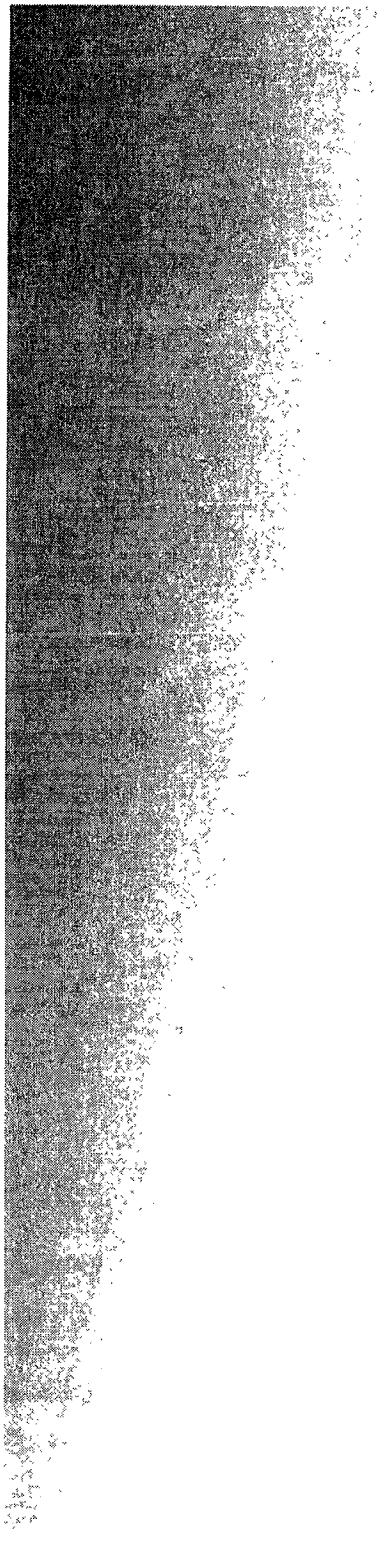
Use of Copper To Control Aquatic Weeds In Stafford Lake



California Environmental Quality Act Initial Study And Mitigated Negative Declaration

August 31, 2004

Project Sponsor and Lead Agency:
North Marin Water District
999 Rush Creek Place
Novato, CA 94945
Contact: Michael McMaster 415.897.4133

Use of Copper to Control Aquatic Weeds In Stafford Lake

CEQA Initial Study & Mitigated Negative Declaration

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1.0 PROJECT DESCRIPTION

1.1 Introduction

The North Marin Water District (herein referred to as the "District") serves a suburban population of 56,000 people situated in and about the City of Novato which is located in a warm inland coastal valley of Marin County, California. The District's primary objective is to provide municipal water to Novato and areas in West Marin County (Point Reyes Station, Olema, Bear Valley, Inverness Park, and Paradise Ranch Estates).

The District owns and operates the Stafford Dam and Stafford Lake. Stafford Lake is located on Novato Creek, four miles west of downtown Novato adjacent to Novato Boulevard (old Hicks Valley Road). All of Stafford Lake and much of the land adjacent to the shoreline is owned by North Marin Water District (870+ acres). Stafford Lake was created with the construction of Stafford Dam on Novato Creek in 1951. It was created to provide a municipal water source for the growing Novato community.

Stafford Lake, which provides approximately 20% of Novato's water supply, collects runoff from 8.3 square miles of watershed property located upstream at the upper tributary reaches to Novato Creek. The lake itself encompasses some 231 surface acres storing 4,287 Acre Feet of water. Water from Stafford Lake is drawn by the outlet tower and fed by gravity or by pumping (depending on the lake level) into the treatment plant located just below the dam.

Sixteen percent of the Stafford Lake watershed is owned by North Marin Water District. Eighty percent is privately owned and used for primarily agriculture (dairy, cattle, and stables). Marin County Parks and Open Space own the remaining acres.

North Marin Water District is committed to the protection of the source water quality of Novato's local municipal water supply. A Watershed Management Plan has been developed to identify future activities. Some protection activities include cooperative erosion control with surrounding land owners on the watershed, dairy Best Management Practices, development of a manure management plan, control over the use and type of fertilizers used by the golf course and nearby county park, development of the Stafford Lake County Park's master plan, involvement with Students and Teachers Restoring A Watershed (STRAW), and riparian fencing.

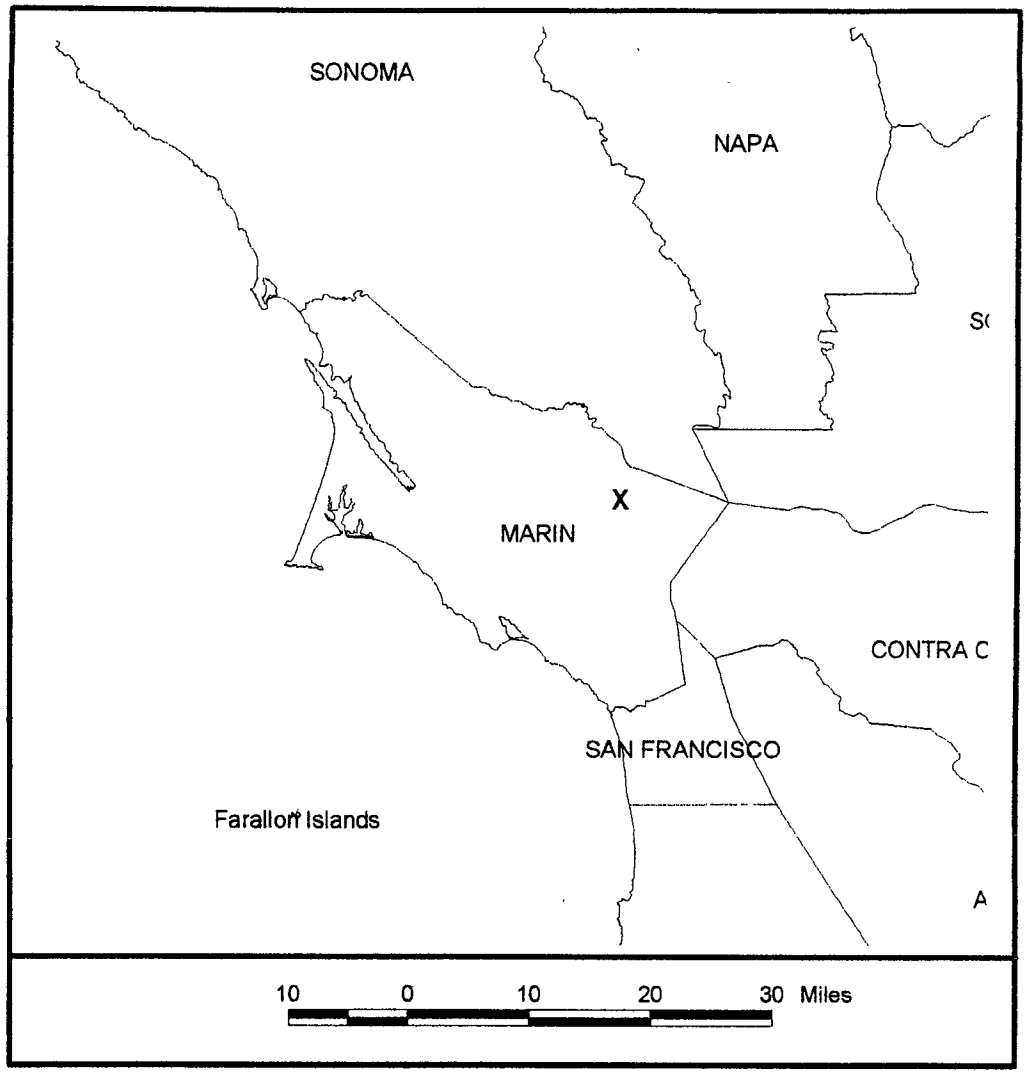
The Stafford Lake and dam provide several beneficial uses beyond municipal water supply. Recreational activities within the watershed include fishing from shoreline only, hiking and picnicking at Marin County Regional Park and golfing at Indian Valley Golf Course. Cattle are grazed within the watershed in areas fenced off from lake shoreline. The Stafford Lake dam provides some degree of flood control through a notched overflow when the lake is spilling. No swimming or boating is allowed at the lake to protect water quality.

