Submission for SIP Section 5.3 Exception for Use of Copper to Control Aquatic Weeds in Sweetwater Reservoir

Water Quality Order No. 2013-002-DWQ

Sweetwater Authority
505 Garett Ave, PO Box 2328
Chula Vista, CA 91912 - 2328

July 9, 2015

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1. Description of Proposed Action

The proposed project consists of the occasional application of copper-based algaecides at Sweetwater Reservoir to control and prevent degradation of water quality resulting from algae blooms. The application of algaecide will occur periodically, as needed to address algae blooms, if the Sweetwater Reservoir is required to meet water supply needs. The application of algaecide may require temporary exceedance of the permitted levels of dissolved copper.

2. Schedule

The seasonal exemption would cover intermittent, periodic discharges that may occur throughout the year. These discharges generally would be a single treatment and will dissipate within approximately one week. The frequency of discharge, based on water supply needs and occurrence or algae blooms, is not expected to be more than 2 times annually.

3. Water Quality Monitoring Plan

The Sweetwater Authority (Authority) will conduct water quality monitoring in accordance with our approved Aquatic Pesticide Application Plan and the requirements of the Statewide General National Pollutant Discharge Elimination System Permit for the Discharge of Aquatic Pesticides for Aquatic Weed Control in Water of the United States General Permit No. CAG990005 (Water Quality Order No. 2013-0002-DWQ, as amended by Order No. 2014-0078-DWQ).

4. CEQA Documentation

The required CEQA documentation is contained in the attachments. The Mitigated Negative Declaration was publically noticed on the San Diego County Water Authority's (SDCWA) web site, within libraries in the surrounding community areas, and submitted to the Office of Planning and Research State Clearinghouse. The MND was approved by the Authority's Board on June 24, 2015 and the Notice of determination was filed with the County Clerk on July 1, 2015.

5. Contingency Plan

If an exception is not granted, the Authority's ability to deliver a reliable water supply to its customers would be impacted. Water stored within Sweetwater Reservoir serves as a strategic local supply, allowing the Authority to diversify its water portfolio, and lessens the dependence on imported water supplies, especially during drought years. In addition, Sweetwater Reservoir is part of the SDCWA regional water conveyance system, providing additional system storage capacity when needed. The presence of untreated algae blooms could result in significant taste and odor problems, impacting the potential use of the reservoir as a supply. In the event that an exemption is not

granted, alternative supplies (if available) would have to be utilized to maintain an adequate supply of drinking water for the Authority's customers.

6. Identification of Alternative Water Supply

The primary mission of the Authority is to provide a safe and reliable drinking water supply to its' approximately 190, 000 customers in Bonita, National City, and Western Chula Vista. Normally, the Authority would prefer to not apply an aquatic pesticide to Sweetwater Reservoir, allowing occasional algae blooms to dissipate naturally. However, without the ability to effectively treat and control nuisance (taste and odor) algae blooms in Sweetwater Reservoir, the Authority would be forced to switch to an alternative source to meet its customer's water supply needs. In the event an alternative source was not available to fully meet system demands, the Authority's customers could be impacted.

7. Residual Waste Disposal Plans

Normal Authority operations are not expected to result in a measurable amount of a product spill. Any normal operational spill would contain only a small amount of algaecide which would not be significant enough to impact the beneficial use of Sweetwater Reservoir and its surrounding watershed. The response, containment, cleanup, and disposal procedures provided in the Authority's Chemical Hygiene Plan, Hazardous Response Plan, product label, and MSDS will be followed in the event of a chemical spill.

Attachments

Attachment 1 - Notice of Determination

Attachment 2 - Mitigated Negative Declaration and Initial Study/Environmental Checklist (with Appendix A5 only)

Attachment 3 – Mitigation, Monitoring, and Reporting Program

Attachment 4 - Sweetwater Reservoir Aquatic Pesticide Application Plan (July 9, 2015)

Attachment 1

Notice of Determination

150099

FILED
Ernest J Dronenburg, Jr. Recorder County Clerk
JUL 01 2015
BY Amber Stevens
DEPUTY

Notice of Determination

To:
☒ Office of Planning and Research

U.S. Mail:	*Street Address:*
P.O. Box 3044	1400 Tenth St., Rm 113
Sacramento, CA 95812-3044	Sacramento, CA 95814

☒ County Clerk
County of: San Diego
Address: 1600 Pacific Highway, Suite 260
San Diego, CA 92101

From:
Public Agency: Sweetwater Authority
Address: 505 Garret Avenue, Chula Vista CA 91910

Contact: Jim Smyth, General Manager
Phone: (619) 420-1413

Lead Agency (if different from above):
San Diego County Water Authority
Address: 4677 Overland Avenue

Contact: Larry Purcell
Phone: (858) 522-6752

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

State Clearinghouse Number (if submitted to State Clearinghouse): 2015031045

Project Title: Application of Copper-Based Algaecides at Five Reservoirs in San Diego County

Project Applicant: Sweetwater Authority, et al

Project Location (include county): Five Reservoirs in San Diego County, including the Sweetwater Reservoir

Project Description:
The project consists of the occasional application of copper-based algaecides at 5 reservoirs to control and prevent degradation of water quality resulting from algae blooms. The subject reservoirs are Olivenhain Reservoir (San Diego County Water Authority), Lake Jennings (Helix Water District), Lake Poway (City of Poway), San Dieguito Reservoir (Santa Fe Irrigation District), and Sweetwater Reservoir (Sweetwater Authority). Sweetwater Authority is the agency responsible for implementing the project at Sweetwater Reservoir. The algaecide application is authorized by the State Water Resources Control Board under a statewide General Permit, Water Quality Order No. 2013-0002-DWQ.

This is to advise that the Sweetwater Authority (☐ Lead Agency or ☒ Responsible Agency) has approved the above described project on June 24, 2015 (date) and has made the following determinations regarding the above described project.

1. The project [☐ will ☒ will not] have a significant effect on the environment.
2. ☐ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
   ☒ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures [☒ were ☐ were not] made a condition of the approval of the project.
4. A mitigation reporting or monitoring plan [☒ was ☐ was not] adopted for this project.
5. A statement of Overriding Considerations [☐ was ☒ was not] adopted for this project.
6. Findings [☐ were ☒ were not] made pursuant to the provisions of CEQA.

This is to certify that the final EIR with comments and responses and record of project approval, or the negative Declaration, is available to the General Public at:
www.sdcwa.org

Signature (Public Agency): _____ Title: General Manager

Date: June 25, 2015 Date Received for filing at OPR: _____

Authority cited: Sections 21083, Public Resources Code.
Reference Section 21000-21174, Public Resources Code.

Revised 2011

State of California—Natural Resources Agency
CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

2015 ENVIRONMENTAL FILING FEE CASH RECEIPT

RECEIPT# SD2015 0589

STATE CLEARING HOUSE # *(If applicable)* 2015031045

SEE INSTRUCTIONS ON REVERSE. TYPE OR PRINT CLEARLY

LEAD AGENCY	DATE
SWEETWATER AUTHORITY	07/01/2015
COUNTY/STATE AGENCY OF FILING	DOCUMENT NUMBER
SAN DIEGO	*20150099*

PROJECT TITLE APPLICATION OF COPPER-BASED ALGAECIDES AT FIVE RESERVOIRS IN SAN DIEGO COUNTY

PROJECT APPLICANT NAME			PHONE NUMBER
SWEETWATER AUTHORITY, ET AL			619-420-1413
PROJECT APPLICANT ADDRESS	CITY	STATE	ZIP CODE
505 GARRET AVENUE	CHULA VISTA	CA	91910

PROJECT APPLICANT *(Check appropriate box)*:

☐ Local Public Agency ☐ School District ☒ Other Special District ☐ State Agency ☐ Private Entity

CHECK APPLICABLE FEES:

☐ Environmental Impact Report (EIR)	$3,069.75	$
☑ Negative Declaration (ND)(MND)	$2,210.00	$ $0.00
☐ Application Fee Water Diversion *(State Water Resources Control Board Only)*	$850.00	$
☐ Projects Subject to Certified Regulatory Programs (CRP)	$1,043.75	$
☑ County Administrative Fee	$50.00	$ $50.00
☐ Project that is exempt from fees		
☐ Notice of Exemption		
☐ CDFW No Effect Determination (Form Attached)		
☐ Other _____		$

PAYMENT METHOD:

☐ Cash ☐ Credit ☑ Check ☐ Other CHK 101318800 TOTAL RECEIVED $ $50.00

SIGNATURE	TITLE
X Amber Stevens	Deputy

REM: 20150074 RCT:20150483

ORIGINAL - PROJECT APPLICANT COPY - CDFW/ASB COPY - LEAD AGENCY COPY - COUNTY CLERK FG 753.5a (Rev. 11/12)

Attachment 2

Mitigated Negative Declaration and Initial Study/Environmental Checklist

(with Appendix A5 only)

FINAL MITIGATED NEGATIVE DECLARATION AND INITIAL STUDY/ENVIRONMENTAL CHECKLIST

APPLICATION OF COPPER-BASED ALGAECIDES AT FIVE RESERVOIRS SAN DIEGO COUNTY CALIFORNIA

SCH No. 2015031045

Prepared for:

San Diego County Water Authority
4677 Overland Avenue
San Diego, California 92123
Contact: Larry Purcell

Sweetwater Authority
505 Garrett Avenue
Chula Vista, California 91910
Contact: Scott McClelland

City of Poway, Public Works Department
13325 Civic Center Drive
Poway, California 92064
Contact: Tom Howard

Helix Water District
7811 University Avenue
La Mesa, California 91942
Contact: Brian Olney

Santa Fe Irrigation District
5920 Linea del Cielo
Rancho Santa Fe, California 92067
Contact: Tim Bailey

Prepared by:

AECOM
401 West A Street, Suite 1200
San Diego, California 92101
Phone: (619) 610-7600
Contact: Alex Hardy

May 2015

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SECTION 1.0
INTRODUCTION

1.1 PROJECT BACKGROUND

The San Diego County Water Authority (Water Authority) and four of its member agencies—Helix Water District (HWD), City of Poway (Poway), Santa Fe Irrigation District (SFID), and Sweetwater Authority (Sweetwater)—have identified the need to occasionally apply copper-based algaecides to their respective surface water reservoirs to control algae blooms. Algae blooms can lead to degradation of drinking water quality through presence of taste and odor compounds and production of algal toxins, and can clog filters in water treatment plants. The subject reservoirs are:

- Olivenhain Reservoir (Water Authority)
- Lake Jennings (HWD)
- Lake Poway (Poway)
- San Dieguito Reservoir (SFID)
- Sweetwater Reservoir (Sweetwater)

These five agencies plan to individually obtain permission from the State Water Resources Control Board (State Board) to apply copper-based algaecide at their reservoirs by qualifying for Water Quality Order No. 2013-0002-DWQ (as amended by Order No. 2014-0078-DWQ), *Statewide General Permit for Residual Aquatic Pesticide Discharges to Waters of the U.S. from Algae and Aquatic Weed Control* (General Permit).[1] All five of the referenced agencies have prepared an Aquatic Pesticide Application Plan (APAP) and submitted a Notice of Intent to the State Board to initiate the permit process. To date, the Water Authority, HWD, Poway, and Sweetwater have received a Notice of Applicability from the State Board approving their APAP; SFID has responded to comments from the State Board and resubmitted their APAP for review.

The General Permit identifies a maximum allowable concentration of certain aquatic pesticide constituents, including copper. Public water agencies may apply to the State Board to obtain a short-term or seasonal exception to the limitations on copper concentration established in the General Permit, pursuant to Section 5.3 of the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries in California* (the State Implementation Plan, or SIP). Exceptions to the limitations are allowed if deemed necessary for drinking water sources to meet statutory requirements under the federal Safe Drinking Water Act or the California Health and Safety Code. Section 5.3 of the SIP states that to be considered for an exception, a water agency must provide the following information to the State Board:

1. A detailed description of the proposed action, including the proposed method of completing the action;
2. A time schedule;

[1] A draft order further amending the General Permit was prepared in December 2014, and a public hearing for the order was held on March 3, 2015. The revision proposes to add calcium hypochlorite and sodium hypochlorite as active ingredients; add State Water Board delegation that allows the Executive Director to add (1) active ingredients to the General Permit and (2) agencies to the SIP exception list; add three agencies to the SIP exception list; and modify the SIP exception for the Department of Water Resources.

3. A discharge and receiving water quality monitoring plan (before project initiation, during the project, and after project completion, with the appropriate quality assurance and quality control procedures);
4. California Environmental Quality Act (CEQA) documentation;
5. Contingency plans;
6. Identification of alternate water supply (if needed); and
7. Residual waste disposal plans.

Upon completion of an application, the agency is required provide certification by a qualified biologist that the receiving water beneficial uses have been restored.

Under the current version of the General Permit, 28 agencies statewide are approved for the exception to the receiving water limitations established in the General Permit, as listed in Appendix G of the permit; the amendment proposed in December 2014 would increase that number to 31 agencies. As additional agencies are approved for the exception, the General Permit would be subsequently amended to add them to the list in Appendix G of the permit.

The five water agencies listed above have indicated the current limitation on dissolved copper levels in the General Permit and the resultant allowable amount of the copper-based algaecide they are able to apply has the potential to constrain the effectiveness of algae control at their facilities and lead to diminished drinking water quality that is delivered to consumers. Therefore, the agencies will be submitting the required documentation to the State Board to be considered for approval of the General Permit exemption. This Mitigated Negative Declaration (MND) has been prepared for purposes of the agencies obtaining CEQA documentation compliance, as listed above.

The CEQA "project" addressed in this MND is the application of copper-based algaecides at each of the five listed reservoirs, as implemented by the respective agencies, which may include periodic exceedances of the limitations stated in the General Permit. The Water Authority is the lead agency for CEQA administrative purposes, but does not have discretionary authority over project activities at the other reservoirs; the other four agencies' decision-making bodies, as Responsible Agencies under CEQA, will separately consider adopting the MND and implementing the project and the mitigation program identified specific to their activities. Aside from this combined MND, each participating agency will be individually responsible for complying with the terms and conditions specified in Section 5.3 of the SIP and in the General Permit as they seek coverage under the General Permit and State Board approval of the SIP limitation exceptions for copper.

The State Board will be a responsible agency under CEQA for this MND, and will be using the document in its review process for considering the agencies' respective exceptions to the receiving-water limitations stated in the General Permit.

1.2 PROJECT LOCATION AND ENVIRONMENTAL SETTING

The five subject reservoirs are located in the western portion of San Diego County, as shown in Figure 1. Specific discussions of the location of and environmental setting at each reservoir are provided below.

1.2.1 Olivenhain Reservoir

Olivenhain Reservoir is a surface water storage reservoir owned by the Water Authority and located in northern unincorporated San Diego County, near the southwestern boundary of the City of Escondido,

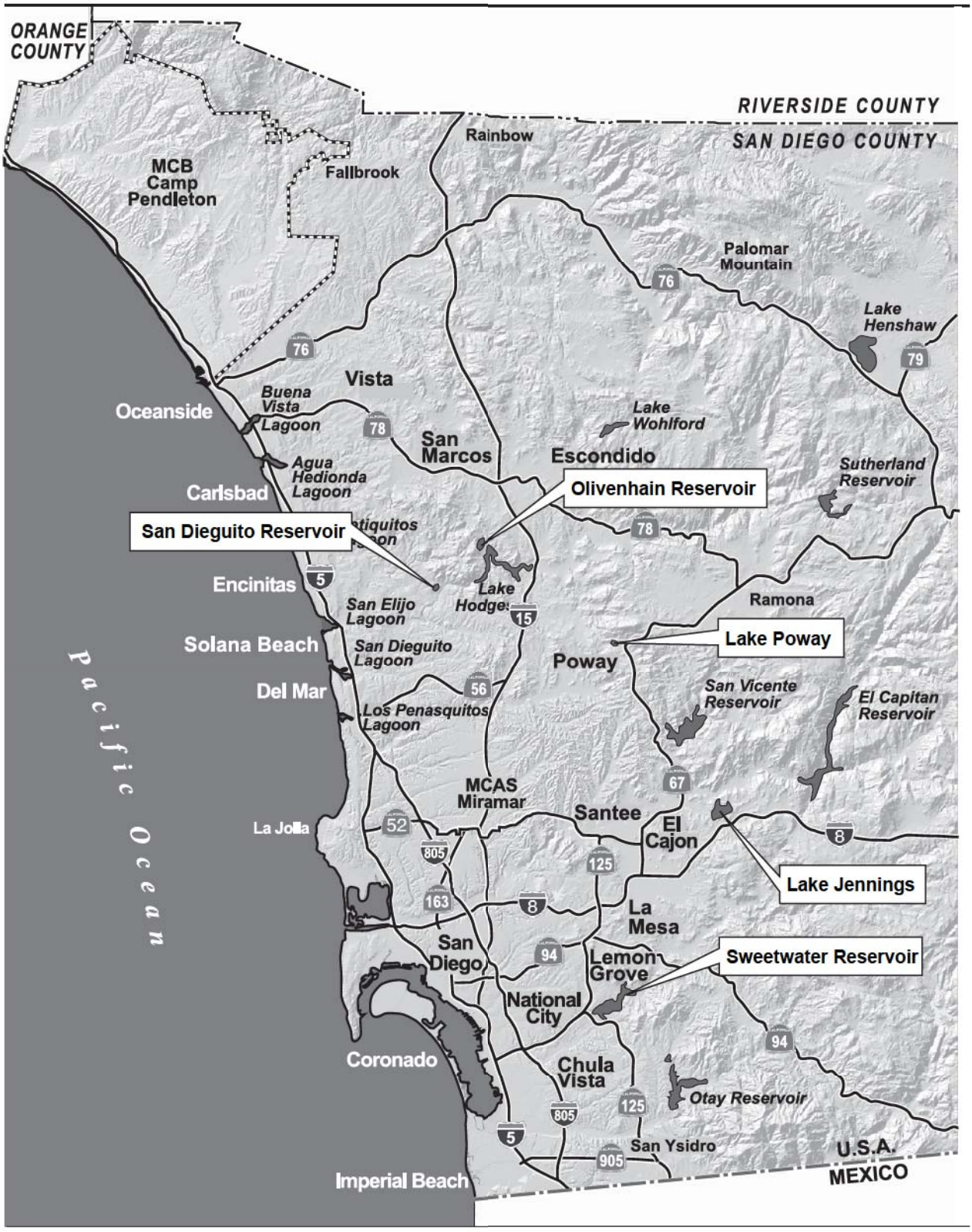

Figure 1
Regional Map

and the far northern reaches of the City of San Diego's incorporated boundaries. The City of Encinitas is approximately 2 miles to the west. Elfin Forest Road provides access to the reservoir and its operations facilities, which are located on the reservoir's southwestern end. Olivenhain Reservoir is approximately 1 mile west of the City of San Diego's Hodges Reservoir, also known as Lake Hodges, which is connected to Olivenhain Reservoir and provides some of the water stored in Olivenhain Reservoir. With storage of approximately 24,400 acre-feet, water in Olivenhain Reservoir is reserved for emergency use throughout the Water Authority's service area (San Diego County Water Authority 2014a). Water stored in Olivenhain Reservoir must be treated before distribution to consumers. Olivenhain Reservoir and the surrounding area are depicted in Figure 2.

Olivenhain Reservoir is surrounded by undeveloped open space of the Elfin Forest Recreational Reserve (Reserve), a 784-acre open space park and recreational area developed by the Water Authority and Olivenhain Municipal Water District (OMWD) in partnership with the U.S. Department of the Interior, Bureau of Land Management, as an element of the Olivenhain Water Storage Project and the Water Authority's Emergency Storage Project biological resources mitigation. The Reserve is owned by the Water Authority and managed by OMWD. A few rural residences are scattered southeast of the reservoir on Mount Israel, and additional residences are located farther east, on the western side of Lake Hodges. Denser residential development in the City of Escondido and unincorporated county begins at a radius of between 2 and 3 miles from the reservoir.

Olivenhain Reservoir is not open for recreational use (San Diego County Water Authority 2014b). However, the Reserve features public picnic areas and approximately 11 miles of trails for hiking, mountain biking, and equestrian use.

1.2.2 Lake Jennings

Lake Jennings is a surface water storage reservoir owned by HWD and located in the unincorporated community of Lakeside, in the central portion of San Diego County, east of the City of Santee. Regional access to the reservoir is provided by Lake Jennings Park Road from Interstate 8. Lake Jennings serves as a short-term storage reservoir for HWD's R. M. Levy Water Treatment Plant, which is on the reservoir's southwest corner. Lake Jennings holds roughly 9,790 acre-feet of water, of which approximately 95% is untreated imported water purchased from the Water Authority. The remaining water comes from ephemeral, unnamed drainages (Helix Water District 2014a). The San Diego River is located approximately 2,000 feet north of Lake Jennings. The reservoir and surrounding area are shown in Figure 3.

Lake Jennings is surrounded by a combination of open space and residential neighborhoods of varying densities, including the Lake Jennings Park Estates mobile home park located on the southern edge of the lake and other single-family residential developments in Lakeside on the west, north, south, and east of the reservoir. Open space is located directly adjacent to the reservoir on the north and east.

Lake Jennings is open to the public year-round for fishing and boating. Swimming and other body contact uses are not allowed. HWD stocks the reservoir with catfish between May and September, and with trout during varying periods depending on water temperature. Stocking schedules are typically every 2 or 3 weeks (Helix Water District 2014b).

1.2.3 Lake Poway

Lake Poway is a surface water storage reservoir owned by Poway and located in the northern portion of the incorporated area. Regional access to the reservoir is provided by Lake Poway Road. The facility is

Source: SANDAG 2012

0.25 0.125 0 0.25 Miles

Scale: 1:15,840; 1 inch = 0.25 miles

Figure 2
Olivenhain Reservoir

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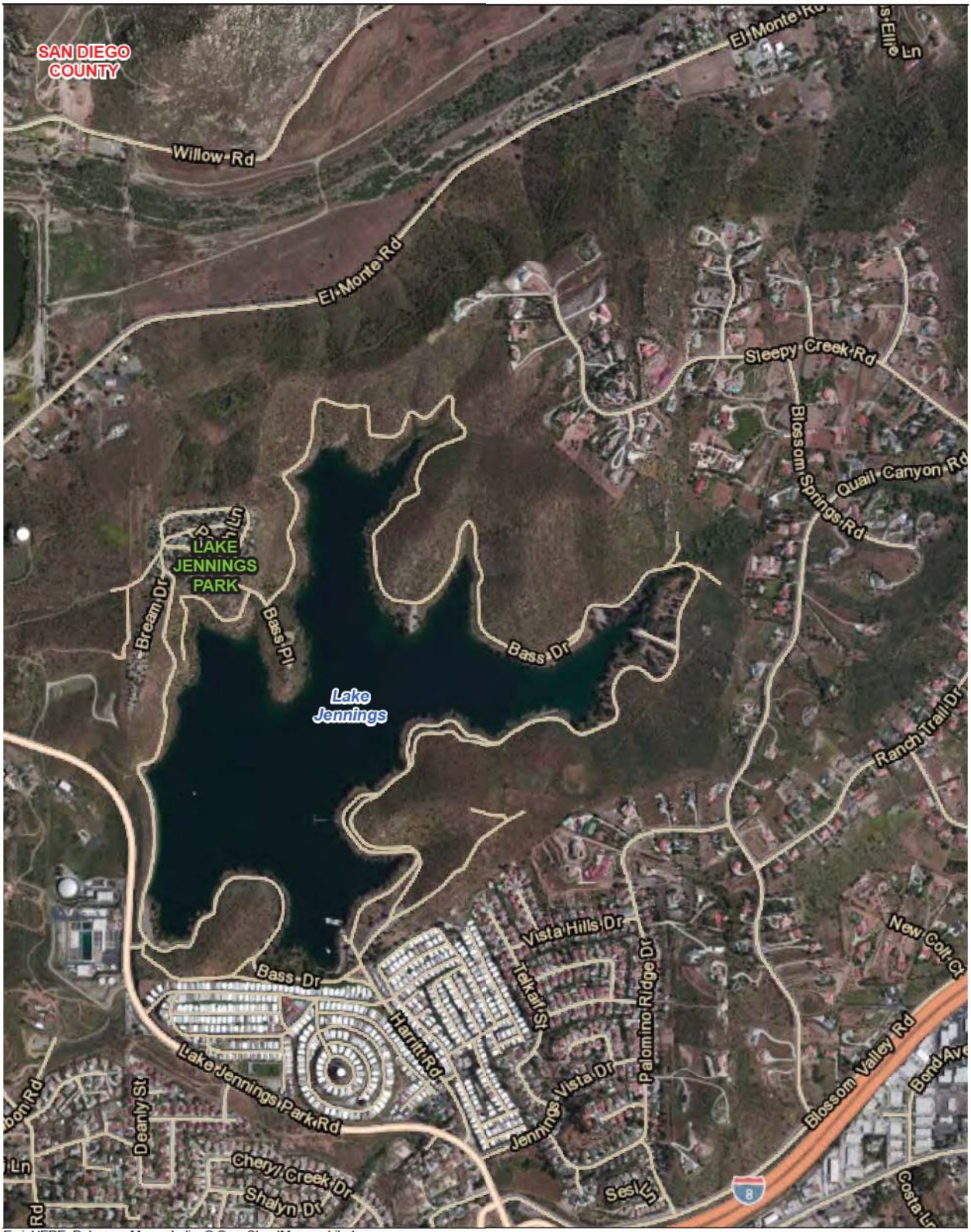

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; SANDAG 2012

0.25 0.125 0 0.25 Miles

Scale: 1:15,840; 1 inch = 0.25 miles

Figure 3
Lake Jennings

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maintained to hold approximately 3,150 acre-feet of water, with an approximately 60-acre surface area. The majority of the water stored in the reservoir is untreated imported water purchased from the Water Authority, although seasonal runoff can also enter the lake through the Boulder Bay stream within Warren Canyon, located east of the reservoir. Water from the reservoir is treated at the Lester J. Berglund Water Treatment Plant, which is located west of the reservoir (City of Poway 2014a). Lake Poway and the surrounding area are depicted in Figure 4.

The Blue Sky Ecological Reserve, a 700-acre open space preserve owned by Poway, is located north and east of Lake Poway. The reservoir directly adjoins to Lake Poway Recreational Area to the east. High-density residential is located to the east of Lake Poway, with lower density housing to the south. Poway High School is located approximately 1 mile southwest of Lake Poway.

Lake Poway is open year-round for fishing Wednesdays through Sundays, sunrise to sunset. Night fishing is available on select nights during the summer. The reservoir is stocked with rainbow trout weekly during the winter, and with channel catfish weekly during the summer. Public rental of rowboats, motorboats, sailboats, and paddle boats is available from a concessionaire, but private boats are not permitted. Swimming and other body contact is not allowed (City of Poway 2014b).

1.2.4 San Dieguito Reservoir

San Dieguito Reservoir is a surface water storage reservoir owned by SFID and located in the northern part of the unincorporated community of Rancho Santa Fe, in the northern part of San Diego County. Access is provided by El Camino del Norte, which runs along the northern side of the reservoir, and El Montevideo and Lago Lindo which runs along the south side of the reservoir. The City of Encinitas is located approximately 1 mile northwest of the reservoir. The facility is an 800-acre-foot terminal reservoir that receives its water from Lake Hodges via the Cielo Pump Station, which is located on Del Dios Highway approximately 2 miles east of the reservoir. San Dieguito Reservoir water is pumped to the R.E. Badger Filtration Plant, which is jointly owned by SFID and the San Dieguito Water District and provides drinking water to both districts (Santa Fe Irrigation District 2014a).

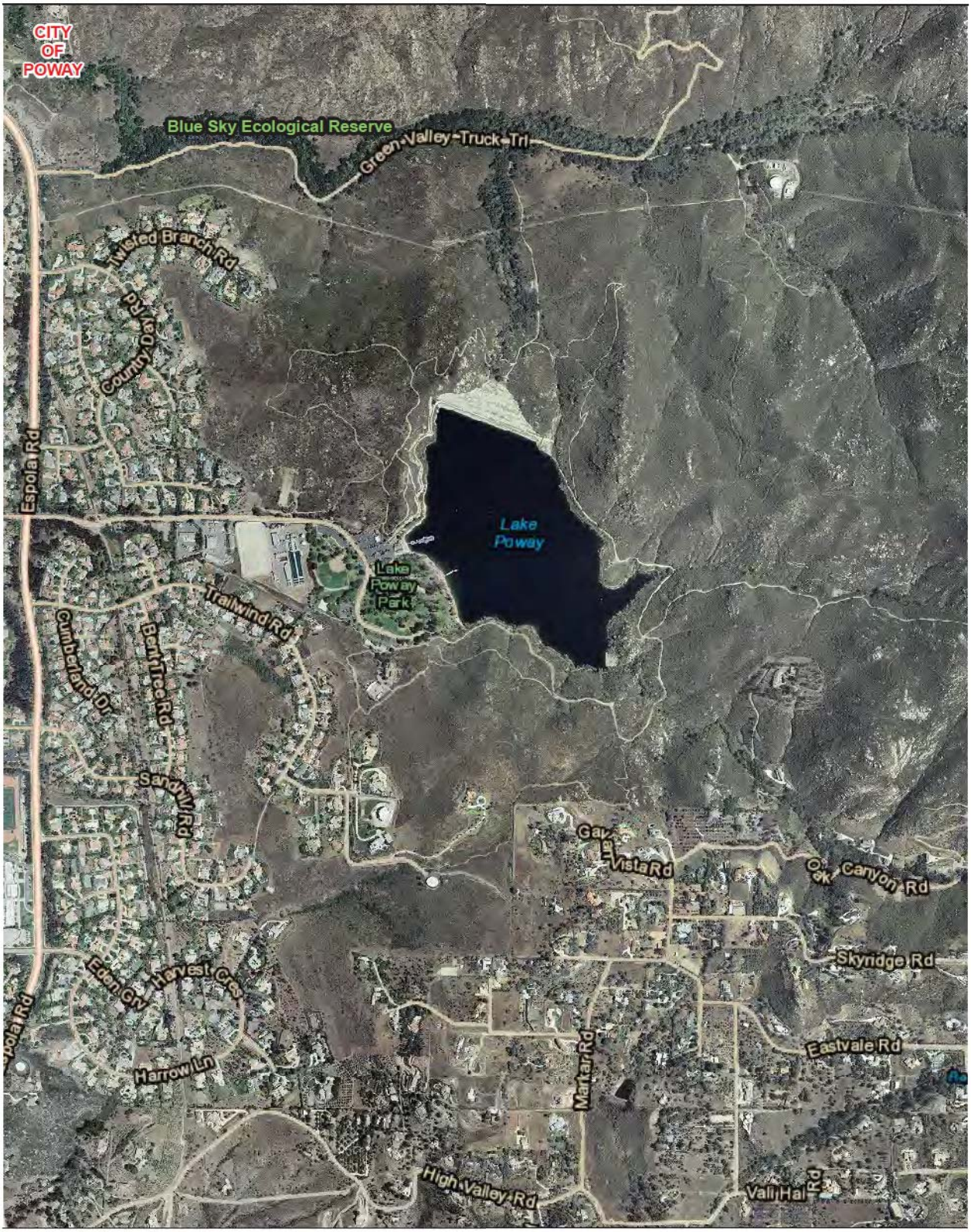
The surrounding areas are composed of rural residential development in the communities of Rancho Santa Fe and Fairbanks Ranch, many with associated agricultural uses. Figure 5 shows the reservoir and its surrounding area.

The reservoir is not open to the public (Santa Fe Irrigation District 2014b).

1.2.5 Sweetwater Reservoir

Sweetwater Reservoir is a surface water storage reservoir owned by Sweetwater and located along the Sweetwater River in southwestern San Diego County, near the unincorporated communities of La Presa to the north and Bonita to the west. The incorporated boundary of the City of Chula Vista is located to the south. The reservoir is directly east of the State Route 54 and State Route 125 interchange. Sweetwater Reservoir has a capacity of approximately 28,100 acre-feet and a maximum surface area of 1,027 acres (Sweetwater Authority 2013).

Sweetwater Summit Regional Park abuts the reservoir's southern bank, and the U.S. Fish and Wildlife Service's (USFWS) 11,152-acre San Diego National Wildlife Refuge is located immediately east of the reservoir. The Sweetwater Summit Regional Park offers trails, picnic areas, and a campground. Additional surrounding uses include single-family residential development to the north and west. The Bonita Golf Club's golf course and the County's Sweetwater Sports Complex are located southwest of the



Source: SANDAG 2012

0.25 0.125 0 0.25 Miles

Scale: 1:15,840; 1 inch = 0.25 miles

Figure 4
Lake Poway

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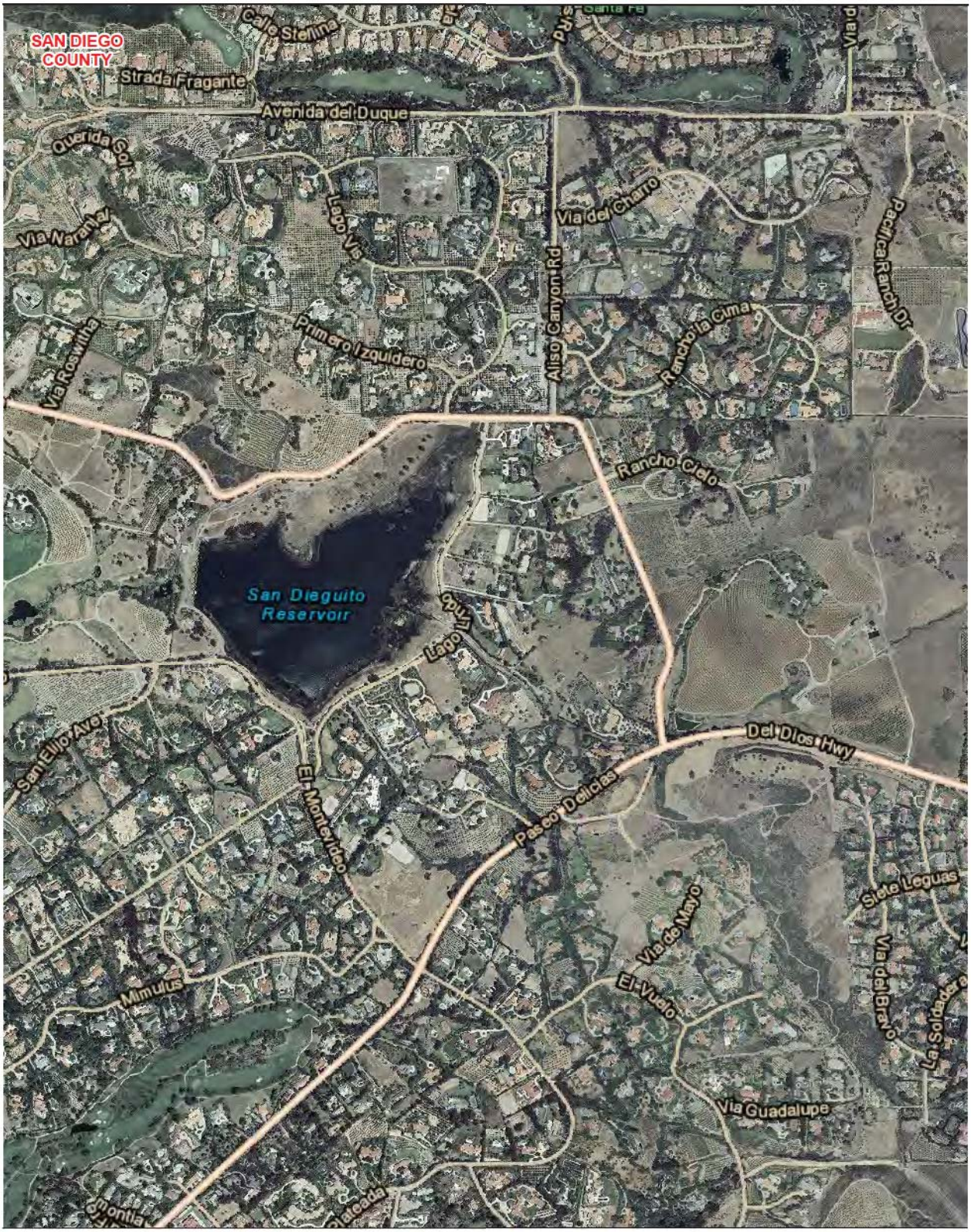

Source: SANDAG 2012

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Scale: 1:15,840; 1 inch = 0.25 miles

Figure 5
San Dieguito Reservoir

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reservoir, across State Route 125. The Sweetwater Dam, the Robert A. Perdue Water Treatment Plant (PWTP), and Sweetwater's operations building are on the western side of the reservoir. The reservoir and surrounding area are shown in Figure 6.

