	1
Boat Operator	193	2	3
Regulatory Compliance Group	193	2	2
Supervisor/coordinators	193	2	1
Other Staff	193	6	1
Monitors	193	3	3
per day	6,948	18	
per application	12,352	32	

	ROG	NOx	CO	SOx	PM10	PM2.5	CO_2	CH_4
g/mile	627.1813	2590.69	22381.2	28.4161	336.7686	147.1142	5034807	25174.04
g/trip	249.7913	17.32962	353.0236	0.034666	0.236474	0.21791	5657.475	28.28738
g/vehicle	0	0	0	0	0	0	0	0
g/day	876.9726	2608.019	22734.22	28.45077	337.0051	147.3321	5040465	25202.32
lbs/day	1.93	5.75	50.12	0.06	0.74	0.32	N/A	N/A
MT/App	N/A	N/A	N/A	N/A	N/A	N/A	5.04	0.03

Monitoring Emissions

Assumptions:

Monitoring:

3	LDA/LDT1/LDT2 vehicles
4	hrs of operation
15	mph (max)
60	miles per truck, per day (max)
120	miles total per day
3	# of days
360	total miles per application

	ROG	NOx	CO	SOx	PM10	PM2.5	CO_2	CH_4
g/mile	10.83215	44.74421	386.5492	0.490779	5.816383	2.540832	146739.9	733.6993
g/trip	832.6378	57.76539	1176.745	0.115552	0.788248	0.726367	31823.3	159.1165
g/vehicle	0	0	0	0	0	0	0	0
g/day	843.4699	102.5096	1563.295	0.606331	6.604631	3.267199	178563.1	892.8157
lbs/day	1.86	0.23	3.45	0.00	0.01	0.01	N/A	N/A

Copper Sulfate Application Project

Ground Vehicle Emissions Calculations

MT/App	N/A	N/A	N/A	N/A	N/A	N/A	0.18	0.001

Copper Sulfate Application Project
EMFAC2014 Results

EMFAC2014 (v1.0.7) Emission Rates
Region Type: County
Region: Inyo
Calendar Year: 2019
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RESTL and DIURN

					ROG			CO			NOx			CO2		
Region	CalYr	VehClass	Fuel		/mile	/trip	/day	/mile	/trip	/day	/mile	/trip	/day	/mile	/trip	/day
Inyo	2019	HHDT	DSL		0.133822	0	3.271012	0.598745	0	11.74909	4.241062	0	4.241062	1589.04	0	20918.04
Inyo	2019	LDA	GAS		0.020187	1.492951	0	0.834644	2.463707	0	0.08994	0.177295	0	299.311	64.81238	0
Inyo	2019	LDT1	GAS		0.090268	6.938648	0	3.221243	9.806212	0	0.372868	0.481378	0	361.7781	78.79057	0
Inyo	2019	LDT2	GAS		0.032231	2.549535	0	1.261248	3.835341	0	0.18302	0.368118	0	407.6107	88.39805	0
				Max	0.090268	6.938648	0	3.221243	9.806212	0	0.372868	0.481378	0	407.6107	88.39805	0
Inyo	2019	LHDT1	DSL		0.237636	0	0.10976	1.128546	0	0.909745	4.708007	0	4.708007	586.6171	0	140.9098
Inyo	2019	LHDT2	DSL		0.188147	0	0.10976	0.905575	0	0.909745	3.066803	0	3.066803	650.3711	0	224.3336
				Max	0.237636	0	0.10976	1.128546	0	0.909745	4.708007	0	4.708007	650.3711	0	224.3336
Inyo	2019	MDV	GAS		0.074856	3.698461	0	2.353047	6.957659	0	0.380536	0.718605	0.380536	548.573	117.8809	0
Inyo	2019	MHDT	DSL		0.216335	0	0.132932	0.615773	0	0.970365	3.802444	0	3.802444	1220.699	0	680.661

			PM10			PM2.5			SOx		
VehClass	Fuel		/mile	/trip	/day	/mile	/trip	/day	/mile	/trip	/day
HHDT	DSL		0.121173	0	0.159204	0.058247	0	0.152317	0.01516	0	0.199568
LDA	GAS		0.046631	0.002609	0	0.01948	0.002399	0	0.003002	0.000691	0
LDT1	GAS		0.04847	0.006569	0	0.021174	0.006053	0	0.003666	0.000963	0
LDT2	GAS		0.046657	0.00273	0	0.019504	0.002512	0	0.00409	0.000951	0
		Max	0.04847	0.006569	0	0.021174	0.006053	0	0.00409	0.000963	0
LHDT1	DSL		0.135146	0	0.028463	0.080446	0	0.027232	0.0056	0	0.001345
LHDT2	DSL		0.136664	0	0.027455	0.075169	0	0.026267	0.006209	0	0.002142
		Max	0.136664	0	0.028463	0.080446	0	0.027232	0.006209	0	0.002142
MDV	GAS		0.046819	0.003345	0	0.019656	0.003084	0	0.005516	0.001304	0
MHDT	DSL		0.232811	0	0.039315	0.145417	0	0.037615	0.011646	0	0.006494

Copper Sulfate Application Project
EMFAC2014 Results

EMFAC2014 (v1.0.7) Emissions Inventory
Region Type: Air Basin
Region: Great Basin Valley
Calendar Year: 2019
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	CalYr	VehClass	Fuel	Trips	CO2_RUNE	CO2_IDLEX	CO2_STREX	CO2_TOTEX
Great Basir	2019	HHDT	GAS	111.7968	1.136414	0	0.019322	1.155736
Great Basir	2019	HHDT	DSL	0	249.217	19.64902	0	268.866
Great Basir	2019	LDA	GAS	237220.4	463.2989	0	16.92727	480.2262
Great Basir	2019	LDA	DSL	2543.009	4.913476	0	0	4.913476
Great Basir	2019	LDA	ELEC	3738.245	0	0	0	0
Great Basir	2019	LDT1	GAS	25603.87	48.5567	0	2.213935	50.77063
Great Basir	2019	LDT1	DSL	40.72731	0.058955	0	0	0.058955
Great Basir	2019	LDT1	ELEC	11.23712	0	0	0	0
Great Basir	2019	LDT2	GAS	98582.02	250.8417	0	9.623824	260.4655
Great Basir	2019	LDT2	DSL	132.8426	0.351715	0	0	0.351715
Great Basir	2019	LHDT1	GAS	25145.17	42.98054	0.216028	1.548911	44.74548
Great Basir	2019	LHDT1	DSL	22352.83	35.50332	0.275958	0	35.77928
Great Basir	2019	LHDT2	GAS	2568.746	6.095723	0.025494	0.188841	6.310058
Great Basir	2019	LHDT2	DSL	5893.354	11.81152	0.116008	0	11.92753
Great Basir	2019	MCY	GAS	5186.11	3.234361	0	0.277413	3.511774
Great Basir	2019	MDV	GAS	78213.4	222.9312	0	10.17238	233.1035
Great Basir	2019	MDV	DSL	940.6523	3.031457	0	0	3.031457
Great Basir	2019	MH	GAS	50.09198	5.348851	0	0.004612	5.353463
Great Basir	2019	MH	DSL	12.01336	1.156823	0	0	1.156823
Great Basir	2019	MHDT	GAS	3035.195	9.072258	0.086854	0.385938	9.545049
Great Basir	2019	MHDT	DSL	0	24.09808	0.320491	0	24.41857
Great Basir	2019	OBUS	GAS	1346.603	4.613525	0.027562	0.112832	4.753919
Great Basir	2019	OBUS	DSL	0	11.13346	0.200052	0	11.33351
Great Basir	2019	SBUS	GAS	92.05819	0.764704	0.063477	0.01287	0.841051
Great Basir	2019	SBUS	DSL	0	2.356423	0.179771	0	2.536194
Great Basir	2019	UBUS	GAS	50.53488	3.255197	0	0.017239	3.272437
Great Basir	2019	UBUS	DSL	143.6029	12.52313	0	0	12.52313

Total CO_2 emissions 2961.903 tons/day
1081095 tons/year

Air Quality, Greenhouse Gas, And Energy Appendix

2. Emissions Calculations

B. Boat Emissions

Copper Sulfate Application Project

Boat Emissions

Emission Factors for Marine Vessels **gr/kW-hr**

	ROG	NOx	CO	SOx	PM10	PM2.5	CO_2	CH_4
				Unmitigated				
Boat	0.78	7.2	5	1.9	0.2	0.2	588	0.07
Auxillary	0.52	7.5	5	2.1	0.4	0.4	690	0.09

** Assume default crew/work boats and auxiliary engines will be Tier 2 due to existing marine engine regulations (category 1 engines with displacement <5), and no mitigation are assumed for these engines.*

Marine Engine Emission Standards:

For NOx, CO, PM10 and PM2.5

https://www.dieselnet.com/standards/us/marine.php

For ROG, Sox, CO2 and CH4

https://www.arb.ca.gov/regact/2008/fuelogv08/appdfuel.pdf

	Main Engine[4,5]			Auxiliary Engine[4,5]		
Equipment	**HP**	**KW**	**LF**	**HP**	**KW**	**LF**
Bio-monitor boat	500	373	0.38	70	52	0.38

4. Engine power ratings were from the Port of Long Beach 2016 Air Emission Inventory. Horsepower of ocean tugboat and work boat were used to represent this project's tugboats and bio-monitor boats, respectively.

5. Load factors were from the Port of Long Beach 2012 Air Emission Inventory.

Port of Long Beach Emission http://polb.com/environment/air/emissions.asp

Assumptions:

2 boats

4 hours per day operation

	ROG	NOx	CO	SOx	PM10	PM2.5	CO_2	CH_4
g/day	966.6181	9351.078	6460.745	2486.82	290.1668	290.1668	775969.5	93.62413
lbs/day	2.13	20.62	14.24	5.48	0.64	0.64	N/A	N/A
MT/App	N/A	N/A	N/A	N/A	N/A	N/A	0.78	0.0001

Air Quality, Greenhouse Gas, And Energy Appendix

2. Emissions Calculations

C. Helicopter Emissions

Copper Sulfate Application Project

Helicopter Emissions

Assumptions:

Type of Helicopter:	Bell 206 L3 Long Ranger	
Commute:	1	hr one way
Air Time (total Application):	1	hr
Air time (per trip);	10	minutes
Take-offs and landings:	8	
Days per year	1	

Emissions:	ROG	NOx	CO	SOx	PM10	PM2.5
			grams			
Per LTO	15.17	238.92	351.58	42.88	-	-
Flight Per Hour	45.62	718.56	1,057.38	128.96	-	-
LTO per Day	121.36	1,911.36	2,812.64	1,031.70	-	-
Flight per Day	136.87	2,155.67	3,172.15	128.96	-	-
Total per day	258.23	4,067.03	5,984.79	1,031.70	-	-
			pounds/day			
Total per day	***0.57***	***8.97***	***13.19***	***2.27***	-	-

Emissions:	CO_2e(g)	CO_2e MT
Per LTO	115,508	
Flight Per Hour	347,394	
LTO per Day	924,067	
Flight per Day	1,042,181	
Total per day	1,966,247	**1.97**

Copper Sulfate Application Project

Helicopter Emissions Background Information

Operation Group	Mode	Fuel (g)	Distance (km)	Duration	CO (g)	HC (g)	TOG (g)	VOC (g)	NMHC (g)	NOx (g)
Heli	Climb Taxi	0	0	00:00.0	0	0	0	0	0	0
Heli	Climb Ground	1852.17	0	01:00.0	17.55	0.66	0.76	0.76	0.76	11.8
Heli	Climb Below 1000	18768.64	30.52	10:14.8	180.15	6.76	7.81	7.77	7.81	122.33
Heli	Climb Below Mixing Height	18768.64	30.52	10:14.8	180.15	6.76	7.81	7.77	7.81	122.33
Heli	Climb Below 10000	18768.64	30.52	10:14.8	180.15	6.76	7.81	7.77	7.81	122.33
Heli	Above 10000	0	0	00:00.0	0	0	0	0	0	0
Heli	Descend Below 10000	17842.56	30.41	09:42.2	171.43	6.43	7.44	7.4	7.44	116.59
Heli	Descend Below Mixing Height	17842.56	30.41	09:42.2	171.43	6.43	7.44	7.4	7.44	116.59
Heli	Descend Below 1000	17842.56	30.41	09:42.2	171.43	6.43	7.44	7.4	7.44	116.59
Heli	Descend Ground	0	0	00:00.0	0	0	0	0	0	0
Heli	Descend Taxi	0	0	00:00.0	0	0	0	0	0	0
Heli	Full Flight	36611.2	60.93	19:57.1	351.58	13.19	15.25	15.17	15.25	238.92

Operation Group	Mode	nvPM Mass (g)	PMSO (g)	PMFO (g)	CO2 (g)	H2O (g)	SOx (g)	PM 2·5 (g)	PM 10 (g)
Heli	Climb Taxi	0	0	0	0	0	0	0	0
Heli	Climb Ground	0	0	0	5843.59	2291.13	2.17	0	0
Heli	Climb Below 1000	0	0	0	59215.07	23216.81	21.98	0	0
Heli	Climb Below Mixing Height	0	0	0	59215.07	23216.81	21.98	0	0
Heli	Climb Below 10000	0	0	0	59215.07	23216.81	21.98	0	0
Heli	Above 10000	0	0	0	0	0	0	0	0
Heli	Descend Below 10000	0	0	0	56293.28	22071.25	20.9	0	0
Heli	Descend Below Mixing Height	0	0	0	56293.28	22071.25	20.9	0	0
Heli	Descend Below 1000	0	0	0	56293.28	22071.25	20.9	0	0
Heli	Descend Ground	0	0	0	0	0	0	0	0
Heli	Descend Taxi	0	0	0	0	0	0	0	0
Heli	Full Flight	0	0	0	115508.35	45288.06	42.88	0	0

LTO Turbine N2O Emissions: Based on FAA Aviation Emissions and Air Quality Handbook:

LTO turbine fuel consumption (grams):	36611.2	AEDT results
LTO turbine fuel consumption (lb):	80.71378	Conversion factor
LTO turbine fuel consumption (gallons):	11.80026	AQ Handbook; calculated
LTO turbine N2O emissions per day (metric tons):	3.66E-06	AQ Handbook; calculated

Copper Sulfate Application Project

Helicopter Emissions Background Information

LTO Emissions in Grams

CO (g)	HC (g)	TOG (g)	VOC (g)	NMHC (g)	NOx (g)	PM (g)	SOx (g)	CO2e (g)	CO2 (g)	CH4 (g)	N2O (g)
351.6	13.2	15.3	15.2	15.3	238.9	-	42.9	115,508.4	115,508.4	-	0.0

AEDT does not calculate particulate matter emissions for helicopters.

CH4 emissions are zero because gas turbine engines are net consumers of CH4 over an LTO cycle.

Average Emissions Per Hour in Grams

CO (g)	HC (g)	TOG (g)	VOC (g)	NMHC (g)	NOx (g)	PM (g)	SOx (g)	CO2e (g)	CO2 (g)	CH4 (g)	N2O (g)
1,057.4	39.7	45.9	45.6	45.9	718.6	-	129.0	347,393.5	347,393.5	-	0.0

AEDT does not calculate particulate matter emissions for helicopters.

CH4 emissions are zero because gas turbine engines are net consumers of CH4 over an LTO cycle.

Air Quality, Greenhouse Gas, And Energy Appendix

3. Air Quality Emissions Summary

Copper Sulfate Application Project
Unmitigated Operational Impacts Summary

Unmitigated Emissions - Existing

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
	Max (Lbs/day)					
Helicopter Application	*0.57*	*8.97*	*13.19*	*2*	-	-
Terrestrial Application	*1.09*	*7.85*	*12.21*	*0.04*	*0.35*	*0.16*
Monitoring	*3.99*	*20.84*	*17.69*	*5.48*	*0.65*	*0.65*
Commute	*1.93*	*5.75*	*50.12*	*0.06*	*0.74*	*0.32*
Total	***8***	***43***	***93***	***8***	***2***	***1***
SCAQMD Thresholds	55	55	550	150	150	55
Exceed Thresholds?	**No**	**No**	**No**	**No**	**No**	**No**

Unmitigated LST Screening Level

		Pollutant				
	ROG	NO_X	CO	SOx	PM_{10}	$PM_{2.5}$
	lbs/day					
Total		38	43		1	1
Threshold		***54***	***632***		***6***	***2***
Exceed Threshold		***No***	***No***		***No***	***No***

Operational: SRA 12 & 13, 100 meter, 1-acre

The screening criteria for NOx were developed based on the 1-hour NO2 CAAQS of 0.18 ppm. However, since the publication of the SCAQMD's guidance, the USEPA has promulgated a 1-hour NO2 NAAQS of 0.100 ppm based on a 98th percentile value, which is more stringent than the CAAQS. In order to determine if Project emissions would result in an exceedance of the 1 hour NO2 NAAQS, an approximated LST was estimated to evaluate the federal 1-hour NO2 standard, as the SCAQMD significance threshold has not been updated to reflect this standard. Calculated by scaling the NO2 LST for by the ratio of 1-hour NO2 standards (federal/state)(i.e., 780 lb/day * (0.10/0.18) =433 lb/day).

Air Quality, Greenhouse Gas, And Energy Appendix

4. Greenhouse Gas Emissions Summary

Copper Sulfate Application Project
Unmitigated GHG Summary

Unmitigated Operational Emissions - Max Annual

	MT CO_2e			
	CO_2	**CH_4**	**CO_2e**	
Terresterial Application	1.76	0.1481	1.91	
Commute Emissions	5.04	0.6301	5.67	
Monitoring Emissions	0.18	0.0223	0.20	
Boat Emissions	0.78	0.0023	0.78	
Helicopter Emissions	1.97	0.0000	1.97	
Total			11	Per Application
			53	5 applications

	MT	
GVAB - Annual Emissions	980,752	2019
	0.00537%	

Air Quality, Greenhouse Gas, And Energy Appendix

5. Energy Summary

Copper Sulfate Application Project
Fuel Consumption Summary

	gallons		
Year	**Diesel**	**Gas**	**Aviation**
Helicopter	-	-	236
Terrestrial	128	76	-
Monitoring	-	110	-
Commute	-	638	-
Total per application	***128***	***824***	***236***
Max Annual	*642*	*4,120*	*1,178*
Annual Average	642	4,120	1,178

*Note: Mitigated and unmitigated construction emissions of CO_2 are identical

	Diesel	**Gas**	**Aviation**
State Usage (2017)[1,2,3]	3,089,833,627	15,540,154,774	15,503,471
Project % State	0.000004%	0.000005%	0.0015%
County Usage[4]	3,000,000	16,000,000	N/A
Project % County	0.0043%	0.0257%	N/A

Assumptions

Gasoline

19.6 pounds of CO_2 per gallon of gasoline[5]

0.45 kg = 1 pound

8.89 Kg of CO_2 per gallon of Gasoline

Diesel

22.4 pounds of CO_2 per gallon of diesel fuel[5]

0.45 kg = 1 pound

10.16 Kg of CO_2 per gallon of Gasoline

Aviation Fuel

18.4 pounds of CO_2 per gallon of diesel fuel[5]

0.45 kg = 1 pound

8.35 Kg of CO_2 per gallon of Gasoline

LCFS & Pavley assumed for on-road vehicles after year 2011

Copper Sulfate Application Project
Fuel Consumption Summary

Sources:

1 California Department of Tax and Fee Administration (CDTFA). 2018a Taxable Diesel Gallons 10 Year Report. Available: https://www.cdtfa.ca.gov/taxes-and-fees/spftrpts.htm. Accessed February 2019.