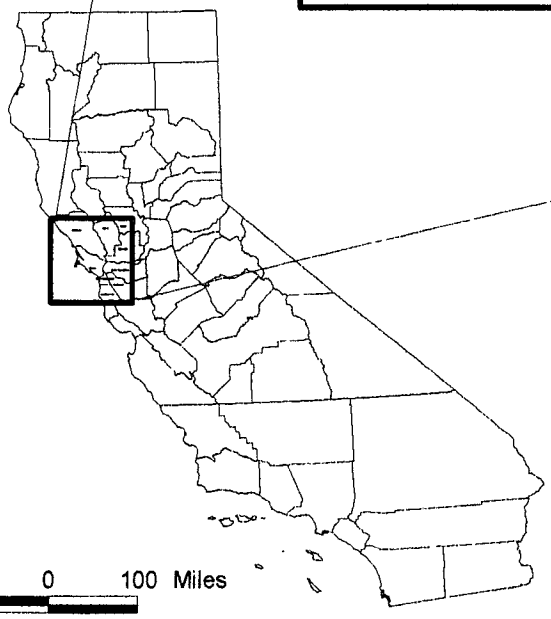
To control algae that imparts an undesirable taste and odor to drinking water, aquatic pesticide applications are made to only one-third to one-half of the lake at any one time. Between 10 to 14 days elapses between aquatic pesticide applications to prevent oxygen depletion in the lake. For control of filamentous blue-green algae (*Anabaena* and *Aphanizomenon*), copper sulfate is applied at 0.67 to 1.3 lbs/acre foot (0.25 to 0.5 ppm). For control of diatoms (*Stephanodiscus*)

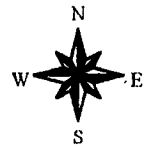
and filamentous algae (*Tribonema*), copper sulfate is applied at 1.3 to 2.6 lbs/acre foot (0.5 to 1 ppm). Applications are made two to five times annually, averaging about three times per year.

The District is presently constructing a new water treatment Plant replacing the old plant which has been in service for nearly 50 years. This $15 million project will encompass new treatment technologies which will better enable the Stafford Water Treatment Operations to deal with the many varying conditions of Stafford lake water quality. However, despite all of these new systems and technologies, some level of lake water treatment for algae will still be required in annual summer operations at Stafford in order to comply with new State and Federal drinking water treatment public health regulations. This fact has been born out of full scale plant tests (at reduced flows in September, October of 2002) along with ancillary pilot scale tests of some of the new processes that will be employed at the new facility when it is completed.

Lake aeration/destratification systems have been installed to address potential oxygen depletion and to disrupt lake temperature stratification, which in turn may aid in limiting algae growth and propagation.







Project Location Map

Legend

- General Project Area
- California County Boundaries
- X Project Location

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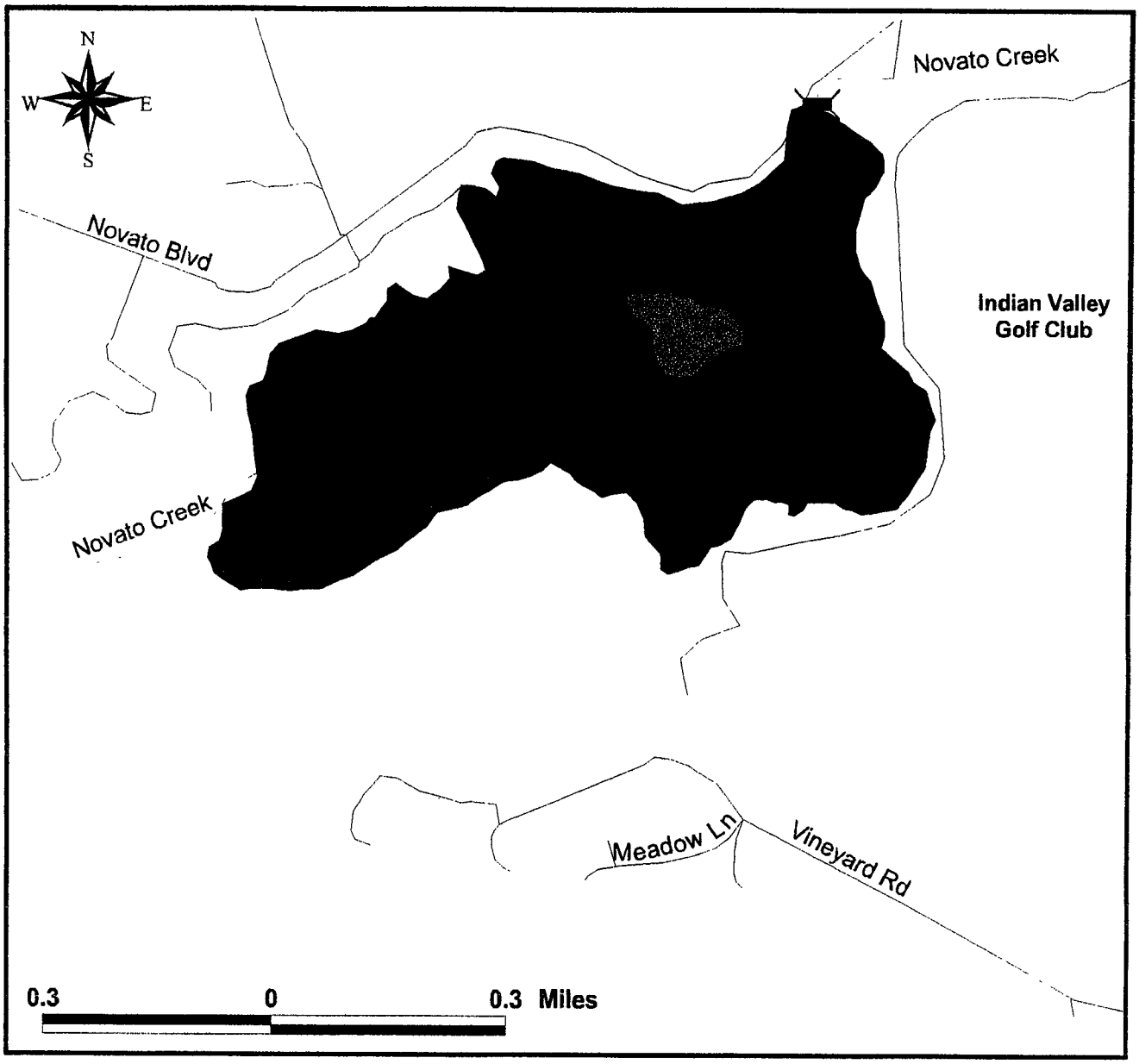
Figure 1

North Marin Water District
Project Detail Map



Legend

- Intake Structure
- Dam
- Island
- Creeks
- Local Roads

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Figure 2

1.2 Regulatory Setting

On June 4, 2004, The State Water Resources Control Board (SWRCB) released the Statewide General National Pollutant Discharge Elimination System (NPDES) Permit for the Discharge of Aquatic Pesticides for Aquatic Weed Control in Waters of the United States, CAG 990005 (hereafter referred to as the "Permit"). The Permit requires compliance with the following:

- The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries in California (aka the State Implementation Plan, or SIP) (SWRCB, 2000)
- The California Toxics Rule (CTR) (CTR, 2000)
- Applicable Regional Water Quality Control Board (RWQCB) Basin Plan Water Quality Objectives (WQOs). (RWQCB-SFB, 1995)

The SIP assigns effluent limitations for CTR priority pollutants, including the aquatic pesticide copper. Further, the SIP prohibits discharges of priority pollutants in excess of applicable water quality criteria outside the mixing zone[1].