Sweetwater Reservoir is open to the public 3 days a week year-round for shoreline fishing from a limited area on the reservoir's southern end; no boats or body contact recreational activities are allowed. Sweetwater does not stock the reservoir with fish. A 5-mile riding and hiking trail is also located on the southern border of the lake for pedestrians, bikes, and horses (Sweetwater Authority 2014).

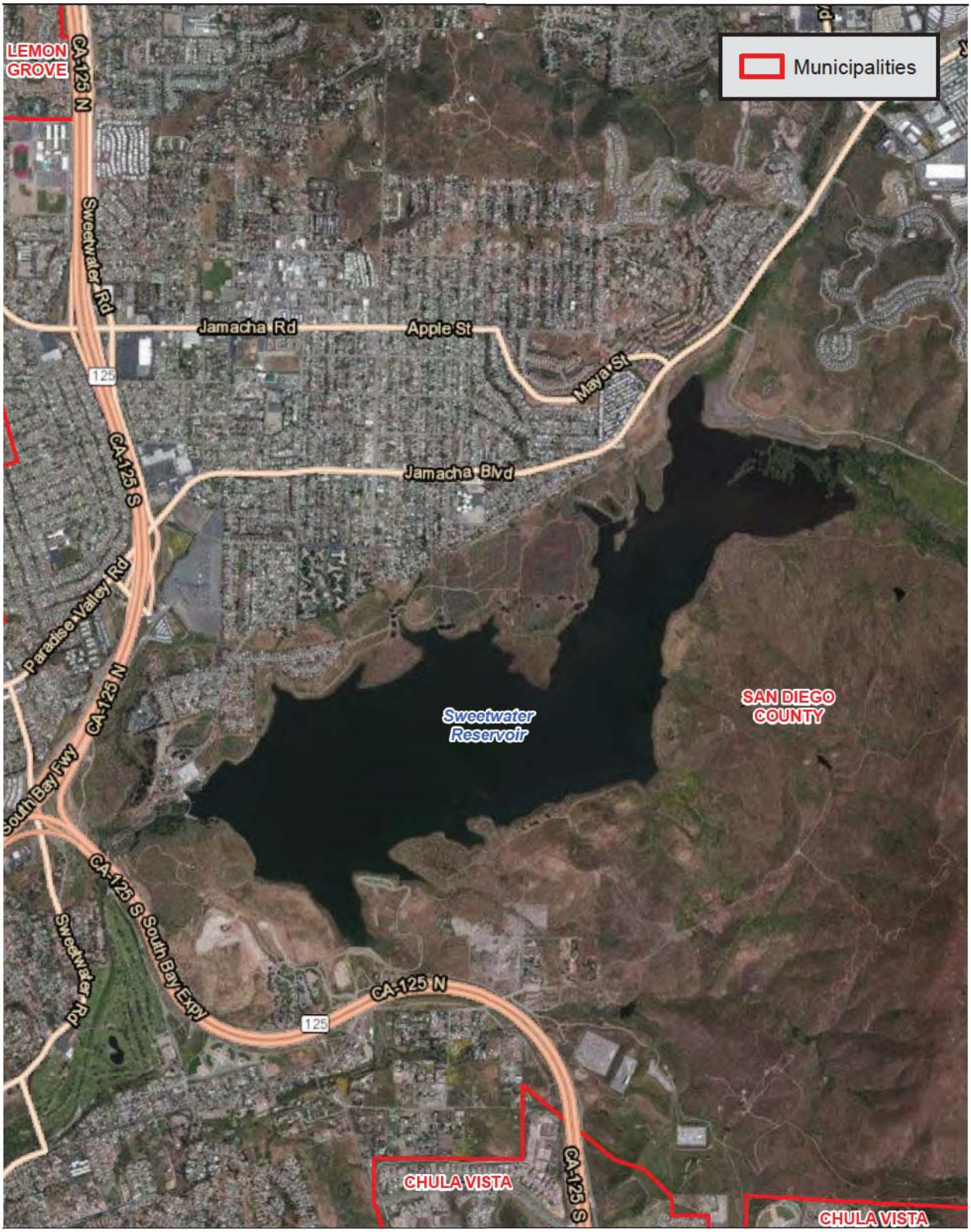
1.3 PROJECT DESCRIPTION

The project entails occasional application of copper-based algaecides at five surface water reservoirs in San Diego County to control and prevent degradation of water quality at those facilities resulting from algae blooms. The five reservoirs are Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, and Sweetwater Reservoir. Algae cause a multitude of water-quality concerns, including the potential to produce taste- and odor-causing compounds and toxins that are potent enough to poison animals and humans. Taste-and-odor compounds cause malodorous or unpalatable drinking water, resulting in increased treatment costs and consumer complaints. In addition, if great masses of algae enter the water treatment plant, the algae can cause operational problems by increasing the amount of suspended material that must be settled out of the water, and excessive algae can lead to water filter clogging. Filter clogging leads to shortened filter run times; this in turn leads to increased electricity and chemical use in the water treatment plant.

The algaecides would be applied at the subject reservoirs pursuant to methods stated in the respective agencies' APAPs, which have been submitted to the State Board for approval of coverage under the General Permit. To date, the Water Authority, HWD, Poway, and Sweetwater have received a Notice of Applicability from the State Board approving their APAP; SFID has responded to comments from the State Board and resubmitted their APAP for review. Each of the five subject agencies has indicated that their periodic treatment of algae may require temporary exceedance of the permitted levels of dissolved copper stated in the General Permit, and the agencies are applying to the State Board for an exception from those copper levels.

The project-related APAPs are included in this MND as Appendix A1 through A5. The requirement to prepare APAPs is described in Section VIII.C of the General Permit, which identifies the following mandatory information:

1. Description of the water system to which algaecides and aquatic herbicides are being applied;
2. Description of the treatment area in the water system;
3. Description of types of weed(s) and algae that are being controlled and why;
4. Algaecide and aquatic herbicide products to be used, the method in which they are applied, and the adjuvants and surfactants used;
5. Discussion of the factors influencing the decision to select algaecide and aquatic herbicide applications for algae and weed control;
6. Description of the control structure to be used to control the extent of receiving waters potentially affected by algaecide and aquatic herbicide application and the inspection schedule of the control structure to ensure that it is not leaking (if applicable);



Source: SANDAG 2012

0.5 0.25 0 0.5 Miles

Scale: 1:31,680; 1 inch = 0.5 miles

Figure 6
Sweetwater Reservoir

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7. If the Discharger has been granted a short-term or seasonal exception under State Water Board *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays,* and Estuaries of California* (Policy) section 5.3 from meeting acrolein and copper receiving water limitations, provide the beginning and ending dates of the exception period, and justification for the needed time for the exception. If algaecide and aquatic herbicide applications occur outside of the exception period, describe plans to ensure that receiving water criteria are not exceeded because the Dischargers must comply with the acrolein and copper receiving water limitations for all applications that occur outside of the exception period
8. Description of a monitoring program demonstrating compliance with the receiving water limitations, discharge specifications, and other requirements in the General Permit;
9. Description of procedures used to prevent sample contamination from persons, equipment, and vehicles associated with algaecide and aquatic herbicide application;
10. Description of the best management practices (BMPs) to be implemented.
11. Examination of possible alternatives to algaecide and aquatic herbicide use to reduce the need for applying algaecides and herbicides.

The individual project descriptions for each subject reservoir provided below summarize the respective APAPs, augmented with additional information obtained from personal communications with representatives of the participating agencies, if needed.

1.3.1 Olivenhain Reservoir

The Water Authority's APAP, provided as Appendix A1 in this MND, proposes application of copper sulfate if necessary to control nuisance algae blooms. Since the reservoir became operational in 2003, it has not experienced significant algal growth and the Water Authority has not needed to apply chemicals to the reservoir to control algae. However, reservoir staff has started to recognize increased algal growth in recent years, which originates from Lake Hodges water transfers, and the Water Authority is seeking General Permit coverage for algaecide application in case the need arises. If nuisance algae blooms occur at Olivenhain Reservoir, in-situ treatment would be required to ensure the Water Authority's deliveries from the reservoir to its member agencies meet appropriate water quality specifications, primarily to prevent taste- and odor-causing compounds and algal toxins from reaching consumers. The Water Authority's primary response to algae blooms at Olivenhain Reservoir is to select a lower withdrawal elevation on the reservoir's outlet tower to avoid algae blooms that form on the surface. If that option is not available, then the secondary response would be isolating Olivenhain Reservoir from the Water Authority's system and transferring water to its member agencies from another storage point. If regional demands or operational constraints do not allow for the termination of flow from Olivenhain Reservoir, then the Water Authority would consider applying copper-based algaecide.

Pursuant to their APAP, the Water Authority would apply a mixture of copper sulfate pentahydrate crystals and granular citric acid (for chelation purposes) at Olivenhain Reservoir from side hoppers attached to a powerboat. Applications are proposed to occur in the surface water on the reservoir's southwestern side. Application would be performed in a manner consistent with product labeling and would be the minimum amount necessary to be effective; the APAP proposes a rate of approximately 2 pounds of copper sulfate and 1 pound of citric acid per surface acre of treated area. The Water Authority estimates up to 80 pounds of the solid crystalline product would be delivered for a single application.

Three monitoring locations are proposed in the Water Authority's APAP. Prior to an application event (24 hours in advance), background monitoring would be conducted near the application area. Event monitoring samples would be collected immediately after the application from two locations outside of

the treatment area—one near the reservoir's outlet tower and another near the Lake Hodges inlet/outlet structure. Post-event monitoring samples would be collected inside the treatment area within a week after application. This post-treatment monitoring would also include visual inspection of the treatment area for evidence of fish kills. The Water Authority will post a notification on its website and/or notify impacted member agencies by email, as appropriate, at least 7 days prior to the first algaecide application every calendar year. The notification will conform to the procedures described in Section VIII.B of the General Permit.

1.3.2 Lake Jennings

HWD's APAP, provided as Appendix A2 in this MND, covers treatment of Lake Jennings for algae with the copper-based algaecide Cutrine Plus, a liquid chelated copper product applied using a boat-mounted spray rig.[2] Algaecide would be applied to the water in an area adjacent to Chet Harritt Dam and the intake tower to the water treatment plant.

HWD normally prevents and controls algae blooms in Lake Jennings by conventional methods, using a mechanical system that aerates and circulates water. The aeration system consists of an air compressor located on the dam, an air diffuser grid that is located on the lake bottom adjacent to the dam, and an air line that connects the air compressor & diffuser grid. HWD places the aeration system in operation at the beginning of the season when algae blooms commonly occur (typically the summer) and operates the system throughout the season. Algaecide was used infrequently at Lake Jennings in the years before HWD installed and activated the aeration system but has not been used in the past 20 years due to the effectiveness of treatment through aeration. Because Lake Jennings is a water source for HWD's water treatment plant that produces potable water for its customers, HWD is seeking approval to use algaecide in case a severe algae bloom occurs that is beyond the capability of the aeration system to control. HWD would use algaecide consistent with the product label requirements and apply the minimum amount of product that is necessary to be effective- an estimated range of 2.75 to 11 gallons of the liquid product.

The HWD APAP establishes two monitoring locations—one at an anchored buoy located within the algaecide application area near the dam, and another at an anchored buoy located outside of the treatment area where prevailing winds tend to push surface water at the reservoir. HWD's monitoring program includes background monitoring within 24 hours before an application event, event monitoring of samples just outside the treatment area immediately after the application event, and post-event monitoring of samples taken within the treatment area up to a week after the application. No public agencies need to be notified of algaecide application at Lake Jennings because HWD is both the discharger and the affected public agency.

1.3.3 Lake Poway

Poway's APAP, provided as Appendix A3 in this MND, covers treatment of Lake Poway for algae blooms to prevent development of nuisance conditions. Poway has used copper sulfate for algae control since the 1970s, with the frequency depending on when algae blooms occur, typically once per year, between April 1 and October 30. The copper sulfate product is ordered by the pallet and then used as needed. Copper sulfate is applied as needed to Lake Poway in the form of large crystals, which are typically applied by boat as a surface application, at various locations as necessary to prevent blooms from spreading. Citric acid is used in the application as a chelating agent. The need for treatment is based

[2] The HWD APAP also covers treatment of aquatic weeds such as tamarix, cattails, and tules by spraying herbicides along the edges of Lake Jennings. However, this MND covers only the application of algaecide, as that is the subject of the exception from the permit limitations that HWD is seeking along with the other participating agencies.

on physical inspections, water quality monitoring, and potential and existing impacts on drinking water quality. Poway uses algaecide consistent with the product label requirements and applies the minimum amount of product that is necessary to be effective. During a single application process roughly five pounds of pesticide per acre foot of water is used, which averages about 300 pounds of solid crystalline product for each application.

Poway does not implement any conventional, non-chemical algae treatment at Lake Poway; however, a Poway representative reported that nuisance algae blooms did not occur when they employed methods for controlling invasive quagga mussels and milfoil plants, which were treated by reducing the reservoir's water level and drying out the shoreline for 30 to 40 days (City of Poway 2014b).

Because copper application within Lake Poway is not performed at any specific location within the reservoir, the copper-application monitoring locations will also vary depending on actual application sites. For each application, a treatment map will be developed showing the application area, treatment area, and adjacent untreated area (if applicable), which will be used throughout the monitoring period for each application. Post-application monitoring includes visual monitoring for fish kills. No agencies will be notified of Poway's algaecide application because no other public agencies are expected to be affected.

1.3.4 San Dieguito Reservoir

SFID's APAP, provided as Appendix A4 in this MND, covers treatment of San Dieguito Reservoir for algae blooms that originate at Lake Hodges and that are transferred into the reservoir along with water deliveries via the Cielo Pump Station. SFID implements a Lake Management Program to control algae at San Dieguito Reservoir, with preferred methods being nonchemical solutions such as aeration, water level manipulation, nutrient control, and selective withdrawals from Lake Hodges's three outlets, pulling water from variable depths to minimize algae intake. These strategies are effective at minimizing algae blooms in the reservoir, but SFID often needs to apply algaecide to control major blooms and prevent adverse effects on water quality.

The Cielo Pump Station is equipped with a closed-feed injection system that can release algaecides directly into the water while being pumped from Lake Hodges to San Dieguito Reservoir as necessary. SFID applies a liquid non-chelated copper sulfate product through this method. The injection system allows for safe and effective application of precise amounts and minimizes the potential for worker exposure and spills. The rate of feed for any treatment event is limited to the recommendations on the product label to ensure effectiveness and minimize any unintended effects on non-targeted organisms. Chelated copper application is not necessary at San Dieguito Reservoir because SFID does not apply directly to the reservoir, so the product does not need to remain suspended in reservoir water in order to effectively treat the targeted algae. The volume of liquid algaecide used for an application would depend on the severity of the algal bloom. SFID estimates between 100 to 500 gallons are used per application. The product is ordered in quantities large enough for roughly one year of application events, and is stored on site until it is used. At the end of a treatment event, the system is flushed with water to eliminate any algaecides remaining in the system. This protects the feed system from corrosion and leaks. The liquid copper sulfate containers are stored within a spill catchment that can capture 100% of the chemical available for feed.

The SFID APAP establishes two representative monitoring locations within San Dieguito Reservoir. One location, at the receiving water pipeline on the reservoir's eastern shore, is used for baseline monitoring, conducted within 24 hours before the treatment, and event monitoring, starting immediately after treatment begins. The second location is the San Dieguito Reservoir pump station inlet on the opposite side of the reservoir, which is used for post-event monitoring conducted within a week after treatment

begins. SFID does not notify other agencies of algaecide application at San Dieguito Reservoir because no other public agencies are expected to be affected by this activity.

1.3.5 Sweetwater Reservoir

Sweetwater's APAP, provided as Appendix A5 in this MND, proposes application of copper sulfate when necessary to control nuisance algae blooms for control of taste and odor in their drinking water, and to prevent filter impairment at the PWTP. Sweetwater has been applying copper sulfate for algae control at least since 1986, averaging approximately one treatment per year during the summer, though the frequency and timing of application varies depending on the number of algae blooms per year, the length of the bloom, and the severity of the taste and odor problem that arises. The need for copper application at Sweetwater Reservoir has not arisen since 2009.

Sweetwater prefers to initially handle algae blooms without the use of an algaecide. Alternative methods employed at Sweetwater Reservoir include obtaining water from different levels of the reservoir that are not inhibited by an algae bloom, adding powdered activated carbon to the water treatment process at PWTP, increasing the duration of free chlorine contact with treated water at PWTP, blending treated water with imported water, and waiting for a bloom to die off naturally. The decision to apply copper to the reservoir is made when nuisance algae indicators increase significantly over a short period of time and when other preferred mitigation strategies have not been successful.

The Sweetwater APAP proposes application of a mixture of copper sulfate crystals and granular citric acid (for chelation purposes) at the reservoir from side hoppers attached to a powerboat. Applications are proposed to occur in an even manner throughout the surface of the western side of the reservoir, depending on the location of the bloom, though no more than one-half of the surface of the reservoir would be treated per application. If an additional treatment is necessary, a minimum of 2 weeks would elapse between applications. Application would be performed in a manner consistent with product labeling and would be the minimum amount necessary to be effective; the APAP proposes a rate of approximately 2 pounds of copper sulfate and 1 pound of citric acid per surface acre of treated area. In the past, the average amount of solid crystalline product used has been approximately 1,250 pounds per application.

Monitoring before, during, and after a copper application is proposed to occur at three numbered buoys in the reservoir, to ensure consistency. Buoy #1 is located at the west end of the reservoir, near the Sweetwater Dam and PWTP; Buoy #2 is located in the center of the reservoir's minimum pool area, in the center of the potential application area; Buoy #7 is located near the opening to Gum Tree Cove on the reservoir's northern shore. Prior to an application event (up to 24 hours in advance), background monitoring would be conducted at Buoy #1 and Buoy #2. Event monitoring samples would be collected at Buoy #7 immediately after the application. Post-event monitoring samples would be collected at Buoy #1 and Buoy #2 within a week after application. Post-treatment monitoring would also include visual inspection of the treatment area by a qualified biologist to ensure beneficial uses have not been impacted. Every calendar year, at least 15 days prior to the first algaecide application (if any), Sweetwater will post a notification on its website and/or provide on-site signage (as appropriate) at the fishing program area. The notification will conform to the procedures described in Section VIII.B of the General Permit. No other agencies have rights to the water in the reservoir, and therefore no public agencies need to be notified.

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SECTION 2.0
INITIAL STUDY/ENVIRONMENTAL CHECKLIST FORM

1.	Project Title:	Application of Copper-Based Algaecides at Five Reservoirs, San Diego County
2.	Lead Agency Name and Address:	San Diego County Water Authority 4677 Overland Avenue San Diego, CA 92123
3.	Contact Person and Phone Number:	Larry Purcell Water Resources Manager (858) 522-6752
4.	Project Location:	Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir
5.	Project Sponsor's Name and Address:	San Diego County Water Authority 4677 Overland Avenue San Diego, CA 92123 Sweetwater Authority 505 Garrett Avenue Chula Vista, California 91910 Helix Water District 7811 University Avenue La Mesa, California 91942 City of Poway, Public Works Department 13325 Civic Center Drive Poway, California 92064 Santa Fe Irrigation District 5920 Linea del Cielo Rancho Santa Fe, California 92067
6.	General Plan Designation:	NA
7.	Zoning:	NA

8. Description of Project:

Please refer to Section 1.3 for a detailed description of the proposed project at each of the subject reservoirs.

9. Surrounding Land Uses and Setting:

Please refer to Section 1.2 for a detailed discussion of the project setting and surrounding land uses.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

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

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

DETERMINATION:

On the basis of this initial evaluation:

□ I find that the proposed project COULD NOT have a significant effect on the environment, and a Categorical Exemption (Class 2, Section 15302) is the appropriate CEQA documentation.

□ 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.

March 10, 2015

Ken Weinberg
Director of Water Resources
San Diego County Water Authority

Date

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

EVALUATION OF ENVIRONMENTAL IMPACTS:

I. Aesthetics

I. AESTHETICS. Would the project:

a) Have a substantial adverse effect on a scenic vista?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

Visible components of the project include occasional operation of boats on existing reservoirs for infrequent algaecide application and monitoring. This activity would not have an aesthetic effect, and would not cause an impact at any scenic vistas that may exist at the subject reservoirs; therefore, no impact would occur.

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See the response to I.a) None of the reservoirs are visible from a scenic highway. No impact would result from this project.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See the response to I.a) The use of boats for infrequent application and/or monitoring would not lead to a significant divergence from normal views at the reservoirs, especially for those that allow recreational boating, and the visible components of this project would have no impact. The application of the algaecides would result in the reduction or removal of algae blooms, which typically occur below the water surface, so their removal generally would not be visible to reservoir users. Therefore, the project would have no impact.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project would not introduce any new source of light to the project area. Additionally, project activities would occur only during daylight hours and would not require any nighttime lighting in order to be carried out. Therefore, no impact would occur.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

II. AGRICULTURE AND FORESTRY RESOURCES.

II. Agriculture and Forestry Resources

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 Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project activities would not convert or alter Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. All activities would occur within the reservoir and have no impact on agricultural resources.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

No Williamson Act contract lands occur within the project area and no agricultural uses would be displaced as a result of the project. Therefore, no related impact would occur.

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))?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

No forest land, timberland, or Timberland Production lands occur within the project area. Therefore, no related impact would occur.

d) Result in the loss of forest land or conversion of forest land to non-forest use?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See II.c) above. Because no forest land exists in the project area, no related impact would occur.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

Application of algaecides to the reservoirs would not lead to changes in the environment that would convert Farmland to non-agricultural use or forest-land to non-forest use. The algaecides would be applied directly to the water and would affect only the algae in the water. Therefore there is no impact.

III. AIR QUALITY.
III. Air Quality
Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?			X	

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project would involve the infrequent use of delivery trucks for transportation of algaecides to the subject reservoirs and the use of boats for application and monitoring. Applications would entail a single delivery truck trip to the respective reservoir's operations facility, and operation of a single boat to apply the product, except at San Dieguito Reservoir, where copper is applied through an in-line injection system, and operation of a single boat for pre- and post-application monitoring. The use of this equipment would be sporadic and last for a short duration of time. Any emissions release from the project equipment would be negligible. Therefore, project implementation would not conflict with or obstruct implementation of the applicable air quality plan. This impact is less than significant.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			X	

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See III.a) above. Project activities would result in minimal vehicle emissions from trucks and boats for the transportation and application of the algaecide and monitoring in the reservoirs. Application events would not occur often, and would not result in long-term emissions. Therefore, this impact would be less than significant.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) 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 (including releasing emissions which exceed quantitative thresholds for ozone precursors)?			X	

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See III.a) and III.b) above. Project-related emissions would be negligible and would not contribute considerably to a net increase for any criteria pollutants in the San Diego region. This impact is less than significant.

d) Expose sensitive receptors to substantial pollutant concentrations?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

Sensitive receptors include residences, schools, playgrounds, child care centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. The nearest sensitive receptors to the proposed project are residential properties scattered around the reservoirs and park uses adjacent to certain reservoirs. The algaecides would be applied directly to the reservoirs in either a solid or liquid form, and would not contribute to air contaminants. Spray application at Lake Jennings are not conducted when winds exceed 10 miles per hour in order to ensure maximum control of the Cutrine Plus application and prevent any spray clouds from escaping the treatment zone. Minimal amounts of exhaust would be created by trucks and boats during the application and monitoring process at the reservoirs, but this would not create a substantial amount of pollutants in the area that would be received by these receptors. Therefore, no impact would occur.

e) Create objectionable odors affecting a substantial number of people?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

Exhaust odors would be emitted by trucks and boats during algaecide application. However, the exhaust is highly diffusive and would be created only in minimal amounts in isolated incidents, so nearby receptors would not be significantly affected. Copper sulfate and citric acid are odorless substances. Furthermore, the algaecides are being applied to reduce or remove algae in the reservoirs, which would also reduce the objectionable odors created by nuisance algae. Therefore, no impact would occur.

Environmental Impact Evaluation	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?			X	

To assess the potential for the project to result in a significant impact on sensitive plant or wildlife species, AECOM first conducted a search of the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB), generating a separate list for each subject reservoir and a surrounding 1-mile radius around the edge of respective reservoir. Sensitive species identified in the database include species listed as endangered or threatened pursuant to the federal Endangered Species Act or California Endangered Species Act, rare plant species identified by the California Native Plant Society, and species listed as State Species of Special Concern by CDFW. AECOM reviewed the search results and then considered the potential for each of the identified species to be present within or adjacent to the reservoir such that they would be likely to come into contact with reservoir water, based on a review of SANDAG regional vegetation mapping to characterize the actual habitats present on-site. For those species that were considered to have potential to occur at the reservoirs based on habitat presence, AECOM considered the potential for these species to be significantly affected by copper application activities, including the temporary increase in copper concentrations in reservoir water. The analysis focused on species that would have the potential to reside or forage in the reservoirs or in wetland habitat on the edges of the reservoirs, because those would be the species that would have the most potential to come into contact with elevated copper levels during and after application. Upland species that are not known to be active in these wetland habitats or to forage in open water were removed from consideration because they would be unlikely to come into contact with elevated copper levels. The analysis concluded that while several special-status species may occur at or adjacent to the reservoirs, the project's impact would be less than significant because these species would not have the potential come into contact with harmful concentrations of copper. The results are summarized below for each subject reservoir.

Copper treatments at the subject reservoirs would result in short-term increases in dissolved copper in the reservoir water. Copper would not be applied directly to land or at the edges of reservoirs. As stated in the General Permit, the registration process for pesticides in California includes evaluation of a product's chemical data by EPA and the California Department of Pesticide Regulation "to ensure that a product used according to label instructions will cause no harm or adverse impact on non-target organisms that cannot be reduced or mitigated with protective measures or use restrictions." The copper-based products discussed in this MND are algaecides with approved registration labels that explicitly allow direct application to water bodies.

According to the U.S. Environmental Protection Agency's (EPA) "Copper Facts" sheet (EPA 2008), copper can be toxic in high concentrations, but it is also an important essential trace element for terrestrial animals, and many terrestrial animals have the ability to cope with some amount of excess copper exposure by storing it in the liver and bone marrow. The factsheet states that copper is highly toxic to most aquatic species, with the main cause of copper toxicity to fish and aquatic invertebrates being

through rapid binding of copper to the gill membranes, which causes damage and interferes with osmoregulatory processes. However, the long-term biological impacts when copper is applied to reservoirs in the amounts needed to control algae are lessened, because the applied copper settles out of the water as it is taken up by the targeted algae and becomes bound to the bottom sediments, where it is biologically unavailable to organisms that are active within the reservoir water. Settlement rates for copper are dependent on several different factors, including water temperature, turbidity, pH, dissolved solids in the water, and oxidation reduction potential. The EPA states that copper strongly absorbs to organic matter, carbonates, and clay, thereby reducing the bioavailability of copper (EPA 2015). While copper has the ability to bioconcentrate in certain fish organs, the EPA considers this to have a low potential to occur in the quantities applied for algaecide purposes. Bioavailability of copper in bottom sediments is highly variable, and appears to be correlated with sediment characteristics, including pH, sediment particle size, cation exchange capacity, and other factors (Willis 2012). The three participating agencies that allow fishing at their reservoirs for recreational purposes—HWD, Poway, and Sweetwater—have not observed fish kill incidents after copper application and have no records that such fish kills have occurred in the past (Helix Water District 2015; City of Poway 2015; Sweetwater Authority 2015).

Olivenhain Reservoir

The CNDDB search conducted for Olivenhain Reservoir identified eight special-status plant species and 12 special-status wildlife species based on the species' regional distribution, as shown in Table 1.

Table 1: CNDDB Search Results at Olivenhain Reservoir

Common Name	Scientific Name	Status	Habitat	Habitat is not Present in Project Area; Species Eliminated from Further Consideration	Habitat is Present in Project Area
PLANTS					
Encinitas baccharis	*Baccharis vanessae*	CNPS-1, SE, FT	Low-growing chaparral dominated by chamise; in Encinitas region, grows nearby Del Mar manzanita, Mojave yucca, and mission manzanita	X	
felt-leaved monardella	*Monardella hypoleuca ssp. lanata*	CNPS-1	Chaparral understory, beneath mature strands of Chamise in xeric conditions	X	
Orcutt's brodiaea	*Brodiaea orcuttii*	CNPS-1	Vernally moist grasslands, mima mound topography, and periphery of vernal pools	X	

Common Name	Scientific Name	Status	Habitat	Habitat is not Present in Project Area; Species Eliminated from Further Consideration	Habitat is Present in Project Area
Robinson's pepper-grass	*Lepidium virginicum var. robinsonii*	CNPS-1	Openings in chaparral and sage scrub, away from coast in foothill elevations; typical sites are relatively dry and exposed	X	
San Diego sagewort	*Artemisia palmeri*	CNPS-4	Coastal sage scrub, riparian scrub or woodland communities, and chaparral below 1970 feet, also along drainages	X	
sea dahlia	*Leptosyne maritima*	CNPS-2	coastal sage scrub, within coastal bluffs	X	
summer holly	*Comarostaphylis diversifolia ssp. diversifolia*	CNPS-1	Southern mixed chaparral, on mesic north-facing slopes	X	
wart-stemmed ceanothus	*Ceanothus verrucosus*	CNPS-2	Coastal chaparral with chamise and Mission Manzanita	X	
REPTILES					
coast horned lizard	*Phrynosoma blainvillii*	CSSC	Lowlands along sandy washes with scattered low bushes	X	
coast patch-nosed snake	*Salvadora hexalepis virgultea*	CSSC	Coastal slope with coastal sage scrub, chaparral, riparian, grasslands, and agricultural fields, but with open habitat with friable or sandy soils, but with some cover	X	
coastal whiptail	*Aspidoscelis tigris stejnegeri*		Deserts and semiarid habitats from sea-level to 7000 feet, often associated with dense vegetation like chaparral and sage scrub around sandy washes and streambeds	X	
orange-throated whiptail	*Aspidoscelis hyperythra*	CSSC	Coastal chaparral and thornscrub, within washes, streams, terraces, and other sandy areas associated with some perennial plants	X	
red-diamond rattlesnake	*Crotalus ruber*	CSSC	Chaparral, coastal sage scrub, along creek banks, and in granite rock outcrops or piles of debris	X	

Common Name	Scientific Name	Status	Habitat	Habitat is not Present in Project Area; Species Eliminated from Further Consideration	Habitat is Present in Project Area
western pond turtle	*Emys marmorata*	CSSC	Slow moving rivers, streams, and ponds with emergent marsh vegetation without dense canopy, with protruding rocks, vegetation mats, or submerged logs for sunning	X	
BIRDS					
coastal California gnatcatcher	*Polioptila californica californica*	FT, CSSC	Diegan coastal sage scrub, dominated by California sagebrush and flat-top buckwheat	X	
southern California rufous-crowned sparrow	*Aimophila ruficeps canescens*	CSSC	Grassy or rocky slopes with open scrub at elevations from sea level to 2000 feet; most populations occur in coastal sage scrub	X	
MAMMALS					
Dulzura pocket mouse	*Chaetodipus californicus femoralis*	CSSC	Coastal sage scrub, chaparral, woodlands, and grasslands, often at the scrub-grassland interface	X	
northwestern San Diego pocket mouse	*Chaetodipus fallax fallax*	CSSC	Open habitats of coastal sage scrub, sage scrub/grassland ecotones,	X	
San Diego desert woodrat	*Neotoma lepida intermedia*	CSSC	Habitats with patches of prickly pear or cholla, or with rock outcrops or low shrubs	X	
western mastiff bat	*Eumops perotis californicus*	CSSC	Areas with caves, rock crevices, or abandoned buildings		X

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ST = State Listed as Threatened
SCSC = State Listed Species of Concern
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CNPS-2 = California Native Plant Society Listed Rare, Threatened, or Endangered
CNPS-4 = California Native Plant Society Listed as Limited Distribution

Of these species identified in the CNDDB search, AECOM concluded that none of the plant species has the potential to exist in or adjacent to the reservoir because these species are found in sage scrub and chaparral habitat, which would not be affected by copper application at Olivenhain Reservoir. Therefore,

the project would not have a significant impact on any of the special-status plant species identified for Olivenhain Reservoir.

One of the 12 CNDDB wildlife species for Olivenhain Reservoir—the western mastiff bat (*Eumops perotis californicus*)—was identified as having potential to use the reservoir as a drinking water source. Western mastiff bat is a CDFW State Species of Special Concern, though it is not a covered species under the Water Authority's Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP). This bat species typically inhabits areas featuring caves, rock crevices, or even abandoned buildings, but is also known to forage over 15 miles from its roost sites and drink from large water impoundments. Western mastiff bat's preferred prey consists of terrestrial invertebrates, so this species is not likely to forage for food on Olivenhain Reservoir, but western mastiff bat has the potential to drink from Olivenhain Reservoir. However, this species is not likely to be affected by increased copper concentrations at Olivenhain Reservoir. If western mastiff bat drinks from the reservoir, it would do so from the reservoir's immediate surface, which would only experience high concentrations of copper immediately following an application, before the chemical would start sinking and mixing with subsurface water. Since algaecide applications at Olivenhain Reservoir would be performed during the day, when western mastiff bat is inactive, the species would not be present to experience an extended exposure to high concentrations of the chemical. Therefore, the western mastiff bat is not likely to ingest large concentrations of copper, and the project would not have a significant impact on this species.

No other special-status species would have the potential to be affected by algaecide application at Olivenhain Reservoir. Therefore, the project would have a less than significant impact at Olivenhain Reservoir.

Lake Jennings

The CNDDB search conducted for Lake Jennings identified four special-status plant species and 16 special-status wildlife species based on the species' regional distribution, as shown in Table 2.