2 CDTFA. 2018b Taxable Gasoline Gallons 10 Year Report. Available: https://www.cdtfa.ca.gov/taxes-and-fees/spftrpts.htm. Accessed February 2019.

3 CDTFA. 2018c Taxable Aviation Gasoline Gallons 10 Year Report. Available: https://www.cdtfa.ca.gov/taxes-and-fees/spftrpts.htm. Accessed February 2019.

4 Califonia Energy Commission (CEC). 2018. California Retail Fuel Outlet Annual Reporting (CEC-A15) Results. Available: https://listserver.energy.ca.gov/almanac/transportation_data/gasoline/piira_retail_survey.html. Accessed: February 2019.

5 U.S. Energy Information Administration (EIA). 2016. Carbon Dioxide Emissions Coefficients. Available: https://www.eia.gov/environment/emissions/co2_vol_mass.php. Accessed: February 2019.

Copper Sulfate Application Project

Fuel Conversion - Construction

	Total CO_2 MT/yr	Fuel Type	Factor $KGCO_2/gal$	Gallons
Terresterial Application	0.68	gasoline	8.89	76
Terresterial Application	1.31	diesel	10.16	128
Commute Emissions	5.67	gasoline	8.89	638
Monitoring Emissions	0.20	gasoline	8.89	23
Boat Emissions	0.78	gasoline	8.89	88
Helicopter Emissions	1.97	Aviation	8.35	236

Copper Sulfate Application Project

Fuel Conversion - Construction

Copper Sulfate Application Project
Energy Information - Transportation Fuels

Accessed: Jan-19

Transportation Fuels

Gasoline

State Consumption

15,589,042,965 gallons 2018

15.59 billion gallons

https://www.cdtfa.ca.gov/taxes-and-fees/spftrpts.htm

County Consumption

16 million gallons Inyo 2017

http://listserver.energy.ca.gov/almanac/transportation_data/gasoline/piira_retail_survey.html

2010-2017 CEC-A15 Results and Analysis (XLSX File

Diesel

Diesel Consumption

3,107,823,655 gallons 2018

3.11 billion gallons

https://www.cdtfa.ca.gov/taxes-and-fees/spftrpts.htm

County Consumption

3 million gallons Inyo 2017

http://listserver.energy.ca.gov/almanac/transportation_data/gasoline/piira_retail_survey.html

2010-2017 CEC-A15 Results and Analysis (XLSX File

Integrated Energy Policy Report

https://www.energy.ca.gov/energypolicy/

Aviation

Aviation Fuel Consumption

15.503471 million gallons State 2017

http://dot.ca.gov/hq/planning/aeronaut/documents/AeroFactSheet.pdf Accessed Feb. 2019

https://www.cdtfa.ca.gov/taxes-and-fees/spftrpts.htm Accessed Feb. 2019

Appendix D
Biological Resources Technical Report

COPPER SULFATE APPLICATION PROJECT

Biological Resources Technical Report

Prepared for
Los Angeles Department of Water and Power

December 2018

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Biological Resources Technical Report

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Biological Resources Technical Report

Executive Summary

The Los Angeles Department of Water and Power (LADWP) is proposing to apply copper sulfate to treat harmful vascular plants and algae along its drinking water conveyance system at Alabama Gates, Merrit Cut, and the North and South Haiwee Reservoirs (project). This treatment is required in order to keep the algae from obstructing flows and impairing waters supplies.

ESA conducted a biological resource field reconnaissance at each proposed application site in December 2018 to document existing conditions, characterize and map vegetation communities, and identify sensitive biological resources present, or potentially present, at the sites that could be directly or inadvertently affected by the copper sulfate applications. Addit2ionally, a literature and database search was conducted to identify sensitive plant, animal, or natural communities previously recorded within the vicinity of the water bodies.

Based on the literature/database search and field reconnaissance, it was determined that no significant impacts to special-status plants would occur because no aquatic special-status plant species are present in the project area and any upland special-status plant species with potential to occur in the project area are unlikely to be exposed to enough copper sulfate to result in toxicity.

Potentially significant impacts to special-status wildlife could occur as a result of vehicle mortalities, disturbance to nesting birds, and direct toxicity to species that forage on aquatic prey. To mitigate these potential impacts to a level of less-than-significant, proposed mitigation includes implementing speed limits, limiting vehicles and equipment to existing roads, implementing nesting bird surveys and buffers, and wildlife toxicity monitoring.

Potential cumulative effects resulting from copper sulfate accumulation due to past and future applications include bioaccumulation in special-status wildlife species, degradation of sensitive natural communities, and federal wetlands. To mitigate this potentially significant cumulative effect, mitigation is proposed that would include implementation of an aquatic pesticide monitoring program to track pesticide accumulation in sediments and the ecosystem.

No impacts to wildlife movement or nursery sites, sensitive natural communities, or federal wetlands would occur, and the project would not conflict with any local plans, policies, ordinances, habitat conservation plans, or natural community conservation plans.

CHAPTER 1
Introduction

This report describes the results of a biological resources background literature and database review, a biological resources field reconnaissance, and impacts analysis under the California Environmental Quality Act (CEQA) for the application of copper sulfate algaecides along the Los Angeles Aqueduct at Alabama Gates, Merrit Cut, North and South Haiwee Reservoirs, and aqueduct segments between these features. Included in this report is a description of the project, relevant laws regulating biological resources in the region, the existing environmental conditions within the project footprint and surrounding areas, and potential impacts to biological resources that may result from implementation of the project. Recommended mitigation measures are included to avoid or reduce potential project-related impacts to sensitive biological resources to a level of less-than-significant in accordance with CEQA.

CHAPTER 2
Project Description

The Los Angeles Department of Water and Power (LADWP) proposes to apply copper sulfate to Alabama Gates, Merritt Cut, and the North and South Haiwee Reservoirs to control algae under the new statewide National Pollutant Discharge Elimination System (NPDES) permit. The LADWP facilities where copper sulfate application is proposed are shown in **Figure 1**. Applications of copper sulfate would be carried out only as needed, that is, when other control options have been exhausted and could occur up to five times per year.

Copper sulfate applications would be applied by fixed-wing aircraft or on the ground by a dry chemical feeder. For treatment of the North or South Haiwee Reservoirs, the copper sulfate would be applied by aircraft and discharged as close as possible to the surface of the water to prevent drift of the crystals. For treatment at Merritt Cut and Alabama Gates, small granules of copper sulfate would be applied directly into treatment areas from a dry chemical feeder (hopper) at a rate that would be determined by volume and flow within the aqueduct.

State water quality regulators require persons using aquatic pesticides to apply for coverage under the general NPDES permit, No. 2013-0002-DWQ. To obtain coverage under this permit, applicants are required to demonstrate either that its discharges comply with the water quality criteria for priority pollutants under the California Toxics Rule (CTR) and National Toxics Rule (NTR) or that it qualifies for an exception from compliance with such criteria, pursuant to section 5.3 of the State Water Resources Control Board (SWRCB) Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California. Furthermore, the permit requires applicants to develop and submit an Aquatic Pesticides Application Plan (APAP) describing their pesticide application, including best management practices (BMPs), and water quality monitoring programs.

LADWP has developed an APAP (LADWP 2018) for application of copper sulfate and other aquatic herbicides, such as glyphosate, imazapyr, and triclopyr-based products. The APAP includes the following BMPs for copper sulfate application at Alabama Gates, Merrit Cut, and the North and South Haiwee Reservoirs:

- **Application:** Copper sulfate is applied by LADWP personnel, contractor, or subcontractor who has either a Qualified Applicator Certificate or License issued by the State of California Department of Pesticide Regulation (Licensing Certification Program). These individuals are trained to ensure that algaecides and aquatic herbicides are applied at rates consistent with label requirements and in a manner that avoids potential adverse effects.
- **Treatment:** Copper sulfate treatment is usually scheduled during daylight hours and may continue into night, if necessary. Treatment is performed by certified personnel using properly-maintained and calibrated equipment capable of delivering desired volumes. If

treatment is applied from a boat, a hose is attached to the dry chemical feeder and lowered to near the surface of the water, which prevents possibility for drift. If treatment is applied aerially by helicopter, wind speeds must be low enough to allow treatment to be performed safely and accurately.

- **Spill Prevention and Cleanup:** Copper sulfate treatment will be applied according to label instruction to prevent spills. However, should a spill occur, staff will follow the field division's established emergency response procedures and refer to the material safety data sheet (MSDS) for instructions on containing and cleaning up the spill. Emergency response and MSDS procedures will be reviewed regularly. A copy of the emergency response procedures and material safety data sheets will be available during each treatment. Cleanup equipment will be kept in good working order and will be readily available at each application site.
- **Monitoring:** Water quality will be monitored before, during, and after treatments. Parameters measured are water temperature, pH, turbidity, electrical conductivity, active ingredient (copper), nonylphenol, hardness, and dissolved oxygen, as required by the NPDES general permit and stated in Appendix B of the APAP.
- **Access:** The roads leading to the treatment areas have locked gates that can only be accessed by authorized personnel.
- **Post-Treatment:** The efficacy of the treatment is evaluated at the conclusion of the growing season.

CHAPTER 3
Regulatory Framework

The project is subject to federal and state regulations related to biological resource protection. A summary of the regulations pertaining to the proposed project is provided below.

3.1 Federal

3.1.1 Federal Endangered Species Act

Under the federal Endangered Species Act (FESA), the Secretary of the Interior and the Secretary of Commerce jointly have the authority to list a species as threatened or endangered (16 USC 1533(c)). Pursuant to the requirements of FESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed or proposed species may be present in the project region and determine whether the proposed project would have a potentially significant impact on such species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under FESA or result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC 1536(3), (4)). Project-related impacts to these species or their habitats would be considered "significant." Section 7 of FESA contains a "take" prohibition which prohibits any action conducted, funded, or approved by a federal agency that adversely affects a member of an endangered or threatened species without prior formal consultation with the United State Fish and Wildlife Service (USFWS). Formal consultation with the USFWS would result in the issuance of a Biological Opinion (BO) that includes either a jeopardy or non-jeopardy decision issued by the USFWS to the consulting federal agency. The BO would also include the possible issuance of an "incidental take" permit. If such authorization is given, the project proponent must provide the USFWS with a Habitat Conservation Plan (HCP) for the affected species and publish notification of the application for a permit in the Federal Register.

Section 4(a)(3) and (b)(2) of the FESA requires the designation of critical habitat to the maximum extent possible and prudent based on the best available scientific data and after considering the economic impacts of any designations. Critical habitat is defined in section 3(5)(A) of the FESA as (1) areas within the geographic range of a species that are occupied by individuals of that species and contain the primary constituent elements (physical and biological features) essential to the conservation of the species, thus warranting special management consideration or protection, and (2) areas outside of the geographic range of a species at the time of listing but that are considered essential to the conservation of the species.

3.1.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA), first enacted in 1918, domestically implements a series of treaties between the United States and Great Britain (on behalf of Canada), Mexico, Japan, and the former Soviet Union that provide for international migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds; the act provides that it shall be unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird…" (16 USC 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA includes several hundred species and essentially includes all native birds. Permits for take of nongame migratory birds can be issued only for specific activities, such as scientific collecting, rehabilitation, propagation, education, taxidermy, and protection of human health and safety and personal property.

3.1.3 Waters of the United States, Including Wetlands

Wetlands are a subset of "waters of the United States" and receive protection under Section 404 of the Clean Water Act (CWA). The term "waters of the U.S." as defined in Code of Federal Regulations (33 CFR 328.3(a); 40 CFR 230.3(s)), includes all waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters subject to the ebb and flow of the tide. Wetlands are defined by the federal government (CFR, Section 328.3(b), 1991) as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Waters of the U.S. do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the FCWA, the final authority regarding CWA jurisdiction remains with U.S. Environmental Protection Agency (USEPA) (328.3(a)(8) added 58 FR 45035, August 25, 1993. The United State Army Corps of Engineers (USACE) regulates the discharge of dredged or fill material into waters of the U.S. under Section 404 of the CWA.

3.1.4 Clean Water Act

In accordance with Section 404 of the CWA, the USACE regulates discharge of dredged or fill material into waters of the U.S. Waters of the U.S. and their lateral limits are defined in 33 CFR 328.3(a) and includes navigable waters of the U.S., interstate waters, all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Waters of the U.S. are often categorized as "jurisdictional wetlands" (i.e., wetlands over which the USACE exercises jurisdiction under Section 404) and "other waters of the United States" when habitat values and characteristics are being described. "Fill" is defined as any material that replaces any portion of a water of the U.S. with dry land or that changes the bottom elevation of any portion of a water of the U.S. Any activity resulting in the placement of dredged or fill material within waters of the United States

requires a permit from USACE. In accordance with Section 401 of the CWA, projects that apply for a USACE permit for discharge of dredged or fill material must obtain water quality certification from the appropriate Regional Water Quality Control Board (RWQCB) indicating that the proposed project would uphold State of California water quality standards.

3.2 State

3.2.1 California Fish and Game Codes

Section 2080 of the California Fish and Game Code states, "No person shall import into this state [California], export out of this state, or take, possess, purchase, or sell within this state, any species, or any part or product thereof, that the commission [California Fish and Game Commission] determines to be an endangered species or threatened species, or attempt any of those acts, except as otherwise provided in this chapter, or the Native Plant Protection Act, or the California Desert Native Plants Act." Pursuant to Section 2081 of the Code, the California Department of Fish and Wildlife (CDFW) may authorize individuals or public agencies to import, export, take, or possess, any state-listed endangered, threatened, or candidate species. These otherwise prohibited acts may be authorized through permits or Memoranda of Understanding if: (1) the take is incidental to an otherwise lawful activity; (2) impacts of the authorized take are minimized and fully mitigated; (3) the permit is consistent with any regulations adopted pursuant to any recovery plan for the species; and (4) the applicant ensures adequate funding to implement the measures required by CDFW. The CDFW makes this determination based on available scientific information and considers the ability of the species to survive and reproduce. Due to the potential presence of state-listed rare, threatened, or endangered species on the project site, Sections 2080 and 2081 of the Code were considered in this evaluation.

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders Falconiformes and Strigiformes), including their nests or eggs. Typical violations of these codes include destruction of active nests resulting from removal of vegetation in which the nests are located. Violation of Section 3503.5 could also include failure of active raptor nests resulting from disturbance of nesting pairs by nearby project construction. This statute does not provide for the issuance of any type of incidental take permit.

Protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species. CDFW is unable to authorize incidental take of fully protected species when activities are proposed in areas inhabited by those species. CDFW has informed nonfederal agencies and private parties that they must avoid take of any fully protected species in carrying out projects.

Section 1602 of the California Fish and Game Code requires a Streambed Alteration Agreement for any activity that may alter the bed and/or bank of a lake, stream, river, or channel. Typical activities that require a Streambed Alteration Agreement include excavation or fill placed within

a channel, vegetation clearing, structures for diversion of water, installation of culverts and bridge supports, cofferdams for construction dewatering, and bank reinforcement.

3.2.2 California Endangered Species Act

Under the California Endangered Species Act (CESA), the CDFW is responsible for maintaining a list of threatened and endangered species, candidate species, and species of special concern. Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state listed endangered or threatened species may be present on the project region and determine whether the proposed project would have a potentially significant impact on such species. In addition, the CDFW encourages informal consultation on any proposed project that may impact a candidate species. If there were project-related impacts to species on the CESA threatened and endangered list, they would be considered "significant." Impacts to "species of concern" would be considered "significant" under certain circumstances, discussed below.

3.2.3 Native Plant Protection Act

The Native Plant Protection Act (NPPA) includes measures to preserve, protect, and enhance rare and endangered native plants. The list of native plants afforded protection pursuant to the NPPA includes those listed as rare and endangered under the CESA. The NPPA provides limitations on take as follows: "No person will import into this State, or take, possess, or sell within this State" any rare or endangered native plant, except in compliance with provisions of the act. Individual landowners are required to notify the CDFW at least 10 days in advance of changing land uses to allow the CDFW to salvage any rare or endangered native plant material. Due to the absence of state-listed rare, threatened, or endangered plant species on the project site, the NPPA was not considered in this evaluation.

3.2.4 CEQA Guidelines Section 15380

Although threatened and endangered species are protected by specific federal and state statutes, *CEQA Guidelines* Section 15380(b) provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definition in FESA and the section of the California Fish and Game Code dealing with rare or endangered plants or animals. This section was included in CEQA primarily to deal with situations in which a public agency is reviewing a project that may have a significant effect on, for example, a candidate species that has not been listed by either USFWS or CDFW. Thus, CEQA provides an agency with the ability to protect a species from the potential impacts of a project until the respective government agencies have an opportunity to designate the species as protected, if warranted. CEQA also calls for the protection of other locally or regionally significant resources, including natural communities. Although natural communities do not at present have legal protection of any kind, CEQA calls for an assessment of whether any such resources would be affected, and requires findings of significance if there would be substantial losses. Natural communities listed by the California Natural Diversity Database (CNDDB) as sensitive are considered by CDFW to be

significant resources and fall under the *CEQA Guidelines* for addressing impacts. Local planning documents such as general plans often identify these resources as well.

3.2.5 Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, waters of the state fall under the jurisdiction of the appropriate RWQCB. Under the act, the RWQCB must prepare and periodically update water quality control basin plans. Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Projects that affect wetlands or waters must meet waste discharge requirements of the RWQCB, which may be issued in addition to a water quality certification or waiver under Section 401 of the CWA.

3.3 Local

3.3.1 Inyo County General Plan

The project is within the planning area for the Inyo County General Plan (Inyo County 2001). The specific policies outlined in the Inyo County General Plan related to biological resources are contained within the Conservation Element and the Open Space Element. These policies are based on goals to (1) Maintain and enhance biological diversity and healthy ecosystems throughout the County and (2) Provide a balanced approach to resource protection and recreational use of the natural environment. Based on a review of the Inyo County General Plan policies specific to biological resources, none of these policies are applicable to the proposed project.

3.3.2 Habitat Conservation Plan for LADWP

The *Habitat Conservation Plan for Los Angeles Department of Water and Power's Operation and Maintenance Activities on Its Land in Mono and Inyo Counties, California* (LADWP 2015), was developed as part of the Section 10(a)(1)(B) Endangered Species Act requirements to address the potential incidental take of listed species. This Habitat Conservation Plan (HCP) was also developed with the intent to serve as the application for an incidental take permit (ITP) under State law pursuant to Fish and Game Code § 2081. Because the HCP is still in draft form, it currently does not serve as a mechanism for take authorization.