The SIP does, however, allow categorical exceptions if determined to be necessary to implement control measures either for resource or pest management conducted by public entities to fulfill statutory requirements, or regarding drinking water conducted to fulfill statutory requirements under the federal Safe Drinking Water Act or the California Health and Safety Code. Such categorical exceptions may also be granted for draining water supply reservoirs, canals, and pipelines for maintenance, for draining municipal storm water conveyances for cleaning or maintenance, or for draining water treatment facilities for cleaning or maintenance. The District has concluded that they meet one or more of the criteria for gaining a SIP exception.

Permittees who elect to use a SIP categorical exception must satisfactorily complete several steps, including preparation and submission of a California Environmental Quality Act (CEQA) document. This document must be submitted to the SWRCB for the permittee to be placed on Attachment E of the Permit and subsequently be afforded coverage.

The SWRCB has suggested that the Permit may be re-opened for additional CEQA document submission over the next 6 months.

[1] Mixing Zone is defined in the SIP as "a limited volume of receiving water that is allocated for mixing with a wastewater discharge where water quality criteria can be exceeded without causing adverse effects to the overall waterbody."

1.3 Required Approvals

To obtain approval of an exception under Section 5.3 of the SIP to the CTR criterion for copper, the District will submit the following documents to the SWRCB and RWQCB for acceptance:

a. A detailed description of the proposed action, including the proposed method of completing the action;
b. A time schedule;
c. 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);
d. CEQA documentation;
e. Contingency plans (to the extent applicable);
f. Identification of alternate water supply (if needed and to the extent applicable);
g. Residual waste disposal plans (to the extent applicable); and
h. Upon completion of the project, the discharger shall provide certification by a qualified biologist that the receiving water beneficial uses have been restored.

1.4 Required Notifications

1.4.1 Marin County Agricultural Commissioner's Office

Prior to the start of every season, the District notifies the Marin County Department of Agriculture and Weights and Measures.

1.5 Standard Operating Procedures

The District implements an Integrated Pest Management (IPM) program for aquatic weed control. The IPM program involves the scouting of aquatic weed locations and densities, establishment of thresholds above which control is needed, and making applications of aquatic pesticides on an "as-needed" basis to achieve the aquatic weed control necessary to convey water.

Prior to application, the following tasks are accomplished:

1. A written recommendation is prepared by a DPR-licensed Pest Control Advisor (PCA). A PCA undergoes 40 hours of training every 2 years on issues including health and safety and prevention of exposure to sensitive receptors. The written recommendation prepared by the PCA must evaluate proximity of occupied buildings and people, health and environmental hazards and restrictions, and a certification that alternatives and mitigation measures that substantially lessen any significant adverse impact on the environment have been considered and if feasible, adopted. Refer to Appendix A.

2. Under the District's present operating plan all personnel involved with the application of copper sulfate or any other aquatic pesticide to Stafford Lake are required to obtain a pesticide applicator's license. This requirement extends to any contractor the District may hire to complete this work as well.

3. All District personnel and their contractors review and strictly adhere to the aquatic pesticide product label that has clear and specific warnings that alert users to hazards that may exist. An example of a specific product label is included in Appendix B.

4. All District personnel and their contractors review and consult the aquatic pesticide Material Safety Data Sheet (MSDS) in Appendix B, and the DPR Worker Health and Safety Branch Pesticide Safety Information Series (PSIS). The PSIS and the MSDS has specific information that describes precautions to be taken during the use of the aquatic pesticide.

5. The condition of the water being treated is field evaluated to ensure that the application is necessary, feasible and can be conducted safely and according to label. This evaluation considers target weed species, level of infestation, water and flow conditions, alternate control methods, and amount of chemical to be applied.

2.0 INITIAL STUDY

This document was prepared in a manner consistent with Section 21064.5 of the California Public Resources Code (CEQA) and Article 6 of the State CEQA Guidelines (14 California Code of Regulations).

This Initial Study, Environmental Checklist, and evaluation of potential environmental effects were completed in accordance with Section 15063(d) of the *State CEQA Guidelines* to determine if the proposed Project could have any potentially significant effect on the physical environment, and if so, what mitigation measures would be imposed to reduce such impacts to less-than-significant levels.

An explanation is provided for all determinations, including the citation of sources as listed in Section *5.* A "No Impact" or a "Less-than-Significant Impact" determination indicates that the proposed Project would not have a significant effect on the physical environment for that specific environmental category.

Mitigation measures will be implemented to reduce the potentially significant impacts to a less-than-significant level. No other environmental categories for this evaluation were found to be potentially affected in a significant manner by the proposed Project.

2.1 CEQA Initial Study & Environmental Check List Form

1. Project Title:	Use of Copper to Control Aquatic Weeds in Stafford Lake
2. Lead Agency Name and Address:	North Marin Water District 999 Rush Creek Place Novato, CA 94945
3. Contact Person & Phone Number:	Michael McMaster 415.897.4133
4. Project Location:	Marin County, California
5. Project Sponsor's Name and address:	Chris DeGabriele, General Manager North Marin Water District 999 Rush Creek Place Novato, CA 94945
6. General Plan Land Use Designation:	Open Space
7. Zoning:	Limited Agriculture/Prime Agriculture
8. Description of Project:	See Section 1.5
9. Surrounding Land Uses and Setting:	Agriculture/Recreation/Residential

10. Other Agencies Whose Approval is Required: As Listed in Section 1

2.2 Environmental Factors Potentially Affected

The environmental factor checked below would be potentially affected by the proposed Project, involving at least one impact that is a 'Potentially Significant Impact" as indicated by the checklist on the following pages:

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

2.3 Determination (To be completed by lead agency)

On the basis of this initial evaluation:

☐ 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 because appropriate mitigation measures are in place. 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 (EIR) 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 EIR 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.

Chris DeGabriel — Signature

September 15, 2004 — Date

Chris DeGabriele, General Manager — Printed Name

North Marin Water District — For

3.0 EVALUATION OF ENVIRONMENTAL IMPACTS

3.1 Aesthetics

		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project:					
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c)	Substantially degrade the existing visual character or quality of the site and its surrounding?	☐	☐	☐	☒
d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

Discussion

Items a) & b): ***No Impact.*** No designated scenic vistas or state scenic highways overlook the project site, therefore no impact would occur.