Table 2: CNDDB Search Results at Lake Jennings

Common Name	Scientific Name	Status	Habitat	Habitat is not Present in Project Area; Species Eliminated from Further Consideration	Habitat is Present in Project Area
PLANTS					
Abrams' spurge	*Chamaesyce abramsiana*	CNPS-2	Creosote Bush Scrub, sandy flats and open areas	X	
decumbent goldenbush	*Isocoma menziesii var. decumbens*	CNPS-1	Coastal Sage Scrub, intermixed with grassland, wetland-riparian, more partial to clay soils	X	

Common Name	Scientific Name	Status	Habitat	Habitat is not Present in Project Area; Species Eliminated from Further Consideration	Habitat is Present in Project Area
delicate clarkia	*Clarkia delicata*	CNPS-1	Periphery of oak woodlands and cismontane Chaparral haunts, partially shaded by tree canopy or large shrubs, and typically mesic situations	X	
Ramona horkelia	*Horkelia truncata*	CNPS-1	Chamise Chaparral, Foothill Woodland	X	
REPTILES					
coast horned lizard	*Phrynosoma blainvillii*	CSSC	Lowlands along sandy washes with scattered low bushes	X	
Coronado Island skink	*Plestiodon skiltonianus interparietalis*	CSSC	Wide variety ranging from coastal sage, chaparral, oak woodlands, pinon-juniper, riparian woodlands, and pine forests, restricted to more mesic micro-habitats	X	
orange-throated whiptail	*Aspidoscelis hyperythra beldingi*	CSSC	Coastal chaparral and thornscrub, within washes, streams, terraces, and other sandy areas associated with some perennial plants	X	
rosy boa	*Charina trivirgata*		Dry rocky brushlands and arid habitats, usually near intermittent streams, also needs vegetation or rock outcrops for shelter	X	
silvery legless lizard	*Anniella pulchra pulchra*	CSSC	Veg communities include coastal dunes, chaparral, pine-oak woodland, and streamside growth of sycamores, cottonwoods, or oaks, with loose, moist, warm soil for burrowing, underneath leaf litter for cover	X	
BIRDS					
coastal cactus wren	*Campylorhynchus brunneicapillus sandiegensis*	CSSC	Coastal sage scrub with extensive stands of prickly pear or cholla cacti	X	
coastal California gnatcatcher	*Polioptila californica californica*	FT, CSSC	Diegan coastal sage scrub, dominated by California sagebrush and flat-top buckwheat	X	

Common Name	Scientific Name	Status	Habitat	Habitat is not Present in Project Area; Species Eliminated from Further Consideration	Habitat is Present in Project Area
southern California rufous-crowned sparrow	*Aimophila ruficeps canescens*	CSSC	Grassy or rocky slopes with open scrub at elevations from sea level to 2000 feet; most populations occur in coastal sage scrub	X	
yellow-breasted chat	*Icteria virens*	CSSC	Riparian woodland with dense undergrowth	X	
MAMMALS					
American badger	*Taxidea taxus*	CSSC	Level and open areas in grasslands, agricultural areas, and open shrub habitats	X	
big free-tailed bat	*Nyctinomops macrotis*	CSSC	Pinyon-juniper and Douglas fir forests, chaparral and oak forests in the mountains and foothills where rocky cliffs and crevices are present	X	
pallid bat	*Antrozous pallidus*	CSSC	Caves, mines, crevices, and abandoned buildings as roost sites	X	
San Diego black-tailed jackrabbit	*Lepus californicus bennettii*	CSSC	Typical habitats include early stages of chaparral, open coastal sage scrub, and grasslands near the edges of brush; needs some open land with some shrubs for cover	X	

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SCSC = State Listed Species of Concern
CNPS-1 = California Native Plant Society Listed Rare, Threatened, or Endangered in CA only
CNPS-2 = California Native Plant Society Listed Rare, Threatened, or Endangered
CNPS-4 = California Native Plant Society Listed as Limited Distribution

Of the four plant species identified in the CNDDB search, AECOM concluded that none of the species have the potential to exist in or adjacent to the reservoir because these species are found in creosote scrub, sage scrub, woodlands, and chaparral habitat, which would not be affected by copper application at Lake Jennings. Therefore, the project would not have a significant impact on any of the special-status plant species identified for Lake Jennings.

Of the 16 wildlife species identified in the CNDDB search for Lake Jennings, AECOM concluded that none of the species have potential to be present in or adjacent to the reservoir such that they could be exposed to elevated copper levels during or after algaecide application. Two State Species of Special Concern bat species—big free-tailed bat (*Nyctinomops macrotis*) and pallid bat (*Antrozous pallidus*)—

were identified in the CNDDB search, but unlike the western mastiff bat mentioned above in the Olivenhain Reservoir discussion, these species do not have high potential to use Lake Jennings as a water source, and they are not likely to forage on the reservoir. Therefore, the project would not result in a significant impact on sensitive species.

No other special-status species would have the potential to be affected by algaecide application at Lake Jennings. Therefore, the project would have a less than significant impact at Lake Jennings.

Lake Poway

The CNDDB search conducted for Lake Poway identified three special-status plant species and three special-status wildlife species based on the species' regional distribution, as shown in Table 3.

Table 3: CNDDB Search Results at Lake Poway

Common Name	Scientific Name	Status	Habitat	Habitat is not Present in Project Area; Species Eliminated from Further Consideration	Habitat is Present in Project Area
PLANTS					
delicate clarkia	*Clarkia delicate*	CNPS-1	Periphery of oak woodlands and cismontane Chaparral haunts, partially shaded by tree canopy or large shrubs, and typically mesic situations	X	
Robinson's pepper-grass	*Lepidium virginicum var. robinsonii*	CNPS-1	Openings in chaparral and sage scrub, away from coast in foothill elevations; typical sites are relatively dry and exposed	X	
San Diego sagewort	*Artemisia palmeri*	CNPS-4	Coastal sage scrub, riparian scrub or woodland communities, and chaparral below 2000 feet, also along drainages	X	
BIRDS					
coastal California gnatcatcher	*Polioptila californica californica*	FT, CSSC	Diegan coastal sage scrub, dominated by California sagebrush and flat-top buckwheat	X	
southern California rufous-crowned sparrow	*Aimophila ruficeps canescens*	CSSC	Grassy or rocky slopes with open scrub at elevations from sea level to 2000 feet; most populations occur in coastal sage scrub	X	
MAMMALS					
San Diego desert woodrat	*Neotoma lepida intermedia*	CSSC	Habitats with patches of prickly pear or cholla, or with rock outcrops or low shrubs	X	

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FT = Federally Listed as Threatened

SE = State Listed as Endangered
ST = State Listed as Threatened
SCSC = State Listed Species of Concern
CNPS-1 = California Native Plant Society Listed Rare, Threatened, or Endangered in CA only
CNPS-2 = California Native Plant Society Listed Rare, Threatened, or Endangered
CNPS-4 = California Native Plant Society Listed as Limited Distribution

Of these species identified in the CNDDB search, AECOM concluded that none of the plant species has the potential to exist in or adjacent to the reservoir because these species are found in sage scrub and chaparral habitat and at the edges of oak woodland habitat, none of which would be affected by copper application at Lake Poway. Therefore, the project would not have a significant impact on any of the special-status plant species identified for Lake Poway.

Similarly, none of the three wildlife species identified in the Lake Poway CNDDB search were considered to have potential to be present in or adjacent to the reservoir such that they could be exposed to elevated copper levels during or after algaecide application. Therefore, the project would not result in a significant impact on sensitive species.

No other special-status species would have the potential to be affected by algaecide application at Lake Poway. Therefore, the project would have a less than significant impact at Lake Poway.

San Dieguito Reservoir

The CNDDB search conducted for San Dieguito Reservoir identified 11 special-status plant species and three special-status wildlife species based on the species' regional distribution, as shown in Table 4.

Table 4: CNDDB Search Results at San Dieguito Reservoir

Common Name	Scientific Name	Status	Habitat	Habitat is not Present in Project Area; Species Eliminated from Further Consideration	Habitat is Present in Project Area
PLANTS					
California adolphia	*Adolphia californica*	CNPS-2	Within Diegan Sage scrub, also peripheral of chaparral habitats on hillsides near creeks	X	
Nuttall's scrub oak	*Quercus dumosa*	CNPS-1	Lowlands from sea level to 1000 feet in open chaparral and coastal sage scrub,	X	
Orcutt's brodiaea	*Brodiaea orcuttii*	CNPS-1	Vernally moist grasslands, mima mound topography, and periphery of vernal pools	X	

Common Name	Scientific Name	Status	Habitat	Habitat is not Present in Project Area; Species Eliminated from Further Consideration	Habitat is Present in Project Area
Orcutt's spineflower	*Chorizanthe orcuttiana*	CNPS-1, SE, FE	Coastal sage scrub and coastal chaparral openings and mesas in chamise, with loose sandy substrate	X	
Palmer's grapplinghook	*Harpagonella palmeri*	CNPS-4	clay soils and bums below 3260 feet as well as open grassy slopes or open Diegan Sage Scrub	X	
San Diego goldenstar	*Bloomeria clevelandii*	CNPS-1	Valley grasslands coastal sage scrub, and chaparral, near Mima mound topography or vicinity of vernal pools	X	
San Diego marsh-elder	*Iva hayesiana*	CNPS-2	Creeks or intermittent streambeds, open riparian canopy to allow sunlight, sandy alluvial embankments with cobbles		X
San Diego sagewort	*Artemisia palmeri*	CNPS-4	Coastal sage scrub, riparian scrub or woodland communities, and chaparral below 2000 feet, also along drainages		X
sticky dudleya	*Dudleya viscida*	CNPS-1	Shallow soils and cracks on vertical rock faces, steep canyon slopes	X	
summer holly	*Comarostaphylis diversifolia ssp. Diversifolia*	CNPS-1	Southern mixed chaparral, on mesic north-facing slopes	X	
wart-stemmed ceanothus	*Ceanothus verrucosus*	CNPS-2	Coastal chaparral with chamise and Mission Manzanita	X	
BIRDS					
coastal cactus wren	*Campylorhynchus brunneicapillus sandiegensis*	CSSC	Coastal sage scrub with extensive stands of prickly pear or cholla cacti	X	
coastal California gnatcatcher	*Polioptila californica californica*	FT, CSSC	Diegan coastal sage scrub, dominated by California sagebrush and flat-top buckwheat	X	
MAMMALS					
Dulzura pocket mouse	*Chaetodipus californicus femoralis*	CSSC	Coastal sage scrub, chaparral, woodlands, and grasslands, often at the scrub-grassland interface	X	

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CNPS-4 = California Native Plant Society Listed as Limited Distribution

Of the 11 special-status plant species identified in the CNDDB search, AECOM concluded that two of the plant species—San Diego marsh-elder (*Iva hayesiana*) and San Diego sagewort (*Artemisia palmeri*)—have the potential to exist adjacent to the reservoir based on the presence of suitable wetland habitat, as mapped in the SANDAG regional vegetation data. San Diego marsh-elder is an evergreen herbaceous perennial shrub that occupies the margins of permanent alkaline streams and playas near the coast. San Diego sagewort is a perennial deciduous shrub that occupies drainages and riparian scrub from the foothills to the coast. Both of these plants are considered sensitive by the California Native Plant Society due to their limited distribution and threats from water channelization and coastal development. These plants are terrestrial species that may be found in or near drainages that lead into San Dieguito Reservoir. They are not found in open water, so they are unlikely to become inundated by copper-treated water that enters the reservoir after injection at the Cielo Pump Station. Furthermore, the EPA has determined that copper sulfate does not pose a risk to freshwater vascular plants or estuarine/marine plants (EPA 2008), so the potential exposure of these plants to copper as a result of the project would not create a significant impact.

None of the three wildlife species identified in the San Dieguito Reservoir CNDDB search were considered to have potential to be present in or adjacent to the reservoir such that they could be exposed to elevated copper levels during or after algaecide application. Therefore, the project would not result in a significant impact on sensitive species.

No other special-status species would have the potential to be affected by algaecide application at San Dieguito Reservoir. Therefore, the project would have a less than significant impact at San Dieguito Reservoir.

Sweetwater Reservoir

The CNDDB search conducted for Sweetwater Reservoir identified 23 special-status plant species and 28 special-status wildlife species based on the species' regional distribution, as shown in Table 5. In addition to the 28 wildlife species identified in the CNDDB search, AECOM considered two more species based on input from Sweetwater biologists regarding special-status species known to occur near the Sweetwater Reservoir.

Table 5: CNDDB Search Results at Sweetwater Reservoir

Common Name	Scientific Name	Status	Habitat	Habitat is not Present in Project Area; Species Eliminated from Further Consideration	Habitat is Present in Project Area
PLANTS					
California adolphia	*Adolphia californica*	CNPS-2	Within Diegan Sage scrub, also peripheral of chaparral habitats on hillsides near creeks	X	
chaparral ragwort	*Senecio aphanactis*	CNPS-2	Coastal sage scrub, cismontane woodland and alkaline flats	X	
Dean's milk-vetch	*Astragalus deanei*	CNPS-1	Open coastal sage scrub, chaparral, or southern oak woodland on dry hillsides between 805 and 1126 feet	X	
decumbent goldenbush	*Isocoma menziesii* var. *decumbens*	CNPS-1	Coastal Sage Scrub, intermixed with grassland, wetland-riparian, more partial to clay soils		X
desert bedstraw	*Galium proliferum*	CNPS-2	Creosote Bush Scrub, Joshua Tree Woodland	X	
felt-leaved monardella	*Monardella hypoleuca* ssp. *lanata*	CNPS-1	Chaparral understory, beneath mature strands of Chamise in xeric conditions	X	
Laguna Mountains jewelflower	*Streptanthus bernardinus*	CNPS-4	Chaparral, Yellow Pine Forest	X	
mud nama	*Nama stenocarpum*	CNPS-2	Muddy embankments of ponds, lakes, and rivers		X
Munz's sage	*Salvia munzii*	CNPS-2	Coastal sage scrub below 1640 feet in elevation	X	
Otay manzanita	*Arctostaphylos otayensis*	CNPS-1	Dry slopes in chaparral on metavolcanic peaks, shallow soils with exposed rock flake, endemic to Otay mountain sites	X	
Otay Mountain ceanothus	*Ceanothus otayensis*	CNPS-1	Xeric chamise chaparral, restricted to metavolcanic and gabbroic peaks	X	
Otay tarplant	*Deinandra conjugens*	CNPS-1, SE, FT	Fractured clay soils in grasslands or lightly vegetated Diegan sage scrub	X	
Palmer's grapplinghook	*Harpagonella palmeri*	CNPS-4	clay soils and bums below 3280 feet as well as open grassy slopes or open Diegan Sage Scrub	X	
Parry's tetracoccus	*Tetracoccus dioicus*	CNPS-1	Low-growing chamise chaparral, with moderately dense canopy cover	X	

Common Name	Scientific Name	Status	Habitat	Habitat is not Present in Project Area; Species Eliminated from Further Consideration	Habitat is Present in Project Area
purple stemodia	*Stemodia durantifolia*	CNPS-2	Riparian habitats, on wet sand or rocks, drying streambeds lower than 1300 feet	X	
Robinson's pepper-grass	*Lepidium virginicum* var. *robinsonii*	CNPS-1	Openings in chaparral and sage scrub, away from coast in foothill elevations; typical sites are relatively dry and exposed	X	
San Diego ambrosia	*Ambrosia pumila*	CNPS-1, FE	Valleys or disturbed areas below 470 feet, usually creek beds, seasonally dry drainages, and floodplains		X
San Diego barrel cactus	*Ferocactus viridescens*	CNPS-2	Diegan sage scrub hillsides; crest of slopes and growing in cobbles, periphery of vernal pools, slopes below 4922 feet	X	
San Diego goldenstar	*Bloomeria clevelandii*	CNPS-1	Valley grasslands coastal sage scrub, and chaparral, near Mima mound topography or vicinity of vernal pools	X	
San Diego marsh-elder	*Iva hayesiana*	CNPS-2	Creeks or intermittent streambeds, open riparian canopy to allow sunlight, sandy alluvial embankments with cobbles		X
San Diego thorn-mint	*Acanthomintha ilicifolia*	CNPS-1, SE, FT	Grassy openings in chaparral or sage scrub with friable or broken clay soils, in clay depressions on mesas	X	
spreading navarretia	*Navarretia fossalis*	CNPS-1, FT	Vernal pools and vernal swales, ditches and other artificial depressions below 1475 feet	X	
variegated dudleya	*Dudleya variegata*	CNPS-1	Openings in sage scrub and chaparral, isolated rocky substrates in open grasslands, proximity to vernal pools	X	
INVERTEBRATE					
Hermes copper butterfly	*Lycaena hermes*		Chaparral or coastal sage scrub with redberry	X	
San Diego fairy shrimp	*Branchinecta sandiegonensis*	FE	Vernal pools on mesas and in roadsides ditches and tire ruts that are shallow	X	
Thorne's hairstreak	*Callophrys thornei*		Requires Tecate cypress (*Cupressus forbesii*) as a host plant for reproduction. Known remaining populations are within the BLM Otay Mountain Wilderness.	X	

Common Name	Scientific Name	Status	Habitat	Habitat is not Present in Project Area; Species Eliminated from Further Consideration	Habitat is Present in Project Area
Western beach tiger beetle	*Cicindela latesignata latesignata*		Coastal habitats consisting of salt flats associated with estuaries.	X	
Western tidal-flat tiger beetle	*Cicindela gabbii*		Salty coastal habitats including salt marsh, tidal flats, and beaches.	X	
AMPHIBIANS					
arroyo toad	*Anaxyrus californicus*	FE, CSSC	Gravelly or sandy washes, stream and river banks, and arroyos; adults burrow in upland habitat near washes and streams		X
Western spadefoot toad	*Spea hammondii*	CSSC	Prefers sandy or gravelly soil in grasslands, open chaparral, and pine-oak woodlands. Breeds in vernal pools and ephemeral ponds.		X
REPTILES					
coast horned lizard	*Phrynosoma blainvillii*	CSSC	Lowlands along sandy washes with scattered low bushes		X
orange-throated whiptail	*Aspidoscelis hyperythra*	CSSC	Coastal chaparral and thornscrub, within washes, streams, terraces, and other sandy areas associated with some perennial plants		X
Coastal whiptail	*Aspidoscelis tigris stejnegeri*	CSSA	Occurs in a variety of habitats, including chaparral, mixed chaparral, desert scrub, alkali scrub, and annual grassland.	X	
red-diamond rattlesnake	*Crotalus ruber*	CSSC	Chaparral, coastal sage scrub, along creek banks, and in granite rock outcrops or piles of debris		X
Rosy boa	*Charina trivirgata*	CSSA	Sparsely distributed in desert and chaparral habitats.		X
San Diego ringnecked snake	*Diadophis punctatus similis*	CSSA	Most common in rocky areas within valley-foothill, mixed chaparral, and annual grassland habitats.	X	
Western pond turtle	*Emys marmorata*	CSSC	Slow moving rivers, streams, and ponds with emergent marsh vegetation without dense canopy, with protruding rocks, vegetation mats, or submerged logs for sunning		X

Common Name	Scientific Name	Status	Habitat	Habitat is not Present in Project Area; Species Eliminated from Further Consideration	Habitat is Present in Project Area
BIRDS					
coastal cactus wren	*Campylorhynchus brunneicapillus sandiegensis*	CSSC	Coastal sage scrub with extensive stands of prickly pear or cholla cacti	X	
coastal California gnatcatcher	*Polioptila californica californica*	FT, CSSC	Diegan coastal sage scrub, dominated by California sagebrush and flat-top buckwheat	X	
Bell's sage sparrow	*Artemisiospiza belli belli*	CSWL	Coastal sage scrub and open chaparral habitats.	X	
California horned lark	*Eremophila alpestris actia*	CSWL	Inhabits sandy ocean or bay shores, grasslands, and open scrublands and woodlands with low, sparse vegetation.	X	
Cooper's hawk	*Accipiter cooperii*	CSWL (nesting)	Uncommon migrant and winter visitor to woodlands, parks, and residential areas.		X
Double-crested cormorant	*Phalacrocorax auritus*	CSWL	Found near fresh and saltwater near coastline, inshore waters, beaches, inland rivers, and lakes.		X
Least Bell's vireo	*Vireo bellii pusillus*	FE, SE, CSSC	Summer resident of low riparian growth in the vicinity of water or in dry river bottoms. Nests are placed along the margins of bushes, usually *Salix*, *Baccharis*, or *Prosopis*.		X
Southern California rufous-crowned sparrow	*Aimophila ruficeps canescens*	CSWL	Uncommon to fairly common localized resident of sage scrub on steep rocky slopes.	X	
Southwestern willow flycatcher	*Empidonax traillii extimus*	FE, SE	Typically nests in riparian woodlands that are marshy or at water's edge.		X
Swainson's hawk	*Buteo swainsoni*	ST	In southern California, now mostly limited to spring and fall transient. Breeds and roosts in open stands of trees in juniper-sage flats, riparian areas, and in oak savannah. Forages in adjacent grasslands or suitable agricultural fields, or livestock pastures.	X	
Tricolored blackbird	*Agelaius tricolor*	SE, CSSC (nesting colony)	Localized resident; nests in large, dense colonies in freshwater marsh; forages in agricultural areas, lakeshores and damp lawns.		X

Common Name	Scientific Name	Status	Habitat	Habitat is not Present in Project Area; Species Eliminated from Further Consideration	Habitat is Present in Project Area
Yellow warbler	*Setophaga petechia*	CSSC (nesting)	Occupies marshes, swamps, streamside groves, willow and alder thickets, open woodlands with thickets, orchards, gardens, and open mangroves.		X
Yellow-breasted chat	*Icteria virens*	CSSC (nesting)	The breeding population is confined to riparian woodlands in the coastal lowlands.		X
MAMMALS					
American badger	*Taxidea taxus*	CSSC	Primarily uses drier, relatively open stages of scrub, forest, and herbaceous habitats that have friable soils.	X	
Pocketed free-tailed bat	*Nyctinomops femorosaccus*	CSSC	Rare in California, but where it is present, the species' habitat preference includes pinyon-juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oasis.		X
San Diego black-tailed jackrabbit	*Lepus californicus bennettii*	CSSC	Habitats include coastal sage scrub, chaparral, and grasslands.	X	

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FT = Federally Listed as Threatened
SE = State Listed as Endangered
ST = State Listed as Threatened
CSSC = State Listed Species of Concern
CSWL = State Watch List
CSSA = State Special Animal

CNPS-1 = California Native Plant Society Listed Rare, Threatened, or Endangered in CA only
CNPS-2 = California Native Plant Society Listed Rare, Threatened, or Endangered
CNPS-4 = California Native Plant Society Listed as Limited Distribution

Of the 23 special-status plant species identified in the CNDDB search, AECOM concluded that three species are known to exist at the Sweetwater reservoir. These include San Diego marsh-elder (*Iva hayesiana*), decumbent goldenbush (*Isocoma menziesii* var. *decumbens*), and mud nama (*Nama stenocarpum*). One other species that appeared in the CNDDB search, San Diego ambrosia (*Ambrosia pumila*), has the potential to occur at the reservoir based on the presence of suitable wetland habitat, as mapped in the SANDAG regional vegetation data. San Diego marsh-elder is an evergreen herbaceous perennial shrub that occupies the margins of permanent alkaline streams and playas near the coast. Decumbent goldenbush is a low-growing perennial evergreen shrub that occupies chaparral and coastal

scrub. Mud nama is a low-growing annual plant found in marshes, swamps, and lake margins. San Diego ambrosia is a low-growing evergreen rhizomatous perennial shrub that occurs most frequently on alluvial soils in valleys and floodplains that are seasonally dry. These plants are all terrestrial species that may be found in or near drainages that lead into Sweetwater Reservoir or, in the case of mud nama, on the reservoir's muddy embankments. They do not grow in open water, so they are unlikely to become inundated by copper-treated water in the reservoir. Furthermore, the EPA has determined that copper sulfate does not pose a risk to freshwater vascular plants or estuarine/marine plants (EPA 2008), so the potential exposure of these plants to copper as a result of the project would not create a significant impact.

Fifteen of the 30 wildlife species identified in the Sweetwater Reservoir CNDDB search and identified by Sweetwater biologists were considered to have potential to be present in habitat immediately adjacent to the reservoir. Seven of these species are reptiles, including the following: coast horned lizard (*Phrynosoma blainvillii*), orange-throated whiptail (*Aspidoscelis hyperythra*), red-diamond rattlesnake (*Crotalus ruber*), and western pond turtle (*Emys marmorata*) (all CDFW State Species of Special Concern), as well as coastal whiptail (*Aspidoscelis tigris stejnegeri*), rosy boa (*Charina trivirgata*), and San Diego ringnecked snake (*Diadophis punctatus similis*) (CDFW State Special Animals). With the exception of the western pond turtle and red-diamond rattlesnake, they are primarily terrestrial species that would typically not enter the reservoir water, and their target prey base consists of terrestrial invertebrates and rodents, so they are not likely to have any exposure to copper-treated water as a result of the project. While the western pond turtle would be expected to occasionally enter the reservoir, it spends the majority of the time in streams, secluded ponded areas, or in basking habitat along the edge of streams and is unlikely to occur in the open water areas that are treated with copper. The red-diamond rattlesnake has been documented swimming in open water, but this behavior is not a regular or common occurrence. The potential for this species to be swimming in the application area on the reservoir's western side is very limited, and it is unlikely this species would come into contact with copper-treated water. Additionally, the rosy boa and the coast horned lizard have also been documented in the upper riparian zone at Sweetwater Reservoir, but this habitat is distant from the areas of copper-based algaecide application and the potential for these species to come into contact with copper-treated water is very limited. Therefore, the project's impact on these special-status reptile species is less than significant.

Two amphibian species with potential to occur in aquatic habitats adjacent to the reservoir are arroyo toad (*Bufo californicus)* and the western spadefoot toad (*Spea hammondii*). The arroyo toad is a species listed by USFWS as endangered pursuant to the federal Endangered Species Act, and is listed as a CDFW State Species of Special Concern. Outside of the arroyo toad's springtime breeding season, which is from March 1 through June 30, this species inhabits uplands areas with moist soils, typically in the interface between upland and riparian areas near streams. During the breeding season, arroyo toads enter slow-moving streams with adjacent sandbars, where quiet backwaters are available for egg laying. The species does not enter open water. Formerly occupied arroyo toad habitat is located upstream of the Sweetwater Reservoir along the Sweetwater River. The habitat is largely over-grown and arroyo toad has not been detected for many years. The western spadefoot toad is a CDFW State Species of Special Concern. This species occupies moist upland burrows for the majority of the year, only entering shallow rain-filled pools and ponds during the breeding season. Western spadefoot toad would not be expected to occur within the open water of the reservoir. Copper application at Sweetwater Reservoir would occur in open water, and high concentrations of copper would not migrate to formerly occupied arroyo toad or western spadefoot

toad habitat upstream of the reservoir. Therefore, the project would not result in a significant impact on arroyo toad or western spadefoot toad.

Thirteen special-status bird species are known to occur in the vicinity of the Sweetwater Reservoir, all of which have affinities for the various upland and/or wetland vegetation communities within the study area (Table 5, "BIRDS"). Six of those 13 bird species are terrestrial species that would not enter the reservoir water, and their target prey base consists of terrestrial invertebrates and rodents, so they are not likely to have any exposure to copper-treated water as a result of the project. These six birds are coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*) (State Species of Concern), coastal California gnatcatcher (*Polioptila californica californica*) (Federally-listed threatened, and a State Species of Concern), Bell's sage sparrow (*Artemisiospiza belli belli*) (State Watch List), California horned lark (*Eremophila alpestris actia*) (State Watch List), southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*) (State Watch List), and Swainson's hawk (*Buteo swainsoni*) (State-listed threatened). Therefore, the project's impact on these special-status reptile species is less than significant.

The other seven bird species are also terrestrial but are strongly associated with riparian and wetland vegetation communities associated with the Sweetwater reservoir. These are double-crested cormorant (*Phalacrocorax auritus*) (State Watch List), least Bell's vireo (*Vireo bellii pusillus*) (Federally and State-listed endangered, and a State Species of Concern), southwestern willow flycatcher (*Empidonax traillii extimus*) (Federally and State-listed endangered), tricolored blackbird (*Agelaius tricolor*) (State-listed endangered, and State Species of Concern), Cooper's hawk (*Accipiter cooperii*) (State Watch List), yellow warbler (*Setophaga petechia*) (State Species of Concern), and yellow-breasted chat (*Icteria virens*) (State Species of Concern). With the exception of the double-crested cormorant, these bird species would not be expected to swim, wade, or forage in the reservoir. In the case of the double-crested cormorant, the proposed application locations would be located away from potential rookery sites. Rookeries are colonial nests, and the double-crested cormorant builds their nests from twigs and branches, on cliff ledges, in trees, or occasionally on the ground; as such, rookeries would typically be near but not on water. Additionally, the activities associated with the application of algaecide would be expected to flush the cormorant away from the treated area. Once applied, copper sulfate quickly hydrolyzes and moves down the water column, and the likelihood of direct contact with avian species would be minimized. Terrestrial wildlife species have mechanisms for sequestering and/or eliminating some excess copper levels (EPA 2008). In order to minimize ecological risk and to avoid exposing terrestrial wildlife to high concentrations of copper that could have adverse effects, the EPA requires strict labeling and application guidelines associated with copper pesticides and algaecides, including weather restrictions and steps to minimize spray drift (EPA 2008), which will be strictly adhered to by Sweetwater pursuant to their APAP. Therefore, the project would have a less than significant impact on avian species at Sweetwater Reservoir.

Of the three special-status mammal species documented in the CNDDB query, only the pocketed free-tailed bat (*Nyctinomops femorosaccus*) would be expected to utilize the aquatic habitat of the Sweetwater Reservoir. The species is a State Species of Concern, and would be expected to fly over the reservoir during nighttime foraging, to skim the surface while drinking water. Since the application of algaecide would occur during daytime hours, the pocketed free-tailed bat would not be present when copper sulfate is being dispersed, or when the compound is at the surface of the reservoir. The other two mammal species identified in the CNDDB query are the American badger (*Taxidea taxus*) and San Diego black-

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

tailed jackrabbit (*Lepus californicus bennettii*), which are both terrestrial species that would not be expected to enter the reservoir. Therefore, the application of copper sulfate is not expected to result in significant impacts to mammal species at the Sweetwater Reservoir site.

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?			X	

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project does not entail vegetation clearing or other activities that could have an adverse effect on riparian habitats or other sensitive natural communities. Project-related application of algaecide would occur in open water at surface water reservoirs or, in the case of San Dieguito Reservoir, through direct injection at the Cielo Pump Station, which then pumps water into a surface water reservoir. Applied copper settles out of water as it is taken up by the targeted algae and becomes bound to bottom sediments. Therefore, significant amounts of copper would not migrate into wetland habitat that exists at the fringes of the subject reservoirs. Furthermore, the EPA has determined that copper sulfate does not pose a risk to freshwater vascular plants or estuarine/marine plants (EPA 2008), so the potential copper exposure to plants that form these wetland communities would not create a significant impact.

Provision IX.4.b of the General Permit requires public entities who obtain an exception to the receiving water limitations on copper concentration to provide certification by a qualified biologist that beneficial uses of receiving waters have been restored upon completion of an algaecide application. This observation and certification process would be incorporated into the monitoring and reporting protocol for all five agencies addressed in this MND. If unforeseen situations arise in which the beneficial uses of receiving waters are adversely affected following an application, then provision IX.5.b of the General Permit requires the agency to implement corrective action by revising its application process and control measures to ensure that the situation is eliminated and will not be repeated in the future.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project does not propose direct removal, filling, hydrological interruption, or other disturbance of wetlands or jurisdictional waters. Therefore, no impact would occur.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project does not entail new construction or modification of existing features that could affect wildlife movement. Therefore, no impact would occur.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

There are no local policies or ordinances pertaining to biological resources that would apply to algae treatment activity at the subject reservoirs. Therefore, no impact would occur.

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?				X

Olivenhain Reservoir

The Water Authority conducts capital improvement projects and operations and maintenance (O&M) work within its system pursuant to the Water Authority NCCP/HCP, which was adopted in December 2010 (San Diego County Water Authority 2010). The Water Authority NCCP/HCP is a comprehensive program designed in conjunction with CDFW and USFWS to (1) facilitate conservation and management of plan-specified covered species and habitats associated with Water Authority activities, and (2) contribute to ongoing regional conservation efforts. Section 5.2.14 of the Water Authority NCCP/HCP identifies pest control, including pesticide application, as a covered activity, but does not specify aquatic pest control at Olivenhain Reservoir as part of this activity (nor does it preclude such activity). The project is limited to occasional O&M work at the reservoir that would not have any direct impact on habitat, nor would it result in take of any covered species. Therefore, the project would not rely on the permits for habitat impacts or species impacts obtained by the Water Authority as part of the NCCP/HCP process, and NCCP/HCP reporting is not required for project-related activities at Olivenhain Reservoir. The project would not conflict with provisions of the Water Authority NCCP/HCP, and there would be no impact.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

Lake Jennings and Sweetwater Reservoir

HWD and Sweetwater, along with Padre Dam Municipal Water District, formed the Joint Water Agencies (JWA) to prepare a combined NCCP and HCP for land management and conservation of natural habitats and species specific to the projects and O&M work related to these agencies' systems. However, preparation of the JWA NCCP was terminated in 2012. Therefore, no current habitat conservation plans pertain to activity at Lake Jennings and Sweetwater Reservoir, and there would be no impact.

Lake Poway

Poway adopted its HCP/NCCP in April 1996 (City of Poway 1996). The Poway HCP/NCCP identifies Lake Poway and immediately surrounding lands with the land use designation Open Space-Recreation as active recreation areas, with the lake allowing boating and fishing and the developed park space supporting picnic areas, ball fields, and land areas featuring active recreation that is generally not compatible with open space preservation. The Poway HCP/NCCP does not explicitly allow or prohibit pesticide application at Lake Poway. The project is limited to occasional O&M work at the reservoir that would not have any direct impact on habitat, nor would it result in take of any species covered by Poway's plan. Therefore, the project would not rely on the permits for habitat impacts or species impacts obtained by the Water Authority as part of the NCCP/HCP process, and NCCP/HCP reporting is not required for project-related activities at Lake Poway. The project would not conflict with provisions of the Water Authority NCCP/HCP, and there would be no impact.

San Dieguito Reservoir

SFID is preparing a subarea plan to the MSCP that will include San Dieguito Reservoir and its surrounding lands, but the plan is in draft form and has not yet been finalized, nor have permits been issued pursuant to the plan (Santa Fe Irrigation District 2012). Therefore, no current habitat conservation plans pertain to activity at San Dieguito Reservoir, and there would be no impact.

V. CULTURAL RESOURCES. Would the project:

V. Cultural Resources

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project does not entail ground disturbance or any other activities that might adversely alter or disturb a historical resource. There would be no impact.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?				X

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See V.a) above. No project activities would disturb or adversely affect the significance of an archaeological resource. There would be no impact.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See V.a) above. No project activities would affect a unique paleontological resource or geologic feature. Project activities would be contained to the open water and therefore would have no impact.

d) Disturb any human remains, including those interred outside of formal cemeteries?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See V.a) above. There would be no impact.