The HCP covers approximately 314,000 acres of LADWP-managed land holdings in Inyo and Mono Counties, California. This habitat-based HCP was developed with the intent to protect habitat for species of special concern, candidate species, and federal and state threatened and endangered species, while allowing LADWP to continue its ongoing water gathering, water distribution, power production, and power transmission activities, and allowing the continuation of other land uses. This HCP is not intended to fully meet the obligation of the "habitat conservation plan" described in a 1997 Memorandum of Understanding between the LADWP, County of Inyo, CDFW, the California State Lands Commission, the Sierra Club, and the Owens Valley Committee (1997 MOU as cited in LADWP 2015). The seven species covered under this

HCP are Owens pupfish (*Cyprindon radiosus*), Owens tui chub (*Siphateles bicolor snyderi*), Owens/Long Valley speckled dace (*Rhinichthys osculus* spp.), bi-state population of Greater Sage-Grouse (*Centrocercus urophasinus*), Yellow-billed Cuckoo (*Coccyzus americanus*), Willow Flycatcher *(Empidonax traillii*), and Bell's Vireo (*Vireo bellii*), collectively called Covered Species. With the exception of Greater Sage-Grouse, all are aquatic or woody riparian obligate species (riparian obligate); therefore, the HCP focuses on aquatic and woody riparian (riparian) habitats. LADWP's activities covered in this HCP are expected to cause no permanent habitat loss and impacts to Covered Species would be minimized and mitigated. This HCP also identifies Conservation Actions that LADWP would implement upon adoption of the HCP. These actions focus at the habitat level for the Covered Species.

CHAPTER 4
Methods

4.1 Literature Review and Database Search

A review of biological resources and environmental setting data applicable to the project was conducted by ESA and included the following:

- CDFW California Natural Diversity Data Base (CNDDB) records search of Owens Valley, Rose Valley, and the surrounding foothills (CDFW 2018a). The CNPS search area included the project area (Haiwee Reservoirs and Union Wash) and the 16 adjacent USGS quadrangles (CNPS 2018). (CDFW 2018a);
- California Native Plant Society (CNPS) *Inventory of Rare and Endangered Vascular Plants of California* rare plant records search of the USGS 7.5-minute quadrangles that include the project area (Haiwee Reservoirs and Union Wash) and the 16 adjacent USGS quadrangles (CNPS 2018);
- National Resources Conservation Service Web Soil Survey of the areas surrounding North and South Haiwee Reservoirs (USDA NRCS 2018); and
- Review of the USGS topographic maps for the 7.5 minute quadrangles Union Wash and Haiwee Reservoirs (USGS 1993; USGS 1982).

4.2 Biological Resource Reconnaissance

A biological resource field reconnaissance was conducted to identify vegetation communities and habitats present within and adjacent to the project area and to assess the occurrence potential for special-status species. The reconnaissance was conducted by ESA biologist Julie Stout at the North and South Haiwee Reservoirs, Merritt Cut, and Alabama Gates on December 7, 2018.

The reconnaissance was conducted by driving the LADWP access road along the west side of the reservoirs and visiting aqueduct infrastructure locations where previous treatments have occurred along the aqueduct, including at Merrit Cut and Alabama Gates. During the reconnaissance, the biologist ground-checked the aerial imagery-based mapping of vegetation communities and cover types and reviewed the project area for special-status species habitats and occurrence potential.

CHAPTER 5
Environmental Setting

This section describes existing conditions and biological resources present in the project area and vicinity. Climate, soils and topography, vegetation communities and cover types, sensitive natural communities, jurisdictional wetlands and aquatic resources, wildlife movement and nursery sites, and common wildlife are described below. Photographs of the project area and vicinity are included as **Appendix 1**.

The project is located in Inyo County, east of the Sierra Nevada Mountains. The Alabama Gates are located at the northeastern base of the Alabama Hills. North and South Haiwee Reservoirs and Merrit Cut are located between Lower Owens Valley and Rose Valley at the base of the Coso Range. Three major bioregions meet within the Owens Valley area: the Sierra Nevada, Great Basin Desert, and Mojave Desert, resulting in high biological diversity (LADWP 2015).

5.1 Climate

The climate in the Owens Valley area is semiarid to arid and characterized by greatly varying temperatures, hot dry summers, moderately cold winters, low precipitation, abundant sunshine, frequent winds, moderate to low humidity, and high potential evapotranspiration (Danskin 1998; LADWP 2015). Air temperatures vary greatly from a winter low of 2 degrees Fahrenheit (°F) to a summer high of 107 °F. The average low January temperature in winter is 21 °F and the average high July temperature is 99 °F. In the Owens Valley, average precipitation is 4 to 6 inches. Most precipitation falls between December and February. Rose Valley is a hot, arid desert region with wide annual temperature fluctuations that occur from a high of 119 °F to a low of 1 °F (CWRCB 1993 and Bauer 2002, as cited in LADWP 2015).

Wind direction, commonly westerly, can be variable depending on the type of storm and the amount of deflection caused by the surrounding mountains. Wind speed is also highly variable, even within a single day, with no seasonal trend. High wind speeds can occur any time during the year, but generally accompany a winter or a spring storm (Danskin 1998). Winds are known to reach as high as 75 miles per hour on a sunny day. The area receives 5 to 7 inches of precipitation per year while the area's open potential water evaporation rate has been estimated to be up to 65 to 80 inches per year (CWRCB 1993 and Bauer 2002, as cited in LADWP 2015).

5.2 Soils and Topography

The Alabama Gates connect the Los Angeles Aqueduct with a spillway running into the Owen's River floodplain. At Alabama Gates, the aqueduct is located at an elevation of 3,800 feet above

mean sea level (amsl). Alabama Gates is within the Soil Map Unit: Yermo stony-Yermo complex, cool, 5 to 15 percent slopes.

Soil survey results, including soils maps, are included as **Appendix 2**. North Haiwee Reservoir, fed by the Los Angeles Aqueduct to the north and draining into Merritt Cut and South Haiwee Reservoir to the south. These features are located at an elevation of approximately 3,775 feet amsl with South Haiwee Reservoir slightly lower in elevation. North and South Haiwee Reservoir are mapped as the Water Map Unit. Soil Map Units surrounding North and South Haiwee Reservoir and Merritt Cut include Cajon loamy sand, stratified substratum, 0 to 5 percent slopes; Lithic Torriorthents-Badland complex, 15 to 75 percent slopes; Helendale-Cajon complex, 0 to 5 percent slopes; and Neuralia-Timosea-Typic Argidurids complex, 2 to 15 percent slopes.

Soils within the project area are generally non-hydric, slightly saline, and have a low water holding capacity. Each soil or non-soil type within these map units is described below.

Open Water

Open water is present at North and South Haiwee Reservoirs where surface soils are permanently inundated by the water within the reservoirs.

Yermo Series

The Yermo series occurs on fan terraces with a parent material of alluvium derived from metasedimentary rock. The typical profile is as follows: 0 to 4 inches - stony sandy loam; 4 to 60 inches - very gravelly sandy loam, very cobbly sandy loam. This non-hydric soil series is well-drained with low runoff potential, rare flooding, and no ponding. The depth to the water table is over 80 inches and the available water storage in the profile is moderate (about 7.21 inches). This soil is slightly to moderately saline.

Cajon Series

The Cajon series occurs on fan terraces with a parent material of alluvium derived from granite. The typical profile is as follows: 0 to 1 inches - gravelly sand; 1 to 3 inches - loamy sand; 3 to 36 inches - gravelly loamy sand; 36 to 70 inches - sand, loamy sand. This non-hydric soil series is somewhat excessively drained with negligible runoff potential, no flooding, and no ponding. The depth to the water table is over 80 inches and the available water storage in the profile is low (about 4.4 inches). This soil is very slightly to slightly saline.

Helendale Series

The Helendale series occurs on fan terraces with a parent material of alluvium derived from granite. The typical profile is as follows: 0 to 4 inches - loamy sand; 4 to 24 inches - sandy loam; 24 to 41 inches - gravelly sandy loam; 41 to 80 inches - stratified loamy coarse sand to very gravelly loamy sand. This non-hydric soil series is well-drained with very low runoff potential, no flooding, and no ponding. The depth to the water table is over 80 inches and the available water storage in the profile is low (about 4.5 inches). This soil is non-saline to very slightly saline.

Lithic Torriorthents

Lithic Torrierthents occur on mountains and hills with a parent material of residuum weathered from metavolcanics and/or metasedimentary rock and/or granite. The typical profile is as follows: 0 to 60 inches – bedrock. This non-hydric soil series is somewhat excessively-drained with very high runoff potential, no flooding, and no ponding. The depth to the water table is over 80 inches and the available water storage in the profile is very low (about 0.0 inches). This soil is non-saline to very slightly saline.

Badlands

Badlands occur on hills and mountains with a parent material of residuum weathered from tuff and/or residuum weathered from metasedimentary rock and/or residuum weathered from metavolcanics. The typical profile is as follows: 0 to 60 inches – bedrock. The available water storage in the profile is very low (about 0.6 inches). This non-soil does not have a drainage potential, runoff potential, or salinity rating.

Neuralia Series

The Neuralia series occurs on fan terraces with a parent material of alluvium derived from granite. The typical profile is as follows: 0 to 1 inches - gravelly loamy sand; 1 to 19 inches - loamy sand; 19 to 27 inches - sandy loam; 27 to 47 inches - gravelly sandy clay loam; 47 to 60 inches - stratified gravelly sand to very cobbly loamy coarse sand. This non-hydric soil series is well-drained with a high runoff potential, no flooding, and no ponding. The depth to the water table is over 80 inches and the available water storage in the profile is low (about 5.9 inches). This soil is non-saline to slightly saline.

Timosea Series

The Timosea series occurs on fan terraces with a parent material of alluvium derived from granite. The typical profile is as follows: 0 to 1 inches - gravelly loamy sand; 1 to 9 inches - gravelly sandy loam; 9 to 31 inches - very cobbly sandy clay loam, very gravelly sandy clay loam, very cobbly sandy loam, stratified gravelly loamy sand to very cobbly sandy loam. This non-hydric soil series is well-drained with a high runoff potential, no flooding, and no ponding. The depth to the water table is over 80 inches and the available water storage in the profile is moderate (about 7.5 inches). This soil is non-saline to very slightly saline.

Typic Argidurids

Typic Argidurids occur on fan remnants with a parent material of alluvium derived from granite. The typical profile is as follows: 0 to 7 inches - gravelly sandy loam; 7 to 22 inches - gravelly sandy clay loam, gravelly sandy clay, indurated; 22 to 27 inches - very cobbly loamy sand. This non-hydric soil series is well-drained with a very high runoff potential, no flooding, and no ponding. The depth to the water table is over 80 inches and the available water storage in the profile is low (about 4.2 inches). This soil is not rated for salinity.

5.3 Vegetation Communities and Cover Types

Vegetation in the Owens Valley is controlled largely by the arid to semiarid conditions, the high salinity of soil in many locations, and the presence of a shallow water table beneath the valley floor. On the sides of the valley, plants subsist solely on direct precipitation or percolation from overland flow or nearby stream courses. The water table in these areas, which are primarily alluvial fans, is many hundreds of feet below land surface and does not provide any water to plants (Danskin 1998).

Vegetation communities within 500 feet of the reservoirs and in the vicinity of Alabama Gates were defined at the vegetation alliance level using keys and descriptions provided in *A Manual of California Vegetation, Second Edition* (Sawyer et al. 2009) and non-vegetated cover types were described. Each community is described by common name and scientific name and depicted in **Figures 2A through 2D**. Vegetation communities and cover types include the following: Allscale Scrub (*Atriplex polycarpa* Shrubland), Aqueduct, Badlands, Black Willow Thickets (*Salix gooddingii* Woodland), Creosote bush – white bursage scrub (*Larrea tridentata-Ambrosia dumosa* Shrubland), Developed, Disturbed, Fourwing Saltbush Scrub (*Atriplex confertifolia* Shrubland), Fremont Cottonwood Forest (*Populus fremontii* Forest), Hardstem Bulrush Marsh (*Schoenoplectus acutus* Herbaceous), Joshua Tree Woodland (*Yucca brevifolia* Woodland), Reservoir, Rubber Rabbitbrush Scrub (*Ericameria nauseosa* Shrubland), Spiny Menodora Scrub (*Menodora spinescens* Shrubland), Tamarisk Thickets (*Tamarix spp.* Shrubland), and White Bursage Scrub (*Ambrosia dumosa* Shrubland).

Allscale Scrub

Allscale (*Atriplex polycarpa*) is dominant in the shrub canopy with white bursage (*Ambrosia dumosa*), cheeseweed (Ambrosia salsola), fourwing saltbush (*Atriplex canescens*), bromes (*Bromus* sp.), and creosote bush (Larrea tridentata).

Aqueduct

This non-vegetated cover type describes the concrete-lined Los Angeles aqueduct and associated concrete-lined channels and canals west of the reservoirs.

Badlands

This cover type describes naturally non-vegetated or sparsely-vegetated areas. These areas lack vegetation due to poor soils or soils highly susceptible to erosion.

Black Willow Thickets

Black willow (*Salix gooddingii*) is dominant or co-dominant in the tree canopy with Fremont cottonwood (*Populus fremontii*). Black willow thickets occur along the shorelines and inlets of the reservoirs. This community is designated by the CDFW as a Sensitive Natural Community.

Creosote Bush - White Bursage Scrub

White bursage (*Ambrosia dumosa*) and creosote bush (*Larrea tridentata*) are co-dominant in the shrub canopy. Joshua trees (*Yucca brevifolia*) may be present at low cover (less than 5 percent).

Developed

The Developed cover type includes all man-made infrastructure or areas permanently altered by the construction and continued maintenance of the reservoirs. These include paved roads, concrete aqueduct infrastructure and channels lacking permanent water, and permanent structures and facilities with surrounding ornamental vegetation. These areas support little vegetation other than annual non-native grasses and ornamental tree species.

Disturbed

Disturbed areas include areas temporarily altered by human activities, including dirt access roads and other areas subject to ground disturbance. These areas have the potential to return to native cover over time.

Fourwing Saltbush Scrub

Fourwing saltbush is dominant or co-dominant with other Atriplex or Ambrosia species. This community is designated by the CDFW as a Sensitive Natural Community.

Fremont Cottonwood Forest

Fremont cottonwood forest occurs sporadically along the perimeter of the reservoirs. Dominant trees in this community include Fremont cottonwood and black willow. This community is designated by the CDFW as a Sensitive Natural Community.

Hardstem Bulrush Marsh

Hardstem bulrush (*Schoenoplectus acutus*) is dominant or co-dominant in the herbaceous layer with other emergent wetland species. Emergent trees and shrubs may be present at low cover. This community is designated by the CDFW as a Sensitive Natural Community.

Joshua Tree Woodland

Joshua trees occur in association an understory of creosote bush and white bursage and/or burrobush. This community is designated by the CDFW as a Sensitive Natural Community.

Reservoir

Reservoir describes the earthen-bottomed North and South Haiwee Reservoirs.

Rubber Rabbitbrush Scrub

Rubber rabbitbrush (Ericameria nauseosa) is dominant or co-dominant in the shrub canopy with other low shrub species including creosote bush and green rabbitbrush (*Chrysothamnus*

viscidiflorus). This community commonly occurs in previously disturbed areas along the reservoir margins. This community is designated by the CDFW as a Sensitive Natural Community.

Shadscale Scrub

Shadscale (*Atriplex confertifolia*) is dominant or co-dominant in the shrub canopy with white bursage, fourwing saltbush, and other shrub species. This community is designated by the CDFW as a Sensitive Natural Community.

Shoreline

These areas describe the intermittently submerged, sandy or rocky shoreline areas along the North and South Haiwee Reservoirs.

Spiny Menodora Scrub

Spiny menodora (*Menodora spinescens*) is dominant or co-dominant in the shrub canopy with cheeseweed, shadscale, and other shrub species. This community is designated by the CDFW as a Sensitive Natural Community.

Tamarisk Thickets

Tamarisk (*Tamarix ramosissima* or *Tamarix* sp.) is dominant in the shrub canopy. Emergent trees may be present at low cover, including Fremont cottonwood and black willow. This alliance occurs on the southeastern portion of South Haiwee Reservoir.

5.4 Sensitive Natural Communities

Sensitive natural communities are those that are considered by the CDFW to be imperiled due to their decline in the region and/or their ability to support special-status plant and/or wildlife species. These communities include those that, if eliminated or substantially degraded, would sustain a significant adverse impact as defined under CEQA. Sensitive natural communities are important ecologically because their degradation and destruction could threaten populations of dependent plant and wildlife species, including special-status species, and significantly reduce the regional distribution and viability of the community. Loss of sensitive natural communities also can remove or reduce important ecosystem functions, such as water filtration by wetlands or bank stabilization by riparian woodlands.

The CDFW Natural Communities List (CDFW 2018b) indicates which natural communities are considered sensitive. The following vegetation communities present within the project vicinity are considered sensitive natural communities: Black Willow Thickets, Fourwing Saltbush Scrub, Fremont Cottonwood Forest, Hardstem Bulrush Marsh, Joshua Tree Woodland, Rubber Rabbitbrush Scrub, Shadscale Scrub, and Spiny Menodora Scrub. The following vegetation communities are not considered sensitive: Allscale Scrub, Creosote Bush – White Bursage Scrub, and Tamarisk Thickets.

5.5 Special-Status Species

Special-status species are defined as those species that, because of their rarity or vulnerability to various causes of habitat loss or population decline, are recognized by federal, state, or other agencies as under threat from human-related activities. Some of these species receive specific protection that is defined by federal or state endangered species legislation. Others have been designated as special-status on the basis of adopted policies and expertise of state resource agencies or organizations with acknowledged expertise, or policies adopted by local governmental agencies such as counties, cities, and special districts to meet local conservation objectives. Special-status species are defined as follows:

- Species listed or proposed for listing as threatened or endangered, or are candidates for possible future listing as threatened or endangered, under the federal Endangered Species Act or the California Endangered Species Act;
- Species that meet the definitions of rare or endangered under *CEQA Guidelines* Section 15380;
- Species designated by CDFW as "species of special concern";
- Species covered under an adopted Natural Community Conservation Plan (NCCP) or Habitat Conservation Plan (HCP).
- Species that are "fully protected" in California (Fish and Game Code Sections 3511, 4700, and 5050).
- Plant species considered by the California Native Plant Society (CNPS) to be rare, threatened, or endangered (Rank 1A, 1B and 2 plants) in California;
- Plants listed by the CNPS as plants in which more information is needed to determine their status and plants of limited distribution (Rank 3 and 4 plants); and
- Plants listed as rare under the California Native Plant Protection Act (Fish and Game Code 1900 et seq.).

A review was conducted of CNDDB and CNPS Inventory of Rare and Endangered Plants special-status species occurrence records within the project vicinity (**Figures 3A through 3C**). The CNDDB search area included Owens Valley, Rose Valley, and surrounding foothills (CDFW 2018a). The CNPS search area included the USGS 7.5-minute quadrangles that include the project area (Haiwee Reservoirs and Union Wash) and the 16 adjacent quadrangles (CNPS 2018). Each recorded species was reviewed for its potential to occur within the project area. The potential to occur is based a species' known elevational and geographical distribution, habitat suitability, proximity of known occurrence records, and the date of the most recently recorded occurrence. The complete list of species records that were reviewed and their potential for occurrence is included as **Appendix 3**.

5.5.1 Special-Status Plants

A complete list of special-status plant species with potential to occur within the project area or vicinity is provided in **Table 1**. Habitat preferences of plant species are described as aquatic,

shoreline, or upland. These terms are provided to characterize species by their potential level of exposure to aquatic applications of copper sulfates.

Aquatic Plants

For purposes of this report, aquatic plants describe free floating, submerged, and emergent plant species that require standing water. If present, aquatic plants would occur within the reservoirs, aqueduct. No special-status aquatic plant species are known or expected to occur in the vicinity of the project.