Item c): ***No Impact.*** The project involves the application of aquatic pesticides to Stafford Lake to control a variety of aquatic weeds, primarily algae. These weeds are typically at or below the water surface. Upon control, the removal of these weeds would be unnoticed and as a result not degrade the visual character of the project site.

Item d): ***No Impact.*** The project is done during the daylight hours, therefore no light sources are needed and no light or glare is produced.

3.2 Agriculture Resources

		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project:					
a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c)	Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	☒

Discussion

Items a) through c): ***No Impact.*** The project involves the application of aquatic pesticides to Stafford Lake to control a variety of aquatic weeds, primarily algae. The reservoir is a municipal water source and will not alter or influence the local agricultural practices or farmlands.

3.3 Air Quality

		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project:					
a)	Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b)	Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☐	☒
c)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal and state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	☒
d)	Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
e)	Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

Discussion

Items a) & b): ***No Impact.*** The project requires the use of pick-up trucks for purposes of transporting aquatic pesticides and a small boat to the boat launching area. The boat is used for purposes of site reconnaissance before, during, and after application of aquatic pesticides. The boat is also used for the application of the aquatic pesticide following the instructions from the District's annual aquatic pesticide application plan. Short-term vehicle and motor emissions will be generated during aquatic pesticide application; however, they will be minor and last only from April to October. To minimize impacts, all equipment will be properly tuned and muffled and unnecessary idling will be minimized.

The District is located in the Bay Area Air Quality Management District (BAAQMD) which includes the following counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara, and portions of southwestern Solano and southern Sonoma. The application of aquatic pesticides does not conflict with the BAAQMD 2000 Clean Air Plan, violate any air quality standards, or contribute to an existing or projected violation.

Item c.) ***No Impact.*** Levels of ozone, carbon monoxide, and suspended matter (PM-10) in the Bay Area have exceeded California Clean Air Act standards, and therefore the area has been considered a "nonattainment area" for these pollutants. BAAQMD's Bay Area '91 Clean Air Plan contains district wide control measures to reduce carbon monoxide and ozone precursor emissions (City of Novato, 2003). However, in April 2004, U.S. EPA made a final finding that the Bay Area has attained the national 1-hour ozone standard. Because of this finding, the previous planning commitments in the 2001 Ozone Attainment Plan are no longer required (BAAQMD, 2004). Project activities will produce minor

amounts of carbon monoxide and suspended matter from running pick-up trucks and outboard motors and will not contribute to nonattainment.

Items d) & e): ***No Impact.*** Aquatic pesticides are applied by District personnel or their contractors on the lake away from people. Applications are not made near, schools, playgrounds, health care facilities, day care facilities, and athletic facilities, thereby eliminating exposure to these sensitive receptors and creating no impact.

3.4 Biological Resources

		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project:					
a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
c)	Have a substantial adverse effect on 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?	☐	☐	☐	☒
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f)	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Discussion

Items a) & b): **Potentially Significant Unless Mitigation Incorporated.** A list of current special status species was compiled from the California Department of Fish and Game (CDFG) California Natural Diversity Database (CNDDB) and the U.S. Fish and Wildlife Service (USFWS), Sacramento Office. Once this list was compiled, a preliminary assessment of the project area was performed to characterize the actual habitats present on-site and the likelihood of special status species occurrence.

A summary of the listed species with habitat present in the project area, their designation, and whether or not they were considered for evaluation of potential impact is presented in **Table 1.** Species habitat and rationale for removal from further consideration is presented in **Appendix C.** Physical, chemical and toxicological data on copper are presented in **Appendix D.**

With one exception, no special status species has habitat in or near, or is otherwise at risk from aquatic pesticides used for the project.

The one species that may be at risk is the northwestern pond turtle because it could live within the lake margins and shoreline habitats. Based on aquatic pesticide label directions, the expected concentration of elemental copper in a drinking water reservoir may be as high as approximately 1 ppm. Using 1 ppm as a starting copper concentration, approximately 2.5 days would need to elapse in order for the copper concentration to drop to levels that are not estimated to pose a risk to the northwestern pond turtle.

During the summer months, when aquatic pesticides may be applied, the volume of water in Stafford Lake is gradually drawn down. For example, in 2003, the lake volume at the beginning of June was approximately 4,000 acre-ft, but by the end of August, the lake volume had decreased to slightly more than 2,000 acre-ft. It is recommended that less than ½ the lake is treated at any time to prevent reductions in dissolved oxygen. As long as no more than ⅓ of the lake is treated at any one time, the lake volume exceeds 2,000 acre-ft, and the target concentration in the upper 10 ft of the water column does not exceed 0.5 ppm Cu (no more than 4,250 lbs $CuSO_4 \cdot 5H_2O$ is applied), the water concentration throughout the lake will not exceed the Toxic Reference Value (TRV) of 0.17 ppm Cu for the northwestern pond turtle.

BIO-1: Because the initial concentration of copper during treatment of the lake may be up to 0.5 ppm (and therefore exceed 0.17 ppm), mitigation for potential exposure of northwestern pond turtle may be required. Specifically, the concentration of total copper in the lake will be measured to verify it does not exceed 0.17 ppm. To evaluate the copper concentration relative to the TRV for the northwestern pond turtle, application of $CuSO_4$ will be as follows:

a) If the lake volume is in excess of 3,300 acre-ft, up to one-half the lake can be treated with up to 6,250 lb $CuSO_4 \cdot 5H_2O$. This scenario will achieve 0.5 ppm in the upper 10 ft of the water column within the portion of the lake where $CuSO_4$ is applied and will not exceed 0.17 ppm Cu throughout the lake.

b) If the lake volume is in excess of 2,000 acre-ft, up to one-third the lake can be treated with up to 4,250 lb $CuSO_4 \cdot 5H_2O$. This scenario will achieve 0.5 ppm in the upper 10 ft

of the water column within the portion of the lake where $CuSO_4$ is applied and will not exceed 0.17 ppm Cu throughout the lake.

c) If the lake volume is in less than 2,000 acre-ft, either the portion of the lake or the concentration in the upper 10 ft of the water column will need to be proportionally reduced so the total amount of $CuSO_4$ added to the lake will not produce a concentration of Cu throughout the lake that will exceed 0.17 ppm.

Item c): ***No Impact.*** The project takes place in the District's reservoir and, therefore, will not impact any upland habitat or wetlands. However, the assessment of risk for species that live in these areas was considered. Risks to these species are adequately mitigated with **BIO-1**.

Item d): ***No Impact.*** Water for the District is derived from the Novato Creek and other minor tributaries in the watershed. Migrating fish are prevented from entering Stafford Lake by Stafford Dam. Accordingly, project activities will not adversely influence movement of any native resident or migratory fish.

Items e) & f): ***No Impact.*** The project does not conflict with, and has no impact to any local policies or ordinances protecting biological resources.

Table 1. Special status species known to occur in project vicinity and that have habitat requirements met in the project vicinity and during the project duration.