VI. GEOLOGY AND SOILS. Would the project:

VI. Geology and Soils

a) Expose people or structures to 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 known fault? Refer to Division of Mines and Geology Special Publication 42.				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

Project activities are limited to algaecide transportation, application, and water quality monitoring at the subject reservoirs. The project would not develop new structures or expose people to any risk of geologic hazards. There would be no impact.

ii) Strong seismic ground shaking?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See VI.a.- i) above. The project would not expose people or structures to seismic shaking and would not produce an increased risk of loss or injury due to ground shaking. There would be no impact.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
iii) Seismic-related ground failure, including liquefaction?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See VI.a.- i) above. Project activities would occur only on the waters of the reservoirs and would not expose people or structures to ground failure. There would be no impact.

iv) Landslides?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See VI.a.- i) above. The project would not involve any ground-disturbing activities and would not expose people or structures to related hazards. There would be no impact.

b) Result in substantial soil erosion or loss of topsoil?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project does not entail ground disturbance and would not create conditions that could contribute to soil erosion and loss of topsoil. There would be no impact.

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?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

No project elements would be located on unstable geologic or soil units, and would not lead to a related hazard. Therefore, no impact would occur.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See VI.c) above. No new structures would be built as a result of this project. No project activities would occur on expansive soil, so no impact would occur.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project involves the direct application of algaecide into reservoirs and would not involve the use of septic tanks or alternative waste water disposal systems. Therefore, no related impacts would occur.

VII. GREENHOUSE GAS EMISSIONS. Would the project:

VII. Greenhouse Gas Emissions

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See Section III.a) above. A minimal amount of greenhouse gas (GHG) emissions would be generated by trucks during the transportation of the algaecides to the reservoirs, and by the boats used to apply the algaecides and to conduct water quality monitoring. These activities would occur minimally on an as-needed basis and would last for a short duration. These emissions would not elevate GHG emissions significantly above existing conditions. This impact is less than significant.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emission of greenhouse gases?			X	

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See VII.a) above. The GHG emissions created by project activities would be negligible. Therefore, the project would not conflict with an applicable plan, policy, or regulation in the San Diego region. This impact is less than significant.

VIII. HAZARDS AND HAZARDOUS MATERIALS. Would the project:

VIII. Hazards and Hazardous Materials

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?		X		

Algaecide application at the subject reservoirs would entail transporting, handling, and using copper, which is a regulated hazardous material, but one that is commonly used in applications such as is proposed as part of the project. The EPA "Copper Facts" factsheet discusses the human health risks and

environmental hazards related to copper-based pesticides and algaecides. According to the EPA's fact sheet, "There are no human health risks of concern for dietary (food and drinking water) exposures to the pesticidal uses of copper. However, some of the various copper compounds and formulations may cause some dermal or eye irritation." Exposure or ingestion at very high levels can be harmful to human health, and the EPA regulates labeling of copper-based pesticide and algaecide products to prevent injury resulting from improper handling and application. The factsheet also indicates that copper is highly toxic to most aquatic species but is less of a concern for terrestrial species. In response to potential hazards of these materials, EPA publishes standards for application of copper-based algaecides that are incorporated into product labels.

The potential for project-related impacts related to transport and handling of copper would be the result of spills or improper application, which could lead to worker or environmental exposure at toxic levels. Section VIII.C of the General Permit requires a discharger to incorporate into their APAP the BMPs that will be employed in association with algaecide application so as to reduce the risk of worker or environmental exposure at hazardous levels, including measures to prevent spills and to ensure application at rates consistent with the product label, a plan for staff education on proper use of the products, and measures to prevent fish kills. Section V.B.1 of the General Permit states that dischargers pursuant to the permit must be licensed by the Department of Pesticide Regulation for applicable products; however, copper-based algaecide applications do not require such a license because copper is not a federal restricted use pesticide (RUP) or a California restricted material.

The impact discussion below assesses the potential hazards of copper application at each of the subject reservoirs and identifies the best management practices stated in the agencies' APAPs, which will be incorporated as mitigation measures to ensure the project's impact related to hazardous materials would be reduced to less-than-significant levels.

Olivenhain Reservoir

Algaecide application at Olivenhain Reservoir entails transporting and handling copper sulfate pentahydrate, which is a regulated hazardous material. The Water Authority estimates up to 80 pounds of the solid crystalline product would be delivered for a single application. The product would be purchased at the time of each application, and would not be stored at the Water Authority's facility. The Water Authority's APAP encloses a Material Safety Data Sheet (MSDS) describing copper sulfate's potential hazards and handling precautions. The MSDS describes copper sulfate pentahydrate as a blue crystalline or powdered, odorless solid that is harmful or potentially fatal if swallowed. The material may cause irritation to the eyes, respiratory system, and skin, and exposing the material to flames may produce irritating, corrosive, and/or toxic fumes. The Water Authority's algaecide application at Olivenhain Reservoir also entails transporting and handling citric acid in solid form, which is less of a concern than copper sulfate, but is identified in the MSDS provided in the Water Authority's APAP as a potential irritant to eyes and skin (San Diego County Water Authority 2014a). All empty containers will be disposed of in accordance with all manufacturer and regulatory requirements.

Transport, handling, and use of copper sulfate and citric acid at Olivenhain Reservoir would create the potential for spills that could affect worker safety and the environment. The Water Authority operates with an Emergency Response Guide and Hazardous Materials Business Plan that would be followed in

the event of a spill. The Water Authority's APAP incorporates measures to prevent hazards related to a potential spill from occurring. With the implementation of these mitigation measures, the project's hazardous materials impact at Olivenhain Reservoir would be reduced to a less-than-significant level.

> **OLIVENHAIN-HAZ-1:** The Water Authority will require training in copper sulfate and citric acid safety for all Water Authority employees participating in the application and handling of these chemicals. Response and containment procedures provided in the Water Authority's Emergency Response Guide, Hazardous Materials Business Plan and the product MSDS will be followed in the event of a spill. These procedures include isolation and containment of the spill while wearing the appropriate personal protective equipment.
>
> **OLIVENHAIN-HAZ-2:** The Water Authority will avoid over-application by ensuring that employees involved with chemical application follow the specific product labels for the algaecides used in the program. Algaecide quantities required for each treatment will be precalculated and only sufficient material to carry out the treatment is transported for an application event. All label directions and California Department of Pesticide Regulation guidelines will be followed as to acceptable application methods as well as weather limitations for application.
>
> **OLIVENHAIN-HAZ-3:** Water Authority staff members that may come into contact with the algaecide will be trained on its use and hazards by the safety department. Review of all applicable MSDSs will be included in the training to ensure that employees are up to date on the hazards associated with the chemical(s) used. Personal protective equipment is supplied to any employee that will be working with the chemical(s). Goggles, face shield, chemically impervious gloves, and protective clothing to prevent skin contact are provided and used any time work is to be done with the algaecide.
>
> **OLIVENHAIN-HAZ-4:** The Water Authority will ensure that application of algaecides is targeted at nuisance algae growths and that algaecides are applied in accordance with label instructions to minimize the application quantity and maximize efficacy. This includes avoiding uneven distribution and applying during favorable weather conditions, when feasible. Because nuisance algal growth affects the beneficial uses within the project area, application of algaecides will be proactive, which will minimize the quantity of decaying algae that results and may threaten oxygen levels.

Lake Jennings

Algaecide application at Lake Jennings entails transporting and handling Cutrine Plus, a liquid copper-based product that is a regulated hazardous material. HWD estimates using 2.75 to 11 gallons of liquid Cutrine Plus per application, and would order the specific amount at the time application is needed. HWD's APAP encloses an MSDS describing Cutrine Plus's potential hazards and handling precautions. The MSDS describes Cutrine Plus as a liquid product that can cause irritation to the eyes, respiratory system, and skin, and that is slightly toxic if swallowed (Helix Water District 2014a). Exposing the material to flames may produce irritating, corrosive, and/or toxic fumes. All empty containers would be disposed of pursuant to the instructions on the product label and applicable regulations.

Transport, handling, and use of Cutrine Plus at Lake Jennings would create the potential for spills that could affect worker safety and the environment. HWD's APAP incorporates measures to prevent these hazards from occurring. With the implementation of these mitigation measures, the project's hazardous materials impact at Lake Jennings would be reduced to a less-than-significant level.

> **JENNINGS-HAZ-1:** HWD will ensure that algaecide use rates will be per the U.S. Environmental Protection Agency (EPA) label and will be limited to ensure compliance with receiving water limitations. Treatments will be performed when no water is being discharged from the lake system.
>
> **JENNINGS-HAZ-2:** HWD will ensure that application personnel follow the storage, transport, and spill control procedures per EPA and California Department of Pesticide Regulation rules, regulations, and label instructions.
>
> **JENNINGS-HAZ-3:** HWD will ensure that algaecide quantities required for each treatment will be precalculated and only sufficient material to carry out the treatment will be transported for an application event. Application equipment will be routinely cleaned and maintained, and all label directions and Department of Pesticide Regulations guidelines will be followed as to acceptable application methods, including limitations due to weather conditions. Surface applications will not be made in winds above 10 miles per hour.

Lake Poway

Algaecide application at Lake Poway entails transporting and handling copper sulfate, which is a regulated hazardous material. Poway applies the solid copper sulfate at a rate of 5 pounds per acre foot of water, and estimates an average use of roughly 300 pounds per application. Copper sulfate is an odorless solid that is harmful or potentially fatal if swallowed. The material may cause irritation to the eyes, respiratory system, and skin, and exposing the material to flames may produce irritating, corrosive, and/or toxic fumes (San Diego County Water Authority 2014a). Copper sulfate is ordered by Poway by the pallet, and is used as needed. Post-application, the empty copper sulfate bags are disposed of by Poway. Transport, handling, and use of copper sulfate at Lake Poway would create the potential for spills that could affect worker safety and the environment. Poway's APAP incorporates measures to prevent these hazards from occurring. With the implementation of these mitigation measures, the project's hazardous materials impact at Lake Poway would be reduced to a less-than-significant level.

> **POWAY-HAZ-1**: Poway will ensure that algaecide use rates will be per the EPA label and will be limited to ensure compliance with receiving water limitations. Treatments will be performed when no water is being discharged from the lake system.
>
> **POWAY-HAZ-2**: Poway will ensure that application personnel follow the storage, transport, and spill control procedures per EPA and California Department of Pesticide Regulation rules, regulations, and label instructions.
>
> **POWAY-HAZ-3**: Poway will ensure that algaecide quantities required for each treatment will be precalculated and only sufficient material to carry out the treatment will be transported for an

application event. Application equipment will be routinely cleaned and maintained, and all label directions and Department of Pesticide Regulation guidelines will be followed as to acceptable application methods, including limitations due to weather conditions. Surface applications will not be made in winds above 10 miles per hour.

San Dieguito Reservoir

Algaecide application at San Dieguito Reservoir entails transporting and handling a liquid form of copper sulfate pentahydrate, which is a regulated hazardous material. SFID's APAP encloses an MSDS describing copper sulfate's potential hazards and handling precautions. The MSDS describes copper sulfate pentahydrate as a clear blue, corrosive liquid with minimal odor. The substance is harmful if swallowed and may cause irritation to the eyes, respiratory system, and skin (Santa Fe Irrigation District 2014a). Exposing the material to flames may produce irritating, corrosive, and/or toxic fumes.

Application of algaecides at San Dieguito Reservoir is conducted via a feed system in the Cielo Pump Station, as opposed to application on the reservoir from a boat, which allows for safe and effective application and minimizes exposure to workers and unintended targets. SFID estimates using 100 to 500 gallons of the liquid copper sulfate pentahydrate per application. Because applications at San Dieguito Reservoir are from a fixed feed system, the rate of application can be tightly controlled from the chemical metering portion of the system. Each feed system is contained within a spill catchment that is sized to capture 100% of the chemical available for feed.

Transport, handling, and use of copper sulfate at San Dieguito Reservoir would create the potential for spills that could affect worker safety and the environment. SFID generally orders a year's supply of the product, and stores it on site to use as needed. After application the containers are triple rinsed and disposed of by SFID. SFID's APAP incorporates measures to prevent hazardous spills and exposure from occurring during and after application of copper sulfate. With the implementation of these mitigation measures, the project's hazardous materials impact at San Dieguito Reservoir would be reduced to a less-than-significant level.

SAN DIEGUITO-HAZ-1: SFID will ensure the algaecide treatment system within the Cielo Pump Station is flushed with water at the end of each treatment event to eliminate having any copper sulfate remaining in the system, which will protect the feed system from corrosion and leaks and minimize the potential for worker exposure.

SAN DIEGUITO-HAZ-2: SFID will ensure that a break in the algaecide application feed line, tanks, or pumps will be captured and treated as hazardous waste. SFID's safety department will employ a hazardous waste disposal company that will properly dispose of any material that has been contaminated by a spill.

SAN DIEGUITO-HAZ-3: SFID staff will calculate maximum dosage rates and program them into the feed system to ensure correct concentration of the feed. The rate of feed for any treatment event will be limited to the recommendations on the product label and the MSDS to ensure effectiveness and minimize any unintended effects on nontargeted organisms.

SAN DIEGUITO-HAZ-4: SFID will ensure that any staff members that may come into contact with copper sulfate are trained on its use and hazards by the SFID safety department. SFID will periodically review the product's MSDS to ensure employees are up to date on the hazards associated with the chemical. SFID will ensure personal protective equipment is supplied to any employee that will be working with copper sulfate. Goggles, face shield, chemically impervious gloves, and protective clothing to prevent skin contact will be provided by SFID and used any time work is to be done with the algaecide.

Sweetwater Reservoir

Algaecide application at Sweetwater Reservoir entails transporting and handling copper sulfate pentahydrate, which is a regulated hazardous material. Sweetwater generally stores enough copper sulfate product on site for two treatment applications. On average, an application at the Sweetwater Reservoir has required 1,250 pounds of solid copper sulfate crystals. This number varies based on water level and how much of the lake's surface area is being treated. The application rate of copper sulfate is approximately 2 pounds per surface acre. Sweetwater's APAP encloses an MSDS describing copper sulfate's potential hazards and handling precautions. The MSDS describes copper sulfate pentahydrate as a blue crystalline or powdered, odorless solid that is harmful or potentially fatal if swallowed. The material may cause irritation to the eyes, respiratory system, and skin, and exposing the material to flames may produce irritating, corrosive, and/or toxic fumes. Sweetwater's algaecide application at Sweetwater Reservoir also entails transporting and handling citric acid in solid form, which is less of a concern than copper sulfate but is identified in the MSDS provided in Sweetwater's APAP as a potential irritant to eyes and skin (Sweetwater Authority 2013). After application, the empty 50 pound bags of copper sulfate are disposed of by Sweetwater in a sanitary landfill, as per the product label instructions.

Transport, handling, and use of copper sulfate and citric acid at Sweetwater Reservoir would create the potential for spills that could affect worker safety and the environment. Sweetwater operates with a Chemical Hygiene Plan and Hazardous Response Plan that would be followed in the event of a spill. Sweetwater's APAP incorporates measures to prevent spill-related hazards from occurring. With the implementation of these mitigation measures, the project's hazardous materials impact at Sweetwater Reservoir would be reduced to a less-than-significant level.

SWEETWATER-HAZ-1: Sweetwater will apply copper sulfate and citric acid in accordance with the product label and shall comply with the recommendations provided on the MSDS applicable to the specific copper sulfate product to be used. Copper sulfate will be applied in an even, consistent manner over the surface area to be treated, thus minimizing the potential for higher than intended localized concentrations.

SWEETWATER-HAZ-2: Sweetwater will require training in copper sulfate and citric acid safety for all Sweetwater employees participating in the application and handling of copper sulfate. Sweetwater shall conduct additional refresher training, as deemed necessary, prior to each treatment event.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

SWEETWATER-HAZ-3: Sweetwater will follow all response and containment procedures provided in their Chemical Hygiene Plan, Hazardous Response Plan, and the product MSDS in the event of a spill. These procedures include isolation and containment of the spill while wearing the appropriate personal protective equipment.

SWEETWATER-HAZ-4: Sweetwater will require its employees participating in the application or handling of copper sulfate and citric acid to wear appropriate personal protective equipment recommended on the MSDS, including protective safety glasses with side shields (or goggles) per Occupational Safety and Health Administration (OSHA) 29 CFR 1910.133. Chemically impervious gloves made of any waterproof material, boots, and protective clothing will be worn to avoid skin contact (refer to OSHA 29 CFR 1910.138), as well as a respirator that meets OSHA 29 CFR 1910.134 requirements.

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?		X		

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See VIII.a) above. Implementation of the mitigation measures identified above will reduce this impact to a less-than-significant level at all of the subject reservoirs.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

There are no schools within ¼ mile of any of the subject reservoirs. Therefore, no impact would occur.

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?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project does not entail any new development, earth disturbance, or other activities that could be affected by prior hazardous materials listing at any of the subject reservoirs. Therefore, no impact would occur.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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 for people residing or working in the project area?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project does not entail any new development or activities that could be affected by air traffic. Therefore, no impact would occur.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project does not entail any new development or activities that could be affected by air traffic. Therefore, no impact would occur.

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project does not entail any new development or construction activities that could interfere with emergency response. Therefore, no impact would occur.

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project does not entail any new development or construction activities that could cause or be affected by wildland fire. Therefore, no impact would occur.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
IX. HYDROLOGY AND WATER QUALITY. Would the project:				
IX. Hydrology and Water Quality				
a) Violate any water quality standards or waste discharge requirements?		X		

As discussed in Section 1.1, the application of copper-based products for treatment of algae is permitted under the State Board's Water Quality Order No. 2013-0002-DWQ, *Statewide General Permit for Residual Aquatic Pesticide Discharges to Waters of the U.S. from Algae and Aquatic Weed Control* (General Permit), which regulates use of aquatic pesticides for the purpose of maintaining water quality statewide. The General Permit identifies a limitation on copper concentration in waters that receive permitted pesticide application, which is specified in Table 3 of the permit. The copper limitation is based on the California Toxics Rule (CTR) and varies depending on water hardness. Copper is more toxic to aquatic species when water is softer, as a lower concentration of minerals means a lower concentration of materials with which copper can bond, leading to a greater accumulation of copper in the water.

However, the State Board's permitting process acknowledges that public water agencies and mutual water companies may need to periodically exceed this copper limitation when required to otherwise control water quality in their facilities that serve the public. Section 5.3 of the State Implementation Plan provides a Categorical Exemption to the toxics standards where the discharge is necessary to meet statutory requirements under the federal Safe Drinking Water Act or the California Health and Safety Code. The potential application of this Categorical Exception to the receiving-water copper limitation is identified in Table 3 of the General Permit, which points to Attachment G of the permit, a list of water agencies and mutual water companies that have been granted exemptions. The Categorical Exception is intended as a short-term or seasonal exception, not a permanent pass on meeting the limitations. As stated in the General Permit's Fact Sheet, Attachment D to the permit, "there is no discrete definition for short-term; but the intent is to allow the exception to apply during the treatment period. It is up to the Discharger to make this demonstration." The timeframe of when an agency expects they may exceed the receiving water limitations is identified in the agency's Notice of Intent. If the agency is granted the exception, the agency's APAP is revised to identify the approved seasonal exception. For these agencies that are granted the exception, the General Permit or SIP does not state additional limits on copper concentrations for those agencies who have been granted an exception. Instead, water quality monitoring is conducted before, during, and after an application event, and this information is reported to the State Board so they can observe application-related conditions and ensure there are no causes for water quality concern at the respective receiving water.

As described above in Section 1.3, the purpose of algaecide application at the five subject reservoirs is to control serious algae blooms that could affect water quality at the subject reservoirs. This periodic treatment is necessary so the agencies can meet taste and odor standards in the drinking water they deliver to their respective consumers. Therefore, such discharges would qualify for the Categorical Exception to the CTR standards that are incorporated into the General Permit's receiving water limitations. The five subject water agencies plan to apply for coverage under the General Permit for use of copper sulfate and, as part of that application, seek the Categorical Exception to the receiving water limitations in case they identify the need to apply increased concentrations of copper during serious algae blooms.

The agencies' use of copper sulfate to control algae blooms would temporarily elevate copper concentrations in the subject reservoirs. If high concentrations of copper are needed or soft water conditions in the treated reservoirs elevate the copper toxicity, then these applications could result in excess of the thresholds set forth in the CTR and translated to the General Permit. Exceeding the thresholds in this instance would itself be necessary to prevent water quality impacts at the five reservoirs, but exceeding the thresholds would still be considered a significant impact. By seeking an exemption from the thresholds pursuant to the State Board's permit process, this potentially significant impact would be reduced to a less-than-significant level. Mitigation measures are stated below for each subject agency.

Olivenhain Reservoir

OLIVENHAIN-WQ-1: The Water Authority will apply for coverage under the State Board's NPDES Permit for Discharges of Aquatic Pesticides and, as part of that application, seek a Categorical Exception pursuant to Section 5.3 of the State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.

OLIVENHAIN-WQ-2: The Water Authority will continue to monitor and report copper levels in Olivenhain Reservoir in accordance with State Board requirements.

Lake Jennings

JENNINGS-WQ-1: HWD will apply for coverage under the State Board's NPDES Permit for Discharges of Aquatic Pesticides and, as part of that application, seek a Categorical Exception pursuant to Section 5.3 of the State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.

JENNINGS-WQ-2: HWD will continue to monitor and report copper levels in Lake Jennings in accordance with State Board requirements.

Lake Poway

POWAY-WQ-1: Poway will apply for coverage under the State Board's NPDES Permit for Discharges of Aquatic Pesticides and, as part of that application, seek a Categorical Exception pursuant to Section 5.3 of the State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.

POWAY-WQ-2: Poway will continue to monitor and report copper levels in Lake Poway in accordance with State Board requirements.

San Dieguito Reservoir

SAN DIEGUITO-WQ-1: SFID will apply for coverage under the State Board's NPDES Permit for Discharges of Aquatic Pesticides and, as part of that application, seek a Categorical Exception pursuant to Section 5.3 of the State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

SAN DIEGUITO-WQ-2: SFID will continue to monitor and report copper levels in San Dieguito Reservoir in accordance with State Board requirements.

Sweetwater Reservoir

SWEETWATER-WQ-1: Sweetwater will apply for coverage under the State Board's NPDES Permit for Discharges of Aquatic Pesticides and, as part of that application, seek a Categorical Exception pursuant to Section 5.3 of the State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.

SWEETWATER-WQ-2: Sweetwater will continue to monitor and report copper levels in Sweetwater Reservoir in accordance with State Board requirements.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project would not entail the use of groundwater and, thus, would not deplete groundwater supplies or interfere with groundwater recharge. Therefore, no related impacts would occur.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project would not affect drainage patterns. Therefore, no impact would occur.

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See IX.c) above. No impact would occur.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See IX.c) above. The project would not create or contribute runoff water. No impact would occur.

f) Otherwise substantially degrade water quality?		X		

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See IX.a) above. All of the respective reservoirs are surface water impoundments within potable water systems, and none of them release considerable amounts of water to downstream water bodies. Therefore, temporarily increased copper levels at the reservoirs after application would have no impact outside the subject reservoirs. There are no other project components that would affect water quality that are not already discussed in IX.a). With the implementation of the mitigation measures stated above in IX.a), this impact would be reduced to a less than-significant level.

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project would not place housing in floodplains. No related impacts would occur.

h) Place structures within a 100-year flood hazard area which would impede or redirect flood flows?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project would not place structures in flood hazard areas. No related impacts would occur.

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project would not expose people or structures to potential flooding. Therefore, no related impacts would occur.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
j) Inundation by seiche, tsunami, or mudflow?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project does not propose development or other uses that could be affected by seiche, tsunami, or mudflow. Therefore, no impact would occur.

X. LAND USE AND PLANNING. Would the project:

X. Land Use and Planning

a) Physically divide an established community?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project would be implemented within existing reservoirs and does not entail building any new structures. Thus, the project would not physically divide an established community and no related impacts would occur.

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project would not result in a change in land use, or create any new land uses, so it would not conflict with any applicable land use plan, policy, or regulation. Therefore, no related impacts would occur.

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See IV.f) above. The project would not conflict with any applicable habitat conservation or natural community conservation plans. Therefore, no impact would occur.

XI. MINERAL RESOURCES. Would the project:

XI. Mineral Resources

a) Result in the loss of availability of a known mineral resource that would be of future value to the region and the residents of the state?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

Activities of the proposed project are limited to the application of algaecides into existing reservoirs in the San Diego region. No development or ground-disturbing activities would occur, and there would be no loss of availability of mineral resources. Therefore, no impacts to mineral resources would occur.

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?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See XI.a) above. The project activities would not result in the loss of availability of a mineral resource recovery site. There would be no impact.

XII. NOISE.
XII. Noise
Would the project result in:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

Algaecide application involves limited use of delivery trucks and boats on the subject reservoirs. Trucks would be licensed for use on existing roadways, and any noise produced would not exceed thresholds. On the reservoirs that allow boating, noise from the boat motor would not create significant adverse conditions. On the reservoirs that restrict boating access, other uses are restricted as well, so no people in the surrounding area would be significantly affected by the noise of the motor. Additionally, noise from one power boat engine would not be enough to exceed the thresholds of a general plan or other applicable standards. Noise generation would be short in duration and occur sporadically, on an as-needed basis. There would be no impact.

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See XII.a) above. Any groundborne vibration from delivery trucks would be inconsequential due to the short duration and minimal use of the equipment. There would be no impact.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project does not entail installation or operation of new permanent sources of stationary noise. Therefore, no impact would occur.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			X	

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See XII.a) above. Trucks and boats would generate noise at the project area, but this would not be a substantial increase in noise, especially for the reservoirs that allow use of the lake for recreational activities. For the reservoirs that do not allow public access, the project activity would not last long enough or create enough of a noise disturbance to be considered substantial. This is a less than significant impact.

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 expose people residing or working in the project area to excessive noise levels?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

None of the subject reservoirs are located within an airport use plan or within 2 miles of a public airport. Therefore, no related impacts would occur.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

None of the subject reservoirs are in the vicinity of a private airstrip. Therefore, no impact would occur.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

XIII. POPULATION AND HOUSING. Would the project:

XIII. Population and Housing

a) Induce substantial 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)?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project does not entail construction of homes, businesses, or new infrastructure. Therefore, no impact would occur.

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project occurs within the boundaries of existing reservoirs, and would not impact or displace existing housing or necessitate construction of replacement housing in the area. Therefore, no related impacts would occur.

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See XIII.b) above. There would be no impact.

XIV. PUBLIC SERVICES.

XIV. Public Services

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 governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

a) Fire protection?			X	

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project involves the application of algaecides into the waters of existing reservoirs. There would be no development or construction of new structures, and no alteration of existing government facilities or new government facilities would be necessary. According to the MSDS included in the project-related APAPs, the algaecide products that would be used pursuant to this project are not flammable; therefore, on-site storage and use in compliance with applicable requirements would not

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

create a fire hazard. However, the products may decompose if exposed to the heat of a fire and produce corrosive and/or toxic fumes. The storage and use of hazardous materials for algaecide application could require the hazmat response services of local fire agencies in the event of an unforeseen accident. The potential for this to occur is limited and would be alleviated by proper storage and use of the products. Therefore, the project would not result in a significant impact on response times or service standards and the project's impact on fire protection services is less than significant.

b) Police protection?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See XIV.a) above. There would be no impact to police protection.

c) Schools?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See XIV.a) above. There would be no impact to school facilities.

d) Parks?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See XIV.a) above. There would be no impact to parks.

e) Other public services?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See XIV.a) above. There would be no impact to other public services.

XV. RECREATION.
XV. 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?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

Application of algaecides at the subject reservoirs would not increase the use of existing recreational facilities. No impact would occur.

In addition, the potential for impacts on existing water-based recreational uses at the subject reservoirs has been considered. There are no in-water recreational uses allowed at Olivenhain Reservoir, San

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

Dieguito Reservoir, or Sweetwater Reservoir. HWD, Poway, and Sweetwater do not restrict recreational use of the reservoir following a copper application (Helix Water District 2015; City of Poway 2015; Sweetwater 2015).

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?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See XV.a) above. The proposed project would not include recreational facilities or require the construction or expansion of recreational facilities. Therefore, no impact would occur.

XVI. TRANSPORTATION/CIRCULATION.
XVI. Transportation/Circulation
Would the project:

a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project involves the use of light- to medium-duty trucks periodically for the delivery of the algaecide to the reservoir, and would not cause a substantial increase in traffic above existing conditions. Deliveries of the algaecide would occur infrequently and would not require an extensive number of trips to and from the project site. The use of boats for algaecide application would not have an impact on transportation at the project site or surrounding areas. There would be no impact.

b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See XVI.a) above. There would be no impact.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project would have no effect on air traffic. Therefore, no related impacts would occur.

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project activities would be limited to the waters of existing reservoirs and existing roadways. No changes to roadways or increases in hazards due to equipment would occur. Therefore, no impact would occur.

e) Result in inadequate emergency access?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project would not restrict emergency access to the reservoirs. There would be no impact.

f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See XVI.d and e) above. The proposed project would not result in effects on existing bus stops, bike lanes, or pedestrian facilities in the vicinity. Thus, the project would not result in conflicts with adopted policies, plans, or programs supporting alternative transportation. There would be no impact.

XVII. UTILITIES AND SERVICE SYSTEMS. Would the project:

XVII. Utilities and Service Systems

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project would be limited to the application of algaecides in existing bodies of water and would not generate any wastewater. No wastewater treatment requirements would be exceeded; therefore, no related impacts would occur.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project would not generate any wastewater. No new or expanded water or wastewater treatment facilities would result or be required. Therefore, no related impacts would occur.

c) Require or result in construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project would not require or include construction of new or expanded storm water facilities. Additionally, no new areas of impervious surface would be created that could increase the volume of storm water runoff associated with the project alignment. Therefore, no related impacts would occur.

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project would not require additional water supplies. No new or expanded facilities would be needed. Therefore, no related impacts would occur.

e) 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?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The proposed project would not result in an increased demand on wastewater services. Therefore, no related impacts would occur.

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

No solid waste would be generated by the application of algaecides into the reservoirs aside from the bags and containers used to store the algaecides. This solid waste generation would be minimal, and no landfill would be needed for this project, and therefore no impact would occur.

g) Comply with federal, state, and local statutes and regulations related to solid waste?				X

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

See XVII.f) above. There would be no impact.

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE.

XVIII. Mandatory Findings of Significance

a) Does the project have the potential to 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, 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?			X	

These topics have been addressed above, including issues of biological resources in Section IV and cultural resources in Section V. Section IV concluded that there would be no significant impact on biological resources. Section V concluded there would be no impacts on cultural resources, so the project would not eliminate 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.)				X

Environmental Impact Evaluation	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

Olivenhain Reservoir, Lake Jennings, Lake Poway, San Dieguito Reservoir, Sweetwater Reservoir

The project entails a very minimal amount of worker activity on an ongoing basis at each of the subject reservoirs, with work being confined to the reservoirs and their adjacent operations facilities. The subject reservoirs are contained by dams that do not release substantial amounts of water downstream, and there is no direct hydrologic connection between any of the reservoirs involved in the project. Therefore, algaecide-treated water in one reservoir would never drain into another reservoir. Application of aquatic pesticides at one reservoir could not lead to increased impacts at any of the others, as the pesticides could not travel between reservoirs and lead to a compounded level of copper. Accordingly, there would be no potential for a cumulative increase in copper levels at any of the reservoirs due to application at any of the other reservoirs. This means that no potential for cumulative water quality impacts would occur at any of the subject reservoirs as a result of this project. This also means there is no potential for a combined accumulation of copper levels at any of the reservoirs that would affect biological resources. This limited amount of activity and lack of connectivity between the reservoirs would not have the potential to substantially contribute to any cumulative impacts that may occur in the project areas. Therefore, no impact would occur.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?		X		

The project's potential to result in impacts on human health have been addressed above, including air quality (Section III), hazards and hazardous materials (Section VIII), and noise (Section XII). As discussed in Sections III and XII, the project would not have air quality or noise effects that would cause substantial direct or indirect adverse effects on human beings. Section VIII identified potential health risks of exposure to copper-based products used in the proposed activity, and identified mitigation measures each of the subject agencies would employ to limit these risks and ensure impacts would be reduced to less-than-significant levels.

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SECTION 3.0
DETERMINATION

In conformance with the State CEQA Guidelines, the Water Authority, as lead agency, prepared an Initial Study (IS) and completed an Environmental Checklist Form (see Section 2.0) for the proposed project. During the analysis of the project's environmental impacts, the Water Authority determined that, unless certain mitigation was implemented, the proposed project could have a significant impact on the following environmental factors: hazards and hazardous materials, and hydrology and water quality. The significant impacts warranting mitigation were presented in the IS Checklist and are detailed below in Section 3.1 through 3.5. The project has been revised to include the specific measures listed below in Section 3.2, which would mitigate these impacts to below a level of significance. Analysis of all environmental issues is presented in the evaluation portion of the IS Checklist, provided in Section 2.0.

3.1 OLIVENHAIN RESERVOIR ENVIRONMENTAL IMPACTS AND MITIGATION

3.1.1 Hazards and Hazardous Materials

Algaecide application at Olivenhain Reservoir entails transporting, handling, and using copper-based products that are regulated hazardous materials and, if handled or applied improperly, could be hazardous to human health and the environment. The following mitigation measures will be incorporated into the project to reduce this impact to a less-than-significant level:

OLIVENHAIN-HAZ-1: The Water Authority will require training in copper sulfate and citric acid safety for all Water Authority employees participating in the application and handling of these chemicals. Response and containment procedures provided in the Water Authority's Emergency Response Guide, Hazardous Materials Business Plan and the product MSDS will be followed in the event of a spill. These procedures include isolation and containment of the spill while wearing the appropriate personal protective equipment.

OLIVENHAIN-HAZ-2: The Water Authority will avoid over-application by ensuring that employees involved with chemical application follow the specific product labels for the algaecides used in the program. Algaecides quantities required for each treatment will be precalculated and only sufficient material to carry out the treatment is transported for an application event. All label directions and California Department of Pesticide Regulation guidelines will be followed as to acceptable application methods as well as weather limitations for application.

OLIVENHAIN-HAZ-3: Water Authority staff members that may come into contact with the algaecide will be trained on its use and hazards by the safety department. Review of all applicable MSDSs will be included in the training to ensure that employees are up to date on the hazards associated with the chemical(s) used. Personal protective equipment is supplied to any employee that will be working with the chemical(s). Goggles, face shield, chemically impervious gloves, and protective clothing to prevent skin contact are provided and used any time work is to be done with the algaecide.

OLIVENHAIN-HAZ-4: The Water Authority will ensure that application of algaecides is targeted at nuisance algae growths and that algaecides are applied in accordance with label instructions to minimize the application quantity and maximize efficacy. This includes avoiding uneven distribution and applying during favorable weather conditions, when feasible. Because

nuisance algal growth affects the beneficial uses within the project area, application of algaecides will be proactive, which will minimize the quantity of decaying algae that results and may threaten oxygen levels.