Shoreline Plants

For purposes of this report, shoreline plants describe plant species that occur in wetland, riparian, shoreline, and playa habitats that do not require persistent standing water. If present, shoreline plants would occur along the reservoir margins in areas that may be intermittently inundated or have a high groundwater table. Nine special-status plant species with a moderate or high potential to occur within the project area or vicinity are shoreline plants.

Upland Plants

For purposes of this report, upland plants describe plant species that occur in habitats lacking a high water table, periodic flooding, or inundation. If present, upland plants would occur in areas outside of the reservoirs. Fourteen special-status plant species with a moderate or high potential to occur within the project area or vicinity are upland plants.

TABLE 1 – SPECIAL-STATUS PLANTS POTENTIAL TO OCCUR IN THE PROJECT VICINITY

Scientific Name	Common Name	Status	Habitat	Potential to Occur in the BSA	Reason
Aliciella ripleyi	Ripley's aliciella	2B.3	Upland. Mojavean desert scrub. On limestone; rocky slopes, rock/cliff bases, and rock crevices. 300-1950 m.	Low	Project site outside of the known range of this species. Most occurrences are to the south and east within Death Valley National Park.
Aliciella triodon	coyote gilia	2B.2	Upland. Great Basin scrub, pinyon and juniper woodland. Fine clayey sand or sand. 600-1670 m.	Moderate	Marginal quality habitat is present. Recorded occurrences in Owen's Valley
Allium atrorubens var. cristatum	Inyo onion	4.3	Upland. Joshua Tree Woodland, Mojavean Desert Scrub, Pinyon and Juniper Woodland. Sandy or rocky. 1200 - 2560 m.	High	Suitable habitat present. Recorded near Alabama Gates in 2011 in Owens Valley, north end of Alabama Hills, along Moffat Ranch Road, 1.9 mi west of Hwy 395, c. 6 mi north of Lone Pine
Arabis repanda var. greenei	Greene's rockcress	3.3	Upland. Subalpine Coniferous Forest, Upper Montane Coniferous Forest. Granitic, Talus, Rocky or sandy. 2345 - 3600 m.	Low	Suitable habitat is absent. This species is more typical of the higher elevation habitats within the Sierra Nevada Mountains.
Astragalus atratus var. mensanus	Darwin Mesa milk-vetch	1B.1	Upland. Great Basin scrub, Joshua tree woodland, pinyon and juniper woodland. Dry desert slopes and mesas, often sheltering under and entangled in shrubs, in volcanic clay and gravel. 1705-2320 m.	Low	This species typically occurs at higher elevations.

Scientific Name	Common Name	Status	Habitat	Potential to Occur in the BSA	Reason
Astragalus geyeri var. geyeri	Geyer's milk-vetch	2B.2	Upland. Chenopod scrub, Great Basin scrub. Sandy flats and valley floors, depressions in mobile or stabilized dunes, and along draws. 1155 -1985 m.	Moderate	Potential to occur in uplands.
Astragalus hornii var. hornii	Horn's milk-vetch	1B.1	Shoreline. Meadows and seeps, playas. Lake margins, alkaline sites. 75 - 350 m.	Low	This species typically occurs at lower elevations.
Atriplex argentea var. hillmanii	Hillman's silverscale	2B.2	Shoreline. Great Basin scrub, meadows and seeps. Alkaline meadows in scrub. 895 -1590 m.	Moderate	Potential to occur along reservoir shores.
Blepharidachne kingii	King's eyelash grass	2B.3	Upland. Great Basin Scrub (usually carbonate). 1065 - 2135 m.	Low	Habitat not present.
Boechera dispar	pinyon rockcress	2B.3	Upland. Joshua tree woodland, pinyon and juniper woodland, Mojavean desert scrub. Granitic, gravelly slopes and mesas. Often under desert shrubs which support it as it grows. 1005 - 2805 m.	Moderate	Potential to occur in uplands.
Boechera lincolnensis	Lincoln rockcress	2B.3	Upland. Chenopod scrub, Mojavean desert scrub. On limestone. 880 - 2410 m.	Moderate	Potential to occur in uplands.
Calochortus excavatus	Inyo County star-tulip	1B.1	Shoreline. Chenopod scrub, meadows and seeps (alkaline). Mostly on fine, sandy loam soils with alkaline salts; grassy meadows in shadscale scrub. 120 - 2195 m.	Moderate	Potential to occur along reservoir shores.
Ceanothus pinetorum	Kern ceanothus	4.3	Upland. Lower Montane Coniferous Forest, Subalpine Coniferous Forest, Upper Montane Coniferous Forest. Rocky, granitic. 1600 - 2745 m	Low	This species typically occurs at higher elevations.
Cleomella brevipes	short-pedicelled cleomella	4.2	Shoreline. Meadows and Seeps, Marshes and Swamps, Playas. Alkaline. 395 - 2195 m	Moderate	Potential to occur along reservoir shores.
Cordylanthus eremicus ssp. kernensis	Kern Plateau bird's-beak	1B.3	Upland. Great Basin Scrub, Joshua Tree Woodland, Pinyon and Juniper Woodland, Upper Montane Coniferous Forest. 1675 - 3000 m	Low	Known only from the Kern Plateau Region, this species typically occurs at higher elevations.
Cryptantha incana	Tulare cryptantha	1B.3	Upland. Lower Montane Coniferous Forest (gravelly or rocky). 1430 - 2150 m	Low	Habitat not present. This species typically occurs at higher elevations.
Cryptantha scoparia	gray cryptantha	4.3	Upland. Chenopod Scrub, Great Basin Scrub, Pinyon and Juniper Woodland. 1890 - 2745 m	Low	Habitat not present. This species typically occurs at higher elevations.
Cryptantha tumulosa	New York Mountains cryptantha	4.3	Upland. Mojavean Desert Scrub, Pinyon and Juniper Woodland. Gravelly or clay, Granitic or carbonate. 915 - 2130 m	Low	Habitat not present.
Cymopterus ripleyi var. saniculoides	sanicle cymopterus	1B.2	Upland. Joshua tree woodland, Mojavean desert scrub. On sandy soils, often with carbonate; usually found in JT woodland or creosote bush scrub. 1130 - 1665 m.	Moderate	Habitat present.
Deinandra mohavensis	Mojave tarplant	SE, 1B.3	Shoreline. Riparian scrub, coastal scrub, chaparral. Low sand bars in river bed; mostly in riparian areas or in ephemeral grassy areas. 640 - 1600 m.	Moderate	Potential to occur along reservoir shores.
Diplacus parryi	Parry's monkeyflower	2B.3	Upland. Great Basin scrub. Great Basin scrub. 1520 - 2590 m.	Low	This species typically occurs at higher elevations.
Eremothera boothii ssp. alyssoides	Pine Creek evening-primrose	4.3	Upland. Great Basin Scrub. Sandy, gravelly. 600 - 1700 m	Low	Habitat not present.
Eremothera boothii ssp. boothii	Booth's evening-primrose	2B.3	Upland. Joshua tree woodland, pinyon and juniper woodland. 285 - 2290 m.	Moderate	Joshua tree woodland present.
Eremothera boothii ssp. intermedia	Booth's hairy evening-primrose	2B.3	Upland. Great Basin scrub, pinyon and juniper woodland. Sandy sites. 880 - 2685 m.	Low	Habitat not present
Eriastrum sparsiflorum	few-flowered eriastrum	4.3	Upland. Chaparral, Cismontane Woodland, Great Basin Scrub, Joshua Tree Woodland, Mojavean Desert Scrub,	Low	Habitat present.

Scientific Name	Common Name	Status	Habitat	Potential to Occur in the BSA	Reason
			Pinyon and Juniper Woodland. Granitic, Sandy, Usually Openings. 1075 - 1710 m.		
Erigeron calvus	bald daisy	1B.1	Upland. Great Basin scrub. Sagebrush and desert scrub; type locality is only known site. 1220 m.	Low	Habitat not present. Only known from a single occurrence.
Ivesia arizonica var. arizonica	yellow ivesia	2B.3	Upland. Pinyon and Juniper Woodland, Subalpine Coniferous Forest, Upper Montane Coniferous Forest. Rocky. 1200 - 3100 m.	Low	Habitat not present. This species typically occurs at higher elevations.
Loeflingia squarrosa var. artemisiarum	sagebrush loeflingia	2B.2	Upland. Sandy flats and dunes. Sandy areas around clay slicks with Sarcobatus, Atriplex, Tetradymia, etc. 700 - 1615 m.	Moderate	Potential to occur in scrub habitats.
Lupinus magnificus var. hesperius	Mcgee Meadows lupine	1B.3	Upland. Great Basin scrub, upper montane coniferous forest. Sandy substrates. 1615 - 2165 m.	Low	Habitat not present. This species typically occurs at higher elevations.
Mentzelia inyoensis	Inyo blazing star	1B.3	Upland. Great Basin scrub, pinyon-juniper woodland. Rocky sites. 1155 - 1980 m.	Low	Habitat not present.
Mentzelia torreyi	Torrey's blazing star	2B.2	Upland. Great Basin scrub, Mojavean desert scrub, pinyon and juniper woodland. Sandy or rocky sites; alkaline, usually volcanic soils. 1165 - 2155 m.	Low	Habitat not present. This species typically occurs at higher elevations.
Mentzelia tridentata	creamy blazing star	1B.3	Upland. Mojavean desert scrub. 545 - 1100 m.	Moderate	Potential to occur in creosote bush - white bursage scrub.
Mielichhoferia elongata	elongate copper moss	4.3	Upland. Broadleafed Upland Forest, Chaparral, Cismontane Woodland, Coastal Scrub, Lower Montane Coniferous Forest, Meadows and Seeps, Subalpine Coniferous Forest. Metamorphic rock, usually acidic, usually vernally mesic, often roadsides, sometimes carbonate. 0 - 1960 m.	Low	Habitat not present.
Orobanche ludoviciana var. arenosa	Suksdorf's broom-rape	2B.3	Upland. Great Basin scrub. Known in CA from only three occurrences. Parasitic on Ericameria and Iva spp. 1345-2075 m.	Low	Habitat not present.
Oryctes nevadensis	Nevada oryctes	2B.1	Upland. Chenopod scrub, Mojavean desert scrub. Dry sites in loose sandy soil in washes and desert foothills in the Owens Valley. 975-2535 m.	Moderate	Potential to occur in drainages.
Penstemon fruticiformis var. amargosae	Amargosa beardtongue	1B.3	Upland. Mojavean desert scrub. Sandy or gravelly washes and drainages. 940-1890 m.	Moderate	Potential to occur in drainages.
Petrophytum caespitosum ssp. acuminatum	marble rockmat	1B.3	Upland. Lower montane coniferous forest, upper montane coniferous forest. Limestone or granite. Rocky sites. 925 - 2290 m.	Low	Habitat not present.
Phacelia inyoensis	Inyo phacelia	1B.2	Shoreline. Meadows and seeps. Alkaline meadows. 915- 3200 m.	Moderate	Potential to occur along reservoir shores.
Phacelia nashiana	Charlotte's phacelia	1B.2	Upland. Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland. Granitic soils; sandy or rocky areas on steep slopes or flats. 335 - 2180 m.	Moderate	Potential to occur in uplands.
Plagiobothrys parishii	Parish's popcornflower	1B.1	Shoreline. Great Basin scrub, Joshua tree woodland. Alkaline soils; mesic sites. 750 - 1400 m.	Moderate	Potential to occur along reservoir shores.
Ranunculus hydrocharoides	frog's-bit buttercup	2B.1	Shoreline. Marshes and swamps. In or bordering shallow springs or freshwater marshes in the mountains. 1260 - 2320 m.	Low	This species typically occurs at higher elevations.
Sarcobatus baileyi	Bailey's greasewood	2B.3	Shoreline. Chenopod scrub. Alkaline soils, dry lakes, washes, roadsides. 1220 - 1525 m.	Moderate	Potential to occur along reservoir shores.
Selaginella leucobryoides	Mojave spike-moss	4.3	Upland. Great Basin Scrub, Lower Montane Coniferous Forest, Mojavean	Moderate	Potential to occur in uplands.

Scientific Name	Common Name	Status	Habitat	Potential to Occur in the BSA	Reason
			Desert Scrub, Pinyon and Juniper Woodland. Rocky, usually carbonate. 600 - 3150 m.		
Sibara deserti	desert winged-rockcress	4.3	Upland. Mojavean Desert Scrub. 345 - 1300 m.	Moderate	Potential to occur in uplands.
Sidalcea covillei	Owens Valley checkerbloom	SE, 1B.1	Shoreline. Moist alkaline meadows and freshwater seeps, fine sandy loam soil, one occurrence in stony calcareous soil. 1090 - 1420 m.	Moderate	Potential to occur along reservoir shores.
Thelypodium integrifolium ssp. complanatum	foxtail thelypodium	2B.2	Shoreline. Great Basin scrub, meadows and seeps. Alkaline or subalkaline soils; mesic sites. 1160 - 2440 m.	Moderate	Potential to occur along reservoir shores.

Status Definitions:
FE = Listed as endangered under the federal Endangered Species Act (ESA)
FC = Candidate for listing (threatened or endangered) under Federal Endangered Species Act.

Status Definitions:
SE = Listed as endangered under the California Endangered Species Act (CESA)

California Rare Plant Rank:
Rank 1B = Plant species that are rare, threatened, or endangered in California and elsewhere.
Rank 2B = Plant species that are rare, threatened, or endangered in California, but more common elsewhere.
Rank 3 = Review List: Plants about which more information is needed.
Rank 4 = Plants of limited distribution - a watch list.

Threat Ranks
0.1 – Seriously threatened in California (high degree/immediacy of threat)
0.2 – Fairly threatened in California (moderate degree/immediacy of threat)
0.3 – Not very threatened in California (low degree/immediacy of threats or no current threats known)

SOURCES: CDFW 2018a and CNPS 2018.

5.5.2 Special-Status Wildlife

A complete list of special-status wildlife species with potential to occur within the project area or vicinity is provided in **Table 1**. Habitat preferences of wildlife species are described as aquatic, shoreline, or upland. These terms are provided to characterize species by their potential level of exposure to aquatic applications of copper sulfates.

TABLE 2 – SPECIAL-STATUS WILDLIFE SPECIES POTENTIAL TO OCCUR IN THE PROJECT VICINITY

Scientific Name	Common Name	Status	Habitat	Potential to Occur in the BSA	Reason
Fish					
Catostomus fumeiventris	Owens sucker	SSC	Aquatic. Endemic to the Owens River drainage. In its native river habitat, it is most common in areas with long runs and few riffles. Adults can thrive in reservoirs, but need gravelly riffles in tributary streams for spawning.	Low	Owen's River endemic. Reservoirs lack the attributes needed for spawning.
Cyprinodon radiosus	Owens pupfish	FE, SE, FP	Aquatic. Shallow water habitats in the Owens Valley. Prefers warm, clear, shallow water free of exotic fishes. Needs areas of firm substrate for spawning.	Low	While introduction of this species is possible, the reservoirs and aqueduct are not expected to sustain viable populations of this species.
Rhinichthys osculus ssp. 2	Owens speckled dace	SSC	Aquatic. Small streams and springs in Owens Valley. Occupies a variety of habitats. Rarely found in water > 29 C.	Low	While introduction of this species is possible, the reservoirs and aqueduct

					are not expected to sustain viable populations of this species.
Siphateles bicolor snyderi	Owens tui chub	FE, SE	Aquatic. Endemic to the Owens River basin in a variety of habitats. Needs clear, clean water, adequate cover, and aquatic vegetation.	Low	While introduction of this species is possible, the reservoirs and aqueduct are not expected to sustain viable populations of this species.
Reptiles and Amphibians					
Batrachoseps campi	Inyo Mountains slender salamander	SSC	Shoreline. Moist canyons on the west and east slopes of the Inyo Mountains, where surface water is present. Takes cover under rocks on moist sandy loam in steep-walled canyons with permanent springs. Also in underground crevices. Elevation range extends from 550 - 2620 m.	Low	Typical canyon spring habitat not present.
Gopherus agassizii	desert tortoise	FT, ST	Upland. 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. It is found from near sea level to 1067 m.	Moderate	Previously recorded occurrences near the south end of South Haiwee Reservoir
Lithobates pipiens	northern leopard frog	SSC	Aquatic. Native range is east of Sierra Nevada-Cascade Crest. Near permanent or semi-permanent water in a variety of habitats. Highly aquatic species. Shoreline cover, submerged and emergent aquatic vegetation are important habitat characteristics. Elevation range extends from sea level to 2130 m.	Low	Only recently recorded populations in Owen's Valley occur north of Bishop.
Rana sierrae	Sierra Nevada yellow-legged frog	FE, ST	Aquatic. Always encountered within a few feet of water. Tadpoles may require 2 - 4 years to complete their aquatic development. Found at elevations from 370 - 3,660 m.	Low	Mainly known from lakes and streams in the Sierra Nevada Mountains.
Birds					
Aquila chrysaetos	golden eagle	FP	Upland. 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.	High	Potential to forage throughout Owen's Valley. Nesting unlikely to occur.
Asio otus	long-eared owl	SSC	Shoreline. 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.	Moderate	Potential to forage and nest in willow thickets around the reservoirs.
Athene cunicularia	burrowing owl	SSC	Upland. 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.	Moderate	Potential to forage in open areas. Potential to nest or seasonally shelter if suitable burrows are present.
Buteo swainsoni	Swainson's hawk	ST	Upland. Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and 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.	Low	Potential for occasional foraging, but more likely to occur in nearby agricultural areas or Owen's River floodplain.
Charadrius alexandrinus nivosus	western snowy plover	FT, SSC	Shoreline. Sandy beaches, salt pond levees and shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.	Moderate	Known to occur at Owen's Lake. Potential to forage along reservoir shorelines.
Charadrius montanus	mountain plover	SSC	Upland. Short grasslands, freshly plowed fields, newly sprouting grain fields, and sometimes sod farms. Short vegetation, bare	Low	Potential for occasional foraging but more likely to occur in nearby

			ground, and flat topography. Prefers grazed areas and areas with burrowing rodents.		agricultural areas or Owen's River floodplain.
Circus cyaneus	northern harrier	SSC	Shoreline. 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.	Moderate	Potential to occur in marsh habitat south of South Haiwee Reservoir.
Coccyzus americanus occidentalis	western yellow-billed cuckoo	FE, SE	Shoreline. 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.	Low	Project area lacks the vast swaths of riparian forest preferred by this species.
Empidonax traillii extimus	southwestern willow flycatcher	FE, SE	Shoreline. Riparian woodland. Riparian woodlands in Southern California.	Moderate	Project area lacks the large patches of riparian woodlands preferred by this species; however, migrants may find refuge in black willow thickets.
Haliaeetus leucocephalus	bald eagle	FD, SE, FP	Shoreline. 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.	High	Potential to forage or nest near the reservoirs.
Icteria virens	yellow-breasted chat	SSC	Shoreline. 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 feet of ground.	High	Potential to occur in riparian habitat along the reservoir margins.
Ixobrychus exilis	least bittern	SSC	Shoreline. Colonial nester in marshlands and borders of ponds and reservoirs which provide ample cover. Nests usually placed low in tules, over water.	High	Potential to occur in bulrush and tules along reservoir margins.
Lanius ludovicianus	loggerhead shrike	SSC	Upland. Broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub and washes. Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.	High	Potential to occur in scrub habitats and along reservoirs.
Toxostoma lecontei	Le Conte's thrasher	SSC	Upland. 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.	Moderate	Potential to occur in upland shrub and wash habitats.
Vireo bellii pusillus	least Bell's vireo	FE, SE	Upland. Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 610 m. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	Moderate	Potential to occur in black willow thickets and riparian habitats along reservoir shorelines.
Mammals					
Antrozous pallidus	pallid bat	SSC	Upland. 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.	High	Potential to forage in open habitats.
Corynorhinus townsendii	Townsend's big-eared bat	SSC	Upland. Found 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.	High	Potential to forage around reservoirs.
Euderma maculatum	spotted bat	SSC	Upland. 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	Moderate	Potential to forage at reservoirs.

			moths. Needs rock crevices in cliffs or caves for roosting.		
Gulo gulo	California wolverine	FP, ST, FP	Upland. Found in the north coast mountains and the Sierra Nevada. Found in a wide variety of high elevation habitats. Needs water source. Uses caves, logs, burrows for cover and den area. Hunts in more open areas. Can travel long distances. Elevations in the southern Sierra Nevada mostly are from 2000-3400 m.	Low	This species typically occurs at higher elevations.
Microtus californicus vallicola	Owens Valley vole	SSC	Shoreline. Found in wetlands and lush grassy ground in the Owens Valley. Needs friable soil for burrowing. Eats grasses, sedges and herbs. Clips grass to make runways leading from burrows.	Moderate	Potential to occur along reservoir margins.
Ovis canadensis sierrae	Sierra Nevada bighorn sheep	FE, SE, FP	Upland. Historically found along the east side and crest of the Sierra Nevada, and on the Great Western Divide. Available water and steep, open terrain free of competition from other grazing ungulates. Habitat occurs from the eastern base of the range as low as 1,460 m to peaks above 4,300 m.	Low	This species typically occurs at higher elevations.
Xerospermophilus mohavensis	Mohave ground squirrel	ST	Upland. Open desert scrub, alkali scrub and 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. Has been found from 505-1525 m in elevation.	Moderate	Potential to occur in washes and uplands near the reservoirs and aqueduct.