Scientific Name	Common Name	Status	Habitat	Habitat is Present in Project Area; Species Eliminated from Further Consideration for Reasons Given (see numbered notes)	Species at Risk
Amphibian					
Rana aurora aurora	northern red-legged frog	FSC, SCSC	Found in humid forests, woodlands, grasslands, and streamsides in northwestern California.	X (1)	
Rana aurora draytonii	California red-legged frog	FT, SCSC	Lowlands & foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation.	X (1)	
Rana boylii	foothill yellow-legged frog	FSC, SCSC	Partly-shaded, shallow streams & riffles with a rocky substrate in a variety of habitats.	X (1)	
Spea hammondii	western spadefoot toad	FSC	Grasslands, open chaparral, pine-oak woodlands	X (2)	
Bird					
Amphispiza belli belli	Bell's sage sparrow	FSC	Shrubland/chaparral	X (3)	
Ardea alba	great egret	None	(Rookery) colonial nester in large trees.	X (4)	
Ardea herodias	great blue heron	None	(Rookery) colonial nester in tall trees, cliffsides, and sequestered spots on marshes.	X (4)	
Athene cunicularia	burrowing owl	FSC	(Burrow sites) open, dry annual or perennial grasslands, deserts & scrublands characterized by low-growing vegetation.	X (3)	
Athene cunicularia hypugaea	western burrowing owl	FSC	See Burrowing owl	X (3)	
Dendroica petechia brewsteri	yellow warbler	SCSC	(Nesting) riparian plant associations. Prefers willows, cottonwoods, aspens, sycamores, & alders for nesting & foraging.	X (3)	
Egretta thula	snowy egret	FSC	(Rookery) colonial nester, with nest sites situated in protected beds of dense tules.	X (4)	

Scientific Name	Common Name	Status	Habitat	Habitat is Present in Project Area; Species Eliminated from Further Consideration for Reasons Given (see numbered notes)	Species at Risk
Elanus leucurus	white-tailed kite	FSC	(Nesting) rolling foothills/valley margins w/scattered oaks & river bottomlands or marshes next to deciduous woodland	X (3)	
Falco peregrinus anatum	American peregrine falcon	FD, SE	(Nesting) near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; also, human-made structures.	X (3)	
Lanius ludovicianus	loggerhead shrike	FSC	Open country with scattered trees and shrubs, savanna, desert scrub, and, occasionally, open woodland	X (3)	
Melanerpes lewis	Lewis' woodpecker	FSC	Open forest and woodland, often logged or burned, including oak, coniferous forest, riparian woodland and orchards	X (3)	
Pandion haliaetus	osprey	SCSC	(Nesting) ocean shore, bays, fresh-water lakes, and larger streams.	X (4)	
Phalacrocorax auritus	double-crested cormorant	SCSC	(Rookery site) colonial nester on coastal cliffs, offshore islands, & along lake margins in the interior of the state.	X (4)	
Riparia riparia	bank swallow	FSC	Riparian and other lowland habitats; requires vertical banks/cliffs with fine soils	X (5)	
Invertebrate					
*Hydrochara ricksecker*i	Ricksecker's water scavenger beetle	FSC	Aquatic; known from the San Francisco bay area.	X (6)	
Incisalia mossii marinensis	Marin elfin butterfly	FSC	Cliff, Grassland/herbaceous, Shrubland/chaparral, Woodland - Hardwood, Woodland - Mixed	X (3)	
Syncaris pacifica	California freshwater shrimp	FSC, SE	Endemic to Marin, Napa, & Sonoma Cos. Found in low elev, low gradient streams where riparian cover is moderate to heavy.	X (1)	

Scientific Name	Common Name	Status	Habitat	Habitat is Present in Project Area; Species Eliminated from Further Consideration for Reasons Given (see numbered notes)	Species at Risk
Mammal					
Antrozous pallidus	pallid bat	SCSC	Deserts, grasslands, shrublands, woodlands & forests. Most common in open, dry habitats with rocky areas for roosting.	**X** (3)	
Corynorhinus (=Plecotus) townsendii townsendii	Pacific western big-eared bat	FSC, SCSC	In CA; solitary males and small groups of females are known to hibernate in buildings in central CA known from limestone caves, lava tubes, and human-made structures in coastal lowlands, cultivated valleys, and nearby hills covered with mixed vegetation	**X** (3)	
Corynorhinus townsendii townsendii	Townsend's western big-eared bat	SCSC	Humid coastal regions of northern & central California. Roost in limestone caves, lava tubes, mines, buildings etc.	**X** (3)	
Eumops perotis californicus	greater western mastiff-bat	FSC	Bare rock/talus/scree, Cliff, Desert, Grassland/herbaceous, Savanna, Shrubland/chaparral, Suburban/orchard, Woodland	**X** (3)	
Myotis evotis	long-eared myotis bat	FSC	Mostly forested areas, especially those with broken rock outcrops; also shrubland, over meadows near tall timber, along wooded streams, over reservoirs	**X** (3)	
Myotis thysanodes	fringed myotis bat	FSC	Wide variety of habitats; pinyon-juniper valley foothill hardwood, and hardwood conifer forests. Uses caves, mines, buildings, or crevices for maternal colonies and roosts	**X** (3)	

Scientific Name	Common Name	Status	Habitat	Habitat is Present in Project Area; Species Eliminated from Further Consideration for Reasons Given (see numbered notes)	Species at Risk
Myotis volans	long-legged myotis bat	FSC	Primarily in montane coniferous forests; also riparian habitats; roosts in abandoned buildings, rock crevices, under bark, etc. in some areas hollow trees are the most common nursery sites, but buildings and rock crevices are also used	X (3)	
Myotis yumanensis	Yuma myotis bat	FSC	Found in a wide variety of upland and lowland habitats, including riparian, desert scrub, moist woodlands and forests, but usually found near open water; flies low; nursery colonies usually are in buildings, caves and mines, and under bridges	X (5)	
Reptile					
Emys (=Clemmys) marmorata	western pond turtle	SCSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams & irrigation ditches with aquatic vegetation.		X
Emys (=Clemmys) marmorata marmorata	northwestern pond turtle	FSC, SCSC	Associated with permanent or nearly permanent water in a wide variety of habitats.		X

Table 1 Numbered Notes:

(1) Species does not occur in Stafford Lake (pers. comm. Bill Cox, CDFG Biologist).
(2) This is a terrestrial species that is known to enter water only during part of its' reproductive cycle. This period of time does not coincide with the application period of aquatic pesticides.
(3) Species not likely to have any exposure as its target prey base or plant food resources consist of terrestrial species.
(4) The dissipation of copper, limited uptake in fish, along with a time-dependent bioconcentration factor for copper in aquatic invertebrates (see **Appendix D**) will limit dietary exposure to an insignificant level.
(5) These species forage for emergent aquatic insects over water. These insects may bioaccumulate copper. But, given the large amount of potential foraging area, the emergent aquatic insects from treated canals would likely only contribute an insignificant percentage of the total diet. Therefore, no risk due to copper exposure is anticipated.
(6) Spends summer burrowed into soil at water's edge (pers. comm. Christopher Rogers, Ecoanalysts, Inc.

Table 1 Status Codes:

FE = Federally Listed as Endangered
FT = Federally Listed as Threatened
FPE = Federally Proposed Endangered
FPT = Federally Proposed Threatened
FPD = Federally Proposed Delisted
FSC = Federally Listed Species of Concern
FC = Federally Listed Candidate Species
FD = Federally Delisted
SCSC = State Listed Species of Concern
SE = State Listed as Endangered
SFP = State Listed as Fully Protected
ST = State Listed as Threatened
SR = State Listed as Rare
SCE = State Candidate Endangered
SCT = State Candidate Threatened
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-3 = California Native Plant Society Listed Presumed Extinct in CA

3.5 Cultural Resources

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☐	☒
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒

Discussion

Items a) through d): ***No Impact.*** The project is confined to the District's reservoir. No known historical or archaeological resource, unique paleontological resource, unique geologic feature, or human remains in or out of formal cemeteries will be impacted.