3.1.2 Hydrology and Water Quality

The Water Authority's use of copper to control algae blooms at Olivenhain Reservoir may result in excess of receiving-water limitations established in the General Permit. Exceeding the thresholds would itself be necessary to prevent algae-related water quality impacts at Olivenhain Reservoir, but this would be considered a significant impact unless the Water Authority obtains an exception from the limitations by the State Water Resources Control Board. The following mitigation measures will be incorporated into the project to reduce this impact to a less-than-significant level:

OLIVENHAIN-WQ-1: The Water Authority will apply for coverage under the State Board's NPDES Permit for Discharges of Aquatic Pesticides and, as part of that application, seek a Categorical Exception pursuant to Section 5.3 of the State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.

OLIVENHAIN-WQ-2: The Water Authority will continue to monitor and report copper levels in Olivenhain Reservoir in accordance with State Board requirements.

3.2 LAKE JENNINGS ENVIRONMENTAL IMPACTS AND MITIGATION

3.2.1 Hazards and Hazardous Materials

Algaecide application at Lake Jennings entails transporting, handling, and using copper-based products that are regulated hazardous materials and, if handled or applied improperly, could be hazardous to human health and the environment. The following mitigation measures will be incorporated into the project to reduce this impact to a less-than-significant level:

JENNINGS-HAZ-1: HWD will ensure that algaecide use rates will be per the U.S. Environmental Protection Agency (EPA) label and will be limited to ensure compliance with receiving water limitations. Treatments will be performed when no water is being discharged from the lake system.

JENNINGS-HAZ-2: HWD will ensure that application personnel follow the storage, transport, and spill control procedures per EPA and California Department of Pesticide Regulation rules, regulations, and label instructions.

JENNINGS-HAZ-3: HWD will ensure that algaecide quantities required for each treatment will be precalculated and only sufficient material to carry out the treatment will be transported for an application event. Application equipment will be routinely cleaned and maintained, and all label directions and Department of Pesticide Regulations guidelines will be followed as to acceptable application methods, including limitations due to weather conditions. Surface applications will not be made in winds above 10 miles per hour.

3.2.2 Hydrology and Water Quality

HWD's use of copper to control algae blooms at Lake Jennings may result in excess of receiving-water limitations established in the General Permit. Exceeding the thresholds would itself be necessary to prevent algae-related water quality impacts at Lake Jennings, but this would be considered a significant

impact unless HWD obtains an exception from the limitations by the State Water Resources Control Board. The following mitigation measures will be incorporated into the project to reduce this impact to a less-than-significant level:

> **JENNINGS-WQ-1:** HWD will apply for coverage under the State Board's NPDES Permit for Discharges of Aquatic Pesticides and, as part of that application, seek a Categorical Exception pursuant to Section 5.3 of the State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.
>
> **JENNINGS-WQ-2:** HWD will continue to monitor and report copper levels in Lake Jennings in accordance with State Board requirements.

3.3 LAKE POWAY ENVIRONMENTAL IMPACTS AND MITIGATION

3.3.1 Hazards and Hazardous Materials

Algaecide application at Lake Poway entails transporting, handling, and using copper-based products that are regulated hazardous materials and, if handled or applied improperly, could be hazardous to human health and the environment. The following mitigation measures will be incorporated into the project to reduce this impact to a less-than-significant level:

> **POWAY-HAZ-1**: Poway will ensure that aquatic algaecide use rates will be per the EPA label and will be limited to ensure compliance with receiving water limitations. Treatments will be performed when no water is being discharged from the lake system.
>
> **POWAY-HAZ-2**: Poway will ensure that application personnel follow the storage, transport, and spill control procedures per EPA and California Department of Pesticide Regulation rules, regulations, and label instructions.
>
> **POWAY-HAZ-3**: Poway will ensure that algaecide quantities required for each treatment will be precalculated and only sufficient material to carry out the treatment will be transported for an application event. Application equipment will be routinely cleaned and maintained, and all label directions and Department of Pesticide Regulation guidelines will be followed as to acceptable application methods, including limitations due to weather conditions. Surface applications will not be made in winds above 10 miles per hour.

3.3.2 Hydrology and Water Quality

Poway's use of copper to control algae blooms at Lake Poway may result in excess of receiving-water limitations established in the General Permit. Exceeding the thresholds would itself be necessary to prevent algae-related water quality impacts at Lake Poway, but this would be considered a significant impact unless Poway obtains an exception from the limitations by the State Water Resources Control Board. The following mitigation measures will be incorporated into the project to reduce this impact to a less-than-significant level:

> **POWAY-WQ-1:** Poway will apply for coverage under the State Board's NPDES Permit for Discharges of Aquatic Pesticides and, as part of that application, seek a Categorical Exception pursuant to Section 5.3 of the State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.

POWAY-WQ-2: Poway will continue to monitor and report copper levels in Lake Poway in accordance with State Board requirements.

3.4 SAN DIEGUITO RESERVOIR ENVIRONMENTAL IMPACTS AND MITIGATION

3.4.1 Hazards and Hazardous Materials

Algaecide application at San Dieguito Reservoir entails transporting, handling, and using copper-based products that are regulated hazardous materials and, if handled or applied improperly, could be hazardous to human health and the environment. The following mitigation measures will be incorporated into the project to reduce this impact to a less-than-significant level:

SAN DIEGUITO-HAZ-1: SFID will ensure the algaecide treatment system within the Cielo Pump Station is flushed with water at the end of each treatment event to eliminate having any copper sulfate remaining in the system, which will protect the feed system from corrosion and leaks and minimize the potential for worker exposure.

SAN DIEGUITO-HAZ-2: SFID will ensure that a break in the algaecide application feed line, tanks, or pumps will be captured and treated as hazardous waste. SFID's safety department will employ a hazardous waste disposal company that will properly dispose of any material that has been contaminated by a spill.

SAN DIEGUITO-HAZ-3: SFID staff will calculate maximum dosage rates and program them into the feed system to ensure correct concentration of the feed. The rate of feed for any treatment event will be limited to the recommendations on the product label and the MSDS to ensure effectiveness and minimize any unintended effects on nontargeted organisms.

SAN DIEGUITO-HAZ-4: SFID will ensure that any staff members that may come into contact with copper sulfate are trained on its use and hazards by the SFID safety department. SFID will periodically review the product's MSDS to ensure employees are up to date on the hazards associated with the chemical. SFID will ensure personal protective equipment is supplied to any employee that will be working with copper sulfate. Goggles, face shield, chemically impervious gloves, and protective clothing to prevent skin contact will be provided by SFID and used any time work is to be done with the algaecide.

3.4.2 Hydrology and Water Quality

SFID's use of copper to control algae blooms at San Dieguito Reservoir may result in excess of receiving-water limitations established in the General Permit. Exceeding the thresholds would itself be necessary to prevent algae-related water quality impacts at San Dieguito Reservoir, but this would be considered a significant impact unless SFID obtains an exception from the limitations by the State Water Resources Control Board. The following mitigation measures will be incorporated into the project to reduce this impact to a less-than-significant level:

SAN DIEGUITO-WQ-1: SFID will apply for coverage under the State Board's NPDES Permit for Discharges of Aquatic Pesticides and, as part of that application, seek a Categorical Exception pursuant to Section 5.3 of the State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.

SAN DIEGUITO-WQ-2: SFID will continue to monitor and report copper levels in San Dieguito Reservoir in accordance with State Board requirements.

3.5 SWEETWATER RESERVOIR ENVIRONMENTAL IMPACTS AND MITIGATION

3.5.1 Hazards and Hazardous Materials

Algaecide application at Sweetwater Reservoir entails transporting, handling, and using copper-based products that are regulated hazardous materials and, if handled or applied improperly, could be hazardous to human health and the environment. The following mitigation measures will be incorporated into the project to reduce this impact to a less-than-significant level:

SWEETWATER-HAZ-1: Sweetwater will apply copper sulfate and citric acid in accordance with the product label and shall comply with the recommendations provided on the MSDS applicable to the specific copper sulfate product to be used. Copper sulfate will be applied in an even, consistent manner over the surface area to be treated, thus minimizing the potential for higher than intended localized concentrations.

SWEETWATER-HAZ-2: Sweetwater will require training in copper sulfate and citric acid safety for all Sweetwater employees participating in the application and handling of copper sulfate. Sweetwater shall conduct additional refresher training, as deemed necessary, prior to each treatment event.

SWEETWATER-HAZ-3: Sweetwater will follow all response and containment procedures provided in their Chemical Hygiene Plan, Hazardous Response Plan, and the product MSDS in the event of a spill. These procedures include isolation and containment of the spill while wearing the appropriate personal protective equipment.

SWEETWATER-HAZ-4: Sweetwater will require its employees participating in the application or handling of copper sulfate and citric acid to wear appropriate personal protective equipment recommended on the MSDS, including protective safety glasses with side shields (or goggles) per Occupational Safety and Health Administration (OSHA) 29 CFR 1910.133. Chemically impervious gloves made of any waterproof material, boots, and protective clothing will be worn to avoid skin contact (refer to OSHA 29 CFR 1910.138), as well as a respirator that meets OSHA 29 CFR 1910.134 requirements.

3.5.2 Hydrology and Water Quality

Sweetwater's use of copper to control algae blooms at the Sweetwater Reservoir may result in excess of receiving-water limitations established in the General Permit. Exceeding the thresholds would itself be necessary to prevent algae-related water quality impacts at Sweetwater Reservoir, but this would be considered a significant impact unless Sweetwater obtains an exception from the limitations by the State Water Resources Control Board. The following mitigation measures will be incorporated into the project to reduce this impact to a less-than-significant level:

SWEETWATER-WQ-1: Sweetwater will apply for coverage under the State Board's NPDES Permit for Discharges of Aquatic Pesticides and, as part of that application, seek a Categorical Exception pursuant to Section 5.3 of the State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.

SWEETWATER-WQ-2: Sweetwater will continue to monitor and report copper levels in Sweetwater Reservoir in accordance with State Board requirements.

3.6 AUTHORITY TO PREPARE A MITIGATED NEGATIVE DECLARATION

As provided in the State CEQA Guidelines Section 15070 (Title 14 - California Code of Regulations), an MND may be prepared for a project subject to CEQA when an IS has identified potentially significant effects on the environment, but revisions to the project have been made so that clearly no significant effect on the environment will result from project implementation. The Water Authority is the lead agency for preparation of this MND. Based on the findings of the IS/Environmental Checklist Form prepared for this project (Section 2.0 of this document), the Water Authority has determined that preparation of an MND is the appropriate method to present environmental review of the proposed project in compliance with CEQA. HWD, City of Poway, SFID, and Sweetwater have reviewed this IS and MND; their respective decision-making bodies will also consider adopting the MND before implementing any mitigation program identified specific to their activities.

3.7 PREPARERS OF THE MITIGATED NEGATIVE DECLARATION

This MND was prepared by AECOM, 401 West A Street, Suite 1200, San Diego, CA 92101. The following AECOM professionals contributed to its preparation.

Bill Graham – Principal in Charge
Alex Hardy – Senior Project Manager
Jessica Fernandes – Environmental Planner
Meghan Haggblade – Environmental Planner
Lyndon Quon – Senior Biologist
Keoni Calantas – Project Biologist
Nick Janssen – Geographic Information Systems Specialist
Therese Tempereau – Technical Editor
Marisa Fabrigas – Word Processor

3.8 RESULTS OF PUBLIC REVIEW (TO BE COMPLETED WITH FINAL MND)

( ) No comments were received during the public input period.

( ) Comments were received during the public input period, but they did not address the Draft Mitigated Negative Declaration findings or the accuracy or completeness of the Initial Study. No response is necessary. The letters are attached.

(x) Comments addressing the findings of the Draft Mitigated Negative Declaration and/or accuracy or completeness of the Initial Study were received during the public input period.

Signature

March 10, 2015
Date of Draft MND

Ken Weinberg
Director of Water Resources
San Diego County Water Authority

May 13, 2015
Date of Final MND

SECTION 4.0
REFERENCES

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SECTION 5.0
RESPONSE TO COMMENTS ON THE DRAFT MND

The Draft MND for the project was circulated for a 30-day public review beginning March 12, 2015. A Notice of Intent (NOI) to Adopt an MND was published in the *U-T San Diego* newspaper on March 12, 2015, and was mailed to a list of potentially interested agencies and organizations compiled by the Water Authority and the four other agencies participating in preparation of the MND. Copies of the Draft MND and the supporting technical appendices were made available for review at the Water Authority and at the following libraries near the reservoirs and/or the participating agencies' service area: Bonita-Sunnyside Branch Library, Escondido Main Library, Lakeside Branch Library, National City Public Library, Poway Branch Library, Rancho San Diego Branch Library, Rancho Santa Fe Branch Library, and Spring Valley Branch Library. An electronic version of the Draft MND and appendices were made available for review and download from the Water Authority's webpage, http://www.sdcwa.org. A public hearing to take testimony on the adequacy of the Draft MND was held at the Water Authority's Board of Directors meeting on March 26, 2015.

One comment letter was received in response to issuance of the Draft MND, from the California Department of Fish and Wildlife. No speakers offered testimony on the MND during the March 26, 2015, hearing.

This Final MND has been prepared in accordance with the requirements of the California Environmental Quality Act (California Public Resources Code Section 21000, et seq., [revised December 1998] herein, CEQA) and the State of California CEQA Guidelines, as amended February 1999 (California Administrative Code, Title 14, Section 15000, et seq.). The purpose of the Final MND is to provide the decision-making body, in this case the San Diego County Water Authority, responsible agencies, and the public with environmental impact information relative to the proposed project. The Water Authority must consider the information contained in this Final MND, including comments received during the public review period, prior to approving the proposed project.

The Final MND includes copies of the comment letter received regarding the Draft MND and the Water Authority's responses to the comments provided in the letter. The Final MND also includes the revised Draft MND and the appendices. Each issue raised in the comment letters has been assigned a number, as indicated with brackets in the margin of the comment letter page, and each response is numbered accordingly. The comment letter has been reproduced on the pages preceding the responses.

The Final MND includes revisions to clarify and correct the Draft MND, where necessary. Those revisions are shown in strike-out/underline format, with strikeout text (~~text~~) signifying deletions and underline text (text) signifying additions. No new significant information is presented in the Final MND that would require recirculation of the Draft MND pursuant to Section 15073.5(a) of the CEQA Guidelines.

DRAFT MND COMMENT LETTERS

State Agencies

California Department of Fish and Wildlife, dated April 13, 2015 (comment letter #1)

COMMENT LETTER #1

California Department of Fish and Wildlife, dated April 13, 2015

(a typographic error on the letter shows the date as April 13, 2014)

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
South Coast Region
3883 Ruffin Road
San Diego, CA 92123
(858) 467-4201
www.wildlife.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

April 13, 2014

Mr. Larry Purcell
San Diego County Water Authority
4677 Overland Avenue
San Diego, California 92123
LPurcell@sdcwa.org

Subject: Comments on the draft Mitigated Negative Declaration for the Application of Copper-based Algaecides at Five Reservoirs Project San Diego County (SCH# 2015031045)

Dear Mr. Purcell:

The California Department of Fish and Wildlife (Department) has reviewed the above-referenced draft Mitigated Negative Declaration (MND) for the Application of Copper- based Algaecides at Five Reservoirs, San Diego County. The following statements and comments have been prepared pursuant to the Department's authority as Trustee Agency with jurisdiction over natural resources affected by the project (California Environmental Quality Act, [CEQA] Guidelines § 15386) and pursuant to our authority as a Responsible Agency under CEQA Guidelines section 15381 over those aspects of the proposed project that come under the purview of the California Endangered Species Act (Fish and Game Code § 2050 *et seq.*) and Fish and Game Code section 1600 *et seq.* The Department also administers the Natural Community Conservation Planning (NCCP) program.

The project consists of the occasional application of copper sulfate pentahydrate or copper-based algaecides at five reservoirs in the western portion of San Diego County to control and prevent degradation of water quality resulting from algal and cyanobacterial blooms. The subject reservoirs and the member agencies that own and operate them are Olivenhain Reservoir (San Diego County Water Authority; SDCWA), Lake Jennings (Helix Water District), Lake Poway (City of Poway), San Dieguito Reservoir (Santa Fe Irrigation District), and Sweetwater Reservoir (Sweetwater Authority). Copper-based algaecide application is authorized by the State Water Resources Control Board (SWQCB) under a Statewide General Permit, Water Quality Order Number 2013-0002-DWQ (as amended by Order No. 2014-0078-DWQ). Each agency will apply to the SWQCB to obtain permission to use copper-based algaecide at their respective reservoirs. Additionally, the MND discusses periodic exceedances of the copper limit stated in the General Permit.

The Department offers the following comments and recommendations to assist the SDCWA in avoiding or minimizing potential project impacts on biological resources.

Algaecide Chelation and Toxicity

The Department is aware that the form of copper and water characteristics (e.g., pH and hardness) affects the toxicity response of algae and cyanobacteria to an algaecide exposure. Chelated copper formulations are used because they typically remain in the water column longer than non-chelated formulations and display a higher margin of safety for non-target

1

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species (e.g., fish). Increased residence time of copper in the water also increases the duration of algaecide exposure. However, the non-chelated algaecides, (e.g., copper sulfate pentahydrate) generally tend to have a shorter residence time and may be more toxic to non-target species than chelated formulations of algaecide (e.g., Cutrine®-Plus). Therefore the Department recommends the use of chelated algaecides whenever it is appropriate. 1 cont.

Algaecide Selection

The draft MND (Page 13) discusses the use of specific types of algaecides. However, there is no mention of how the algaecides were selected. The Department is not clear if studies were conducted to determine the appropriate form and concentration of copper that should be used to control the algae and cyanobacteria. Additionally, the Aquatic Pesticide Application Plans do not contain any information regarding how algaecides were selected. Therefore, the Department recommends that the final MND contain a section which explains the algaecide selection process. 2

Algaecide Applications

Page 2 of the MND states "the application of copper-based algaecides at each of the five listed reservoirs, as implemented by the respective agencies, which may include periodic exceedances of the limitations stated in the General Permit." Higher concentrations of algaecide may cause increased toxicity to aquatic organisms. 3

The Department recommends using multiple (2 or more) algaecide applications (if possible) to control algal growth and / or using field trials (or laboratory bioassay) to determine the most efficient and effective chelated algaecide formulation before the five water agencies resort to increasing copper concentrations to control problematic algae and cyanobacteria.

We appreciate the opportunity to comment on the referenced MND. Questions regarding this letter and further coordination on these issues should be directed to Bryand Duke at (858) 637-5511or Bryand.Duke@wildlife.ca.gov.

Sincerely,

Gail K. Sevrens
Environmental Program Manager
South Coast Region

ec: Lauren Kershek (U.S. Fish and Wildlife Service; lauren_kershek@fws.gov)
Scott Morgan (State Clearinghouse)

References

American Society for Testing and Materials (ASTM). 1993b. Standard guide for conducting acute toxicity tests with fishes, macroinvertebrates, and amphibians.

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RESPONSE TO COMMENT LETTER #1

California Department of Fish and Wildlife

1. Four of the five agencies whose algaecide application programs are discussed in the MND propose to use either pre-chelated copper algaecide products or citric acid as a chelating agent, when copper-based algaecide is applied to their respective reservoirs. The Water Authority, Sweetwater Authority, and Poway use and/or propose to use citric acid as a chelating agent for their copper applications. HWD currently uses and proposes to continue using Cutrine Plus, a pre-chelated copper product.

   SFID uses and proposes to continue using a non-chelated copper algaecide product at San Dieguito Reservoir because it is more appropriate to SFID's method of application, which is a direct injection and mixing in the pipeline that delivers water to their reservoir. The algaecide application point for water transferred from Lake Hodges to San Dieguito Reservoir is in a pipeline approximately 1 mile from the reservoir, so the algaecide acts while water is in transit to the reservoir rather than while water is in the reservoir. Because SFID's water is treated in line, the product does not need to remain suspended in reservoir water in order to treat the targeted algae; therefore, the non-chelated product is the most effective and efficient means of algae control at San Dieguito Reservoir.

   Sections 1.3.2, 1.3.3, and 1.3.4 have been revised in the Final MND to clarify the products that each of the agencies proposes to use in their algae control programs.

2. As a requirement of APAP preparation, each agency addressed in this MND performed an examination of alternative, non-chemical treatment methods of algae control, and has described the alternate methods they considered and those they already employ in their respective APAPs. Based on this review of alternative treatment options, application of the respective copper products proposed at each subject reservoir has been determined to be the most practical and effective method to control nuisance algae blooms, while minimizing potential environmental impacts. Copper-based algaecides have a long history of effective treatment of algae blooms at reservoirs in the United States and around the world. This historic use has provided extensive field data that inform manufacturers' chemical formulation and recommended concentration specifications as listed on the products' EPA-regulated labels. With the exception of the Water Authority, which has not had to use algaecide at Olivenhain Reservoir in the past, the water agencies addressed in this MND have their own histories with copper-based algaecide application at their respective reservoirs, and as a result have extensive field data on application at their own reservoirs. This past experience and the monitoring required pursuant to the General Permit has enabled each agency to develop and optimize an efficient algae-control program that minimizes potential toxicity to non-target species. The Water Authority has relied on an ample amount of information available on various copper-based algaecides to select their product, and will follow all label requirements and industry-standard practices whenever they need to commence algaecide application at Olivenhain. All of the agency practices addressed in this MND will continue to conform to requirements stated in the General Permit, including pre- and post-application monitoring and reporting to the State Board to demonstrate permit compliance.

3. Application of algaecides at each of the reservoirs addressed in this MND will continue to be conducted in conformance with algaecide label instructions, including specifications governing product formulation, concentration, and application frequency. Large blooms of algae are most effectively controlled by repeated low dosage algaecide applications in conformance with label directions (and as recommended in this comment), rather than by merely increasing the amount of copper used in a single application. However, the infrequent exceedance of copper limitations allowed by the General Permit exception provisions may occur even though the agencies conform to label requirements and treat algal blooms with multiple low concentrations rather than a single higher concentration of algaecide product.

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APPENDIX A5

Sweetwater Reservoir APAP

SWEETWATER AUTHORITY
ROBERT A. PERDUE WATER TREATMENT PLANT

STATE WATER RESOURCES CONTROL BOARD

AQUATIC PESTICIDE APPLICATION PLAN

(WATER QUALITY ORDER NO. 2013-0002-DWQ)

Prepared By

Mark D. Hatcher
Sweetwater Authority
Water Quality Laboratory Supervisor

July 9, 2015

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1.0 Introduction

On March 5, 2013 the State Water Resources Control Board (SWRCB) formally adopted Water Quality Order No. 2013-0002-DWQ; General Permit No. CAG990005. This Permit Order becomes effective on December 1, 2013 and will expire on November 30, 2018. Public agencies currently covered under Permit Order No. 2004-0009-DWQ must apply for coverage under the new aquatic weed permit by submitting a Notice of Intent (NOI) and an Aquatic Pesticide Application Plan (APAP) in compliance with Section II.C (General Permit Application) of Order No. 2013-0002-DWQ. The Sweetwater Authority's APAP was written in accordance with the guidelines provided in Section VIII.C (Aquatic Pesticides Application Plan). The purpose of the APAP is to describe the parameters, methods, and protocols to be used for algaecide applications in Sweetwater Reservoir, as follows:

- The water system and treatment area to which the algaecide will be applied
- The types of aquatic weeds to be controlled and why
- Factors influencing the selection and decision to apply an algaecide
- Best Management Practices (BMPs) to be implemented
- Examination of possible alternatives to reduce the need for algaecide use
- Monitoring Program and procedures to prevent contamination

The Authority's APAP will ensure the application of copper sulfate in Sweetwater Reservoir to control nuisance algae will comply with the requirements of Order No. 2013-0002-DWQ.

2.0 Description of Sweetwater Authority

The Sweetwater Authority is located in San Diego County and is a publicly owned, joint-powers water agency with policies and procedures established by a seven-member Board of Directors. The Authority provides water service to approximately 187,000 people in National City, Bonita, and the western and central portions of Chula Vista. The 32 square mile service area receives water from four sources: the Sweetwater Reservoir, deep freshwater wells in National City, semi-brackish groundwater from wells in Chula Vista and National City, and imported water which is drawn from the Colorado River or the State Water Project in Northern California.

The Authority's watershed encompasses approximately 230 square miles. The Sweetwater River is the primary water course through the watershed, flowing from the Cuyamaca Mountains in eastern San Diego County down to San Diego Bay. There are two impoundment facilities located along the Sweetwater River: Loveland Reservoir (25,400 acre-ft capacity), which is located in the eastern San Diego County community of Alpine; and Sweetwater Reservoir (28,100 acre-ft capacity), which borders Spring Valley. Sweetwater Reservoir has a maximum surface area of 1,027acres.

The 30 million gallon per day (MGD) Robert A. Perdue Water Treatment Plant, which is located adjacent to Sweetwater reservoir, was originally constructed in 1959 as a direct

filtration plant. Today, it is a conventional filtration plant consisting of chemical treatment, chemical mixing using pumped diffusion, flocculation, dissolved air flotation, and dual-media filters. As mentioned above, the Perdue Plant is capable of either treating (pumping) raw water from Sweetwater Reservoir or from the raw water aqueduct pipeline.

The primary beneficial use of Sweetwater Reservoir is as a drinking water impoundment and it is the main source of supply for the Perdue Water Treatment Plant. Sweetwater Reservoir is a warm water (i.e. remains above 4 ° C throughout the year), eutrophic water body with a typical secchi disk clarity of less than 10 ft. Stratification typically occurs in the late spring through fall, forming an anoxic hypolimnetic layer in the lower reaches of the reservoir. Under stratifying conditions, nutrients such as phosphorous are released into the hypolimnion and become available for cyanobacteria (blue-green algae), which tend to bloom when the lake is stratified.

Not all blue-green algae blooms cause taste and odor problems. However, certain species of cyanobacteria, such as *Anabaena circinalis, Anabaena flos-aquae, Anabaena spiroides, Aphanizomenon flos-aquae,* and *Pseudanabaena limnetica* are known to produce taste and odor compounds such as MIB and/or Geosmin that drinking water consumers find objectionable. Although the Authority's primary algae control strategy is to avoid adding algaecides to Sweetwater Reservoir, there are situations (i.e. nuisance algal blooms) where the Authority may have to directly apply an aquatic pesticide that would be permitted under Order No. 2013-0002-DWQ; General Permit No. CAG990005.

3.0 Characterization of Aquatic Pesticide Application Project

3.1 Copper Sulfate Application Protocol

The only aquatic pesticide ever used on the Sweetwater Reservoir is copper sulfate. Copper sulfate is generally applied to control taste and odor producing algae primarily abundant in the warmer summer months (May – August). Application is performed by adding rock copper sulfate (with granular citric acid as a chelating agent, at a ratio of 2:1) to side hoppers attached to a powerboat. The boat is transversed throughout the surface of the reservoir. A target application of 1 part per million (1milligram per liter) copper is calculated for the volume of the surface strata as a determination of the total amount of copper sulfate to be applied. The surface strata is the volume of water above the thermocline, this volume varies as the ambient air temperatures and the depth of the reservoir changes. Approximately 2 lbs of copper sulfate and 1 lb of citric acid per surface acre are typically added to treat a nuisance blue-green algae bloom in Sweetwater Reservoir. MSDS documents are provided in Appendix A (copper sulfate) and B (citric acid).

3.2 Gates and Control Structures

The Sweetwater Dam functions as a drinking water impoundment, effectively isolating the reservoir water from other waters of the U.S. Therefore, it is not necessary for the Authority to employ any other gates or control structures to control the extent of

receiving waters potentially affected by the application of copper sulfate. However, the Authority does exercise and inspect the four emergency release valves at the bottom of the dam on an annual basis to ensure the valves function properly and do not leak.

3.3 Copper Transport, Fate, and Effects

In Sweetwater Reservoir, after application of copper sulfate, transport of copper will occur primarily through mixing and dispersion. Copper treatments result in short term increases in dissolved copper, however the long term environmental risk from copper is expected to be less than significant because the applied copper becomes bound to the bottom sediments and is no longer biologically available.

3.4 Triggers for Copper Sulfate Treatment

The factors which influence the decision to apply copper sulfate to control nuisance algae in Sweetwater Reservoir include the following:

- Concentrations of methylisoborneol (MIB) and geosmin
- Cyanobacteria population levels
- Raw and finished water threshold odor number and odor characterization
- Degradation of filter performance
- Consumer taste and odor water quality complaints

In order to track the concentration of taste and odor compounds in Sweetwater Reservoir throughout the year, the Authority typically monitors for MIB and geosmin on a weekly basis. Plankton determinations for Sweetwater reservoir are performed weekly using a Sedgewick-Rafter counting chamber. Plankton speciation and density (counts in ten fields of vision) are recorded. The Perdue Pant operators perform a daily determination of the threshold odor number for Sweetwater Reservoir raw water and Perdue Plant finished water, including a description of the odor (i.e. fishy, musty, grassy, etc.). The Perdue Plant Water Quality Laboratory records consumer complaints received regarding the taste and odor of the finished drinking water in the distribution system.

During an algae bloom, plankton and MIB/geosmin monitoring frequency may be increased so that day to day fluctuations of cyanobacteria counts and odor causing compounds in the reservoir can be tracked. Specifically, the goal is to determine if the cyanobacteria counts and MIB/geosmin levels are increasing, decreasing, or remaining constant. Consumers can generally detect MIB and geosmin above 5 ng/L and if the number of complaints received increases rapidly over a short period of time, it could be an indication that corrective action may be warranted.

Typically, when the decision to apply copper sulfate to Sweetwater Reservoir is made, it is because the indicators described above have increased significantly over a short period of time and because other mitigation strategies, such as adding powdered activated carbon (PAC), increasing free chlorine contact time at the Perdue Plant, or waiting for the bloom to die off have not been successful. In addition, certain species of blue-green

algae, green algae, and diatoms are known to impair filter performance, which could impact compliance with the filtration requirements of the California Surface Water Treatment Rule. As mentioned above, the Authority's primary strategy is to avoid adding copper sulfate. However, in order to comply with state mandated primary (i.e. filter turbidity) and secondary (i.e. taste and odor) water quality standards, there are times when the addition of copper sulfate may be necessary.

3.5 Public Notification

The Authority is the sole owner and operator of Sweetwater Reservoir, which is primarily used as a drinking water impoundment. No other agency has rights to the water stored in Sweetwater Reservoir. The only public access allowed is for the three-day per week fishing program, which is located on a limited section of shoreline on the southern end of the reservoir.

Every calendar year, at least 15 days prior to the first algaecide application (if any), the Authority will post a notification on its website and/or provide on-site signage (as appropriate) at the fishing program area. The notification will conform to the procedures described in Section VIII.B of Order No. 2013-0002-DWQ.

4.0 Best Management Practices

4.1 Avoidance of Aquatic Pesticide Usage

The Sweetwater Authority Water Quality Department practices avoidance of aquatic pesticides as its primary management tool. However, as described above, there are conditions where pesticide application is unavoidable. Only when there is a major bloom of nuisance algae, or an algal caused taste and odor episode, will copper sulfate treatment be initiated, and even then it will be used only after other alternative strategies have been unsuccessful.

4.2 Copper Sulfate

With the implementation of the following copper sulfate application and hazard mitigation BMPs, the potential to create a significant hazard to the public or to the environment will be reduced to less than significant.

4.2.1 Application

Whenever the application of an algaecide has been necessary to control a nuisance algae bloom in Sweetwater Reservoir, a mixture of copper sulfate and citric acid (2:1 ratio) has been shown to be the most effective treatment approach. Using citric acid as a copper-chelating agent has decreased the amount of copper sulfate needed to effectively treat the reservoir by a factor of six or seven. Increasing the effectiveness of each copper sulfate application lessens the possibility that repeat copper sulfate treatment would be required.

However, if additional treatment is necessary, a minimum of two weeks shall elapse between applications. In order to minimize the potential for environmental impacts in Sweetwater Reservoir, no more than one half the surface of the lake will be treated per application (refer to Figure 1).

The Authority shall apply copper sulfate in accordance with the product label and shall comply with the recommendations provided on the MSDS applicable to the specific copper sulfate product to be used (refer to Attachment A). Copper sulfate will be applied in an even, consistent manner over the surface area to be treated, thus minimizing the potential for higher than intended localized concentrations.

4.2.2 Spill Prevention and Containment

Training in copper sulfate safety shall be required for all Authority employees participating in the application and handling of copper sulfate. Additional refresher training may occur, as deemed necessary, prior to each treatment event. Response and containment procedures provided in the Authority's Chemical Hygiene Plan, Hazardous Response Plan, and the product MSDS will be followed in the event of a spill. These include isolation and containment of the spill while wearing the appropriate personal protective equipment.

4.2.3 Personal Protective Equipment

In order to avoid any adverse health effects during the application of copper sulfate, the Authority shall require its employees participating in the application or handling of copper sulfate to wear appropriate personal protective equipment recommended on the MSDS, including protective safety glasses with side shields (or goggles) as per OSHA 29 CFR 1910.133. Chemically-impervious gloves made of any waterproof material, boots, and protective clothing will be worn to avoid skin contact (refer to OSHA 29 CFR 1910.138), as well as a respirator that meets OSHA 29 CFR 1910.134 requirements.

4.3 Watershed Management

As part of its multi-barrier approach to watershed management, the Authority maintains native vegetation buffer strips around the perimeter of Sweetwater Reservoir. These buffer strips help to reduce soil erosion during rain events, which helps to limit the inflow of nutrients into the reservoir.

In addition, the Authority does not allow livestock grazing or farming on lands (owned by the Authority) surrounding Sweetwater Reservoir. This minimizes the potential for nutrient loading into the reservoir from agricultural wastes and fertilizers.

The Sweetwater Authority has also installed a state of the art Urban Runoff Diversion System (URDS) to collect first flush and low flow urban waters from developed areas around Sweetwater Lake and diverts them around the reservoir. This process virtually eliminates the inflow of urban nutrients (phosphorus and nitrates) into the reservoir which, in turn helps to reduce the potential for severe blue-green algae blooms.

4.4 Raw Water Intake, Treatment and Blending Options

The Authority has the option of obtaining water from different levels at its intake structure (40, 50, 60, and 75 feet from the bottom of the reservoir). If water quality conditions permit, water will be drawn from a level where the by-products of the taste and odor producing algae (i.e. MIB and geosmin) are at the lowest concentration.

The Authority also has the ability to blend the reservoir water to a level where the taste and odor compounds are at an acceptable level. Options include blending untreated reservoir water with imported raw waters, or blending Sweetwater treated waters with imported treated waters.

Powdered Activated Carbon (PAC) may be added to the treatment process at the Perdue WTP to mitigate for taste and odor from cyanobacteria algae blooms. The PAC disperses in the water and adsorbs taste and odor compounds such as MIB and geosmin. The purpose of this strategy is to delay or eliminate the need for copper sulfate treatment over the bloom period by allowing enough time for the bloom to die off. The success of this strategy depends on the severity of the bloom and the detected levels of MIB and geosmin.

During a severe bloom, the Authority may increase the dose of chlorine dioxide, which is a strong oxidizer that is added at the intake tower to precondition the raw water prior to entering the Perdue WTP. In addition, free chlorine may be added at the settled water to increase the oxidation of organic compounds which cause taste and odors in the water. This strategy is most effective when "grassy", "swampy", or "fishy" tastes and odors are detected.