Status Definitions:

FE = Listed as endangered under the federal Endangered Species Act (ESA)
FT = Listed as threatened under ESA
FD = Delisted in accordance with the ESA
SE = Listed as endangered under the California Endangered Species Act (CESA)
ST = Listed as threatened under the CESA
SSC = Species of Special Concern as identified by the CDFW
FP = Listed as fully protected under Fish and Game Code

SOURCES: CDFW 2018a; Nafis 2018; Zeiner et al. 1988-1990.

Aquatic Wildlife

For purposes of this report, aquatic wildlife describes species that live in water for their entire lives or during specific stages of development. Aquatic wildlife includes all fish species as well as certain insects and amphibians that reproduce in water and undergo aquatic larval phases. No special-status aquatic wildlife species are known or expected to occur within the project area.

Shoreline Wildlife

For purposes of this report, shoreline wildlife describes species associated with wetland, riparian, shoreline, and other aquatic habitats for the purpose of nesting, foraging, or sheltering. These include species that nest or shelter in wetland or riparian habitats or forage predominantly on plants or other prey tied to wetland, riparian, or aquatic habitats. Special-status shoreline wildlife with a moderate or high potential to occur in the BSA include the long-eared owl, western snowy plover, northern harrier, bald eagle, yellow-breasted chat, least bittern, least Bell's vireo, and Owen's Valley vole. Each of these species is described below.

Long-Eared Owl

The long-eared owl is a California Species of Special Concern also protected under CFGC Sections 3503 and 3503.5 and the MBTA. This raptor species forages in open habitats and nests

in riparian woodlands. This species has potential to nest in the black willow thickets surrounding the reservoirs.

Western Snowy Plover

The western snowy plover is federally-threatened and a CDFW Species of Special Concern. This shorebird species nests and forages along sandy beaches and alkali lakes. It is known to nest at nearby Owen's Lake and has some potential to forage where sandy beaches are present around the reservoir.

Northern Harrier

The northern harrier is a CDFW Species of Special Concern also protected under CFGC Sections 3503 and 3503.5 and the MBTA. This raptor species nests and forests in grassy marshlands and has potential to occur in association with the large wetland areas between North and South Haiwee Reservoirs.

Bald Eagle

The bald eagle is a federally-delisted, State Endangered, and State Fully-Protected species also protected under CFGC Sections 3503 and 3503.5 and the MBTA. This raptor species feeds on fish and waterfowl and has potential to forage at the reservoirs.

Yellow-Breasted Chat

The yellow-breasted chat is a CDFW Species of Special Concern also protected under CFGC Section 3503 and the MBTA. This songbird species inhabits dense riparian woodland and shrub habitats and has potential to occur in the black willow thickets around the reservoirs.

Least Bittern

The least bittern is a CDFW Species of Special Concern also protected under CFGC Section 3503 and the MBTA. This wading bird species inhabits marshes and has potential to occur in the bulrushes around the reservoirs.

Least Bell's Vireo

The least Bell's vireo is federally- and state endangered and protected under CFGC Section 3503 and the MBTA. This songbird nests and forages in riparian scrub and forest habitats and has potential to occur in the black willow thickets bordering the reservoirs.

Owen's Valley Vole

The Owen's Valley vole is a CDFW Species of Special Concern that is found in wetlands and grassy areas of the Owen's Valley. This rodent species requires friable soils from digging and grasses, sedges, and herbs for foraging. This species has potential to occur in wetland habitats around the reservoirs.

Upland Wildlife

Upland species are generally those that occupy the arid scrub habitats, ephemeral wash habitats, badlands, and foothills surrounding the project site. Upland species with a moderate or high

potential to occur include the desert tortoise, golden eagle, burrowing owl, loggerhead shrike, Le Conte's thrasher, pallid bat, Townsend's big-eared bat, spotted bat, and Mohave ground squirrel. Each of these species is described below.

Desert Tortoise

This federally and state-threated reptile species has a high potential to occur in uplands around the North and South Haiwee Reservoirs and Merritt Cut and low potential to occur and Alabama Gates. While the project area is above the generally described elevation range of the species, this species was recorded along the southern border of South Haiwee Reservoir in 2006. There are no records of this species north of Owen's Lake; therefore, this species is not expected to occur at the Alabama Gates. The project is within the Western Mojave Recovery Unit and is not within or near any designated critical habitat for this species.

Golden Eagle

The golden eagle is a state-fully protected species that is also protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. This raptor species forages in broad, open habitats and nests on cliffs, power lines, structures, and trees. The golden eagle has potential to occasionally forage in the habitats around the reservoirs and along the aqueduct. This species is unlikely to nest around the reservoirs, but has the potential to nest on cliffs in the surrounding canyons and foothills.

Burrowing Owl

The burrowing owl is a CDFW Species of Special Concern also protected under CFGC Sections 3503 and 3503.5 and the MBTA. This raptor species occupies open, dry, grasslands and scrublands with low-growing vegetation. For nesting and shelter, this species is dependent on the presence of burrows created by other wildlife species.

Loggerhead Shrike

The loggerhead shrike is a CDFW Species of Special Concern also protected under CFGC Section 3503 and the MBTA. This bird species prefers open habitats for foraging and dense shrubs for nesting and has potential to occur in the scrub habitats along the reservoir margins.

Le Conte's Thrasher

The Le Conte's thrasher is a CDFW Species of Special Concern also protected under CFGC Section 3503 and the MBTA. This bird species occurs in upland scrub and wash habitats.

Pallid bat

The pallid bat is a CDFW Species of Special Concern that forages in a variety of open habitats and roosts in caves, crevices, mines, and occasionally in hollow tree and buildings. This species needs occasional access to water but has urine-concentrating abilities. This species has potential to forage around the project area or occasionally drink from the reservoirs, but no suitable roosting habitat is known to occur.

Townsend's Big-eared Bat

The Townsend's big-eared bat is a CDFW Species of Special Concern that forages in a variety of habitat, particularly in mesic areas, and roosts in caves, tunnels, mines, and buildings. This species needs access to water and has a relatively poor urine-concentrating ability compared to other southwestern bats. This species has potential to forage around the project area and is likely to drink from the reservoirs. No suitable roosting habitat is known to occur, but potential roosting habitat may be provided by unknown caves, mines, or man-made structures around the reservoir.

Spotted Bat

The spotted bat is a CDFW Species of Special Concern that forages in a variety of habitats including deserts, grasslands, and forests. This species typically roosts in rock crevices of cliffs. This species drinks water but has a high ability to concentrate urine compared to bats of mesic habitats. This species has potential to forage in the project area and has been captured in Owen's Valley. It is not expected to regularly roost in the project area due to the lack of large cliffs.

Mohave Ground Squirrel

5.6 Designated Critical Habitat

No designated critical habitat is located near or within the project area. The nearest designated critical habitat is for Sierra Nevada bighorn sheep (*Ovis canadensis sierrae*) and is located approximately five miles northwest of North Haiwee Reservoir.

5.7 Jurisdictional Wetlands and Aquatic Resources

The Alabama Gates, North and South Haiwee Reservoirs, and Merritt Cut all convey water from the Los Angeles Aqueduct and are maintained and operated by LADWP. The waters of the Los Angeles Aqueduct are partially 'off-stream' meaning that the aqueduct is sourced with water pumped from outside of its natural watershed. Sources include the Owens River and creeks from the Mono Basin Diversion that would have flowed into Mono Lake.

Aquatic resources within the project area are under the potential jurisdiction of USACE, Lahontan RWQCB, and CDFW under CWA Section 404 and 401 and CFGC Section 1600, respectively.

CWA permitting requirements are triggered when a pollutant is discharged into a jurisdictional water. The requirement of a Lake and Streambed Alteration Notification to CDFW may be required where a project may deposit or dispose of material into any river, stream, or lake.

5.7.1 U.S. Army Corps of Engineers

The USACE may regulate aqueducts and canals as "waters of the United States" where they serve as tributaries, removing water from one part of the tributary network and moving it to another (Environmental Protection Agency [EPA] n.d.). The Los Angeles Aqueduct partially serves as a tributary of the Lower Owens River where diversions allow for return flow into the Owen's River floodplain. The Lower Owens River may qualify as a Traditional Navigable Water.

Federal wetlands are defined in Section 404 of the Clean Water Act as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support (and do support, under normal circumstances) a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3[b], 40 CFR 230.3). To be meet the USACE definition of a wetland, an area must meet all three parameters for hydrophytic vegetation, hydric soils, and wetland hydrology. The term "other waters of the United States" refers to seasonal or perennial water bodies, including lakes, stream channels, drainages, ponds, and other surface water features that exhibit an ordinary high-water mark but lack positive indicators for one or more of the three wetland parameters described above (33 CFR 328.4). The National Wetlands Inventory (NWI) has mapped areas of freshwater emergent and forested/shrub wetlands along the shorelines of the North and South Haiwee Reservoirs **(Figures 4A and 4B)**. While NWI wetlands may not meet all three parameters required to be considered USACE wetlands, it is expected that USACE-jurisdictional wetlands are present along the parameters of the North and South Haiwee Reservoirs.

Vegetation communities that include hydrophytic vegetation include black willow thickets, Fremont cottonwood forest, hardstem bulrush marsh, and tamarisk thickets.

5.7.2 Lahontan Regional Water Quality Control Board

The Lahontan RWQCB regulates all USACE-jurisdictional waters under CWA Section 401 as well as all surface water, groundwater, wetlands and both point and nonpoint sources of pollution under the Porter-Cologne Water Quality Control Act. Water resources within the project area, including the waters conveyed by the Los Angeles Aqueduct and stored within the North and South Haiwee Reservoirs would be subject to RWQCB regulation.

5.7.3 California Department of Fish and Wildlife

CFGC Section 1600 et seq. applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the state. CDFW jurisdiction generally extends to the top of bank of the stream or to the outer limit of the adjacent riparian vegetation, whichever is greater. Canals, aqueducts, irrigation ditches, other means of water conveyance, and reservoirs can also be considered streams or lakes under CDFW jurisdiction if they support aquatic life, riparian vegetation, or terrestrial wildlife dependent on associated habitats.

5.8 Wildlife Movement and Nursery Sites

5.8.1 Wildlife Movement

Habitat linkages are contiguous areas of open space that connect two larger habitat areas. Linkages provide for the dispersal for a variety of species within the landscape. In addition, linkages can serve as primary habitat for some smaller species. Corridors are linear linkages between two or more habitat patches and provide for wildlife movement and dispersal.

The project area is part of the Pacific Flyway, a significant bird migration path in the western United States. North and South Haiwee Reservoirs provide stopover areas for migratory birds, particularly migratory waterfowl and shorebirds.

The Alabama Gates, North and South Haiwee Reservoirs, or Merrit Cut are not expected to provide essential migratory habitat to terrestrial wildlife species, although certain terrestrial species may move along the margins of the reservoirs where water is readily available. The North and South Haiwee Reservoirs and Los Angeles Aqueduct may impede terrestrial wildlife movement as these features are generally steep-banked and difficult to cross. Wildlife movement within the vicinity of the project is also impeded by the SR-395 highway corridor and the naturally occurring difficult terrain of the badlands and erosional gullies. With the exception of these features, the majority of habitat surrounding the project area is undeveloped and open, allowing for generally unconstrained wildlife movement.

Because the reservoirs and aqueduct are part of a largely isolated water supply system with only fixed intake locations and outlets, these features are not expected to provide habitat connectivity for aquatic species.

5.8.2 Nursery Sites

The project area includes habitats that may be used by native wildlife species as nursery sites. Aquatic species, including the various species of fish and amphibians described in Section 5.6 below, breed within the reservoirs. The reservoir shorelines and emergent wetlands are expected to serve as nursery habitat for many of these aquatic species. Additionally, bats have the potential to use trees and structures surrounding the reservoirs and aqueduct as maternity roost sites.

5.9 Common Wildlife

Common wildlife species are those species that are not protected by the species-specific designations described for special-status species and may include both native and non-native species. General wildlife protection laws and statutes are applicable to certain common wildlife genera and species. MBTA and CFGC Sections 3503 and 3503.5 are applicable to common native bird and raptor species, and protections under CEQA for wildlife movement corridors and nursery sites apply to various common wildlife species.

Fish species known to occur in the North and South Haiwee Reservoirs include brown trout (*Salmo trutta*), coastal rainbow trout (*Oncorhynchus mykiss irideus*), largemouth bass (*Micropterus salmoides*), and western mosquitofish (*Gambusia affinis*) (Santos et al. 2018). These fish species are likely present due to stocking for recreational fishing that previously occurred at the reservoirs.

Terrestrial reptile and amphibian species likely to utilize upland zones around the reservoirs and aqueduct include the western side-blotched lizard (*Uta stansburiana elegans*), Mohave Desert Sidewinder (*Crotalus cerastes cerastes*), Great Basin collared lizard (*Crotaphytus bicinctores*), western zebra-tailed lizard (*Callisaurus draconoides rhodostictus*), southern desert horned lizard (*Phrynosoma platyrhinos calidiarum*), Great Basin whiptail (*Aspidoscelis tigris tigris*), and Great

Basin gopher snake (*Pituophis catenifer deserticola*). Common species likely to utilize the wet transition zones surrounding the reservoirs include western toad (*Anaxyrus boreas*) and American bullfrog (*Lithobates catesbeianus*).

Various migratory and resident bird species are likely to utilize the habitats within the project area including rock wren (*Salpinctes obsoletus*), horned lark (*Eremophila alpestris*), loggerhead shrike (*Lanius ludovicianus*), common raven (*Corvus corax*), red-winged blackbird (*Agelaius phoeniceus*), and red-tailed hawk (*Buteo jamaicensis*). Waterfowl and shorebirds likely to occur at the reservoirs include American coot (*Fulica americana*), double-crested cormorant (*Phalacrocorax auritus*), ruddy duck (*Oxyura jamaicensis*), and pied-billed grebe (*Podilymbus podiceps*).

Terrestrial mammals expected to occur in the project vicinity include deer mice (*Peromyscus* spp.), kangaroo rats (*Dipodomys* spp.), antelope ground squirrel (*Ammospermophilus leucurus*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus auduboni*), Virginia opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), bobcat (*Lynx rufus*), and coyote (*Canis latrans*) (Trimble 1999). Bat species expected to forage in the area include the canyon bat (*Parastrellus hesperus*), Mexican free-tailed bat (*Tadarida brasiliensis*), Yuma myotis (*Myotis yumanensis*), pallid bat (*Antrozous pallidus*), big brown bat (*Eptesicus fuscus*) and others. Due to the arid climate and scarcity of water in the region, it is expected that the reservoirs and aqueduct may serve as important surface water sources to bat populations in the region. The area within 5 miles of the project site contains multiple mine prospects, pits, and shafts, which could support bat roost colonies. Within the project area, LADWP aqueduct infrastructure (including Alabama Gates), as well as culverts, bridges, and mature riparian trees have the potential to provide day-roost and maternity-roost habitat for bats.

CHAPTER 6
Impact Analysis

The potential for the project to impact biological resources is based on Appendix G of the CEQA Guidelines (i.e., the Initial Study Checklist). Below are the biological resource questions that were considered.

a) Would the project 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 CDFW or USFWS?

b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations, or by the CDFW or USFWS?

c) Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

d) Would the project 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) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

f) Would the project conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan?

6.1 Special-Status Species

This section describes the potential impacts to special-status species that may occur within or along the shoreline of each water body as a result of the proposed project. No critical habitat, as designated by USFWS, occurs in the project area. The staging areas for the herbicide application are developed to accommodate operational activities and do not contain special-status plant or animal species.

6.1.1 Special-Status Plants

As described in Chapter 5, aquatic plants describe free floating, submerged, and emergent plants that require standing water; shoreline plants describe plants that occur in wetland, riparian, shoreline, and playa habitats that do not require persistent standing water; and upland plants

describe plants that occur in habitats lacking a high water table, periodic flooding, or inundation. Potential impacts to special-status plant are analyzed below.

Aquatic Plants

Copper sulfate would be applied to directly to aquatic habitat within the project area. There are no aquatic special-status plant species with potential to occur in the aquatic habitats of the project area. **No impact** would occur.

Shoreline Plants

Special-status species with the potential to occur within wetlands, mesic sites, alkaline pools and plays, and sandy shorelines along the reservoir margins and aqueduct outflow locations include the Inyo County star-tulip, short-pedicelled cleomella, Parish's popcornflower, Owen's Valley checkerbloom, foxtail thelypodium, Bailey's greasewood, and Mojave tarplant. While not exclusively wetland species, these plants are tied to locations with periodic inundation.

The use of copper sulfate would be limited to aquatic environments and affected vegetation generally includes algae and submerged and floating broadleaf plants (DiTomaso 2012). The USEPA ascertains that their assessment of the ecological effects of copper sulfate "does not indicate a risk of concern to freshwater vascular plants or estuarine/marine plants" (USEPA 2008).

Only plant tissues present in water would potentially come in contact with copper sulfate. The special-status plant species with potential to occur in shoreline areas are more likely to occur in areas with saturated soils but no standing water, based on the habitat preferences of these species. These areas would generally be outside of the areas where applications would be targeted. Copper sulfate is not likely to be taken up through roots in soil substrate. Copper is generally considered to be biologically inactive in sediments (Gettys et al. 2009) because it becomes strongly adsorbed to the soil (DiTomaso et al. 2013). Therefore, even in inundated areas, plants rooted in soil are unlikely to take up toxic levels of copper via the root system.