3.6 Geology and Soils

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project:				
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 a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic-related ground shaking?	☐	☐	☐	☒
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☒
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

Discussion

a) through e): ***No Impact.*** The project consists of applying aquatic pesticides to Stafford Lake within the jurisdiction of the District. The project does not include any new structures, ground disturbances, or other elements that could expose persons or property to geological hazards. There would be no risk of landslide or erosion of topsoil. The Project would not require a septic or other wastewater system, as workers would use existing facilities in the operation areas of the reservoirs.

3.7 Hazards and Hazardous Materials

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
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?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
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?	☐	☐	☐	☒

Discussion

Items a) & b): **Less Than Significant Impact.** The project would involve handling aquatic pesticides which are regulated hazardous materials. Refer to the representative MSDS presented in **Appendix B**. Use of this material would create a potential for spills that could affect worker safety and the environment. The spills could occur potentially at the District facility, at the point of application, or during transport.

The District handles, stores, transports aquatic pesticides and disposes of containers in accordance with federal, state, and county requirements and manufacturer's recommendations. This approach is supplemented by the following components of the District's aquatic weed management program:

1. District personnel and their contractors that make aquatic pesticide applications are under the direct supervision of a Qualified Applicator Certificate or Qualified Applicator License holder. Expertise and training used by these personnel result in mitigating potentially significant impacts.

2. A written recommendation is prepared by a DPR-licensed Pest Control Advisor (PCA). A PCA undergoes 40 hours of training every 2 years on issues including health and safety and prevention of exposure to sensitive receptors. The written recommendation prepared by the PCA must evaluate proximity of occupied buildings and people, health and environmental hazards and restrictions, and a certification that alternatives and mitigation measures that substantially lessen any significant adverse impact on the environment have been considered and if feasible, adopted. Refer to **Appendix A.**

3. All District personnel and their contractors review and strictly adhere to the aquatic pesticide product label that has clear and specific warnings that alert users to hazards that may exist. An example of a specific product label is included in **Appendix B**.

4. All District personnel and their contractors review and consult the aquatic pesticide Material Safety Data Sheet (MSDS) in **Appendix B**, and the DPR Worker Health and Safety Branch Pesticide Safety Information Series (PSIS). The PSIS and the MSDS have specific information that describes precautions to be taken during the use of the aquatic pesticide. District personnel's familiarity with the DPR PSIS series mitigates potentially significant impacts. For example, the PSIS series describes the personal protective equipment (PPE) needed for the safe handling of aquatic pesticides, including goggles, disposable coveralls, gloves and respirators.

5. The condition of the reservoir being treated is field evaluated to ensure that the application is necessary, feasible and can be conducted safely and according to label. This evaluation considers target weed species, level of infestation, water and flow conditions, alternate control methods, and amount of chemical to be applied.

6. Water in the treatment plant will be sampled and analyzed for copper just prior to the start of the treatment and continued daily for up to 10 days or until such time as the

copper concentration returns to pretreatment levels. The detection limit will range from 2 to 20 ppb, depending on water hardness, using EPA Method 200.

Item c): ***No Impact.*** No known, existing or proposed schools are located within ¼ mile of locations were applications are made.

Item d): ***No Impact.*** The project site is not listed on any hazardous waste site lists compiled in Government Code Section *65962.5.*

Items e) & f): ***No Impact.*** No airports are located within a 2 mile range of the project.

Item g): ***No Impact.*** The proposed Project would not impact emergency evacuation routes because public roadways are not affected by the Project.

Item h): ***No Impact.*** The project will not increase fire hazards at the project sites. Truck access and parking near application sites is done in such a manner so as to minimize muffler contact with dry grass.

3.8 Hydrology and Water Quality

		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project:					
a)	Violate any water quality standards or waste discharge 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 (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)?	☐	☐	☐	☒
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?	☐	☐	☐	☒
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?	☐	☐	☐	☒
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?	☐	☐	☐	☒
f)	Otherwise substantially degrade water quality?	☐	☐	☐	☒
g)	Place housing within100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h)	Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
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?	☐	☐	☐	☒

j)	Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

General Discussion

The District implements an Integrated Pest Management (IPM) program for aquatic weed control. The IPM program involves the scouting of aquatic weed locations and densities, establishment of thresholds above which control is needed, and making applications of aquatic pesticides on an "as-needed" basis to achieve the aquatic weed control necessary to provide safe municipal water.

Consistent with the District's IPM program, the application of aquatic pesticides is done infrequently (2-5 times per year) and over a short duration (4 to 8 hours per treatment).

Copper-based pesticides will be discussed for checklist item a.) above. All other checklist items will be discussed together at the end of this section.

Prior to aquatic pesticide applications, the following tasks are accomplished:

1. A written recommendation is prepared by a DPR-licensed Pest Control Advisor (PCA). A PCA undergoes 40 hours of training every 2 years on issues including health and safety and prevention of exposure to sensitive receptors. The written recommendation prepared by the PCA must evaluate proximity of occupied buildings and people, health and environmental hazards and restrictions, and a certification that alternatives and mitigation measures that substantially lessen any significant adverse impact on the environment have been considered and if feasible, adopted. Refer to **Appendix A.**

2. All District personnel involved with the application of copper sulfate or any other aquatic pesticide in Stafford Lake shall also have a pesticide applicator's license. This requirement will also be required for any contractor hired to perform this work as well.

3. All District personnel and their contractors review and strictly adhere to the aquatic pesticide product label that has clear and specific warnings that alert users to hazards that may exist. An example of a specific product label is included in **Appendix B**.

4. All District personnel and their contractors review and consult the aquatic pesticide Material Safety Data Sheet (MSDS) in **Appendix B**, and the DPR Worker Health and Safety Branch Pesticide Safety Information Series (PSIS). The PSIS and the MSDS have specific information that describes precautions to be taken during the use of the aquatic pesticide.

5. The condition of the reservoir being treated is field evaluated to ensure that the application is necessary, feasible and can be conducted safely and according to label. This evaluation considers target weed species, level of infestation, water and flow conditions, alternate control methods, and amount of chemical to be applied.

6. Water in the treatment plant will be sampled and analyzed for copper just prior to the start of the treatment and continued daily for up to 10 days or until such time as the

copper concentration returns to pretreatment levels. The detection limit will range from 2 to 20 ppb, depending on water hardness, using EPA Method 200.

7. The District has developed a lake level spreadsheet that calculates the amount of water in the lake from corresponding lake elevations. Dosage for the application will consider the volume of water and the impact the dose will have on the calculated volume of water to be treated. This will be calculated from the daily lake elevation readings with the corresponding water volume readings.