4.5 Visual Assessment of Adverse Impacts on Beneficial Uses Caused by the Application of Aquatic Pesticides

Sweetwater Reservoir supports a warm freshwater habitat for many non-native, recreational fish species such as threadfin shad (*Dorosoma petenense*), common carp (*Cyprinus carpio*), channel catfish (*Ictalurus punctatus*), white catfish (*Ictalurus catus*), brown bullhead catfish (*Ictalurus nebulus*), large-mouth bass (*Micropterus salmoides*), white crappie (*Pomoxis nigromaculatus*), and bluegill (*Lepomis macrochirus*).

Although copper sulfate may have short-term toxic effects on aquatic invertebrates (snails, worms, and clams) and larval fish, vertebrate animals such as adult game fish species and birds are typically unaffected by the low doses generally applied to control nuisance algae. This is supported by the observation that no fish or bird die-offs have ever been observed by Authority staff after copper sulfate additions. A visual inspection by a qualified senior biologist (who is knowledgeable regarding the flora, fauna, ecology, and beneficial uses of Sweetwater Reservoir) will be conducted of the treated areas of Sweetwater reservoir after each copper sulfate application to ensure that no fish kills are observed.

Long-term impacts to the beneficial uses of Sweetwater Reservoir (i.e. drinking water supply, recreation, or wildlife habitat) are not likely to occur for the reasons described in Order No. 2013-0002-DWQ, Fact Sheet Section VII: 1) water quality criteria, which are used directly as receiving water limitations in this General Permit have built-in factors of safety, 2) as shown in the 2004 toxicity study (performed by the San Francisco Estuary Institute (SFEI) on behalf of the SWRCB), the actual peak concentrations after application of copper did not exceed toxicity values, and 3) the applications of copper sulfate are short-term in duration.

In addition, the detected levels of copper are typically near or below the State of California Safe Drinking Water Act detection limit for reporting purposes (DLR) of 50 ug/L. Thus, any impacts to the primary beneficial use of Sweetwater Reservoir as a drinking water source of supply would be less than significant.

5.0 State Implementation Policy (SIP) Section 5.3 Exception

The Authority has been granted a short-term, seasonal exception under Section 5.3 of the State Water Board's *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries* (SIP) for applying copper sulfate to control taste and odor causing cyanobacteria. The seasonal exemption would cover intermittent, periodic discharges that may occur throughout the year. These discharges generally would be a single treatment and will dissipate within approximately one week. The frequency of discharge, based on water supply needs and occurrence or algae blooms, is not expected to be more than 2 times annually.

6.0 Examination of Possible Alternative Treatment Methods

The Sweetwater Authority will consider other methods of algae control on an on-going basis, but is not currently performing any such on-site evaluations.

The Authority has performed an extensive examination of alternative (nuisance algae bloom) treatment strategies described in the SFEI Aquatic Pesticide Monitoring Program Report entitled "Review of Alternative Aquatic Pest Control Methods for California Waters". Other potential treatment methods such as ultrasonic waves and peroxide were also reviewed. A summary of alternative treatment options is provided below. At the present time, copper sulfate (with citric acid as a chelating agent) appears to be the most effective, and least intrusive, algaecide available to control nuisance algae in Sweetwater Reservoir.

In developing the APAP, the Authority applied a decision matrix concept, balancing the need to comply with the California Safe Drinking Water Act regulatory requirements (with respect to taste and odor and finished water turbidity) with the need to control nuisance algae blooms in an environmentally sensitive manner, ensuring the beneficial uses of the reservoir are not impacted. As mentioned in Section 4.0 above, copper sulfate will only be applied in instances when alternative strategies such as avoidance and/or

treatment plant process changes have been ineffective. In situations when copper sulfate treatment is unavoidable, the lowest effective dose will be applied to no more than half the surface area of the Sweetwater Reservoir, thus minimizing any potential environmental impacts.

6.1 Biological Methods

Biological control would include using bio-manipulation, bacteria, enzymes, barley straw, or organic matter amendments to reduce the survival, growth, or reproduction of nuisance algae species.

Bio-manipulation involves the introduction of larger fish higher in the food chain to prey upon the smaller planktivorous fish that feed on the zooplankton, which in turn graze upon nuisance algae species. By reducing the population of the smaller fish, the zooplankton population increases, thus reducing the overall abundance of algae in a water body. The downside of fish bio-manipulation is that it is difficult to manage and implement effectively. Further, this control strategy has not yet been attempted in California waters.

There are commercially available microbial products containing a mixture of bacteria and enzymes, which can be applied to increase the bacterial populations in a water body. The theory is that increased bacterial concentrations will limit the availability of nutrients available for algal growth and reproduction. Bio-control agents are relatively inexpensive however peer-reviewed studies indicate that microbial methods are not very effective for control of nuisance algae blooms and may not be practical in large reservoirs.

Barley straw has been used for algae control with varying success in private ponds or lakes as a "home remedy". As barley straw is decomposed by fungi, lignins and tannins are released into the water, preventing the growth of algae. The downside is that algae already present in the water are not affected. Adding barley to the surface of Sweetwater Reservoir would create an aesthetic nuisance. Also, barley straw is not registered as an aquatic pesticide in California.

6.2 Physical Control Methods

Physical control methods include mechanical harvesting and removal of aquatic plants, sediment removal, shading, aeration, oxygenation, circulation, nutrient removal, and ultrasonic wave technology.

Mechanical harvesting is a strategy that can be used to reduce dissolved phosphorous and nitrogen inputs from aquatic plants in a lake. Although harvesting can decrease within-lake nutrient levels, algae production may continue to remain high due to nutrient release from sediments under anoxic conditions. Due to the uneven terrain surrounding Sweetwater Reservoir and logistical concerns, mechanical harvesting of aquatic plants is not a viable option for the Authority.

Sediment dredging has been used to remove nutrient rich sediments from irrigation canals and physical shading can be used to reduce algal growth by limiting the amount of light available for photosynthesis. However, neither of these strategies would be logistically practical for a large body of water such as Sweetwater Reservoir.

Aeration, oxygenation, and water circulation are used to maintain oxygen levels in the hypolimnion, which ultimately reduces algae growth by reducing the rate of nutrient recycling into the water column and also by disturbing the habitat of taste and odor causing cyanobacteria. While this approach may be effective in smaller water bodies, it would not be logistically possible to aerate the entire volume of Sweetwater Reservoir. In addition, Sweetwater Reservoir is infested with quagga mussels, and one of the Authority's primary quagga control strategies is to naturally maintain hypolimnetic anoxia under stratifying conditions.

Commercially available ultrasonic wave generating devices control blue/green algae by damaging their cellular structure, causing them to sink to the bottom of a water body. The main limitation of this technology is that it operates by "line of sight". Because Sweetwater Reservoir has many different inlets and "line of sight" obstructions, multiple ultrasonic generating devices would have to be purchased, which could potentially make this strategy cost prohibitive in Sweetwater Reservoir.

6.3 Non-Conventional Chemical Controls

Many non-conventional chemical algae control methods include calcium based products such as lime ($Ca(OH)_2$), limestone ($CaCO_4$), gypsum ($CaSO_4$) or iron gypsum (Fe-$CaSO_4$), and aluminum based alum ($Al_2(SO_4)_3$) which can be added to eutrophic lakes to bind and precipitate phosphorous out of the water column and into the sediment where it remains sequestered as long as oxygenated conditions prevail.

Aside from the enormous amounts of these chemicals that would have to be added to effectively bind and remove the phosphorous in the lake, this strategy would not be effective in Sweetwater Reservoir because the lake typically stratifies in the spring and summer, creating anoxic conditions in the hypolimnion. So, any phosphorus which had been sequestered in the bottom sediment would be re-solubilized and become a bioavailable nutrient for further cyanobacteria (algae) blooms. It is also not clear whether or not the SWRCB would approve the use of these sequestering chemicals for NPDES permits.

Aquashade is an EPA registered chemical that controls algae growth by filtering out photosynthetically available radiation in the range of blue-violet and red-orange (i.e. 550 nm – 650 nm). This product has been used in private recreational lakes and ponds in California to control algae. However, certain municipalities have declined to use it because they believe it creates an unnatural appearance in the water body. Aside from potential aesthetic concerns, it is unknown whether this treatment strategy would be appropriate for a large scale application in Sweetwater Reservoir. According to the SFEI Report, more research is necessary to fully determine the efficacy of this product.

Oxidizer algaecides use hydrogen peroxide to rupture the cell walls of the blue-green algae. Sodium Carbonate Peroxyhydrate has been registered in California as an algaecide and oxidizer since early 2006. The advantage of this chemical alternative to copper sulfate is that it breaks down quickly into sodium carbonate, water, and oxygen and is non-persistent in the environment. It is formulated as a flaky granule or liquid which is applied by broadcasting it over the surface of the water within the target area (Clean Lakes Inc. 2011 Winter/Spring Newsletter). This product has been used in California waters to control blue-green algae blooms, however the amount of chemical necessary to treat a lake the size Sweetwater Reservoir could be as high as 25,000 lbs - 50,000 lbs. The downside of using oxidizer algaecides is they have not been as widely used or studied as extensively as copper-based algaecides in California and their long-term efficacy remains to be determined.

7.0 Aquatic Pesticide Monitoring Program

The Authority's Aquatic Pesticide Monitoring Program is designed to comply with the provisions outlined in the Monitoring and Reporting Plan (MRP) in Attachment C of Permit Order No. 2013-0002-DWQ.

7.1 Monitoring Locations

Figure 1 provides a topographical map of Sweetwater Reservoir and includes the monitoring locations to be sampled under the APAP. The Authority uses monitoring locations which are representative of the water quality before, during, and after copper sulfate has been applied. To ensure the monitoring station (buoy) locations are consistent over time, GPS coordinates have been assigned to each location.

7.2 Sample Types

There are three distinct sample types associated with the application of copper sulfate to Sweetwater Reservoir to treat a nuisance algae bloom:

1) Background Monitoring (Buoy #1, Buoy #2): Background monitoring samples shall be collected in the application area just prior to (up to 24 hrs in advance of) the application event.

2) Event Monitoring (Buoy #7): Event monitoring samples shall be collected immediately outside of the treatment area, immediately after the application event, but after sufficient time has elapsed such that the treated water would have exited the treatment area.

3) Post-Event Monitoring (Buoy #1, Buoy #2): Post-event monitoring samples shall be collected within the treatment area within one week after application.

7.3 General Monitoring Provisions

Figure 2 provides the Authority's Aquatic Pesticide Monitoring Worksheet, which includes the chemical and physical analyses (and methods) required in the MRP. All laboratory analyses resulting from a copper sulfate treatment event shall be conducted only at laboratories certified by the California Department of Public Health (CDPH). All analyses shall be conducted in accordance with methods and guidelines established in 40 CFR 136.

Records of monitoring information shall include the date, place, and time of sampling and field measurements, the individuals who performed the sampling or field measurements, the dates and individuals who performed the analyses, the analytical methods used, and a summary of monitoring results.

The Authority shall maintain a log for each copper sulfate application event (refer to Figure 3). The application log shall record the date of application, location of application, names of the applicators, amount of copper sulfate used, lake level, start and stop time of the application event, application rate, and concentration. A visual monitoring assessment is also conducted for each event and includes field observations such as weather conditions, secchi disk clarity, and color.

As required under Section 5.3 of the SIP, upon completion of each copper sulfate application project, certification that the receiving water beneficial uses have been restored will be provided by a qualified senior biologist, who is knowledgeable regarding the flora, fauna, ecology, and beneficial uses of Sweetwater Reservoir.

7.4 Water Quality Analyses

7.4.1 Routine Baseline Monitoring

The Sweetwater Authority Water Quality Laboratory performs baseline testing of the Sweetwater Reservoir at regular intervals. Temperature, pH, color, turbidity, Total Coliform bacteria, and taste and odor analysis are performed daily. Alkalinity, nitrite-N, and ammonia-N are determined weekly, and conductivity, chloride, total hardness, iron, and manganese are measured on a monthly basis. State certified contract laboratories perform most Title 22 inorganic chemical, heavy metal, volatile organic chemical (VOC), and synthetic organic chemical (SOC) analysis at least annually on the reservoir water.

Plankton speciation and enumeration are performed weekly. At the same time the plankton sample is collected, a depth profile for temperature and dissolved oxygen is performed using a Yellow Springs Instrument (YSI), ProDO optical dissolved oxygen instrument.

7.4.2 Copper Sulfate Event Monitoring

All samples are collected and transported to the Water Quality Laboratory by trained Sweetwater Authority Laboratory personnel following proper chain of custody procedures. Proper collection methods and procedures will be followed to ensure samples are representative and free from contamination. Samples are collected in appropriately prepared and labeled containers and transported back to the laboratory in an ice chest with frozen blue ice. All sample bottles are labeled with the sample location, date, time, preservation (if any), sampler, analysis, and sample identification number.

Whenever copper sulfate applications are required to control taste and odor producing algae, the water quality monitoring for this plan will commence. As required in Table C-1 of the MRP, samples will be collected at a depth of three ft below the surface at each monitoring location (refer to Figure 1) using a depth sampler. Background samples will be taken no earlier than 24 hrs before application. Event monitoring will be performed no later than 24 hrs after algaecide application. Post-event monitoring will be conducted within one week after copper sulfate treatment.

Measurements for dissolved oxygen, temperature, and secchi disk clarity will be performed in the field by Authority staff at each monitoring location. Plankton speciation and enumeration, turbidity, pH, total hardness, and conductivity will be determined in the Authority's Water Quality Laboratory. All laboratory instrumentation will be calibrated according to method and/or manufacturer's specifications.

USEPA Method 200.8 (inductively coupled plasma mass spectrometry (ICPMS)) will be used to determine soluble (i.e. dissolved) copper concentration following filtration with a 0.45 um membrane filter. Samples for copper will be properly preserved and shipped (with chain of custody documentation) to a state certified contract laboratory for testing.

The analytical results will be reviewed first by the analyst. The Laboratory Supervisor will perform a final review of all data for accuracy, consistency, and completeness. The final review will include verification that calibration standards and quality control samples are within method specifications and that the analytical results are properly reported.

7.5 Laboratory Quality Assurance Program

The Authority's Laboratory Quality Assurance (QA) Program will serve as the Quality Assurance Plan for all Aquatic Pesticide Monitoring Program activities associated with Permit Order 2013-0002-DWQ. The Laboratory QA Program is designed to offer controls over both the quality of laboratory equipment and materials, and the reliability of the analytical methods, procedures, and techniques used for analysis. The Laboratory QA Program is a written description of QA activities associated with the sampling, analysis, and data reporting and review procedures followed in the Authority's Water Quality Laboratory. The Standard Operating Procedures (SOPs) utilized in the laboratory will reference either *Standard Methods for the Examination of Water and Wastewater* or analytical methods promulgated by the Environmental Protection Agency (EPA) in accordance with 40 CFR part 136.

7.6 Monitoring Reports

As required in MRP Section IV.C, an annual report shall be submitted to the Deputy Director of the SWRCB and the appropriate Region 9 Water Quality Control Board Executive Officer, consisting of a summary of the past year's treatment and monitoring activities and will certify compliance with all requirements of Permit Order No. 2013-0002-DWQ. If no copper sulfate treatment was necessary during the calendar year, the discharger shall provide a certification that no algaecide discharges occurred in Sweetwater Reservoir over that time frame. The annual report shall be submitted by March 1 of the year following the calendar year being reported and will contain the following information:

1) An executive summary discussing compliance or violation of Order No. 2013-002-DWQ and the effectiveness of the APAP; and

2) A summary of monitoring data, including the identification of water quality improvements or degradation as a result of copper sulfate application.

If additional reporting become necessary (i.e. a 24-hr oral report, 5-day written report, or electronic report), the reporting protocols provided in Section IV of Order No. 2013-0002-DWQ will be followed.

Figure 1 Monitoring Locations

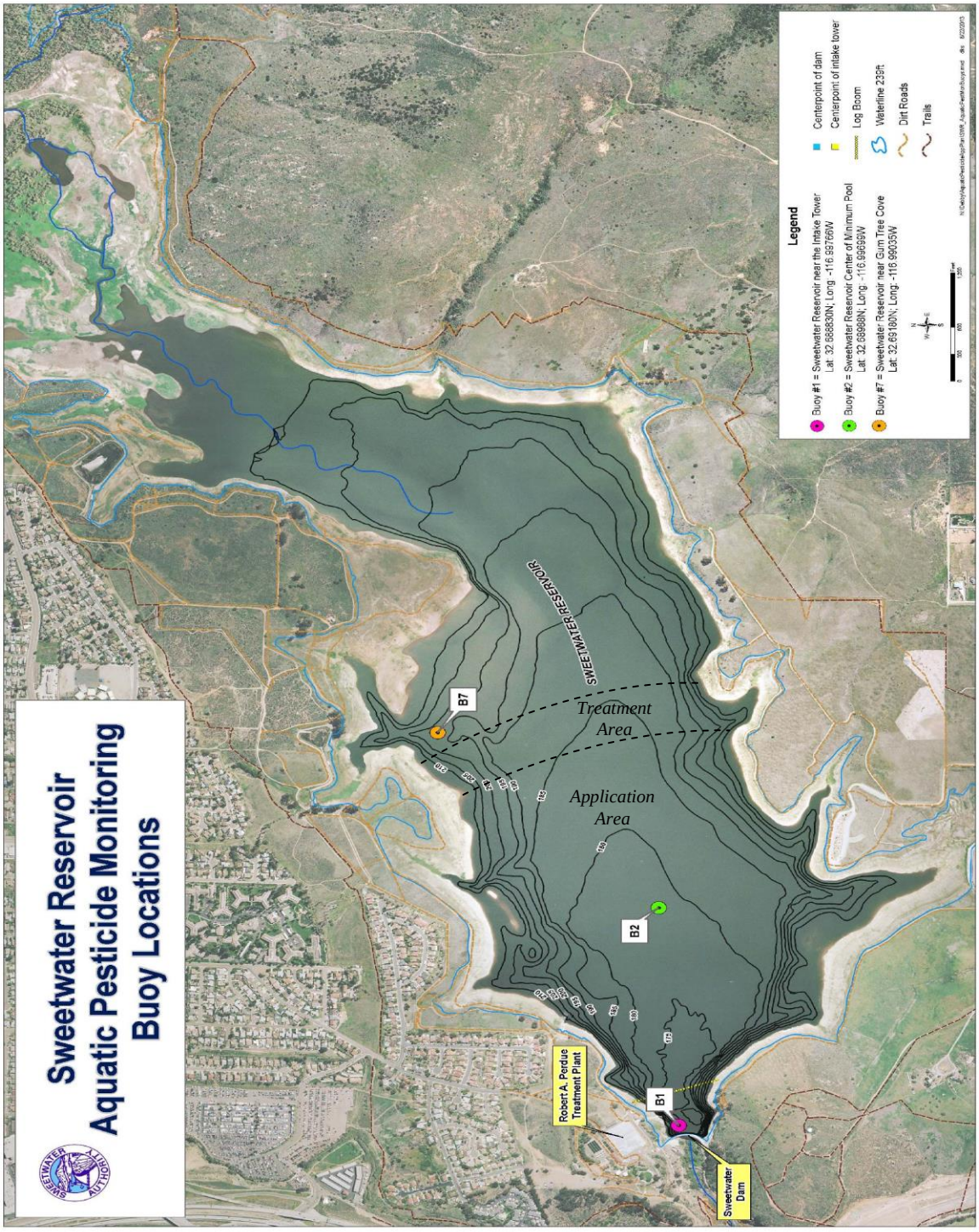

Figure 2 Monitoring Worksheet

Sweetwater Authority
Aquatic Pesticide Monitoring Worksheet

Sample Location	Sample Date	Sample Time	Sample Depth (ft)	Sampler Initials	Analysis Date	Analyst Initials	D.O. mg/L (ASTM D888-C)	Temp.(°C) (SM 2550B)	pH Units (SM 4500-H+B)	Turbidity NTU (SM 2130B)	Total Hardness mg/L as CaCO3 (SM 2340C)	Conductivity umhos/cm (2510B)	Dissolved Copper ug/L (EPA 200.8)
Buoy #1													
Buoy #2													
Buoy #7													
Buoy #1													
Buoy #2													
Buoy #7													
Buoy #1													
Buoy #2													
Buoy #7													

Monitoring Buoy Location	GPS Coordinates	
Buoy #1 (Sweetwater Reservoir near the Intake Tower)	Longitude: -116.99766	Latitude: 32.688830
Buoy #2 (Sweetwater Reservoir Center of Minimum Pool)	Longitude: -116.99699	Latitude: 32.68988
Buoy #7 (Sweetwater Reservoir near Gum Tree Cove)	Longitude: -116.99035	Latitude: 32.69180

Figure 3 Application Log

Sweetwater Authority
Aquatic Pesticide Application Log

Application Date:_____ Application Start:_____ Application End:_____ Copper Sulfate Application Protocol: Sweetwater Authority APAP

Pesticide Application Crew:_____ Lake Level (ft):_____

Lbs of CuSO4 used: _____ Lbs of Citric Acid used: _____ Reservoir Surface Area (Acre): _____ Reservoir Volume (Acre-ft): _____

Sweetwater Reservoir - Visual Monitoring Assessment									
Date	Time	Sampler	Weather Conditions (foggy, rainy, cloudy, windy, or sunny)	Floating debris or suspended matter present?	Color	Aquatic Life Observations	Visible films, sheens, or coatings?	Surface algae growth (light, moderate, or heavy)	Secchi Disk Clarity (ft)

ATTACHMENT A -- Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

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, Small, Medium, Large, FCC IV, and Very High Purity

Supplier Information

Chem One Ltd.
8017 Pinemont Drive, Suite 100
Houston, Texas 77040-6519

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.

Attachment A

Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

* * * 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.

ATTACHMENT A

Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

* * * 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.

ATTACHMENT A

Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

* * * 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.

ATTACHMENT A

Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

*** * * 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; Subcutaneous-rat 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 weeks-continuous: 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: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants), Specific Developmental Abnormalities: Central Nervous System, body wall

ATTACHMENT A

Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

*** * * 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.

ATTACHMENT A

Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

* * * 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 or (1-800-CLEANUP or equivalent organization) 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 * * *

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 I.M.O., I.C.A.O. (I.A.T.A.) and 49 CFR to assure regulatory compliance.

US DOT Information

UN/NA#: UN3077

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

Hazard Class: 9 (Miscellaneous Hazardous Material)

Packing Group: III

Required Label(s): Class 9 (Miscellaneous Hazardous Materials)

RQ Quantity: 10 lbs (4.54 kg)[Cupric Sulfate]

Additional Shipping Information: Cupric Sulfate is a Severe Marine Pollutant (49 CFR 172.322) and requires the marine pollutant mark for vessel transportation. Because Copper Sulfate is listed as a Severe Marine Pollutant as found in Appendix B to 172.101and when shipped by vessel, each inner package which exceeds 500 g (17.6 oz) will need a marine pollutant marking, UN-certified package, marked with the Proper Shipping Name, UN Number will be required when shipped by vessel, when each inner package exceeds 500 g (17.6 oz).

Limited Quantity Shipments: Inner packagings less than 500 g (17.6 oz) will not need to be in a UN-approved box and will not need a Marine Pollutant marking. Such 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 30 kg (66 lb). For a shipment by air the Class 9 label will be required.

Domestic Transportation Exception:

49 CFR 172.504(f)(9) Domestic transportation, a Class 9 placard is not required. A bulk packaging containing a Class 9 material must be marked with the appropriate identification number displayed on a Class 9 placard, an orange panel or a white-square-on-point display configuration as required by subpart D of this part. 49 CFR 172.322 (d)(3) allows the use of the Class 9 placard to replace the marine pollutant marking for domestic shipments.

ATTACHMENT A

Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

*** * * Section 14 - Transportation Information (Continued)* * ***

International Air Transport Association (IATA)

For Shipments by Air transport: We classify this product as hazardous (Class 9) when shipped by air because 49 CFR 173.140 (a). "For the purposes of this subchapter, miscellaneous hazardous material (Class 9) means a material which presents a hazard during transportation, but which does not meet the definition of any other hazard class. This class includes: (a) Any material which has an anesthetic, noxious, or other similar property which could cause extreme annoyance or discomfort to a flight crew member so as to prevent the correct performance of assigned duties."

UN: UN 3077
Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s. (cupric sulphate)
Hazard Class: 9
Packing Group: III
Passenger & Cargo Aircraft Packing Instruction: 911
Passenger & Cargo Aircraft Maximum Net Quantity: No Limit
Limited Quantity Packing Instruction (Passenger & Cargo Aircraft): Y911
Limited Quantity Maximum Net Quantity (Passenger & Cargo Aircraft): 30 kg
Special Provisions: A97
ERG Code: 9L
Limited Quantity Shipments: Such shipments must be marked with the proper shipping name, UN number, and must be additionally marked with the words LIMITED QUANTITIES or LTD. QTY. The total weight of each outer packaging cannot exceed 30 kg (66 lb.) . For a shipment by air the class 9 label will be required

International Maritime Organization (I.M.O.) Classification

For shipments via marine vessel transport, the following classification information applies.

UN #: UN3077
Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Cupric sulfate)
Hazard Class: class 9
Packing Group: III
Special Provisions: 274, 909, 944
Limited Quantities: 500g.
Packing Instructions: P002, LP02
Packing Provisions PP12
EmS: Fire F-A Spill S-F
Stowage and Segregation: Category A
Marine Pollutant: This material is considered a severe marine pollutant by the IMO and shipments of the material must carry the marine pollutant mark label. Refer to IMO Amendment 31-02 Chapter 2.10.
Limited Quantity Shipments: Inner packaging less than 500 g (17.6 oz) will not need to be in a UN-approved box and will not need a Marine Pollutant marking. Such 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 30 kg (66 lb) .

*** * * 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.

ATTACHMENT A

Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

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

US Federal Regulations (continued)

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)

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

ATTACHMENT A

Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

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

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 1 to 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 r 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 24 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.

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Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

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

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.
This is the end of MSDS # C1-121A

ATTACHMENT B -- Citric Acid MSDS

Univar USA Inc Material Safety Data Sheet

MSDS No:	P21822VS
Version No:	016 2008-10-27
Order No:	

Univar USA Inc., 17425 NE Union Hill Rd., Redmond WA 98052
(425) 889 3400

Emergency Assistance

For emergency assistance involving chemicals call
Chemtrec - (800) 424-9300

ATTACHMENT B

Citric Acid MSDS

UNIVAR USA INC.
ISSUE DATE:2008-05-20
Annotation:

MSDS NO:P21822VS
VERSION:016 2008-10-27

The Version Date and Number for this MSDS is : 10/27/2008 - #016

PRODUCT NAME: CITRIC ACID ANHYDROUS

MSDS NUMBER: P21822VS

DATE ISSUED: 05/20/2008

SUPERSEDES: 07/01/2005

ISSUED BY: 006886

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MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

COMMERCIAL PRODUCT NAME: CITRIC ACID ANHYDROUS

Distributed by:
Univar USA Inc.
17425 NE Union Hill Rd.
Redmond, WA 98052
425-889-3400

24 Hour Emergency Phone Number: CHEMTREC 1-800-424-9300

PRODUCT USE: Widely used acidulant for flavoring, beverages, food, and as a basic chemical.

2. COMPOSITION, INFORMATION ON INGREDIENTS

Chemical Name Of The Material: 2-hydroxy-1,2,3-propane tricarboxylic acid
Chemical Formula C6H807
Chemical Family Organic Acid
SYNONYMS: Citric Acid, Beta-hydroxytricarboxylic acid.

COMPOSITION:	CAS Reg. No.	%
Citric Acid Anhydrous	77-92-9	100

EC-No. 201-069-1
European Food Additive E330
HAZARDOUS IMPURITIES None

3. HAZARDS IDENTIFICATION

ATTACHMENT B

Citric Acid MSDS

UNIVAR USA INC. MSDS NO:P21822VS
ISSUE DATE:2008-05-20 VERSION:016 2008-10-27
Annotation:

Emergency Overview: Odorless, colorless translucent crystals with strong acidic taste. Citric acid is a skin and mucous membrane irritant and an eye irritant. It may cause allergic reactions in some individuals.

Most important Hazard: Irritating to eyes.

Potential Health Effects:

Inhalation: May cause mucous membrane irritation with sore throat, coughing and shortness of breath.

Eye contact: May cause irritation with redness, pain, possible eye burns, conjunctivitis, ulceration and permanent cloudiness.

Skin contact: May cause irritation with swelling, redness and pain.

Ingestion: May cause acute gastrointestinal irritation with abdominal pain.

Chronic: Repeated or prolonged skin contact may result in dermatitis. Prolonged or repeated eye contact may result in conjunctivitis. Long term oral overexposure may cause damage to tooth enamel.

Carcinogen status: None

4. FIRST AID MEASURES

General advice	Consult a physician.
Major effects of exposure:	Irritating to eyes and skin.
Inhalation	Move to fresh air.
Skin contact	Wash off immediately with soap and plenty of water. If skin irritation persists, call a physician.
Eye contact	Rinse immediately with plenty of water and seek medical advice.
Ingestion	Drink plenty of water. Do not induce vomiting. Consult a physician if necessary
Protection of first-aiders	Use personal protective equipment.

5. FIRE FIGHTING MEASURES

FLASH POINT	Not Applicable
FLAMMABLE LIMITS	Lower 8 gm/FT3 Upper 65 gm/FT3
Autoignition temperature:	1010 deg C / 1850 deg F
Suitable extinguishing media	water, water spray, dry powder, foam , carbon dioxide (CO2), remove containers if possible. Cool container exposed to fire with water spray.

Extinguishing media which must not

ATTACHMENT B

Citric Acid MSDS

be used for safety reasons	None
Hazardous decomposition products	carbon oxides
Special protective equipment for firefighters	Use personal protective equipment including self-contained breathing apparatus when fighting fire in enclosed area.
Specific methods	Standard procedure for chemical fires.

6. ACCIDENTAL RELEASE MEASURES

General: Wear dust respirator and protective clothing. Keep unnecessary personnel away. Sweep or vacuum into closed containers for disposal. Dispose in compliance with local, state, and federal regulations.

7. HANDLING AND STORAGE

Handling: Avoid contact with eyes and prolonged contact with skin. Avoid breathing large amounts of dust. Wash away splashes and spillages with water.

Storage Temperature General: Ambient storage pressure: atmospheric
Store in cool dry area away from incompatible materials and protected from moisture. Protect containers from damage.

Incompatible products Empty Containers: Incompatible with strong bases and oxidizing agents
Empty containers retain product residue and vapors. Observe all label precautions even after container is emptied. Do not reuse unless thoroughly cleaned.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Engineering measures	Provide general dilute ventilation.
Exposure limit(s)	None established for this ingredient, use OSHA PEL, ACGIH TLV for Nuisance dusts of 5 mg/3

Personal protection equipment

Respiratory protection	NIOSH approved dust respirator
Hand protection	Gloves
Eye Protection	Safety glasses
Skin and body protection	Lightweight protective clothing
Hygiene measures	Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form	crystalline powder
Color	colorless / white

ATTACHMENT B

Citric Acid MSDS

Odor	none
pH (5 % solution)	1.8
Vapor pressure	3.70E-009mm Hg@25 deg C
Vapor density	not applicable
Boiling point	175 deg C
Evaporation rate	essentially 0
Coefficient of water/oil distrib Log P (oct)	-1.72 (measured)
Log P (oct)	-1.25 to -1.80 (calculated)
Melting point/range	153 deg C
Decomposition temperature	> 170 deg C
Relative density	1,665 g/cm3
Bulk density	650 - 950 kg/m3
Solubility, Water solubility (25 deg C)	576 g/kg
Solubility in other solvents, Alcohol (25 deg C)	383 g/I
Molecular weight	192.12

10. STABILITY AND REACTIVITY

Stability	Stable at normal conditions
Conditions to avoid	Avoid dust formation and moisture. Take precautionary measures against static discharges.
Materials to avoid	Incompatible with strong bases and oxidizing agents.
Hazardous polymerization	Does not occur.
Corrosion	May corrode metals. 316 Stainless Steel recommended for handling.

11. TOXICOLOGICAL INFORMATION

Acute toxicity	LD50/p.o./rat	11,700 mg/kg
	LD50/i.p./rat	885 mg/kg
	LD50/p.o./mouse	5,040 mg/kg
	LD50/I.p./mouse	961 mg/kg
Local effects	Irritating to eyes and skin	
Chronic toxicity	None	
Human experience	Health injuries are not known or expected under normal use.	

12. ECOLOGICAL INFORMATION

Mobility	Completely soluble
Persistence and degradability	
Chemical oxygen demand	(COD) = 728 mg 02/g

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Citric Acid MSDS

Biological oxygen demand/5 days	(BOD) = 528 mg 02/g
Readily biodegradable	98% after 2 days
Bioaccumulation	None
Ecotoxicity effects	Toxicity to fish (LC50/96h/goldfish) = 440-706 mg/L Toxicity to bacteria(ECO) = >10,000 mg/L

13. DISPOSAL CONSIDERATIONS

Waste from residues/unused products
Any disposal practice must be in compliance with local, state and federal laws and regulations (contact local or state environmental agency for specific rules).

14. TRANSPORT INFORMATION

Not Regulated
Not classified as dangerous according to TDG (Transportation of Dangerous Goods) and US DOT (Department of Transportation)

15. REGULATORY INFORMATION

Citric acid is generally regarded as safe (GRAS) by USA FDA. 21 CFR 184.1033
Meets the criteria for hazardous material as defined by OSHA Hazard Communication Standard 21 CFR 1910.1200.

The material is listed on the TSCA Inventory List.
CERCLA (Comprehensive Response Compensation, and Liability Act): Not hazardous
SARA Title III (Superfund Amendments and Reauthorization Bill): Not Considered Hazardous

Foreign Inventory Status
Canadian DSL (Domestic Substance List) WHMIS Class E
IDL Citric Acid (CAS-No. 77-92-9) is listed on the Ingredient Disclosure List
DSL Citric Acid (CAS-No. 77-92-9) is listed on the Domestic Substance List

To the best of our knowledge, this Citric Acid Anhydrous does not contain any contaminants or biproducts known to the State of California to cause cancer or reproductive toxicity as listed under Proposition 65 State Drinking Water and Toxic Enforcement Act.

16. OTHER INFORMATION

HMIS* Rating Health = 1, Fire = 0, Reactivity =0
0=minimal, 1=slight, 2=moderate, 3=serious, 4=severe
*Hazardous Materials Identification System of the National Paint and Coating Association.

ATTACHMENT B

Citric Acid MSDS

Univar USA Inc Material Safety Data Sheet

For Additional Information contact MSDS Coordinator during business hours, Pacific time: (425) 889-3400

Notice

Univar USA Inc. ("Univar") expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a product specification sheet and/or a certificate of analysis. These can be obtained from your local Univar sales office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein.

This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process

ATTACHMENT B

Citric Acid Spec Sheet

PRODUCT SPECIFICATION

UNIVAR

Citric Acid, Anhydrous

USP/FCC Grade, Kosher Ⓤ

Univar's premium grade citric acid, anhydrous, is produced to meet the specifications of the Food Chemical Codex (FCC) and the United States Pharmacopoeia (USP). Test methods are listed in the current FCC and USP. This material is supplied in a multi-wall paper bag designed to Univar requirements.