Wetland and shoreline special-status plant species, if present, are unlikely to be negatively affected by the application of copper sulfate because the majority of the above-ground tissue is typically present outside of the water column and limited plant tissue would come in contact with copper sulfate resulting in limited exposure. Non-aquatic plant species growing along the reservoir margins are unlikely to be exposed to enough copper sulfate to result in toxicity. As a result, potential impacts to special-status plants potentially occurring in shoreline areas would be **less than significant**.

Upland Plants

The copper sulfate would be applied at the reservoirs by aircraft with all loading, unloading, takeoff, and landing activities located in previously developed or disturbed areas. Additionally, all ground-based applications would use existing maintained access roads. No copper sulfate would be dispersed directly within upland habitat areas where special-status plants could be

present. Potential impacts to special-status plants potentially occurring in upland areas would be **less than significant**.

To further reduce the potential for impacts to upland plant species resulting from accidental drift outside of intended application areas, the following Best Management Practice is recommended:

> **BMP-1 – Wind Restrictions:** Copper sulfate applications would not be conducted if continuous wind velocity exceeds 10 miles per hour to minimize the potential for drift.

6.1.2 Special-Status Wildlife

Aquatic Wildlife

Impacts to aquatic wildlife could occur through immediate exposure and toxicity, long-term exposure and bioaccumulation, and through post-application decreases in dissolved oxygen. Studies have shown that the application of copper sulfate to surface waters for nuisance algae control in reservoirs has no apparent negative effects for most adult game fish (Anderson et al. 2001). However, copper sulfate has been shown to be toxic to larval fish and aquatic invertebrates (Diamond et al. 1997; TOXNET 1975-1986). CDFW laboratory tests have shown that concentrations of 1,000 parts per billion (ppb) are many times below the toxicity values for delta smelt (California Department of Boating and Waterways [DBW] 2001). Salmonids tend to be more sensitive to copper sulfate than other fish species but tests for rainbow trout have also shown toxicity values many times higher than the application concentrations that would occur with this project (DBW 2001). Copper concentrations would be applied according to the label to achieve a maximum concentration of 1,000 ppb, well below any known concentrations that may be toxic to fish in the project area. However, this refers to the concentration of copper suspended in the water column and does not account for direct interactions with copper-laden sediments and algae.

While not associated with direct copper toxicity, aquatic herbicides, including copper sulfate have the potential to result in temporary decreases in dissolved oxygen (DO) concentrations in water if large blooms of algae are treated at one time or through frequent treatments that occur over a relatively short duration. Low DO concentrations (< 5 to 6 mg/L) can occur when the decomposition of organic matter (dead algal matter) results in high biological oxygen demand (BOD). Sudden increases in BOD and associated decreases in DO (below 5 to 6 mg/L for warm-water fish and below 6 to 8 mg/L for cold-water fish) can result in conditions that are unsuitable for fish and lead to fish kills (SWRCB 2004). Substantial decreases in DO are not expected to result from copper sulfate applications because LADWP has developed an APAP describing their copper sulfate applications, including best management practices (BMPs), and water quality monitoring programs.

Based on a review of copper concentration toxicities to fish and other aquatic species, the concentrations of copper that would be achieved with applications of copper, and bioavailability of copper in reservoir sediments, impacts resulting from copper sulfate exposure would be less than significant. In addition, no aquatic special-status wildlife species are known or expected to occur within the project area, therefore, **no impact** would occur.

Shoreline Wildlife

The following special-status shoreline wildlife species have potential to occur in the project area or vicinity: long-eared owl, western snowy plover, northern harrier, bald eagle, yellow-breasted chat, least bittern, southwestern willow flycatcher, least Bell's vireo, and Owen's Valley vole. Shoreline wildlife species are not likely to come in direct contact with applications because they do not directly inhabit aquatic habitats. Shoreline species that inhabit riparian and wetland areas and forage predominantly on non-aquatic prey are not expected to be subject to significant copper sulfate exposure.

However, shoreline species that consume aquatic prey, including the bald eagle and least bittern, may be exposed to copper sulfates. Impacts to shoreline wildlife that feed directly on aquatic prey species could occur through bioaccumulation and immediate exposure and toxicity through consumption of contaminated prey species. These potential exposure routes are described below.

Immediate Exposure and Toxicity

Wildlife species that utilize aquatic habitats for foraging could be exposed to copper sulfate if they consume prey species that are present in the application areas during periods when applications are taking place or if they consume prey species that interact with the water or sediments following applications.

Copper sulfate exposure poses less of a threat to birds than to other animals, with the lowest lethal dose for this material in pigeons and ducks being 1,000 parts per million (ppm) (Tucker and Crabtree 1970). This toxicity value is many times higher than the target application concentrations that would occur for this project. However, if copper sulfate applications inadvertently exceed target concentrations, immediate exposure and toxicity could occur, resulting in **potentially significant impacts** to shoreline wildlife species. The following mitigation measures are recommended:

> **BIO-1 – Remedial Actions:** If levels of copper sulfate measured during monitoring conducted under the Aquatic Pesticides Application Plan exceed those recommended in manufacturer application guidelines, remedial measures shall be implemented, such as the addition of coagulant additives and a refinement of application procedures.
>
> **BIO-2 – Fish and Wildlife Toxicity Monitoring:** In addition to monitoring activities specified under the Aquatic Pesticides Application Plan, monitoring shall include visual fish and wildlife monitoring during and up to at least 7 days after applications. If distressed wildlife is observed during monitoring with the cause of distress potentially associate with the copper sulfate applications, application procedures would be refined in order to avoid any potential harm. If deceased wildlife is detected during or after applications with an unknown cause of death, specimens would be sent for necropsies would be conducted to determine the cause of death.

Because the potential for special-status species exposure to copper sulfate applications is low and because targeted application concentrations of copper sulfate are substantially lower than toxicity

thresholds for special-status wildlife, with implementation of Mitigation Measures BIO-1 and BIO-2, impacts associated with immediate exposure and toxicity would be **less than significant**.

Long-term Exposure and Bioaccumulation

Although copper sulfate is highly water soluble; that is, it dissolves very easily in water, the copper ions are strongly adsorbed by soil (lake-bottom sediment) particles following applications (TOXNET 1975-1986). Copper compounds, or precipitates, also settle out of solution in a process called precipitation. Copper that is absorbed by sediments and copper precipitates are biologically inactive, meaning that they do not undergo further biological changes (Gangstad 1986). Additionally, copper that is not in a soluble form (i.e., absorbed by sediment or copper precipitate) is less available for uptake into the food web and less toxic (Moffett et al. 1998). Because copper sulfate applications are expected to be rapidly absorbed by lake sediments (TOXNET 1975-1986) and/or form precipitates and fall out of solution, and these forms are much less bio-available and toxic.

Impacts associated with long-term exposure and bioaccumulation of copper are **less than significant**.

Upland Wildlife

As discussed above for special-status plants, copper sulfate would not be applied to uplands; therefore, copper sulfate applications are not anticipated to affect upland special-status wildlife species. However, activities associated with applications would occur adjacent to upland habitat and have the potential to result in potentially significant impacts to upland special-status species. Vehicles traveling on access roads could result in mortalities to special-status species, such as the desert tortoise and Mohave ground squirrel, during copper sulfate applications. To reduce these impacts to less than significant, the following measures are recommended.

> **BIO-3 – Driving and speed Limits:** All vehicles associated with copper sulfate applications and monitoring shall travel at posted speed limits or at speeds of 15 miles per hour or less on unpaved access roads where no speed limit is posted. Vehicles associated with the project shall remain on existing roads at all times.
>
> **BIO-4 – Parked Vehicle Checks:** When vehicles are parked along dirt access roads for more than 5 minutes, the vehicle operator shall inspect beneath the tires for wildlife prior operating the vehicle to ensure that wildlife are not in harm's way.

Application activities have the potential to disturb nesting special-status birds in adjacent native habitats, including loggerhead shrikes, burrowing owls, and Le Conte's thrashers. To reduce impacts to nesting special-status bird species, the following measure is recommended:

> **BIO-5 – Nesting Bird Surveys:** All ground activities shall remain on access roads and in established work areas. If ground activities will occur in undisturbed areas that provide habitat for nesting birds, a qualified biologist shall conduct a bird nest survey within in areas that will be disturbed no more than 3 days prior to those activities occurring. If active nests are found, buffers and/or nest monitoring shall be implemented around each

nest based on the species, location of the nest, and type of activity occurring, as determined by a qualified biologist.

With implementation of Mitigation Measures BIO-4 and BIO-5, impacts to upland special-status species and nesting birds would be **less than significant**.

6.2 Riparian Habitat and Sensitive Natural Communities

Potential sensitive natural communities present in the project vicinity include Black Willow Thickets, Fourwing Saltbush Scrub, Fremont Cottonwood Forest, Hardstem Bulrush Marsh, Joshua Tree Woodland, Rubber Rabbitbrush Scrub, Shadscale Scrub, and Spiny Menodora Scrub.

Because copper sulfates and associated activities would avoid upland natural communities, no impact would occur to upland sensitive natural communities, including Fourwing Saltbush Scrub, Joshua Tree Woodland, Rubber Rabbitbrush Scrub, Shadscale Scrub, and Spiny Menodora Scrub. However, wetland and riparian sensitive natural communities, including Black Willow Thickets, Fremont Cottonwood Forest, and Hardstem Bulrush Marsh may experience minor exposure to copper sulfates where they are exposed to water from the reservoirs.

While not expected to result in direct wetland or riparian plant mortality, copper sulfates reaching riparian and wetland habitats have the potential to disrupt certain ecological processes within those habitats and reduce the overall ecological health of the community, leaving some plants more susceptible to disease. Because copper sulfates are toxic to bacteria and fungi, it is expected that they could result in negative impacts to mycorrhizae. Mycorrhiza is a fungi that has a symbiotic association with a vascular host plant, assisting the host plant with nutrient exchanges, disease resistance, drought tolerance, and salinity resistance (Zeng 2006; Porcel et al. 2012). However, due to the limited amount of copper sulfate exposure that these communities would experience, these impacts would be **less than significant**.

6.3 Federal Wetlands

The North and South Haiwee Reservoirs contain wetland features that may be considered jurisdictional by the USACE under Section 404 of the Clean Water Act, the RWQCB under Section 401 of the Clean Water Act, and CDFW under California Fish and Game Code (including riparian habitat, and/or other vegetation communities considered sensitive by CDFW). Additionally, Alabama Gates includes an outfall draining directly into wetlands along the Owen's River floodplain.

No loss of wetland features that may be considered jurisdictional by the USACE, RWQCB, or CDFW; nor the loss of riparian habitat, or other communities considered sensitive by CDFW, would occur as a result of the proposed project. The project does not propose to remove, fill, or alter the existing wetland or riparian features within any of the water bodies. In addition, no water releases to adjacent wetland or riparian areas outside of the closed aqueduct system would occur during or immediately after copper sulfate applications. Therefore, **no impact** would occur.

6.4 Wildlife Movement and Nursery Sites

The project area is not expected to function as a significant movement corridor for terrestrial species because the aqueduct and reservoirs impede terrestrial wildlife movement. Because the reservoirs and aqueduct are part of a largely isolated water supply system with only fixed intake locations and outlets, these features are not expected to provide habitat connectivity for aquatic species.

The open water habitat provided by the reservoir provides important habitat for migrating shorebirds and waterfowl along the Eastern Sierra route of the greater Pacific Flyway. Small patches of wetland and riparian habitat surrounding the reservoirs may also provide important stopover habitat for migrating bird species, however, as described above, these habitats would not be impacted. Additionally, during aerial applications, migrating waterfowl or other avian species utilizing the water bodies would be able to utilize other areas of the reservoirs located away from the noise of the aircraft. Therefore, impacts to wildlife movement corridors would be **less than significant**.

The project area may provide wildlife nursery habitat in nearby potential roost structures and trees for bat maternity colonies; however, the aerial applications would not target shoreline areas, and the project would not disturb structures or trees along the reservoir shorelines, therefore, impacts to bat maternity colonies are not expected to occur.

The project area may provide wildlife nursery habitat in the form of shallow waters for fish and amphibian maturation. Potential impacts to fish and aquatic wildlife nursery sites could result from direct toxicity and post-application decreases in dissolved oxygen. Studies have shown that the application of copper sulfate to surface waters for nuisance algae control in reservoirs have no apparent negative effects for most adult game fish (Anderson et al. 2001). However, copper sulfate has been shown to be toxic to larval fish and aquatic invertebrates (Diamond et al. 1997; TOXNET 1975-1986). CDFW laboratory tests have shown that concentrations of 1,000 parts per billion (ppb) are many times below the toxicity values for delta smelt (California Department of Boating and Waterways [DBW] 2001). Salmonids tend to be more sensitive to copper sulfate than other fish species but tests for rainbow trout have also shown toxicity values many times higher than the application concentrations that would occur with this project (DBW 2001). Copper concentrations would be applied according to the label to achieve a maximum concentration of 1,000 ppb, well below any known concentrations that may be toxic to fish in the project area. However, this refers to the concentration of copper suspended in the water column and does not account for direct interactions with copper-laden sediments and algae.

While not associated with direct copper toxicity, aquatic herbicides, including copper sulfate have the potential to result in temporary decreases in dissolved oxygen (DO) concentrations in water if large blooms of algae are treated at one time or through frequent treatments that occur over a relatively short duration. Low DO concentrations (< 5 to 6 mg/L) can occur when the decomposition of organic matter (dead algal matter) results in high biological oxygen demand (BOD). Sudden increases in BOD and associated decreases in DO (below 5 to 6 mg/L for warm-water fish and below 6 to 8 mg/L for cold-water fish) can result in conditions that are unsuitable for fish and lead to fish kills (SWRCB 2004). Substantial decreases in DO are not expected to

result from copper sulfate applications because LADWP has developed an APAP describing their copper sulfate applications, including best management practices (BMPs), and water quality monitoring programs.

Based on this review of copper concentration toxicities to fish, the concentrations of copper that would be achieved with applications of copper, and bioavailability of copper in reservoir sediments, significant impacts to aquatic nursery sites are not expected to resulting from copper sulfate exposure. Additionally, the project area does not provide uniquely valuable nursery habitat for these species and habitat provided by the reservoirs is artificial with fish species introduced for recreational purposes. Therefore, impacts would be **less than significant**. Implementation of Mitigation Measure BIO-2 (fish and wildlife toxicity monitoring) would further reduce the potential for impacts to aquatic wildlife nursery sites.

6.5 Local Policies or Ordinances Protecting Biological Resources

The project would not conflict with the Inyo County General Plan because the goal and policies of this plan are not applicable to the activities occurring under the proposed project. **No impact** would occur.

6.6 Habitat Conservation Plans and Natural Community Conservation Plans

No adopted NCCPs, HCPs, or other conservation plans occur within the project area; therefore, the proposed project would not conflict with any provisions of such adopted plans, or other approved local, regional, or state habitat conservation plan. In addition, the proposed project does not conflict with any provisions of the draft HCP. **No impact** would occur.

6.7 Cumulative Effects

6.7.1 Special-Status Plants

Aquatic Plants

No aquatic special-status plants are expected to occur in the project vicinity, therefore, **no cumulative effects** would occur.

Shoreline Plants

Cumulative effects to shoreline plants could result from additional facilities maintenance activities along the aqueduct and around the reservoirs. These activities could include vegetation removal and use of other additives and treatments within the reservoir and aqueduct system. The addition of copper sulfates from the proposed project is not expected to contribute to incremental

effects in a way that would be cumulatively considerable. Therefore, cumulative effects would be **less than significant**.

Upland Plants

Cumulative effects to upland plants could result from additional facilities maintenance activities along the aqueduct and around the reservoirs. These activities could include vegetation removal or development of natural habitats. However, the proposed project is located in a relatively undeveloped area, and the addition of copper sulfates contributed by the proposed project is not expected to contribute to incremental effects in a way that would be cumulatively considerable. Therefore, cumulative effects would be **less than significant**.

6.7.2 Special-Status Wildlife

Aquatic Wildlife

No special-status aquatic wildlife species are expected to occur in the project area; therefore, **no cumulative effects** would occur.

Shoreline Wildlife

Cumulative effects to special-status shoreline wildlife could occur as a result of bioaccumulation related to previous copper sulfate treatments, as well as due to the effects of ongoing operations and maintenance activities at the reservoirs and aqueduct.

While it is expected that copper sulfate applied in the aqueduct would be largely carried downstream and become continually more diluted, it is expected that copper applications in the reservoirs would likely accumulate in the bottom sediments of the reservoirs. Because copper sulfate could result in wildlife toxicity due to bioaccumulation or direct toxicity from exposure to accumulated copper sulfates in bottom sediments from repeat applications, including previous applications that are not part of the proposed project, cumulative effects to shoreline wildlife species could be potentially significant, depending on the existing levels of copper sulfates within sediments. To reduce this potentially significant cumulative effect, the following measure is recommended:

> **BIO-6 – Aquatic Pesticide Monitoring Program:** The APAP shall include a monitoring component to assess the current and future levels of copper sulfate accumulation in reservoir sediments and/or aquatic organisms to determine whether future copper sulfate applications could result in the introduction of toxic levels of copper sulfates into the food chain. The APAP's monitoring requirements shall assess the potential for compounding (or mitigating) effects if multiple types chemical applications within the same waterbody, and shall include a biological sampling component to ensure that bioaccumulation of copper sulfates within the ecosystem is not reaching levels of concern, as determined by the U.S. EPA Office of Pesticide Programs.

With implementation of Mitigation Measure BIO-6, cumulative effects to shoreline special-status wildlife would be **less than significant**.

Upland Wildlife

Ongoing operations and maintenance activities that occur at the reservoirs and aqueduct in addition to the proposed project are assumed to be relatively low impact; therefore, with implementation of Mitigation Measures BIO-3 and BIO-4 to reduce the project's contribution to cumulative vehicle related mortalities to wildlife species such as desert tortoise; implementation of MM BIO-5 to reduce the project's contribution to cumulative effects to nesting upland birds; and with implementation of an aquatic pesticide monitoring program under Mitigation Measure BIO-6 to reduce the project's contribution to potential cumulative effects to upland wildlife through bioaccumulation within the food chain, overall cumulative effects to upland special-status wildlife would be **less than significant**.

6.7.2 Riparian Habitat and Sensitive Natural Communities

Cumulative impacts to riparian habitat and sensitive natural communities could occur due to copper sulfate accumulation in the sediments and shorelines of reservoirs from applications prior to those under the proposed project. Accumulation of copper sulfate could disrupt ecological processes and decrease the health of these communities. However, with implementation of a pesticide monitoring program under MM BIO-6, cumulative impacts would be **less than significant**.

6.7.3 Federal Wetlands

The project would not result in direct impacts to federal wetlands or the loss of federal wetlands. Ecological impacts to federal wetlands would be the same as those described under riparian habitat and sensitive natural communities. Accumulation of copper sulfate from the project in combination with copper sulfate from previous applications could disrupt ecological processes and decrease the health of these communities. However, with implementation of a pesticide monitoring program under Mitigation Measure BIO-6, cumulative impacts would be **less than significant**.