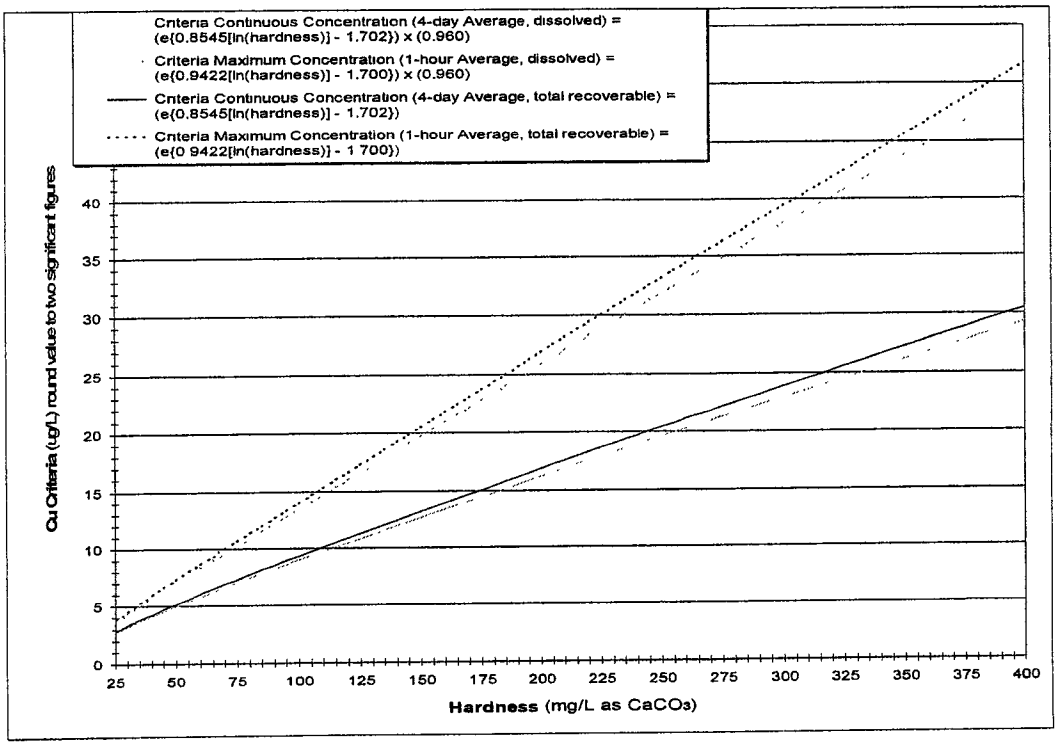
8. Copper concentrations at the treatment plant intake did not exceed 0.10 mg/L copper in any sample collected within 14 days of a copper treatment to Stafford Lake during 2002 or 2003. These concentrations do not exceed the MCL for copper of 1300 ug/L (CalEPA RWQCB Compilation of Water Quality Goals, August 2003). Since the copper concentrations at the treatment plant intake do not exceed the MCL, there are no project-related drinking water concerns.

Copper Discussion

Item a): **Potentially Significant Unless Mitigation Incorporated**. As presented in Section 1.2, the District intends to obtain coverage under the Permit that requires compliance with the SIP and the CTR.

Application of copper-based aquatic pesticides according to label direction typically require concentrations of copper between 500 and 2,000 µg/L. However, applications to municipal water reservoirs cannot exceed 1300 µg/L (CalEPA, 2003). Water quality criteria for copper as described in the CTR and by the San Francisco Bay RWQCB (RWQCB, 1995) are hardness-dependent. Refer to **Figure 3.** From 1995 to 2002, District water varied in hardness between approximately 53 and 114 mg/L (North Marin Water District, 2002).

Figure 3. Cu Criteria Dependence on Hardness



Based on the relation of copper criteria to hardness, the applicable water quality criteria for copper in Stafford Lake have the following ranges:

Continuous Dissolved Concentration (4 day Average):	5-10 µg/L
Continuous Total Concentration (4 day Average):	6-11 µg/L
Maximum Dissolved Concentration (1 Hour Average):	8–14 µg/L
Maximum Total Concentration (1 Hour Average):	8–15 µg/L

These water quality criteria are exceeded in the lake water at the time of application. Accordingly, because label application rates exceed the CTR water quality criteria, the District is obtaining a SIP exception.

Copper-containing aquatic pesticide treatments are made to one-half the reservoir at any time. As such, the combination of dilution and uptake occur. Copper-containing aquatic pesticides applied in Stafford Lake dissipate and/or become permanently insoluble shortly after application (CDFA 2002; Trumbo 1997, 1998; WA DOE 2004). When copper is applied according to label direction, its half-life is between 3 and 19 hours due to a combination of precipitation, adsorption by biota and particulate matter, and complexation with organic matter.

Table 2. Anticipated Rate of Copper Dissipation

Time (hours)	Time (Days)	Cu Concentration µg/L
0	0	1000
6	0.25	803
12	0.5	645
24	1	417
48	2	174
72	3	72
96	4	30
120	5	13
144	6	5
168	7	2
192	8	0.91
216	9	0.38
240	10	0.16
288	12	0.03
312	13	0.01

As **Table 2** shows, only a short-term CTR copper water quality criteria exceedance will occur in Stafford Lake.

Assuming typical label rate starting concentrations and the previously mentioned half-life, the risk to species shown in **Table 1** from copper was estimated. Species exposure was conservatively assumed to occur immediately after introduction of copper into the reservoir. With the exception of the northwestern pond turtle the concentration of copper in Stafford Lake does not pose a risk. This is consistent with the fact that District personnel have not reported adverse impacts to aquatic, avian, terrestrial or benthic organisms as a result of using copper-based aquatic pesticides.

In spite of significant evidence that suggests that when used according to label directions by qualified personnel, impacts of copper-containing aquatic pesticides have no significant impact, the District will implement the following mitigation measures to continue operating without a significant impact and reduce any future potentially significant impacts to less than a significant level: These mitigation measures are:

HWQ-1. As required by the SIP and the Permit, the District will prepare and execute an Aquatic Pesticide Application Plan (APAP). The plan will call for surfacewater sampling and analysis before, during, and after project completion to assess the impact, if any, that the project may have on beneficial uses of water. Additionally, consistent with SIP exception requirements, the District will arrange for a qualified biologist to assess reservoir water beneficial uses.

BIO-1. See Biological Resources Section. District staff will implement mitigation measure **BIO-1** to address potential risks to the northwestern pond turtle. With this mitigation, a less than significant impact exists to this species. By regularly

monitoring and reporting the presence/absence of this species in its reservoir, the District will be able to identify problems with water quality and take corrective action if necessary.

Item b): ***No Impact.*** The project would not involve any construction activities or require the use of groundwater, so there is no impact on groundwater recharge or supplies.

Items c), d), & e): ***No Impact.*** The project will not involve construction of any structures that would alter drainage patterns or increase storm water runoff. The Project would not increase erosion or siltation on- or off-site.

Item f): See response to item a).

Items g), h), i), & j): ***No Impact.*** Since the project would involve no new construction, no housing or other structures would be placed within a designated 100-year floodplain. The project would not alter the floodplain or have the potential to redirect flood flows. The Project would not be subject to tsunami or inundation due to mudflows. Nor would the Project expose personnel to a substantial risk due to seiche waves or from flooding as a result of a catastrophic dam failure.

3.9 Land Use Planning

		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project:					
a)	Physically divide an established community?	☐	☐	☐	☒
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?	☐	☐	☐	☒
c)	Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Discussion

Item a): ***No Impact.*** The project will be implemented within the District's existing reservoir. Nearby housing is rural and will not be affected. The proposed Project would not result in any division of an established community.

Item b): ***No Impact.*** The project will not create any new land uses or alter any existing uses and would not conflict with any applicable land use plan, policy or agency regulation.

Item c): ***No Impact.*** Refer to Section 3.4, item f). No known plan conflicts with the project.

3.10 Mineral Resources

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan other land use plan?	☐	☐	☐	☒

Discussion

Items a) & b): ***No Impact.*** The project involves the addition of aquatic pesticides to the District's reservoir and has no impact on the availability of any known mineral resource recovery site.