Property	Specification	Typical Results
Description	White or colorless crystals	White or colorless crystals
Assay, calculated on the anhydrous basis	99.5% ~ 100.5%	99.6%
Identification	Pass test	Pass
Clarity of Solution	Pass test	Pass
Color of Solution	Pass test	Pass
Moisture	< 0.3%	0.15 %
Heavy Metal (as Pb)	< 5 ppm	3 ppm
Oxalate	< 350 ppm	< 100 ppm
Readily Carbonizable Substances	Pass test	Pass test
Residue on Ignition (Sulfated ash)	< 0.05%	0.01%
Sulfate	Pass test (< 150 ppm)	10 ppm
Lead, Pb	< 0.5 ppm	< 0.5 ppm
Iron, Fe (not in current FCC/ USP)	< 5 ppm	< 5 ppm

CAS: 77-92-9 **Formula:** $C_6H_8O_7$ **M.W.:** 192.13

Mesh Sizes Available:

Granular:	16 - 30 mesh in 50 lb. Univar bags, or 1 MT super sack Particle size: Retained on 14 mesh: 5% max Through 50 mesh: 10% max
Fine Granular:	30 - 80 mesh in 50 lb. Univar bags Particle size: Retained on 30 mesh: 5 % max Through 100 mesh: 10% max
Powder:	70 - 120 mesh (available in 25 kg fiber drums or cartons only)

RE-EVALUATION DATE: Granular and Fine Granular: 2 years for Yixing/ RZBC; 3 years for BBCA

SOLUBILITY: Water, 25°C: 62.2%; Ethanol, 20°C: 66%

USES:

- ***Flavoring extracts, soft drinks, candy***
- ***Effervescent salts***
- ***Acidifier***
- ***Acidulant and antioxidant in foods***
- ***Sequestering agent, water conditioning agent, and detergent builder***
- ***Cleaning compounds***

P/C (50 lb. gran): 765118 - Yixing; 765119 - BBCA; 765120 – RZBC
(1000 kg. SS gran): 713074 - Yixing
(1000 lbs SS gran): 786641 - Yixing; 787544 - RZBC

(50 lb. fine gran): 765121 - Yixing; 765122 - BBCA; 765123 - RZBC
(1000 lbs SS fine gran): 787545 – RZBC

10-20-2010

Country of Origin: China

Univar
17425 NE Union Hill Road
Redmond, WA 98052-3375
USA
+1 425 889 3400

Attachment 3

Mitigation, Monitoring, and Reporting Program

MITIGATION MONITORING AND REPORTING PROGRAM

APPLICATION OF COPPER-BASED ALGAECIDES AT FIVE RESERVOIRS SAN DIEGO COUNTY CALIFORNIA

Prepared for:

San Diego County Water Authority
4677 Overland Avenue
San Diego, California 92123
Contact: Larry Purcell

Sweetwater Authority
505 Garrett Avenue
Chula Vista, California 91910
Contact: Scott McClelland

City of Poway, Public Works Department
13325 Civic Center Drive
Poway, California 92064
Contact: Tom Howard

Helix Water District
7811 University Avenue
La Mesa, California 91942
Contact: Brian Olney

Santa Fe Irrigation District
5920 Linea del Cielo
Rancho Santa Fe, California 92067
Contact: Tim Bailey

Prepared by:

AECOM
401 West A Street, Suite 1200
San Diego, California 92101

May 2015

INTRODUCTION

The California Environmental Quality Act (CEQA) requires that public agencies adopting a Mitigated Negative Declaration (MND) take affirmative steps to determine that approved mitigation measures and project design features are implemented subsequent to project approval. The lead or responsible agency must adopt a monitoring and reporting program for the mitigation measures incorporated into a project or included as conditions of approval. The program must be designed to ensure compliance with the MND during project implementation (Public Resources Code, Section 20181.6; CEQA Guidelines, Section 15074(d)).

This Mitigation Monitoring and Reporting Program (MMRP) will be used by the San Diego County Water Authority (Water Authority) and four of its member agencies—Helix Water District (HWD), City of Poway (Poway), Santa Fe Irrigation District (SFID), and Sweetwater Authority (Sweetwater)—to ensure compliance with adopted mitigation measures associated with the application of copper-based algaecides to their respective surface water reservoirs to control algal blooms. This MMRP is divided into five sections that identify the project mitigation measures for each agency and its reservoir. The Water Authority is the lead agency on this project for CEQA administrative purposes, but only has discretionary authority over activities at Olivenhain Reservoir and does not have discretionary authority over project activities at the other agencies' reservoirs. The Water Authority, as CEQA lead agency, has determined that all the measures stated in this MMRP are appropriate to mitigate impacts identified in the MND, but the Water Authority only has the authority to implement the measures listed for Olivenhain Reservoir. The Water Authority has determined that the measures listed for HWD, Poway, SFID, and Sweetwater can and should be implemented at the agencies' respective reservoirs. The other four agencies' decision-making bodies, as Responsible Agencies under CEQA, will separately consider adopting this MMRP and will be responsible for implementing the mitigation measures identified specific to activities at their respective reservoirs.

This MMRP contains the following sections, which correspond to the measures to be implemented by the agencies addressed in the MND:

Section 1: San Diego County Water Authority
Section 2: Helix Water District
Section 3: City of Poway
Section 4: Santa Fe Irrigation District
Section 5: Sweetwater Authority

SECTION 1. MITIGATION MEASURES FOR IMPLEMENTATION BY SAN DIEGO COUNTY WATER AUTHORITY

Section 1 consists of a checklist (Table 1) that lists the project mitigation measures to be carried out by the Water Authority, organized by environmental impact category discussed in the MND. The table identifies the mitigation monitoring and reporting requirements, including the timing of implementation (prior to, during, or after application) and the party responsible for implementing the measure. Space is provided for sign-off following completion/implementation of the mitigation measure. The Water Authority, as lead agency pursuant to CEQA and the agency responsible for activity at Olivenhain Reservoir, will ensure that all mitigation measures identified for the project at Olivenhain Reservoir are carried out in accordance with this section of the adopted MMRP.

Table 1. Mitigation Monitoring and Reporting Program: San Diego County Water Authority Application of Copper-Based Algaecides at Olivenhain Reservoir

Mitigation No.	Mitigation Measure	Timing of Verification (application phase)			Responsible Party	Completed		Comments	Resp. Team Member	Comments
		Pre App	During App	Post App		Initials	Date			
HAZARDS AND HAZARDOUS MATERIALS										
OLIVENHAIN-HAZ-1	The Water Authority will require training in copper sulfate and citric acid safety for all Water Authority employees participating in the application and handling of these chemicals. Response and containment procedures provided in the Water Authority's Emergency Response Guide, Hazardous Materials Business Plan, and the product material safety data sheet will be followed in the event of a spill. These procedures include isolation and containment of the spill while wearing the appropriate personal protective equipment.	X			Water Authority					
OLIVENHAIN-HAZ-2	The Water Authority will avoid over-application by ensuring that employees involved with chemical application follow the specific product labels for the algaecides used in the program. Algaecide quantities required for each treatment will be precalculated and only sufficient material to carry out the treatment is transported for an application event. All label directions and California Department of Pesticide Regulation guidelines will be followed as to acceptable application methods as well as weather limitations for application.	X	X		Water Authority					
OLIVENHAIN-HAZ-3	Water Authority staff members that may come into contact with the algaecide will be trained on its use and hazards by the safety department. Review of all applicable MSDSs will be included in the training to ensure that employees are up to date on the hazards associated with the chemical(s) used. Personal protective equipment is supplied to any employee that will be working with the chemical(s). Goggles, face shield, chemically impervious gloves, and protective clothing to prevent skin contact are provided and used any time work is to be done with the algaecide.	X	X		Water Authority					
OLIVENHAIN-HAZ-4	The Water Authority will ensure that application of algaecides is targeted at nuisance algae growths and that algaecides are applied in accordance with label instructions to minimize the application quantity and maximize efficacy. This includes avoiding uneven distribution and applying during favorable weather conditions, when feasible. Because nuisance algal growth affects the beneficial uses within the project area, application of algaecides will be proactive, which will minimize the quantity of decaying algae that results and may threaten oxygen levels.		X		Water Authority					

Mitigation No.	Mitigation Measure	Timing of Verification (application phase)			Responsible Party	Completed		Comments	Resp. Team Member	Comments
		Pre App	During App	Post App		Initials	Date			
HYDROLOGY AND WATER QUALITY										
OLIVENHAIN-WQ-1	The Water Authority will apply for coverage under the State Board's National Pollutant Discharge Elimination System Permit for Discharges of Aquatic Pesticides and, as part of that application, seek a Categorical Exception pursuant to Section 5.3 of the State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.	X			Water Authority					
OLIVENHAIN-WQ-2	The Water Authority will continue to monitor and report copper levels in Olivenhain Reservoir in accordance with State Board requirements.			X	Water Authority					

SECTION 2. MITIGATION MEASURES FOR IMPLEMENTATION BY HELIX WATER DISTRICT

Section 2 consists of a checklist (Table 2) that lists the project mitigation measures to be carried out by HWD, organized by environmental impact category discussed in the MND. The table identifies the mitigation monitoring and reporting requirements, including the timing of implementation (prior to, during, or after application) and the party responsible for implementing the measure. Space is provided for sign-off following completion/implementation of the mitigation measure. HWD, as a Responsible Agency pursuant to CEQA, will ensure that all mitigation measures identified for the project at Lake Jennings are carried out in accordance with this section of the adopted MMRP.

Table 2. Mitigation Monitoring and Reporting Program: Helix Water District Application of Copper-Based Algaecides at Lake Jennings

Mitigation No.	Mitigation Measure	Timing of Verification (application phase)			Responsible Party	Completed		Comments	Resp. Team Member	Comments
		Pre App	During App	Post App		Initials	Date			
HAZARDS AND HAZARDOUS MATERIALS										
JENNINGS-HAZ-1	HWD will ensure that algaecide use rates will be per the U.S. Environmental Protection Agency (EPA) label and will be limited to ensure compliance with receiving water limitations. Treatments will be performed when no water is being discharged from the lake system.		X		HWD					
JENNINGS-HAZ-2	HWD will ensure that application personnel follow the storage, transport, and spill control procedures per EPA and California Department of Pesticide Regulation rules, regulations, and label instructions.	X	X		HWD					
JENNINGS-HAZ-3	HWD will ensure that algaecide quantities required for each treatment will be precalculated and only sufficient material to carry out the treatment will be transported for an application event. Application equipment will be routinely cleaned and maintained, and all label directions and Department of Pesticide Regulations guidelines will be followed as to acceptable application methods, including limitations due to weather conditions. Surface applications will not be made in winds above 10 miles per hour.	X	X		HWD					
HYDROLOGY AND WATER QUALITY										
JENNINGS-WQ-1	HWD will apply for coverage under the State Board's National Pollutant Discharge Elimination System Permit for Discharges of Aquatic Pesticides and, as part of that application, seek a Categorical Exception pursuant to Section 5.3 of the State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.	X			HWD					
JENNINGS-WQ-2	HWD will continue to monitor and report copper levels in Lake Jennings in accordance with State Board requirements.			X	HWD					

SECTION 3. MITIGATION MEASURES FOR IMPLEMENTATION BY CITY OF POWAY

Section 3 consists of a checklist (Table 3) that lists the project mitigation measures to be carried out by Poway, organized by environmental impact category discussed in the MND. The table identifies the mitigation monitoring and reporting requirements, including the timing of implementation (prior to, during, or after application) and the party responsible for implementing the measure. Space is provided for sign-off following completion/implementation of the mitigation measure. Poway, as a Responsible Agency pursuant to CEQA, will ensure that all mitigation measures identified for the project at Lake Poway are carried out in accordance with this section of the adopted MMRP.

Table 3. Mitigation Monitoring and Reporting Program: City of Poway
Application of Copper-Based Algaecides at Lake Poway

Mitigation No.	Mitigation Measure	Timing of Verification (application phase)			Responsible Party	Completed		Comments	Resp. Team Member	Comments
		Pre App	During App	Post App		Initials	Date			
HAZARDS AND HAZARDOUS MATERIALS										
POWAY-HAZ-1	Poway will ensure that aquatic algaecide use rates will be per the U.S. Environmental Protection Agency (EPA) label and will be limited to ensure compliance with receiving water limitations. Treatments will be performed when no water is being discharged from the lake system.		X		Poway					
POWAY-HAZ-2	Poway will ensure that application personnel follow the storage, transport, and spill control procedures per EPA and California Department of Pesticide Regulation rules, regulations, and label instructions.	X	X		Poway					
POWAY-HAZ-3	Poway will ensure that algaecide quantities required for each treatment will be precalculated and only sufficient material to carry out the treatment will be transported for an application event. Application equipment will be routinely cleaned and maintained, and all label directions and Department of Pesticide Regulation guidelines will be followed as to acceptable application methods, including limitations due to weather conditions. Surface applications will not be made in winds above 10 miles per hour.	X	X		Poway					
HYDROLOGY AND WATER QUALITY										
POWAY-WQ-1	Poway will apply for coverage under the State Board's National Pollutant Discharge Elimination System Permit for Discharges of Aquatic Pesticides and, as part of that application, seek a Categorical Exception pursuant to Section 5.3 of the State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.	X			Poway					
POWAY-WQ-2	Poway will continue to monitor and report copper levels in Lake Poway in accordance with State Board requirements.			X	Poway					

SECTION 4. MITIGATION MEASURES FOR IMPLEMENTATION BY SANTA FE IRRIGATION DISTRICT

Section 4 consists of a checklist (Table 4) that lists the project mitigation measures to be carried out by SFID, organized by environmental impact category discussed in the MND. The table identifies the mitigation monitoring and reporting requirements, including the timing of implementation (prior to, during, or after application) and the party responsible for implementing the measure. Space is provided for sign-off following completion/implementation of the mitigation measure. SFID, as a Responsible Agency pursuant to CEQA, will ensure that all mitigation measures identified for the project at San Dieguito Reservoir are carried out in accordance with this section of the adopted MMRP.

Table 4. Mitigation Monitoring and Reporting Program: Santa Fe Irrigation District Application of Copper-Based Algaecides at San Dieguito Reservoir

Mitigation No.	Mitigation Measure	Timing of Verification (application phase)			Responsible Party	Completed		Comments	Resp. Team Member	Comments
		Pre App	During App	Post App		Initials	Date			
HAZARDS AND HAZARDOUS MATERIALS										
SAN DIEGUITO-HAZ-1	SFID will ensure the algaecide treatment system within the Cielo Pump Station is flushed with water at the end of each treatment event to eliminate having any copper sulfate remaining in the system, which will protect the feed system from corrosion and leaks and minimize the potential for worker exposure.			X	SFID					
SAN DIEGUITO-HAZ-2	SFID will ensure that a break in the algaecide application feed line, tanks, or pumps will be captured and treated as hazardous waste. SFID's safety department will employ a hazardous waste disposal company that will properly dispose of any material that has been contaminated by a spill.		X	X	SFID					
SAN DIEGUITO-HAZ-3	SFID staff will calculate maximum dosage rates and program them into the feed system to ensure correct concentration of the feed. The rate of feed for any treatment event will be limited to the recommendations on the product label and the material safety data sheet (MSDS) to ensure effectiveness and minimize any unintended effects on nontargeted organisms.	X	X		SFID					
SAN DIEGUITO-HAZ-4	SFID will ensure that any staff members that may come into contact with copper sulfate are trained on its use and hazards by the SFID safety department. SFID will periodically review the product's MSDS to ensure employees are up to date on the hazards associated with the chemical. SFID will ensure personal protective equipment is supplied to any employee that will be working with copper sulfate. Goggles, face shield, chemically impervious gloves, and protective clothing to prevent skin contact will be provided by SFID and used any time work is to be done with the algaecide.	X	X		SFID					
HYDROLOGY AND WATER QUALITY										
SAN DIEGUITO-WQ-1	SFID will apply for coverage under the State Board's National Pollutant Discharge Elimination System Permit for Discharges of Aquatic Pesticides and, as part of that application, seek a Categorical Exception pursuant to Section 5.3 of the State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.	X			SFID					
SAN DIEGUITO-WQ-2	SFID will continue to monitor and report copper levels in San Dieguito Reservoir in accordance with State Board requirements.			X	SFID					

SECTION 5. MITIGATION MEASURES FOR IMPLEMENTATION BY SWEETWATER AUTHORITY

Section 5 consists of a checklist (Table 5) that lists the project mitigation measures to be carried out by Sweetwater, organized by environmental impact category discussed in the MND. The table identifies the mitigation monitoring and reporting requirements, including the timing of implementation (prior to, during, or after application) and the party responsible for implementing the measure. Space is provided for sign-off following completion/implementation of the mitigation measure. Sweetwater, as a Responsible Agency pursuant to CEQA, will ensure that all mitigation measures identified for the project at Sweetwater Reservoir are carried out in accordance with this section of the adopted MMRP.

Table 5. Mitigation Monitoring and Reporting Program: Sweetwater Authority Application of Copper-Based Algaecides at Sweetwater Reservoir

Mitigation No.	Mitigation Measure	Timing of Verification (application phase)			Responsible Party	Completed		Comments	Resp. Team Member	Comments
		Pre App	During App	Post App		Initials	Date			
HAZARDS AND HAZARDOUS MATERIALS										
SWEETWATER-HAZ-1	Sweetwater will apply copper sulfate and citric acid in accordance with the product label and shall comply with the recommendations provided on the material safety data sheet (MSDS) applicable to the specific copper sulfate product to be used. Copper sulfate will be applied in an even, consistent manner over the surface area to be treated, thus minimizing the potential for higher than intended localized concentrations.		X		Sweetwater					
SWEETWATER-HAZ-2	Sweetwater will require training in copper sulfate and citric acid safety for all Sweetwater employees participating in the application and handling of copper sulfate. Sweetwater shall conduct additional refresher training, as deemed necessary, prior to each treatment event.	X			Sweetwater					
SWEETWATER-HAZ-3	Sweetwater will follow all response and containment procedures provided in their Chemical Hygiene Plan, Hazardous Response Plan, and the product MSDS in the event of a spill. These procedures include isolation and containment of the spill while wearing the appropriate personal protective equipment.		X	X	Sweetwater					
SWEETWATER-HAZ-4	Sweetwater will require its employees participating in the application or handling of copper sulfate and citric acid to wear appropriate personal protective equipment recommended on the MSDS, including protective safety glasses with side shields (or goggles) per Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1910.133. Chemically impervious gloves made of any waterproof material, boots, and protective clothing will be worn to avoid skin contact (refer to OSHA 29 CFR 1910.138), as well as a respirator that meets OSHA 29 CFR 1910.134 requirements.		X		Sweetwater					
HYDROLOGY AND WATER QUALITY										
SWEETWATER-WQ-1	Sweetwater will apply for coverage under the State Board's National Pollutant Discharge Elimination System Permit for Discharges of Aquatic Pesticides and, as part of that application, seek a Categorical Exception pursuant to Section 5.3 of the State Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California.	X			Sweetwater					
SWEETWATER-WQ-2	Sweetwater will continue to monitor and report copper levels in Sweetwater Reservoir in accordance with State Board requirements.			X	Sweetwater					

Attachment 4

Sweetwater Reservoir Aquatic Pesticide Application Plan

(July 9, 2015)

SWEETWATER AUTHORITY
ROBERT A. PERDUE WATER TREATMENT PLANT

STATE WATER RESOURCES CONTROL BOARD

AQUATIC PESTICIDE APPLICATION PLAN

(WATER QUALITY ORDER NO. 2013-0002-DWQ)

Prepared By

Mark D. Hatcher
Sweetwater Authority
Water Quality Laboratory Supervisor

July 9, 2015

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Attachments

1.0 Introduction

On March 5, 2013 the State Water Resources Control Board (SWRCB) formally adopted Water Quality Order No. 2013-0002-DWQ; General Permit No. CAG990005. This Permit Order becomes effective on December 1, 2013 and will expire on November 30, 2018. Public agencies currently covered under Permit Order No. 2004-0009-DWQ must apply for coverage under the new aquatic weed permit by submitting a Notice of Intent (NOI) and an Aquatic Pesticide Application Plan (APAP) in compliance with Section II.C (General Permit Application) of Order No. 2013-0002-DWQ. The Sweetwater Authority's APAP was written in accordance with the guidelines provided in Section VIII.C (Aquatic Pesticides Application Plan). The purpose of the APAP is to describe the parameters, methods, and protocols to be used for algaecide applications in Sweetwater Reservoir, as follows:

- The water system and treatment area to which the algaecide will be applied
- The types of aquatic weeds to be controlled and why
- Factors influencing the selection and decision to apply an algaecide
- Best Management Practices (BMPs) to be implemented
- Examination of possible alternatives to reduce the need for algaecide use
- Monitoring Program and procedures to prevent contamination

The Authority's APAP will ensure the application of copper sulfate in Sweetwater Reservoir to control nuisance algae will comply with the requirements of Order No. 2013-0002-DWQ.

2.0 Description of Sweetwater Authority

The Sweetwater Authority is located in San Diego County and is a publicly owned, joint-powers water agency with policies and procedures established by a seven-member Board of Directors. The Authority provides water service to approximately 187,000 people in National City, Bonita, and the western and central portions of Chula Vista. The 32 square mile service area receives water from four sources: the Sweetwater Reservoir, deep freshwater wells in National City, semi-brackish groundwater from wells in Chula Vista and National City, and imported water which is drawn from the Colorado River or the State Water Project in Northern California.

The Authority's watershed encompasses approximately 230 square miles. The Sweetwater River is the primary water course through the watershed, flowing from the Cuyamaca Mountains in eastern San Diego County down to San Diego Bay. There are two impoundment facilities located along the Sweetwater River: Loveland Reservoir (25,400 acre-ft capacity), which is located in the eastern San Diego County community of Alpine; and Sweetwater Reservoir (28,100 acre-ft capacity), which borders Spring Valley. Sweetwater Reservoir has a maximum surface area of 1,027acres.

The 30 million gallon per day (MGD) Robert A. Perdue Water Treatment Plant, which is located adjacent to Sweetwater reservoir, was originally constructed in 1959 as a direct

filtration plant. Today, it is a conventional filtration plant consisting of chemical treatment, chemical mixing using pumped diffusion, flocculation, dissolved air flotation, and dual-media filters. As mentioned above, the Perdue Plant is capable of either treating (pumping) raw water from Sweetwater Reservoir or from the raw water aqueduct pipeline.

The primary beneficial use of Sweetwater Reservoir is as a drinking water impoundment and it is the main source of supply for the Perdue Water Treatment Plant. Sweetwater Reservoir is a warm water (i.e. remains above 4 ° C throughout the year), eutrophic water body with a typical secchi disk clarity of less than 10 ft. Stratification typically occurs in the late spring through fall, forming an anoxic hypolimnetic layer in the lower reaches of the reservoir. Under stratifying conditions, nutrients such as phosphorous are released into the hypolimnion and become available for cyanobacteria (blue-green algae), which tend to bloom when the lake is stratified.

Not all blue-green algae blooms cause taste and odor problems. However, certain species of cyanobacteria, such as *Anabaena circinalis, Anabaena flos-aquae, Anabaena spiroides, Aphanizomenon flos-aquae,* and *Pseudanabaena limnetica* are known to produce taste and odor compounds such as MIB and/or Geosmin that drinking water consumers find objectionable. Although the Authority's primary algae control strategy is to avoid adding algaecides to Sweetwater Reservoir, there are situations (i.e. nuisance algal blooms) where the Authority may have to directly apply an aquatic pesticide that would be permitted under Order No. 2013-0002-DWQ; General Permit No. CAG990005.

3.0 Characterization of Aquatic Pesticide Application Project

3.1 Copper Sulfate Application Protocol

The only aquatic pesticide ever used on the Sweetwater Reservoir is copper sulfate. Copper sulfate is generally applied to control taste and odor producing algae primarily abundant in the warmer summer months (May – August). Application is performed by adding rock copper sulfate (with granular citric acid as a chelating agent, at a ratio of 2:1) to side hoppers attached to a powerboat. The boat is transversed throughout the surface of the reservoir. A target application of 1 part per million (1milligram per liter) copper is calculated for the volume of the surface strata as a determination of the total amount of copper sulfate to be applied. The surface strata is the volume of water above the thermocline, this volume varies as the ambient air temperatures and the depth of the reservoir changes. Approximately 2 lbs of copper sulfate and 1 lb of citric acid per surface acre are typically added to treat a nuisance blue-green algae bloom in Sweetwater Reservoir. MSDS documents are provided in Appendix A (copper sulfate) and B (citric acid).

3.2 Gates and Control Structures

The Sweetwater Dam functions as a drinking water impoundment, effectively isolating the reservoir water from other waters of the U.S. Therefore, it is not necessary for the Authority to employ any other gates or control structures to control the extent of

receiving waters potentially affected by the application of copper sulfate. However, the Authority does exercise and inspect the four emergency release valves at the bottom of the dam on an annual basis to ensure the valves function properly and do not leak.

3.3 Copper Transport, Fate, and Effects

In Sweetwater Reservoir, after application of copper sulfate, transport of copper will occur primarily through mixing and dispersion. Copper treatments result in short term increases in dissolved copper, however the long term environmental risk from copper is expected to be less than significant because the applied copper becomes bound to the bottom sediments and is no longer biologically available.

3.4 Triggers for Copper Sulfate Treatment

The factors which influence the decision to apply copper sulfate to control nuisance algae in Sweetwater Reservoir include the following:

- Concentrations of methylisoborneol (MIB) and geosmin
- Cyanobacteria population levels
- Raw and finished water threshold odor number and odor characterization
- Degradation of filter performance
- Consumer taste and odor water quality complaints

In order to track the concentration of taste and odor compounds in Sweetwater Reservoir throughout the year, the Authority typically monitors for MIB and geosmin on a weekly basis. Plankton determinations for Sweetwater reservoir are performed weekly using a Sedgewick-Rafter counting chamber. Plankton speciation and density (counts in ten fields of vision) are recorded. The Perdue Pant operators perform a daily determination of the threshold odor number for Sweetwater Reservoir raw water and Perdue Plant finished water, including a description of the odor (i.e. fishy, musty, grassy, etc.). The Perdue Plant Water Quality Laboratory records consumer complaints received regarding the taste and odor of the finished drinking water in the distribution system.

During an algae bloom, plankton and MIB/geosmin monitoring frequency may be increased so that day to day fluctuations of cyanobacteria counts and odor causing compounds in the reservoir can be tracked. Specifically, the goal is to determine if the cyanobacteria counts and MIB/geosmin levels are increasing, decreasing, or remaining constant. Consumers can generally detect MIB and geosmin above 5 ng/L and if the number of complaints received increases rapidly over a short period of time, it could be an indication that corrective action may be warranted.

Typically, when the decision to apply copper sulfate to Sweetwater Reservoir is made, it is because the indicators described above have increased significantly over a short period of time and because other mitigation strategies, such as adding powdered activated carbon (PAC), increasing free chlorine contact time at the Perdue Plant, or waiting for the bloom to die off have not been successful. In addition, certain species of blue-green

algae, green algae, and diatoms are known to impair filter performance, which could impact compliance with the filtration requirements of the California Surface Water Treatment Rule. As mentioned above, the Authority's primary strategy is to avoid adding copper sulfate. However, in order to comply with state mandated primary (i.e. filter turbidity) and secondary (i.e. taste and odor) water quality standards, there are times when the addition of copper sulfate may be necessary.

3.5 Public Notification

The Authority is the sole owner and operator of Sweetwater Reservoir, which is primarily used as a drinking water impoundment. No other agency has rights to the water stored in Sweetwater Reservoir. The only public access allowed is for the three-day per week fishing program, which is located on a limited section of shoreline on the southern end of the reservoir.

Every calendar year, at least 15 days prior to the first algaecide application (if any), the Authority will post a notification on its website and/or provide on-site signage (as appropriate) at the fishing program area. The notification will conform to the procedures described in Section VIII.B of Order No. 2013-0002-DWQ.

4.0 Best Management Practices

4.1 Avoidance of Aquatic Pesticide Usage

The Sweetwater Authority Water Quality Department practices avoidance of aquatic pesticides as its primary management tool. However, as described above, there are conditions where pesticide application is unavoidable. Only when there is a major bloom of nuisance algae, or an algal caused taste and odor episode, will copper sulfate treatment be initiated, and even then it will be used only after other alternative strategies have been unsuccessful.

4.2 Copper Sulfate

With the implementation of the following copper sulfate application and hazard mitigation BMPs, the potential to create a significant hazard to the public or to the environment will be reduced to less than significant.

4.2.1 Application

Whenever the application of an algaecide has been necessary to control a nuisance algae bloom in Sweetwater Reservoir, a mixture of copper sulfate and citric acid (2:1 ratio) has been shown to be the most effective treatment approach. Using citric acid as a copper-chelating agent has decreased the amount of copper sulfate needed to effectively treat the reservoir by a factor of six or seven. Increasing the effectiveness of each copper sulfate application lessens the possibility that repeat copper sulfate treatment would be required.

However, if additional treatment is necessary, a minimum of two weeks shall elapse between applications. In order to minimize the potential for environmental impacts in Sweetwater Reservoir, no more than one half the surface of the lake will be treated per application (refer to Figure 1).

The Authority shall apply copper sulfate in accordance with the product label and shall comply with the recommendations provided on the MSDS applicable to the specific copper sulfate product to be used (refer to Attachment A). Copper sulfate will be applied in an even, consistent manner over the surface area to be treated, thus minimizing the potential for higher than intended localized concentrations.

4.2.2 Spill Prevention and Containment

Training in copper sulfate safety shall be required for all Authority employees participating in the application and handling of copper sulfate. Additional refresher training may occur, as deemed necessary, prior to each treatment event. Response and containment procedures provided in the Authority's Chemical Hygiene Plan, Hazardous Response Plan, and the product MSDS will be followed in the event of a spill. These include isolation and containment of the spill while wearing the appropriate personal protective equipment.

4.2.3 Personal Protective Equipment

In order to avoid any adverse health effects during the application of copper sulfate, the Authority shall require its employees participating in the application or handling of copper sulfate to wear appropriate personal protective equipment recommended on the MSDS, including protective safety glasses with side shields (or goggles) as per OSHA 29 CFR 1910.133. Chemically-impervious gloves made of any waterproof material, boots, and protective clothing will be worn to avoid skin contact (refer to OSHA 29 CFR 1910.138), as well as a respirator that meets OSHA 29 CFR 1910.134 requirements.

4.3 Watershed Management

As part of its multi-barrier approach to watershed management, the Authority maintains native vegetation buffer strips around the perimeter of Sweetwater Reservoir. These buffer strips help to reduce soil erosion during rain events, which helps to limit the inflow of nutrients into the reservoir.

In addition, the Authority does not allow livestock grazing or farming on lands (owned by the Authority) surrounding Sweetwater Reservoir. This minimizes the potential for nutrient loading into the reservoir from agricultural wastes and fertilizers.

The Sweetwater Authority has also installed a state of the art Urban Runoff Diversion System (URDS) to collect first flush and low flow urban waters from developed areas around Sweetwater Lake and diverts them around the reservoir. This process virtually eliminates the inflow of urban nutrients (phosphorus and nitrates) into the reservoir which, in turn helps to reduce the potential for severe blue-green algae blooms.

4.4 Raw Water Intake, Treatment and Blending Options

The Authority has the option of obtaining water from different levels at its intake structure (40, 50, 60, and 75 feet from the bottom of the reservoir). If water quality conditions permit, water will be drawn from a level where the by-products of the taste and odor producing algae (i.e. MIB and geosmin) are at the lowest concentration.

The Authority also has the ability to blend the reservoir water to a level where the taste and odor compounds are at an acceptable level. Options include blending untreated reservoir water with imported raw waters, or blending Sweetwater treated waters with imported treated waters.

Powdered Activated Carbon (PAC) may be added to the treatment process at the Perdue WTP to mitigate for taste and odor from cyanobacteria algae blooms. The PAC disperses in the water and adsorbs taste and odor compounds such as MIB and geosmin. The purpose of this strategy is to delay or eliminate the need for copper sulfate treatment over the bloom period by allowing enough time for the bloom to die off. The success of this strategy depends on the severity of the bloom and the detected levels of MIB and geosmin.

During a severe bloom, the Authority may increase the dose of chlorine dioxide, which is a strong oxidizer that is added at the intake tower to precondition the raw water prior to entering the Perdue WTP. In addition, free chlorine may be added at the settled water to increase the oxidation of organic compounds which cause taste and odors in the water. This strategy is most effective when "grassy", "swampy", or "fishy" tastes and odors are detected.

4.5 Visual Assessment of Adverse Impacts on Beneficial Uses Caused by the Application of Aquatic Pesticides

Sweetwater Reservoir supports a warm freshwater habitat for many non-native, recreational fish species such as threadfin shad (*Dorosoma petenense*), common carp (*Cyprinus carpio*), channel catfish (*Ictalurus punctatus*), white catfish (*Ictalurus catus*), brown bullhead catfish (*Ictalurus nebulus*), large-mouth bass (*Micropterus salmoides*), white crappie (*Pomoxis nigromaculatus*), and bluegill (*Lepomis macrochirus*).

Although copper sulfate may have short-term toxic effects on aquatic invertebrates (snails, worms, and clams) and larval fish, vertebrate animals such as adult game fish species and birds are typically unaffected by the low doses generally applied to control nuisance algae. This is supported by the observation that no fish or bird die-offs have ever been observed by Authority staff after copper sulfate additions. A visual inspection by a qualified senior biologist (who is knowledgeable regarding the flora, fauna, ecology, and beneficial uses of Sweetwater Reservoir) will be conducted of the treated areas of Sweetwater reservoir after each copper sulfate application to ensure that no fish kills are observed.

Long-term impacts to the beneficial uses of Sweetwater Reservoir (i.e. drinking water supply, recreation, or wildlife habitat) are not likely to occur for the reasons described in Order No. 2013-0002-DWQ, Fact Sheet Section VII: 1) water quality criteria, which are used directly as receiving water limitations in this General Permit have built-in factors of safety, 2) as shown in the 2004 toxicity study (performed by the San Francisco Estuary Institute (SFEI) on behalf of the SWRCB), the actual peak concentrations after application of copper did not exceed toxicity values, and 3) the applications of copper sulfate are short-term in duration.

In addition, the detected levels of copper are typically near or below the State of California Safe Drinking Water Act detection limit for reporting purposes (DLR) of 50 ug/L. Thus, any impacts to the primary beneficial use of Sweetwater Reservoir as a drinking water source of supply would be less than significant.

5.0 State Implementation Policy (SIP) Section 5.3 Exception

The Authority has been granted a short-term, seasonal exception under Section 5.3 of the State Water Board's *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries* (SIP) for applying copper sulfate to control taste and odor causing cyanobacteria. The seasonal exemption would cover intermittent, periodic discharges that may occur throughout the year. These discharges generally would be a single treatment and will dissipate within approximately one week. The frequency of discharge, based on water supply needs and occurrence or algae blooms, is not expected to be more than 2 times annually.

6.0 Examination of Possible Alternative Treatment Methods

The Sweetwater Authority will consider other methods of algae control on an on-going basis, but is not currently performing any such on-site evaluations.