6.7.4 Wildlife Movement and Nursery Sites

The project site generally does not provide a corridor for the movement of terrestrial or aquatic wildlife species. Migratory waterfowl and shorebirds may use the reservoirs as stopover habitat during migration, but in combination with additional past, current, and reasonably foreseeable future projects, the proposed project is not expected to cumulatively constrain the use of this habitat. Cumulative impacts to wildlife movement would be **less than significant.**

The project area may provide wildlife nursery habitat in the form of shallow waters for fish and amphibian maturation and nearby potential roost structures and trees for bat maternity colonies. However, the project area does not provide uniquely valuable nursery habitat for these species

and the provided aquatic habitat is artificial with fish species introduced for recreational purposes. Cumulative impacts to wildlife nursery sites would be **less than significant**.

6.7.5 Local Policies or Ordinances Protecting Biological Resources

No local policies and ordinances protecting biological resources are applicable to the proposed project; therefore, cumulatively there would be **no impact**

6.7.6 Habitat Conservation Plans and Natural Community Conservation Plans

No adopted conservation plans apply to the project area; therefore, cumulatively there would be **no impact.**

CHAPTER 7
References

Anderson, M. A., M. S. Giusti and W. D. Taylor. 2001. Hepatic Copper Concentrations and Condition Factors of Largemouth Bass (*Micropterus salmoides*) and Common Carp (*Cyprinus carpio*) from Copper Sulfate-Treated and Untreated Reservoirs. *Lake and Reserv. Manage*. 17(2): 97-104.

California Department of Boating and Waterways (DBW). 2001. *Final Environmental Impact Report for the* Egeria densa *Control Program*. Sacramento, CA.

California Department of Fish and Wildlife (CDFW) 2018a. California Natural Diversity Database (CNDDB). BIOs Selection. Accessed in October 2018.

_____. 2018b. California Natural Community List. October 15. Accessed at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153609

California Native Plant Society (CNPS). 2018a. Inventory of Rare and Endangered Plants (online edition, v8-03 0.39). California Native Plant Society. Sacramento, CA. Accessed in October 2018 at http://www.rareplants.cnps.org.

Diamond, J.M., C. Gerardi, E. Leppo, and T. Miorelli. 1997. Using a Water-Effect Ratio Approach to Establish Effects of an Effluent-Influenced Stream on Copper Toxicity to the Fathead Minnow. *Environmental Toxicology and Chemistry*, Vol.16, No. 7, pp. 1480-1486, 1997.

DiTomaso, J.M. 2012. *Mode of Action and Degradation of Aquatic Herbicides. Presentation. Aquatic Weed School.* Weed Research and Information Center, University of California, Davis. September 5-6, 2012

DiTomaso, J.M., G.B. Kyser et al. 2013. *Weed Control in Natural Areas in the Western United States*. Weed Research and Information Center, University of California. 544pp.

Eisler, R. 1998. Copper hazards to fish, wildlife, and invertebrates: a synoptic review. U.S. Geological Survey, Biological Resources Division, Biological Science Report USGS/BRD/BSR--1997-0002. 98 pp

Environmental Protection Agency (EPA). N.d. Clean Water Rule Comment Compendium Topic 14 – Miscellaneous. Accessed at https://archive.epa.gov/epa/sites/production/files/2015-06/documents/cwr_response_to_comments_13_process_concerns_and_admin_0.pdf

Gangstad, E. O. 1986. *Freshwater vegetation management.* Fresno, CA: Thomson Publications.

Gettys, L.A, W.T. Haller, and M. Bellaud, editors. 2009. *Biology and Control of Aquatic Plants: A Best Management Practices Handbook.* Aquatic Ecosystem Restoration Foundation, Marietta, Georgia, USA.

Holland, R.F. 1986. *Descriptions of the Terrestrial Natural Communities of California*. 1986. California Department of Fish and Game, Natural Heritage Division, Sacramento, CA.

Inyo County. 2001. Inyo County General Plan, Goals and Policies Report, Chapter 8 Conservation/Open Space Element. December. Accessed at: http://inyoplanning.org/general_plan/goals/ch8.pdf, accessed November 4, 2015.

Los Angeles Department of Water and Power (LADWP). 2018. *Aquatic Pesticides Application Plan (APAP)*. Order No. 2013-0002-DWQ NPDES No. CAG990005 Statewide General National Discharge Pollutant Discharge Elimination System (NPDES) Permit for Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications. August 6. City of Los Angeles, Environmental Affairs, Wastewater Quality and Compliance Group, Los Angeles, CA. August 6.

_____. 2015. Habitat Conservation Plan for Los Angeles Department of Water and Power's Operations, Maintenance, and Management Activities on Its Land in Mono and Inyo Counties, California. August. Accessed at https://www.fws.gov/carlsbad/HCPs/HCP_Docs.html

Moffett, J., P. Paquin, and L. Mayer. 1998. Copper Bioavailability, In: *Chemistry, Toxicity, and Bioavailability of Copper and Its Relationship to Regulation in the Marine Environment.* P. F. Seligman and A. Zirino, Editors. Technical Document 304. Office of Naval Research Workshop Report.

Nafis, G. 2018. A Guide to the Amphibians and Reptiles of California. Accessed at http://www.californiaherps.com/ in October 2018.

Porcel R, Aroca, R, Ruiz-Lozano J.M. 2012. "Salinity stress alleviation using arbuscular mycorrhizal fungi. A review" Agronomy for Sustainable Development 32: 181-200

Santos, N.R., J.V.E Katz, PB Moyle, and J.D. Viers. 2018. A programmable information system for management and analysis of aquatic species range data in California. Accessed at http://calfish.ucdavis.edu/location/ in October 2018.

Sawyer, J.O. and T. Keeler-Wolf. 2009. *A Manual of California Vegetation, 2nd Edition.* California Native Plant Society. United Sates of America.

State Water Resources Control Board (SWRCB). 2004. Dissolved Oxygen Fact Sheet, The Clean Water Team Guidance Compendium for Watershed Monitoring and Assessment, State Water Resources Control Board 3.1.1.0-FS-(DO) a. September 29, 2004.

TOXNET. 1975-1986. National library of medicine's toxicology data network. Hazardous Substances Data Bank (HSDB). Public Health Service. National Institute of Health, U. S. Department of Health and Human Services http://pmep.cce.cornell.edu/profiles/extoxnet/carbaryl-dicrotophos/copper-sulfate-ext.html.

Tucker, R. and D.G. Crabtree. 1970. Handbook of Toxicity of Pesticides to Wildlife. U.S. Department of Agriculture, Fish and Wildlife Service. Bureau of Sport Fisheries and Wildlife.

United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS). 2018. Web Soil Survey. http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed October 2018.

United States Environmental Protection Agency. 2008. *Copper Facts*. Document number EPA-F-06-014. US EPA Prevention, Pesticides and Toxic Substances. Office of Pesticide Programs. June.

United States Fish and Wildlife Service (USFWS). 2018. Critical Habitat Mapper. Accessed at https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77. Last modified September 28.

Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. Life history accounts for species in the California Wildlife Habitat Relationships System. California Depart. of Fish and Game, Sacramento, California.

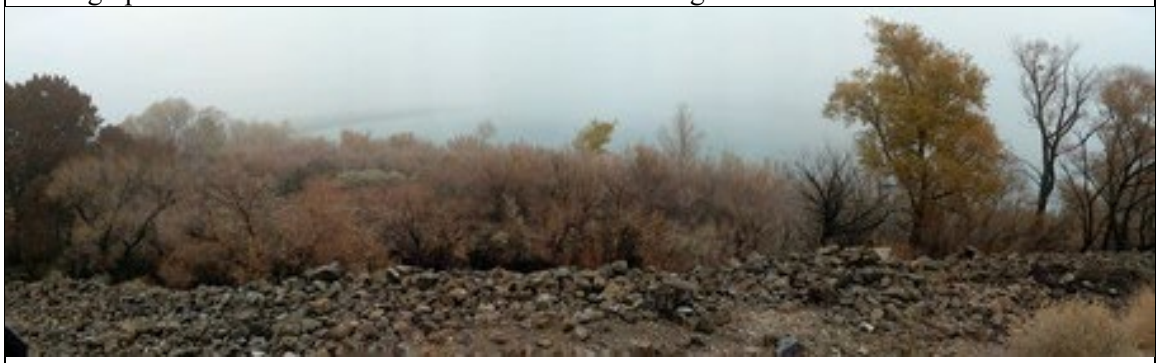
Zeng, R.S. 2006. Disease Resistance in Plants Through Mycorrhizal Fungi Induced Allelochemicals. Allelochemicals: Biological Control of Plant Pathogens and Diseases. Disease Management of Fruits and Vegetables, vol 2. Springer, Dordrecht

APPENDIX 1 – PHOTOGRAPHS

Photograph 1 – Southwest end of South Haiwee Reservoir

Photograph 2 – Southwest end of South Haiwee Reservoir

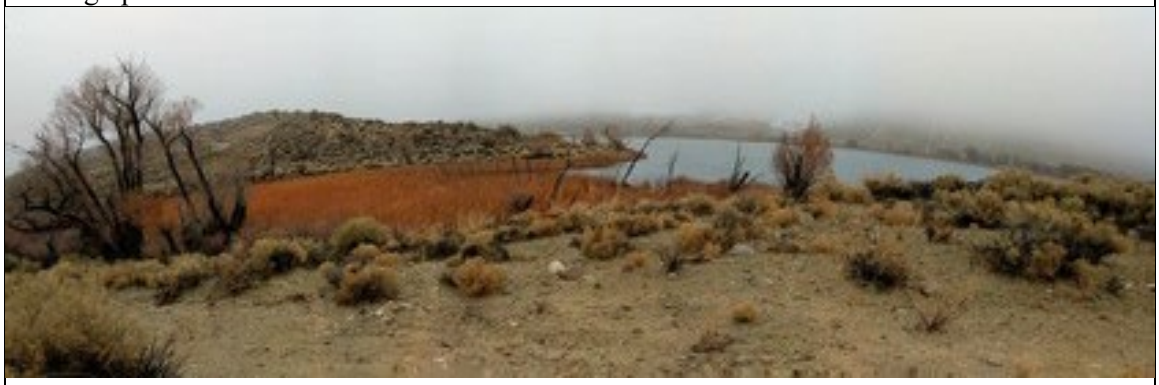
Photograph 3 – Fremont Cottonwood Forest Habitat along South Haiwee Reservoir



Photograph 4 – Black willow thickets along South Haiwee Reservoir.

Photograph 5 – Merrit Cut and segment of aqueduct.

Photograph 6 – Merrit Cut.



Photograph 7 – Hardstem bulrush marsh along North Haiwee Reservoir.

Photograph 8 – North Haiwee Reservoir.

Photograph 9 – North Haiwee Reservoir.

Photograph 10 – North Haiwee Reservoir.

Photograph 11 – North Haiwee Reservoir.

Photograph 12 – North Haiwee Reservoir.

Photograph 13 – North Haiwee Reservoir.

Photograph 14 – North Haiwee Reservoir.

Photograph 15 – North Haiwee Reservoir. Boat access ramp used for boat access to conduct water quality monitoring.

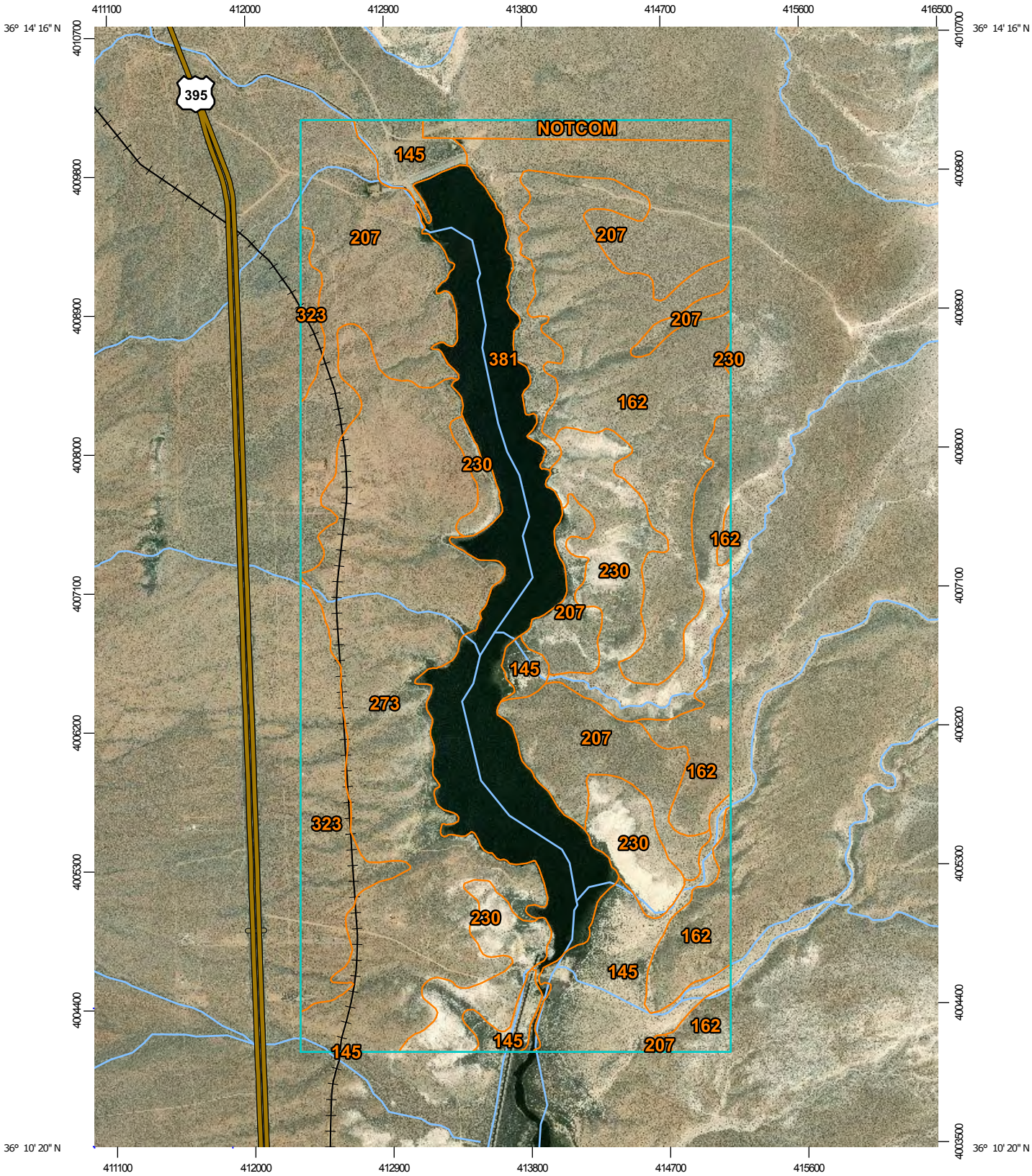
Photograph 16 – Los Angeles Aqueduct north of North Haiwee Reservoir.

Photograph 17 – Los Angeles Aqueduct at Alabama Gates.

Photograph 18 – Los Angeles Aqueduct at Alabama Gates showing platform where copper sulfate application occurs.

APPENDIX 2 – SOILS SURVEY

Soil Map—Benton-Owens Valley Area Parts of Inyo and Mono Counties, California, and Inyo County Area, ...
(North Haiwee)



Map Scale: 1:35,400 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Benton-Owens Valley Area Parts of Inyo and Mono Counties, California
Survey Area Data: Version 16, Sep 12, 2018

Soil Survey Area: Inyo County Area, California
Survey Area Data: Version 1, Dec 9, 2013

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 27, 2014—Nov 2, 2017

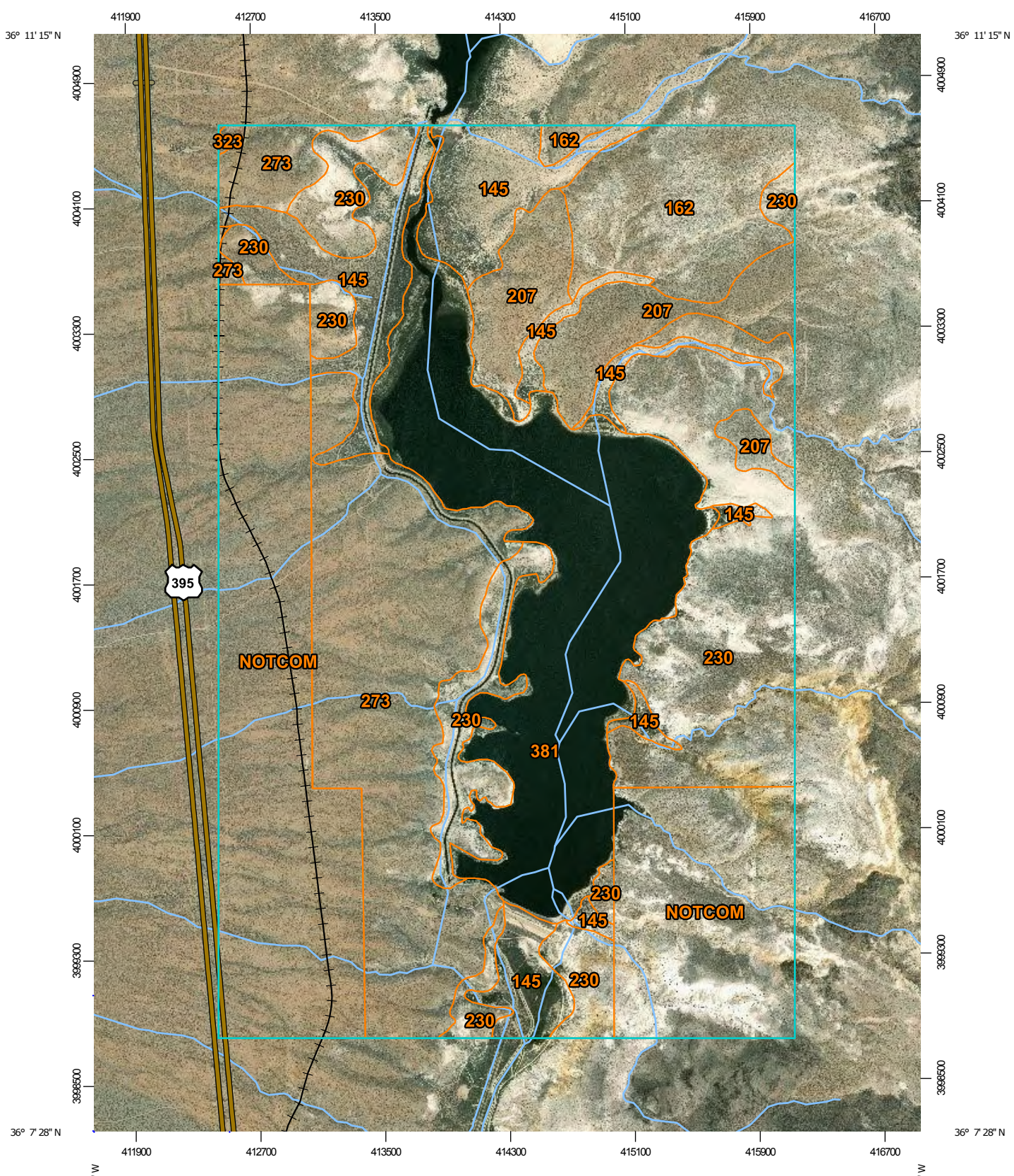
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
145	Cajon loamy sand, stratified substratum, 0 to 5 percent slopes	290.8	6.9%
162	Centennial-Helendale complex, 2 to 9 percent slopes	721.6	17.2%
207	Helendale-Cajon complex, 0 to 5 percent slopes	908.2	21.7%
230	Lithic Torriorthents-Badland complex, 15 to 75 percent slopes	496.6	11.8%
273	Neuralia-Timosea-Typic Argidurids complex, 2 to 15 percent slopes	882.3	21.1%
323	Timosea-Neuralia complex, 2 to 9 percent slopes	230.4	5.5%
381	Water	598.7	14.3%
Subtotals for Soil Survey Area		**4,128.5**	**98.5%**
Totals for Area of Interest		**4,190.8**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
NOTCOM	No Digital Data Available	62.2	1.5%
Subtotals for Soil Survey Area		**62.2**	**1.5%**
Totals for Area of Interest		**4,190.8**	**100.0%**

Soil Map—Benton-Owens Valley Area Parts of Inyo and Mono Counties, California, and Inyo County Area, ...
(South Haiwee Merritt Cut)



Map Scale: 1:34,100 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Benton-Owens Valley Area Parts of Inyo and Mono Counties, California
Survey Area Data: Version 16, Sep 12, 2018

Soil Survey Area: Inyo County Area, California
Survey Area Data: Version 1, Dec 9, 2013

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 27, 2014—Nov 2, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
145	Cajon loamy sand, stratified substratum, 0 to 5 percent slopes	513.4	9.6%
162	Centennial-Helendale complex, 2 to 9 percent slopes	333.2	6.2%
207	Helendale-Cajon complex, 0 to 5 percent slopes	319.2	6.0%
230	Lithic Torriorthents-Badland complex, 15 to 75 percent slopes	1,006.2	18.9%
273	Neuralia-Timosea-Typic Argidurids complex, 2 to 15 percent slopes	887.7	16.6%
323	Timosea-Neuralia complex, 2 to 9 percent slopes	3.2	0.1%
381	Water	970.7	18.2%
Subtotals for Soil Survey Area		**4,033.6**	**75.6%**
Totals for Area of Interest		**5,335.8**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
NOTCOM	No Digital Data Available	1,302.2	24.4%
Subtotals for Soil Survey Area		**1,302.2**	**24.4%**
Totals for Area of Interest		**5,335.8**	**100.0%**

APPENDIX 3 – CNDDB SUMMARY REPORT

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: BIOS selection

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Active Desert Dunes	G4	None		3,640	4	0	0	0	0	0	1	1	0	1	0	0
Active Desert Dunes	S2.2	None		3,640	S:1											
Aliciella ripleyi	G3	None	Rare Plant Rank - 2B.3	4,700	19	1	0	0	0	0	2	3	0	3	0	0
Ripley's aliciella	S2	None		5,500	S:3											
Aliciella triodon	G5	None	Rare Plant Rank - 2B.2	3,750	11	0	0	0	0	0	2	1	1	2	0	0
coyote gilia	S2	None		3,880	S:2											
Alkali Seep	G3	None		4,560	10	0	0	0	0	0	1	1	0	1	0	0
Alkali Seep	S2.1	None		4,560	S:1											
Antrozous pallidus	G5	None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	3,550	415	0	1	1	0	0	8	8	2	10	0	0
pallid bat	S3	None		6,780	S:10											
Aquila chrysaetos	G5	None	BLM_S-Sensitive CDF_S-Sensitive CDFW_FP-Fully Protected CDFW_WL-Watch List IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	3,315	320	0	0	0	0	0	5	4	1	5	0	0
golden eagle	S3	None		5,700	S:5											
Asio otus	G5	None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	3,800	46	0	0	0	0	0	1	1	0	1	0	0
long-eared owl	S3?	None		3,800	S:1											
Astragalus atratus var. mensanus	G4G5T2	None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	5,600	9	0	0	0	0	0	1	1	0	1	0	0
Darwin Mesa milk-vetch	S2	None		5,600	S:1											
Astragalus geyeri var. geyeri	G4T4	None	Rare Plant Rank - 2B.2	3,800	24	0	0	0	0	0	1	1	0	1	0	0
Geyer's milk-vetch	S2	None		3,800	S:1											
Astragalus hornii var. hornii	G4G5T1T2	None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	1,100	14	0	0	0	0	0	1	1	0	1	0	0
Horn's milk-vetch	S1	None		1,100	S:1											

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Athene cunicularia burrowing owl	G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	3,370 4,100	1972 S:8	7	0	0	0	0	1	1	7	8	0	0
Atriplex argentea var. hillmanii Hillman's silverscale	G5T4 S2	None None	Rare Plant Rank - 2B.2	3,800 3,800	6 S:1	0	0	0	0	0	1	1	0	1	0	0
Batrachoseps campi Inyo Mountains slender salamander	G3 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_EN-Endangered USFS_S-Sensitive	4,000 8,500	21 S:13	5	1	1	1	0	5	8	5	13	0	0
Batrachoseps robustus Kern Plateau salamander	G3 S3	None None	IUCN_NT-Near Threatened	5,300 6,800	25 S:6	0	0	0	0	0	6	6	0	6	0	0
Boechera dispar pinyon rockcress	G3 S3	None None	Rare Plant Rank - 2B.3 SB_RSABG-Rancho Santa Ana Botanic Garden	5,085 6,800	68 S:2	0	0	1	0	0	1	1	1	2	0	0
Boechera lincolnensis Lincoln rockcress	G4G5 S3	None None	Rare Plant Rank - 2B.3 BLM_S-Sensitive	6,800 6,800	14 S:1	0	0	0	0	0	1	1	0	1	0	0
Bombus crotchii Crotch bumble bee	G3G4 S1S2	None None		6,900 6,900	234 S:2	0	0	0	0	0	2	2	0	2	0	0
Bombus morrisoni Morrison bumble bee	G4G5 S1S2	None None	IUCN_VU-Vulnerable	3,700 5,000	85 S:6	0	0	0	0	0	6	6	0	6	0	0
Buteo swainsoni Swainson's hawk	G5 S3	None Threatened	BLM_S-Sensitive IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	3,690 3,860	2465 S:3	0	1	0	0	0	2	1	2	3	0	0
Calochortus excavatus Inyo County star-tulip	G2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive USFS_S-Sensitive	400 5,000	70 S:32	0	9	13	3	0	7	8	24	32	0	0
Canbya candida white pygmy-poppy	G3G4 S3S4	None None	Rare Plant Rank - 4.2 SB_RSABG-Rancho Santa Ana Botanic Garden USFS_S-Sensitive	3,350 3,350	30 S:1	0	0	0	0	0	1	1	0	1	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Catostomus fumeiventris Owens sucker	G3G4 S3	None None	CDFW_SSC-Species of Special Concern	3,850 3,850	35 S:1	0	0	0	0	0	1	1	0	1	0	0
Charadrius alexandrinus nivosus western snowy plover	G3T3 S2S3	Threatened None	CDFW_SSC-Species of Special Concern NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	3,600 3,860	138 S:2	0	0	0	0	0	2	1	1	2	0	0
Charadrius montanus mountain plover	G3 S2S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	3,600 3,880	90 S:2	0	0	0	0	0	2	1	1	2	0	0
Circus cyaneus northern harrier	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	4,500 4,500	53 S:1	0	1	0	0	0	0	1	0	1	0	0
Clarkia xantiana ssp. parviflora Kern Canyon clarkia	G4T3T4 S3S4	None None	Rare Plant Rank - 4.2 SB_RSABG-Rancho Santa Ana Botanic Garden	5,741 5,741	21 S:2	0	0	0	0	0	2	2	0	2	0	0
Coccyzus americanus occidentalis western yellow-billed cuckoo	G5T2T3 S1	Threatened Endangered	BLM_S-Sensitive NABCI_RWL-Red Watch List USFS_S-Sensitive USFWS_BCC-Birds of Conservation Concern	3,800 4,500	155 S:4	0	2	1	0	1	0	3	1	3	0	1
Corynorhinus townsendii Townsend's big-eared bat	G3G4 S2	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	3,250 6,780	626 S:14	0	1	1	0	0	12	10	4	14	0	0
Cryptochia denningi Denning's cryptic caddisfly	G1G2 S1S2	None None		4,200 4,200	5 S:1	0	0	0	0	0	1	1	0	1	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Cymopterus ripleyi var. saniculoides sanicle cymopterus	G3G4T3Q S1	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	3,710 4,600	6 S:5	0	0	1	0	0	4	4	1	5	0	0
Cyprinodon radiosus Owens pupfish	G1 S1	Endangered Endangered	AFS_EN-Endangered CDFW_FP-Fully Protected IUCN_EN-Endangered	3,120 3,900	23 S:8	0	0	1	0	7	0	7	1	1	2	5
Deinandra mohavensis Mojave tarplant	G2 S2	None Endangered	Rare Plant Rank - 1B.3 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden USFS_S-Sensitive	4,050 4,050	77 S:1	1	0	0	0	0	0	0	1	1	0	0
Diplacus parryi Parry's monkeyflower	G4G5 S3	None None	Rare Plant Rank - 2B.3	5,900 5,900	13 S:1	0	0	0	0	0	1	1	0	1	0	0
Dipodomys panamintinus argusensis Argus Mountains kangaroo rat	G5T1T3 S1S3	None None		3,600 3,600	4 S:1	0	0	0	0	0	1	1	0	1	0	0
Dipodomys panamintinus panamintinus Panamint kangaroo rat	G5T3 S3	None None		3,800 3,800	4 S:1	0	1	0	0	0	0	0	1	1	0	0
Empidonax traillii extimus southwestern willow flycatcher	G5T2 S1	Endangered Endangered	NABCI_RWL-Red Watch List	3,910 3,910	70 S:1	0	0	0	0	0	1	1	0	1	0	0
Eremothera boothii ssp. boothii Booth's evening-primrose	G5T4 S3	None None	Rare Plant Rank - 2B.3	3,500 5,000	35 S:4	0	0	1	0	0	3	2	2	4	0	0
Eremothera boothii ssp. intermedia Booth's hairy evening-primrose	G5T3T4 S3	None None	Rare Plant Rank - 2B.3	3,840 3,900	14 S:2	0	0	0	0	0	2	2	0	2	0	0
Erigeron calvus bald daisy	G1Q S1	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	4,000 4,000	1 S:1	0	0	0	0	0	1	1	0	1	0	0
Euderma maculatum spotted bat	G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern WBWG_H-High Priority	3,550 4,000	68 S:9	0	2	5	0	0	2	9	0	9	0	0
Gopherus agassizii desert tortoise	G3 S2S3	Threatened Threatened	IUCN_VU-Vulnerable	3,455 3,900	961 S:6	1	5	0	0	0	0	0	6	6	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Gulo gulo California wolverine	G4 S1	Proposed Threatened Threatened	CDFW_FP-Fully Protected IUCN_NT-Near Threatened USFS_S-Sensitive	5,620 5,620	174 S:1	0	0	0	0	0	1	1	0	1	0	0
Haliaeetus leucocephalus bald eagle	G5 S3	Delisted Endangered	BLM_S-Sensitive CDF_S-Sensitive CDFW_FP-Fully Protected IUCN_LC-Least Concern USFS_S-Sensitive USFWS_BCC-Birds of Conservation Concern	3,850 3,850	327 S:1	0	0	0	0	0	1	1	0	1	0	0
Hydromantes platycephalus Mount Lyell salamander	G4 S4	None None	CDFW_WL-Watch List IUCN_LC-Least Concern	3,950 5,200	45 S:2	0	0	0	0	0	2	1	1	2	0	0
Icteria virens yellow-breasted chat	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	3,680 5,100	97 S:5	0	1	0	0	0	4	5	0	5	0	0
Ixobrychus exilis least bittern	G4G5 S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	3,560 3,760	10 S:2	0	2	0	0	0	0	2	0	2	0	0
Lanius ludovicianus loggerhead shrike	G4 S4	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	3,767 3,767	109 S:1	0	1	0	0	0	0	0	1	1	0	0
Lasionycteris noctivagans silver-haired bat	G5 S3S4	None None	IUCN_LC-Least Concern WBWG_M-Medium Priority	3,440 3,440	139 S:1	0	0	0	0	0	1	0	1	1	0	0
Lithobates pipiens northern leopard frog	G5 S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	100 100	22 S:1	0	0	0	0	0	1	1	0	1	0	0
Loeflingia squarrosa var. artemisiarum sagebrush loeflingia	G5T3 S2	None None	Rare Plant Rank - 2B.2 BLM_S-Sensitive	3,820 3,820	26 S:1	0	0	0	0	0	1	1	0	1	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Lupinus magnificus var. hesperius Mcgee Meadows lupine	G3T1Q S1	None None	Rare Plant Rank - 1B.3 BLM_S-Sensitive	5,300 7,100	4 S:2	0	0	1	0	0	1	1	1	2	0	0
Mentzelia inyoensis Inyo blazing star	G3 S3	None None	Rare Plant Rank - 1B.3 BLM_S-Sensitive USFS_S-Sensitive	5,200 5,200	8 S:1	0	0	0	0	0	1	1	0	1	0	0
Mentzelia torreyi Torrey's blazing star	G4 S2	None None	Rare Plant Rank - 2B.2	3,832 3,880	17 S:3	0	0	0	0	0	3	3	0	3	0	0
Mentzelia tridentata creamy blazing star	G3 S3	None None	Rare Plant Rank - 1B.3 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	3,600 3,800	32 S:3	0	1	0	0	0	2	2	1	3	0	0
Microtus californicus vallicola Owens Valley vole	G5T3 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern	1,130 6,000	14 S:9	0	2	0	0	0	7	8	1	9	0	0
Myotis ciliolabrum western small-footed myotis	G5 S3	None None	BLM_S-Sensitive IUCN_LC-Least Concern WBWG_M-Medium Priority	3,600 3,600	82 S:1	0	0	0	0	0	1	1	0	1	0	0
Myotis volans long-legged myotis	G5 S3	None None	IUCN_LC-Least Concern WBWG_H-High Priority	3,600 3,600	117 S:1	0	0	0	0	0	1	1	0	1	0	0
Myotis yumanensis Yuma myotis	G5 S4	None None	BLM_S-Sensitive IUCN_LC-Least Concern WBWG_LM-Low-Medium Priority	3,550 3,600	264 S:5	0	0	0	0	0	5	5	0	5	0	0
Orobanche ludoviciana var. arenosa Suksdorf's broom-rape	G5T5 S2	None None	Rare Plant Rank - 2B.3		5 S:1	0	0	0	0	0	1	1	0	1	0	0
Oryctes nevadensis Nevada oryctes	G3 S2	None None	Rare Plant Rank - 2B.1	3,660 8,310	33 S:11	0	2	0	1	0	8	11	0	11	0	0
Ovis canadensis sierrae Sierra Nevada bighorn sheep	G4T2 S2	Endangered Endangered	CDFW_FP-Fully Protected	10,400 12,400	5 S:3	0	0	0	0	1	2	3	0	2	1	0
Pandion haliaetus osprey	G5 S4	None None	CDF_S-Sensitive CDFW_WL-Watch List IUCN_LC-Least Concern	3,870 3,870	500 S:1	0	0	0	0	0	1	1	0	1	0	0

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Penstemon fruticiformis var. amargosae Amargosa beardtongue	G4T3 S2	None None	Rare Plant Rank - 1B.3 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	5,200 5,200	18 S:1	0	0	0	0	0	1	1	0	1	0	0
Petrophytum caespitosum ssp. acuminatum marble rockmat	G5T2 S2	None None	Rare Plant Rank - 1B.3 USFS_S-Sensitive	6,800 6,800	3 S:1	0	0	0	0	0	1	1	0	1	0	0
Phacelia inyoensis Inyo phacelia	G3 S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive USFS_S-Sensitive	3,940 4,600	19 S:4	3	0	0	0	0	1	4	0	4	0	0
Phacelia nashiana Charlotte's phacelia	G3 S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden SB_USDA-US Dept of Agriculture	3,900 3,900	71 S:1	0	0	0	0	0	1	1	0	1	0	0
Plagiobothrys parishii Parish's popcornflower	G1 S1	None None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden USFS_S-Sensitive	3,602 4,450	16 S:5	0	1	0	0	0	4	3	2	5	0	0
Plebulina emigdionis San Emigdio blue butterfly	G1G2 S1S2	None None	USFS_S-Sensitive	3,780 3,780	11 S:1	0	1	0	0	0	0	0	1	1	0	0
Pyrgulopsis wongi Wong's springsnail	G2 S2	None None	IUCN_LC-Least Concern USFS_S-Sensitive	1,750 6,042	50 S:22	0	2	1	2	0	17	18	4	22	0	0
Rana sierrae Sierra Nevada yellow-legged frog	G1 S1	Endangered Threatened	CDFW_WL-Watch List IUCN_EN-Endangered USFS_S-Sensitive	3,700 3,700	658 S:1	0	0	0	0	0	1	1	0	1	0	0
Ranunculus hydrocharoides frog's-bit buttercup	G4 S1	None None	Rare Plant Rank - 2B.1	5,050 5,050	4 S:1	0	0	0	0	1	0	1	0	0	1	0
Rhinichthys osculus ssp. 2 Owens speckled dace	G5T1T2Q S1S2	None None	AFS_TH-Threatened CDFW_SSC-Species of Special Concern	3,160 3,850	28 S:3	0	0	0	0	1	2	3	0	2	1	0
Sarcobatus baileyi Bailey's greasewood	G4 S1	None None	Rare Plant Rank - 2B.3	4,000 4,000	3 S:1	0	0	0	0	0	1	0	1	1	0	0
Sceloporus graciosus graciosus northern sagebrush lizard	G5T5 S3	None None	BLM_S-Sensitive	3,800 3,800	1 S:1	0	1	0	0	0	0	0	1	1	0	0

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Sidalcea covillei Owens Valley checkerbloom	G2 S2	None Endangered	Rare Plant Rank - 1B.1 BLM_S-Sensitive	3,580 4,640	43 S:19	1	13	1	1	3	0	6	13	16	1	2
Siphateles bicolor snyderi Owens tui chub	G4T1 S1	Endangered Endangered	AFS_EN-Endangered	3,120 3,800	20 S:5	0	0	0	0	4	1	4	1	1	2	2
Thelypodium integrifolium ssp. complanatum foxtail thelypodium	G5T4T5 S2	None None	Rare Plant Rank - 2B.2	3,820 3,820	13 S:1	0	0	0	0	0	1	1	0	1	0	0
Toxostoma lecontei Le Conte's thrasher	G4 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	3,700 5,100	236 S:2	0	0	0	0	0	2	2	0	2	0	0
Vireo bellii pusillus least Bell's vireo	G5T2 S2	Endangered Endangered	IUCN_NT-Near Threatened NABCI_YWL-Yellow Watch List	3,600 3,720	483 S:2	0	0	0	0	2	0	2	0	0	1	1
Water Birch Riparian Scrub Water Birch Riparian Scrub	GNR SNR	None None		4,460 8,200	29 S:13	0	0	0	0	0	13	13	0	13	0	0
Xerospermophilus mohavensis Mohave ground squirrel	G2G3 S2S3	None Threatened	BLM_S-Sensitive IUCN_VU-Vulnerable	3,100 5,200	432 S:25	1	8	1	0	0	15	15	10	25	0	0