The Authority has performed an extensive examination of alternative (nuisance algae bloom) treatment strategies described in the SFEI Aquatic Pesticide Monitoring Program Report entitled "Review of Alternative Aquatic Pest Control Methods for California Waters". Other potential treatment methods such as ultrasonic waves and peroxide were also reviewed. A summary of alternative treatment options is provided below. At the present time, copper sulfate (with citric acid as a chelating agent) appears to be the most effective, and least intrusive, algaecide available to control nuisance algae in Sweetwater Reservoir.

In developing the APAP, the Authority applied a decision matrix concept, balancing the need to comply with the California Safe Drinking Water Act regulatory requirements (with respect to taste and odor and finished water turbidity) with the need to control nuisance algae blooms in an environmentally sensitive manner, ensuring the beneficial uses of the reservoir are not impacted. As mentioned in Section 4.0 above, copper sulfate will only be applied in instances when alternative strategies such as avoidance and/or

treatment plant process changes have been ineffective. In situations when copper sulfate treatment is unavoidable, the lowest effective dose will be applied to no more than half the surface area of the Sweetwater Reservoir, thus minimizing any potential environmental impacts.

6.1 Biological Methods

Biological control would include using bio-manipulation, bacteria, enzymes, barley straw, or organic matter amendments to reduce the survival, growth, or reproduction of nuisance algae species.

Bio-manipulation involves the introduction of larger fish higher in the food chain to prey upon the smaller planktivorous fish that feed on the zooplankton, which in turn graze upon nuisance algae species. By reducing the population of the smaller fish, the zooplankton population increases, thus reducing the overall abundance of algae in a water body. The downside of fish bio-manipulation is that it is difficult to manage and implement effectively. Further, this control strategy has not yet been attempted in California waters.

There are commercially available microbial products containing a mixture of bacteria and enzymes, which can be applied to increase the bacterial populations in a water body. The theory is that increased bacterial concentrations will limit the availability of nutrients available for algal growth and reproduction. Bio-control agents are relatively inexpensive however peer-reviewed studies indicate that microbial methods are not very effective for control of nuisance algae blooms and may not be practical in large reservoirs.

Barley straw has been used for algae control with varying success in private ponds or lakes as a "home remedy". As barley straw is decomposed by fungi, lignins and tannins are released into the water, preventing the growth of algae. The downside is that algae already present in the water are not affected. Adding barley to the surface of Sweetwater Reservoir would create an aesthetic nuisance. Also, barley straw is not registered as an aquatic pesticide in California.

6.2 Physical Control Methods

Physical control methods include mechanical harvesting and removal of aquatic plants, sediment removal, shading, aeration, oxygenation, circulation, nutrient removal, and ultrasonic wave technology.

Mechanical harvesting is a strategy that can be used to reduce dissolved phosphorous and nitrogen inputs from aquatic plants in a lake. Although harvesting can decrease within-lake nutrient levels, algae production may continue to remain high due to nutrient release from sediments under anoxic conditions. Due to the uneven terrain surrounding Sweetwater Reservoir and logistical concerns, mechanical harvesting of aquatic plants is not a viable option for the Authority.

Sediment dredging has been used to remove nutrient rich sediments from irrigation canals and physical shading can be used to reduce algal growth by limiting the amount of light available for photosynthesis. However, neither of these strategies would be logistically practical for a large body of water such as Sweetwater Reservoir.

Aeration, oxygenation, and water circulation are used to maintain oxygen levels in the hypolimnion, which ultimately reduces algae growth by reducing the rate of nutrient recycling into the water column and also by disturbing the habitat of taste and odor causing cyanobacteria. While this approach may be effective in smaller water bodies, it would not be logistically possible to aerate the entire volume of Sweetwater Reservoir. In addition, Sweetwater Reservoir is infested with quagga mussels, and one of the Authority's primary quagga control strategies is to naturally maintain hypolimnetic anoxia under stratifying conditions.

Commercially available ultrasonic wave generating devices control blue/green algae by damaging their cellular structure, causing them to sink to the bottom of a water body. The main limitation of this technology is that it operates by "line of sight". Because Sweetwater Reservoir has many different inlets and "line of sight" obstructions, multiple ultrasonic generating devices would have to be purchased, which could potentially make this strategy cost prohibitive in Sweetwater Reservoir.

6.3 Non-Conventional Chemical Controls

Many non-conventional chemical algae control methods include calcium based products such as lime ($Ca(OH)_2$), limestone ($CaCO_4$), gypsum ($CaSO_4$) or iron gypsum (Fe-$CaSO_4$), and aluminum based alum ($Al_2(SO_4)_3$) which can be added to eutrophic lakes to bind and precipitate phosphorous out of the water column and into the sediment where it remains sequestered as long as oxygenated conditions prevail.

Aside from the enormous amounts of these chemicals that would have to be added to effectively bind and remove the phosphorous in the lake, this strategy would not be effective in Sweetwater Reservoir because the lake typically stratifies in the spring and summer, creating anoxic conditions in the hypolimnion. So, any phosphorus which had been sequestered in the bottom sediment would be re-solubilized and become a bioavailable nutrient for further cyanobacteria (algae) blooms. It is also not clear whether or not the SWRCB would approve the use of these sequestering chemicals for NPDES permits.

Aquashade is an EPA registered chemical that controls algae growth by filtering out photosynthetically available radiation in the range of blue-violet and red-orange (i.e. 550 nm – 650 nm). This product has been used in private recreational lakes and ponds in California to control algae. However, certain municipalities have declined to use it because they believe it creates an unnatural appearance in the water body. Aside from potential aesthetic concerns, it is unknown whether this treatment strategy would be appropriate for a large scale application in Sweetwater Reservoir. According to the SFEI Report, more research is necessary to fully determine the efficacy of this product.

Oxidizer algaecides use hydrogen peroxide to rupture the cell walls of the blue-green algae. Sodium Carbonate Peroxyhydrate has been registered in California as an algaecide and oxidizer since early 2006. The advantage of this chemical alternative to copper sulfate is that it breaks down quickly into sodium carbonate, water, and oxygen and is non-persistent in the environment. It is formulated as a flaky granule or liquid which is applied by broadcasting it over the surface of the water within the target area (Clean Lakes Inc. 2011 Winter/Spring Newsletter). This product has been used in California waters to control blue-green algae blooms, however the amount of chemical necessary to treat a lake the size Sweetwater Reservoir could be as high as 25,000 lbs - 50,000 lbs. The downside of using oxidizer algaecides is they have not been as widely used or studied as extensively as copper-based algaecides in California and their long-term efficacy remains to be determined.

7.0 Aquatic Pesticide Monitoring Program

The Authority's Aquatic Pesticide Monitoring Program is designed to comply with the provisions outlined in the Monitoring and Reporting Plan (MRP) in Attachment C of Permit Order No. 2013-0002-DWQ.

7.1 Monitoring Locations

Figure 1 provides a topographical map of Sweetwater Reservoir and includes the monitoring locations to be sampled under the APAP. The Authority uses monitoring locations which are representative of the water quality before, during, and after copper sulfate has been applied. To ensure the monitoring station (buoy) locations are consistent over time, GPS coordinates have been assigned to each location.

7.2 Sample Types

There are three distinct sample types associated with the application of copper sulfate to Sweetwater Reservoir to treat a nuisance algae bloom:

1) Background Monitoring (Buoy #1, Buoy #2): Background monitoring samples shall be collected in the application area just prior to (up to 24 hrs in advance of) the application event.

2) Event Monitoring (Buoy #7): Event monitoring samples shall be collected immediately outside of the treatment area, immediately after the application event, but after sufficient time has elapsed such that the treated water would have exited the treatment area.

3) Post-Event Monitoring (Buoy #1, Buoy #2): Post-event monitoring samples shall be collected within the treatment area within one week after application.

7.3 General Monitoring Provisions

Figure 2 provides the Authority's Aquatic Pesticide Monitoring Worksheet, which includes the chemical and physical analyses (and methods) required in the MRP. All laboratory analyses resulting from a copper sulfate treatment event shall be conducted only at laboratories certified by the California Department of Public Health (CDPH). All analyses shall be conducted in accordance with methods and guidelines established in 40 CFR 136.

Records of monitoring information shall include the date, place, and time of sampling and field measurements, the individuals who performed the sampling or field measurements, the dates and individuals who performed the analyses, the analytical methods used, and a summary of monitoring results.

The Authority shall maintain a log for each copper sulfate application event (refer to Figure 3). The application log shall record the date of application, location of application, names of the applicators, amount of copper sulfate used, lake level, start and stop time of the application event, application rate, and concentration. A visual monitoring assessment is also conducted for each event and includes field observations such as weather conditions, secchi disk clarity, and color.

As required under Section 5.3 of the SIP, upon completion of each copper sulfate application project, certification that the receiving water beneficial uses have been restored will be provided by a qualified senior biologist, who is knowledgeable regarding the flora, fauna, ecology, and beneficial uses of Sweetwater Reservoir.

7.4 Water Quality Analyses

7.4.1 Routine Baseline Monitoring

The Sweetwater Authority Water Quality Laboratory performs baseline testing of the Sweetwater Reservoir at regular intervals. Temperature, pH, color, turbidity, Total Coliform bacteria, and taste and odor analysis are performed daily. Alkalinity, nitrite-N, and ammonia-N are determined weekly, and conductivity, chloride, total hardness, iron, and manganese are measured on a monthly basis. State certified contract laboratories perform most Title 22 inorganic chemical, heavy metal, volatile organic chemical (VOC), and synthetic organic chemical (SOC) analysis at least annually on the reservoir water.

Plankton speciation and enumeration are performed weekly. At the same time the plankton sample is collected, a depth profile for temperature and dissolved oxygen is performed using a Yellow Springs Instrument (YSI), ProDO optical dissolved oxygen instrument.

7.4.2 Copper Sulfate Event Monitoring

All samples are collected and transported to the Water Quality Laboratory by trained Sweetwater Authority Laboratory personnel following proper chain of custody procedures. Proper collection methods and procedures will be followed to ensure samples are representative and free from contamination. Samples are collected in appropriately prepared and labeled containers and transported back to the laboratory in an ice chest with frozen blue ice. All sample bottles are labeled with the sample location, date, time, preservation (if any), sampler, analysis, and sample identification number.

Whenever copper sulfate applications are required to control taste and odor producing algae, the water quality monitoring for this plan will commence. As required in Table C-1 of the MRP, samples will be collected at a depth of three ft below the surface at each monitoring location (refer to Figure 1) using a depth sampler. Background samples will be taken no earlier than 24 hrs before application. Event monitoring will be performed no later than 24 hrs after algaecide application. Post-event monitoring will be conducted within one week after copper sulfate treatment.

Measurements for dissolved oxygen, temperature, and secchi disk clarity will be performed in the field by Authority staff at each monitoring location. Plankton speciation and enumeration, turbidity, pH, total hardness, and conductivity will be determined in the Authority's Water Quality Laboratory. All laboratory instrumentation will be calibrated according to method and/or manufacturer's specifications.

USEPA Method 200.8 (inductively coupled plasma mass spectrometry (ICPMS)) will be used to determine soluble (i.e. dissolved) copper concentration following filtration with a 0.45 um membrane filter. Samples for copper will be properly preserved and shipped (with chain of custody documentation) to a state certified contract laboratory for testing.

The analytical results will be reviewed first by the analyst. The Laboratory Supervisor will perform a final review of all data for accuracy, consistency, and completeness. The final review will include verification that calibration standards and quality control samples are within method specifications and that the analytical results are properly reported.

7.5 Laboratory Quality Assurance Program

The Authority's Laboratory Quality Assurance (QA) Program will serve as the Quality Assurance Plan for all Aquatic Pesticide Monitoring Program activities associated with Permit Order 2013-0002-DWQ. The Laboratory QA Program is designed to offer controls over both the quality of laboratory equipment and materials, and the reliability of the analytical methods, procedures, and techniques used for analysis. The Laboratory QA Program is a written description of QA activities associated with the sampling, analysis, and data reporting and review procedures followed in the Authority's Water Quality Laboratory. The Standard Operating Procedures (SOPs) utilized in the laboratory will reference either *Standard Methods for the Examination of Water and Wastewater* or analytical methods promulgated by the Environmental Protection Agency (EPA) in accordance with 40 CFR part 136.

7.6 Monitoring Reports

As required in MRP Section IV.C, an annual report shall be submitted to the Deputy Director of the SWRCB and the appropriate Region 9 Water Quality Control Board Executive Officer, consisting of a summary of the past year's treatment and monitoring activities and will certify compliance with all requirements of Permit Order No. 2013-0002-DWQ. If no copper sulfate treatment was necessary during the calendar year, the discharger shall provide a certification that no algaecide discharges occurred in Sweetwater Reservoir over that time frame. The annual report shall be submitted by March 1 of the year following the calendar year being reported and will contain the following information:

1) An executive summary discussing compliance or violation of Order No. 2013-002-DWQ and the effectiveness of the APAP; and

2) A summary of monitoring data, including the identification of water quality improvements or degradation as a result of copper sulfate application.

If additional reporting become necessary (i.e. a 24-hr oral report, 5-day written report, or electronic report), the reporting protocols provided in Section IV of Order No. 2013-0002-DWQ will be followed.

Figure 1 Monitoring Locations

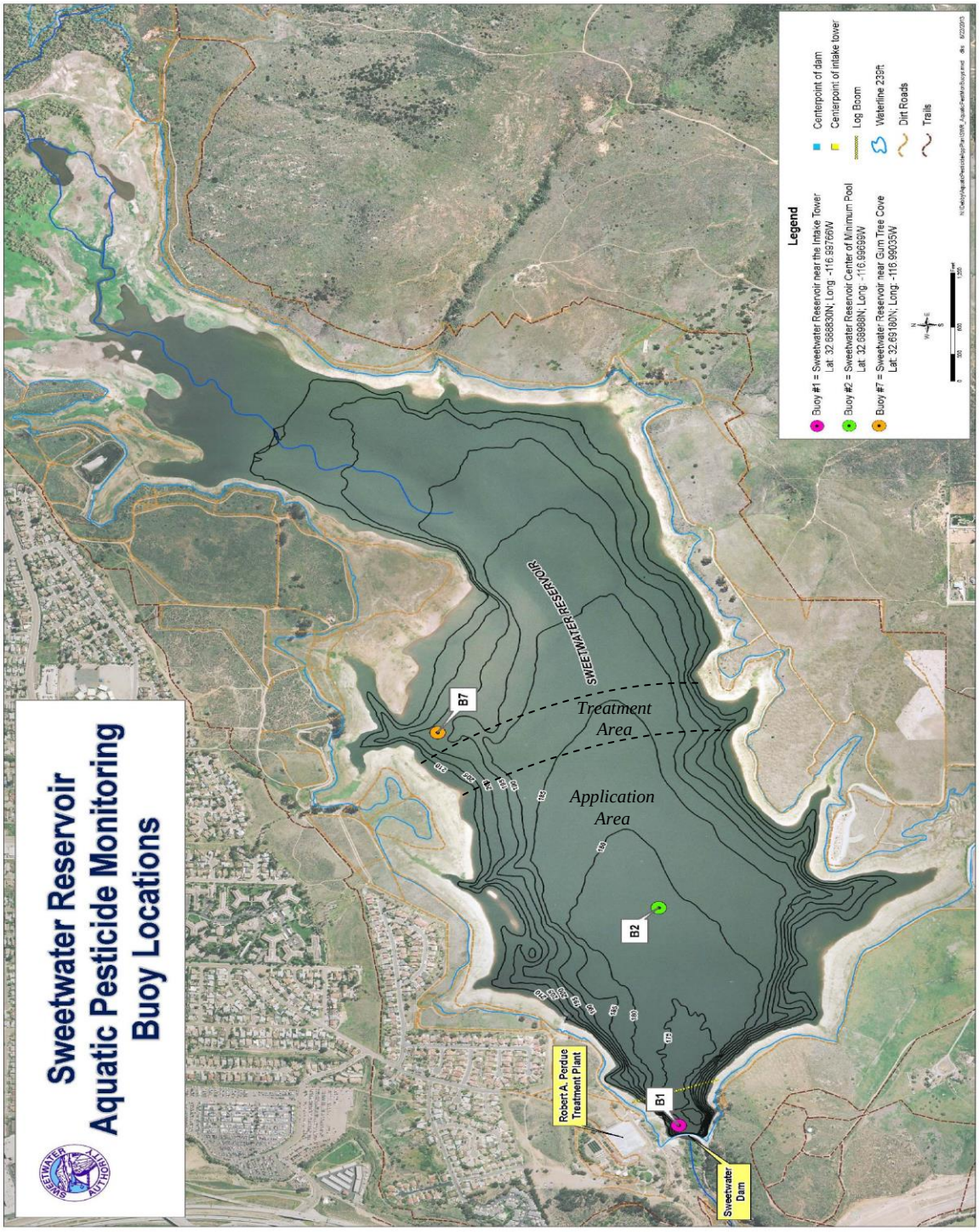

Figure 2 Monitoring Worksheet

Sweetwater Authority
Aquatic Pesticide Monitoring Worksheet

Sample Location	Sample Date	Sample Time	Sample Depth (ft)	Sampler Initials	Analysis Date	Analyst Initials	D.O. mg/L (ASTM D888-C)	Temp.(°C) (SM 2550B)	pH Units (SM 4500-H+B)	Turbidity NTU (SM 2130B)	Total Hardness mg/L as CaCO3 (SM 2340C)	Conductivity umhos/cm (2510B)	Dissolved Copper ug/L (EPA 200.8)
Buoy #1													
Buoy #2													
Buoy #7													
Buoy #1													
Buoy #2													
Buoy #7													
Buoy #1													
Buoy #2													
Buoy #7													

Monitoring Buoy Location	GPS Coordinates	
Buoy #1 (Sweetwater Reservoir near the Intake Tower)	Longitude: -116.99766	Latitude: 32.688830
Buoy #2 (Sweetwater Reservoir Center of Minimum Pool)	Longitude: -116.99699	Latitude: 32.68988
Buoy #7 (Sweetwater Reservoir near Gum Tree Cove)	Longitude: -116.99035	Latitude: 32.69180

Figure 3 Application Log

Sweetwater Authority
Aquatic Pesticide Application Log

Application Date:_____ Application Start:_____ Application End:_____ Copper Sulfate Application Protocol: Sweetwater Authority APAP

Pesticide Application Crew:_____ Lake Level (ft):_____

Lbs of CuSO4 used: _____ Lbs of Citric Acid used: _____ Reservoir Surface Area (Acre): _____ Reservoir Volume (Acre-ft): _____

Sweetwater Reservoir - Visual Monitoring Assessment									
Date	Time	Sampler	Weather Conditions (foggy, rainy, cloudy, windy, or sunny)	Floating debris or suspended matter present?	Color	Aquatic Life Observations	Visible films, sheens, or coatings?	Surface algae growth (light, moderate, or heavy)	Secchi Disk Clarity (ft)

ATTACHMENT A -- Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

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, Small, Medium, Large, FCC IV, and Very High Purity

Supplier Information

Chem One Ltd.
8017 Pinemont Drive, Suite 100
Houston, Texas 77040-6519

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.

Attachment A

Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

* * * 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.

ATTACHMENT A

Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

* * * 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.

ATTACHMENT A

Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

* * * 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.

ATTACHMENT A

Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

*** * * 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; Subcutaneous-rat 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 weeks-continuous: 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: post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants), Specific Developmental Abnormalities: Central Nervous System, body wall

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Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

*** * * 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.

ATTACHMENT A

Copper Sulfate MSDS

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From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

* * * 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 or (1-800-CLEANUP or equivalent organization) 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 * * *

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 I.M.O., I.C.A.O. (I.A.T.A.) and 49 CFR to assure regulatory compliance.

US DOT Information

UN/NA#: UN3077

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

Hazard Class: 9 (Miscellaneous Hazardous Material)

Packing Group: III

Required Label(s): Class 9 (Miscellaneous Hazardous Materials)

RQ Quantity: 10 lbs (4.54 kg)[Cupric Sulfate]

Additional Shipping Information: Cupric Sulfate is a Severe Marine Pollutant (49 CFR 172.322) and requires the marine pollutant mark for vessel transportation. Because Copper Sulfate is listed as a Severe Marine Pollutant as found in Appendix B to 172.101and when shipped by vessel, each inner package which exceeds 500 g (17.6 oz) will need a marine pollutant marking, UN-certified package, marked with the Proper Shipping Name, UN Number will be required when shipped by vessel, when each inner package exceeds 500 g (17.6 oz).

Limited Quantity Shipments: Inner packagings less than 500 g (17.6 oz) will not need to be in a UN-approved box and will not need a Marine Pollutant marking. Such 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 30 kg (66 lb). For a shipment by air the Class 9 label will be required.

Domestic Transportation Exception:

49 CFR 172.504(f)(9) Domestic transportation, a Class 9 placard is not required. A bulk packaging containing a Class 9 material must be marked with the appropriate identification number displayed on a Class 9 placard, an orange panel or a white-square-on-point display configuration as required by subpart D of this part. 49 CFR 172.322 (d)(3) allows the use of the Class 9 placard to replace the marine pollutant marking for domestic shipments.

ATTACHMENT A

Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

*** * * Section 14 - Transportation Information (Continued)* * ***

International Air Transport Association (IATA)

For Shipments by Air transport: We classify this product as hazardous (Class 9) when shipped by air because 49 CFR 173.140 (a). "For the purposes of this subchapter, miscellaneous hazardous material (Class 9) means a material which presents a hazard during transportation, but which does not meet the definition of any other hazard class. This class includes: (a) Any material which has an anesthetic, noxious, or other similar property which could cause extreme annoyance or discomfort to a flight crew member so as to prevent the correct performance of assigned duties."

UN: UN 3077
Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s. (cupric sulphate)
Hazard Class: 9
Packing Group: III
Passenger & Cargo Aircraft Packing Instruction: 911
Passenger & Cargo Aircraft Maximum Net Quantity: No Limit
Limited Quantity Packing Instruction (Passenger & Cargo Aircraft): Y911
Limited Quantity Maximum Net Quantity (Passenger & Cargo Aircraft): 30 kg
Special Provisions: A97
ERG Code: 9L
Limited Quantity Shipments: Such shipments must be marked with the proper shipping name, UN number, and must be additionally marked with the words LIMITED QUANTITIES or LTD. QTY. The total weight of each outer packaging cannot exceed 30 kg (66 lb.) . For a shipment by air the class 9 label will be required

International Maritime Organization (I.M.O.) Classification

For shipments via marine vessel transport, the following classification information applies.

UN #: UN3077
Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Cupric sulfate)
Hazard Class: class 9
Packing Group: III
Special Provisions: 274, 909, 944
Limited Quantities: 500g.
Packing Instructions: P002, LP02
Packing Provisions PP12
EmS: Fire F-A Spill S-F
Stowage and Segregation: Category A
Marine Pollutant: This material is considered a severe marine pollutant by the IMO and shipments of the material must carry the marine pollutant mark label. Refer to IMO Amendment 31-02 Chapter 2.10.
Limited Quantity Shipments: Inner packaging less than 500 g (17.6 oz) will not need to be in a UN-approved box and will not need a Marine Pollutant marking. Such 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 30 kg (66 lb) .

*** * * 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.

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Copper Sulfate MSDS

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

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

US Federal Regulations (continued)

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)

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

ATTACHMENT A

Copper Sulfate MSDS

Product #: 909794 Name: COPPER SULFATE LG CRYS Desc:
From: BRENNTAG MID-SOUTH INC. To: Wednesday, September 14, 2011

Material Safety Data Sheet

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

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

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 1 to 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 r 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 24 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.

ATTACHMENT A

Copper Sulfate MSDS

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

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

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.
This is the end of MSDS # C1-121A

ATTACHMENT B -- Citric Acid MSDS

Univar USA Inc Material Safety Data Sheet

MSDS No:	P21822VS
Version No:	016 2008-10-27
Order No:	

Univar USA Inc., 17425 NE Union Hill Rd., Redmond WA 98052
(425) 889 3400

Emergency Assistance

For emergency assistance involving chemicals call
Chemtrec - (800) 424-9300

ATTACHMENT B

Citric Acid MSDS

UNIVAR USA INC.
ISSUE DATE:2008-05-20
Annotation:

MSDS NO:P21822VS
VERSION:016 2008-10-27

The Version Date and Number for this MSDS is : 10/27/2008 - #016

PRODUCT NAME: CITRIC ACID ANHYDROUS

MSDS NUMBER: P21822VS

DATE ISSUED: 05/20/2008

SUPERSEDES: 07/01/2005

ISSUED BY: 006886

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MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

COMMERCIAL PRODUCT NAME: CITRIC ACID ANHYDROUS

Distributed by:
Univar USA Inc.
17425 NE Union Hill Rd.
Redmond, WA 98052
425-889-3400

24 Hour Emergency Phone Number: CHEMTREC 1-800-424-9300

PRODUCT USE: Widely used acidulant for flavoring, beverages, food, and as a basic chemical.

2. COMPOSITION, INFORMATION ON INGREDIENTS

Chemical Name Of The Material: 2-hydroxy-1,2,3-propane tricarboxylic acid
Chemical Formula C6H807
Chemical Family Organic Acid
SYNONYMS: Citric Acid, Beta-hydroxytricarboxylic acid.

COMPOSITION:	CAS Reg. No.	%
Citric Acid Anhydrous	77-92-9	100

EC-No. 201-069-1
European Food Additive E330
HAZARDOUS IMPURITIES None

3. HAZARDS IDENTIFICATION

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Citric Acid MSDS

UNIVAR USA INC. MSDS NO:P21822VS
ISSUE DATE:2008-05-20 VERSION:016 2008-10-27
Annotation:

Emergency Overview: Odorless, colorless translucent crystals with strong acidic taste. Citric acid is a skin and mucous membrane irritant and an eye irritant. It may cause allergic reactions in some individuals.

Most important Hazard: Irritating to eyes.

Potential Health Effects:

Inhalation: May cause mucous membrane irritation with sore throat, coughing and shortness of breath.

Eye contact: May cause irritation with redness, pain, possible eye burns, conjunctivitis, ulceration and permanent cloudiness.

Skin contact: May cause irritation with swelling, redness and pain.

Ingestion: May cause acute gastrointestinal irritation with abdominal pain.

Chronic: Repeated or prolonged skin contact may result in dermatitis. Prolonged or repeated eye contact may result in conjunctivitis. Long term oral overexposure may cause damage to tooth enamel.

Carcinogen status: None

4. FIRST AID MEASURES

General advice	Consult a physician.
Major effects of exposure:	Irritating to eyes and skin.
Inhalation	Move to fresh air.
Skin contact	Wash off immediately with soap and plenty of water. If skin irritation persists, call a physician.
Eye contact	Rinse immediately with plenty of water and seek medical advice.
Ingestion	Drink plenty of water. Do not induce vomiting. Consult a physician if necessary
Protection of first-aiders	Use personal protective equipment.

5. FIRE FIGHTING MEASURES

FLASH POINT	Not Applicable
FLAMMABLE LIMITS	Lower 8 gm/FT3 Upper 65 gm/FT3
Autoignition temperature:	1010 deg C / 1850 deg F
Suitable extinguishing media	water, water spray, dry powder, foam , carbon dioxide (CO2), remove containers if possible. Cool container exposed to fire with water spray.

Extinguishing media which must not

ATTACHMENT B

Citric Acid MSDS

be used for safety reasons	None
Hazardous decomposition products	carbon oxides
Special protective equipment for firefighters	Use personal protective equipment including self-contained breathing apparatus when fighting fire in enclosed area.
Specific methods	Standard procedure for chemical fires.

6. ACCIDENTAL RELEASE MEASURES

General: Wear dust respirator and protective clothing. Keep unnecessary personnel away. Sweep or vacuum into closed containers for disposal. Dispose in compliance with local, state, and federal regulations.

7. HANDLING AND STORAGE

Handling: Avoid contact with eyes and prolonged contact with skin. Avoid breathing large amounts of dust. Wash away splashes and spillages with water.

Storage Temperature General: Ambient storage pressure: atmospheric
Store in cool dry area away from incompatible materials and protected from moisture. Protect containers from damage.

Incompatible products Empty Containers: Incompatible with strong bases and oxidizing agents
Empty containers retain product residue and vapors. Observe all label precautions even after container is emptied. Do not reuse unless thoroughly cleaned.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Engineering measures	Provide general dilute ventilation.
Exposure limit(s)	None established for this ingredient, use OSHA PEL, ACGIH TLV for Nuisance dusts of 5 mg/3

Personal protection equipment

Respiratory protection	NIOSH approved dust respirator
Hand protection	Gloves
Eye Protection	Safety glasses
Skin and body protection	Lightweight protective clothing
Hygiene measures	Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form	crystalline powder
Color	colorless / white

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Citric Acid MSDS

Odor	none
pH (5 % solution)	1.8
Vapor pressure	3.70E-009mm Hg@25 deg C
Vapor density	not applicable
Boiling point	175 deg C
Evaporation rate	essentially 0
Coefficient of water/oil distrib Log P (oct)	-1.72 (measured)
Log P (oct)	-1.25 to -1.80 (calculated)
Melting point/range	153 deg C
Decomposition temperature	> 170 deg C
Relative density	1,665 g/cm3
Bulk density	650 - 950 kg/m3
Solubility, Water solubility (25 deg C)	576 g/kg
Solubility in other solvents, Alcohol (25 deg C)	383 g/I
Molecular weight	192.12

10. STABILITY AND REACTIVITY

Stability	Stable at normal conditions
Conditions to avoid	Avoid dust formation and moisture. Take precautionary measures against static discharges.
Materials to avoid	Incompatible with strong bases and oxidizing agents.
Hazardous polymerization	Does not occur.
Corrosion	May corrode metals. 316 Stainless Steel recommended for handling.

11. TOXICOLOGICAL INFORMATION

Acute toxicity	LD50/p.o./rat	11,700 mg/kg
	LD50/i.p./rat	885 mg/kg
	LD50/p.o./mouse	5,040 mg/kg
	LD50/I.p./mouse	961 mg/kg
Local effects	Irritating to eyes and skin	
Chronic toxicity	None	
Human experience	Health injuries are not known or expected under normal use.	

12. ECOLOGICAL INFORMATION

Mobility	Completely soluble
Persistence and degradability	
Chemical oxygen demand	(COD) = 728 mg 02/g

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Citric Acid MSDS

Biological oxygen demand/5 days	(BOD) = 528 mg 02/g
Readily biodegradable	98% after 2 days
Bioaccumulation	None
Ecotoxicity effects	Toxicity to fish (LC50/96h/goldfish) = 440-706 mg/L Toxicity to bacteria(ECO) = >10,000 mg/L

13. DISPOSAL CONSIDERATIONS

Waste from residues/unused products
Any disposal practice must be in compliance with local, state and federal laws and regulations (contact local or state environmental agency for specific rules).

14. TRANSPORT INFORMATION

Not Regulated
Not classified as dangerous according to TDG (Transportation of Dangerous Goods) and US DOT (Department of Transportation)

15. REGULATORY INFORMATION

Citric acid is generally regarded as safe (GRAS) by USA FDA. 21 CFR 184.1033
Meets the criteria for hazardous material as defined by OSHA Hazard Communication Standard 21 CFR 1910.1200.

The material is listed on the TSCA Inventory List.
CERCLA (Comprehensive Response Compensation, and Liability Act): Not hazardous
SARA Title III (Superfund Amendments and Reauthorization Bill): Not Considered Hazardous

Foreign Inventory Status
Canadian DSL (Domestic Substance List) WHMIS Class E
IDL Citric Acid (CAS-No. 77-92-9) is listed on the Ingredient Disclosure List
DSL Citric Acid (CAS-No. 77-92-9) is listed on the Domestic Substance List

To the best of our knowledge, this Citric Acid Anhydrous does not contain any contaminants or biproducts known to the State of California to cause cancer or reproductive toxicity as listed under Proposition 65 State Drinking Water and Toxic Enforcement Act.

16. OTHER INFORMATION

HMIS* Rating Health = 1, Fire = 0, Reactivity =0
0=minimal, 1=slight, 2=moderate, 3=serious, 4=severe
*Hazardous Materials Identification System of the National Paint and Coating Association.

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Citric Acid MSDS

Univar USA Inc Material Safety Data Sheet

For Additional Information contact MSDS Coordinator during business hours, Pacific time: (425) 889-3400

Notice

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Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a product specification sheet and/or a certificate of analysis. These can be obtained from your local Univar sales office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein.

This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process

ATTACHMENT B

Citric Acid Spec Sheet

PRODUCT SPECIFICATION

UNIVAR

Citric Acid, Anhydrous

USP/FCC Grade, Kosher Ⓤ

Univar's premium grade citric acid, anhydrous, is produced to meet the specifications of the Food Chemical Codex (FCC) and the United States Pharmacopoeia (USP). Test methods are listed in the current FCC and USP. This material is supplied in a multi-wall paper bag designed to Univar requirements.

Property	Specification	Typical Results
Description	White or colorless crystals	White or colorless crystals
Assay, calculated on the anhydrous basis	99.5% ~ 100.5%	99.6%
Identification	Pass test	Pass
Clarity of Solution	Pass test	Pass
Color of Solution	Pass test	Pass
Moisture	< 0.3%	0.15 %
Heavy Metal (as Pb)	< 5 ppm	3 ppm
Oxalate	< 350 ppm	< 100 ppm
Readily Carbonizable Substances	Pass test	Pass test
Residue on Ignition (Sulfated ash)	< 0.05%	0.01%
Sulfate	Pass test (< 150 ppm)	10 ppm
Lead, Pb	< 0.5 ppm	< 0.5 ppm
Iron, Fe (not in current FCC/ USP)	< 5 ppm	< 5 ppm

CAS: 77-92-9 **Formula:** $C_6H_8O_7$ **M.W.:** 192.13

Mesh Sizes Available:

Granular:	16 - 30 mesh in 50 lb. Univar bags, or 1 MT super sack Particle size: Retained on 14 mesh: 5% max Through 50 mesh: 10% max
Fine Granular:	30 - 80 mesh in 50 lb. Univar bags Particle size: Retained on 30 mesh: 5 % max Through 100 mesh: 10% max
Powder:	70 - 120 mesh (available in 25 kg fiber drums or cartons only)

RE-EVALUATION DATE: Granular and Fine Granular: 2 years for Yixing/ RZBC; 3 years for BBCA

SOLUBILITY: Water, 25°C: 62.2%; Ethanol, 20°C: 66%

USES:

- ***Flavoring extracts, soft drinks, candy***
- ***Effervescent salts***
- ***Acidifier***
- ***Acidulant and antioxidant in foods***
- ***Sequestering agent, water conditioning agent, and detergent builder***
- ***Cleaning compounds***

P/C (50 lb. gran): 765118 - Yixing; 765119 - BBCA; 765120 – RZBC
(1000 kg. SS gran): 713074 - Yixing
(1000 lbs SS gran): 786641 - Yixing; 787544 - RZBC

(50 lb. fine gran): 765121 - Yixing; 765122 - BBCA; 765123 - RZBC
(1000 lbs SS fine gran): 787545 – RZBC

10-20-2010

Country of Origin: China

Univar
17425 NE Union Hill Road
Redmond, WA 98052-3375
USA
+1 425 889 3400