3.11 Noise

		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	☐	☐	☐	☒
b)	Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
c)	A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d)	A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
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?	☐	☐	☐	☒
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?	☐	☐	☐	☒

Discussion

Items a) through d): ***No Impact.*** Project activity occurs in a recreational area. The incidental noise and vibration generated by the use of pick-up trucks and an small outboard motor will have less than significant impact.

Items e) & f): ***No Impact.*** No airports are located within a 2-mile range of the project.

3.12 Population and Housing

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project:				
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)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing units, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion

Items a) through c): ***No Impact.*** No new homes, roads or other infrastructure will be required. No displacement of existing homes or people will occur.

3.13 Public Services

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered 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:	☐	☐	☐	☒
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

Discussion

Item a): ***No Impact.*** The project will not alter or require the construction of new schools, parks, or other public facilities, nor will it increase the need for police and fire services beyond existing conditions.

3.14 Recreation

		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a)	Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b)	Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse effect on the environment?	☐	☐	☐	☒

Discussion

Items a) & b): ***No Impact.*** The project takes place in the District's reservoir. Swimming and boating are not permitted in the reservoir. No alterations to current recreational use are anticipated.

3.15 Transportation/Traffic

		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project:					
a)	Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	☐	☒
b)	Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
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?	☐	☐	☐	☒
d)	Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e)	Result in inadequate emergency access?	☐	☐	☐	☒
f)	Result in inadequate parking capacity?	☐	☐	☐	☒
g)	Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☒

Discussion

Items a) & b): ***No Impact.*** The project involves the use of pick-up trucks and a small boat with a outboard motor that will not cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the county roads in the project area.

Item c): ***No Impact.*** The project has no influence on air traffic.

Items d) through g): ***No Impact.*** The project does not involve changes in road design or encourage incompatible road or highway uses. Further, the project does not impact emergency access or parking. Lastly, the project does not impact or conflict with adopted policies, plans, or programs supporting alternative transportation.

3.16 Utilities and Service Systems

		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project:					
a)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
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?	☐	☐	☐	☒
c)	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
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?	☐	☐	☐	☒
f)	Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒
g)	Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

Discussion

Items a) & b), and e) through g): ***No Impact.*** The project does not discharge to a wastewater treatment plant and does not generate any solid waste. All aquatic pesticide containers will be properly disposed according to label instructions (See **Appendix B**).

Item c): ***No Impact.*** The project does not alter storm water flow or impact storm water drainage systems.

Item d): ***No Impact.*** The project involves the treatment of aquatic weeds in District's existing reservoir and has no known influence on the entitlements or resources utilized by the District.

3.17 Mandatory Findings of Significance

		Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	☐	☒	☐	☐
b)	Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☒	☐	☐
c)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

Discussion

Item a): **Potentially Significant Unless Mitigation Incorporated.** The project involves the use of copper-containing aquatic pesticides introduced into the District's reservoir at concentrations that temporarily exceed CTR water quality objectives. Significant evidence suggests that when used according to label directions by qualified personnel, CTR exceedence is short-term and impacts of these aquatic pesticides are less than significant.

However, the District will implement mitigation (**BIO-1 and HWQ-1**) to reduce any future potential impacts to less than a significant level.

Item b): **Potentially Significant Unless Mitigation Incorporated.** The cumulative impacts of continued application of copper-based pesticides is not known. Specifically, the extent to which copper accumulates, becomes bioavailable, and subsequently creates a

significant impact, if at all, is not clear at this time. Potential cumulative impacts, if any, are addressed through mitigation **HWQ-1**. This mitigation reduces the impact to a less than a significant level.

Item c): **Less Than Significant Impact.** As a result of implementation of District standard procedures as described in the Hazards and Hazardous Materials section, any hazard/hazardous material impacts to the human beings is reduced to a less than a significant level.

4.0 LIST OF MITIGATION MEASURES

4.1 Biological Resources

BIO-1: Because the initial concentration of copper during treatment of the lake may be up to 0.5 ppm (and therefore exceed 0.17 ppm), mitigation for potential exposure of northwestern pond turtle may be required. Specifically, the concentration of total copper in the lake will be measured to verify it does not exceed 0.17 ppm. To evaluate the copper concentration relative to the TRV for the northwestern pond turtle, application of $CuSO_4$ will be as follows:

a) If the lake volume is in excess of 3,300 acre-ft, up to one-half the lake can be treated with up to 6,250 lb $CuSO_4 \cdot 5H_2O$. This scenario will achieve 0.5 ppm in the upper 10 ft of the water column within the portion of the lake where $CuSO_4$ is applied and will not exceed 0.17 ppm Cu throughout the lake.

b) If the lake volume is in excess of 2,000 acre-ft, up to one-third the lake can be treated with up to 4,250 lb $CuSO_4 \cdot 5H_2O$. This scenario will achieve 0.5 ppm in the upper 10 ft of the water column within the portion of the lake where $CuSO_4$ is applied and will not exceed 0.17 ppm Cu throughout the lake.

c) If the lake volume is in less than 2,000 acre-ft, either the portion of the lake or the concentration in the upper 10 ft of the water column will need to be proportionally reduced so the total amount of $CuSO_4$ added to the lake will not produce a concentration of Cu throughout the lake that will exceed 0.17 ppm.

4.2 Hydrology & Water Quality

HWQ-1. As required by the SIP and the Permit, the District will prepare and execute an APAP. The APAP requires surfacewater sampling and analysis before, during, and after project completion to assess the impact, if any, that the project may have on beneficial uses of water. Additionally, consistent with SIP exception requirements, the District will arrange for a qualified biologist to assess receiving water beneficial uses.

5.0 REFERENCES

Bay Area Air Quality Management District (BAAQMD). 2004. 2003 - 2004 Ozone Planning. Available at: http://www.baaqmd.gov/pln/plans/ozone/2003_04.asp.

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California EPA. 2003. Regional Water Quality Control Board Compilation of Water Quality Goals.

California Toxics Rule (CTR), May 18, 2000. 65 Federal Register 31682-31719 (Adds Section 131.38 to 40 CFR).

City of Novato. 2003. City of Novato General Plan. Adopted March 8, 1996. Most resent revision: March 25, 2003.

North Marin Water District. 2002. Stafford Lake Watershed Survey.

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SWRCB, 2000. The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries in California (the State Implementation Plan, or SIP)

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Trumbo, J. 1998. Environmental monitoring of hydrilla eradication activities in Clear Lake, 1997. State of California, The Resources Agency, Department of Fish and Game. Rancho Cordova, California.

WA DOE 2003. Washington Department of Ecology SEIS for Aquatic Herbicides Vol 6, Section 3, Copper Environmental Fate Table 3.5

6.0 PERSONS AND AGENCIES CONTACTED

1.) Wayne Sobieralski, SWRCB
2.) Jim Maughn, SWRCB
3.) Phillip Isorena, SWRCB
4.) Joel Trumbo, CDFG
5.) Bill Cox, CDFG
6.) Christopher Rogers, Ecoanalysts, Inc.

7.0 LIST OF PREPARERS

1.) Michael S. Blankinship, PE, PCA, Blankinship & Associates
2.) Joshua M. Owens, Staff Scientist, Blankinship & Associates
3.) Sara Castellanos, Staff Scientist, Blankinship & Associates
4.) Joseph P. Sullivan, Ph.D., Certified Wildlife Biologist, Ardea Consulting
5.) Michael McMaster, NMWD

Appendix A

Pest Control Recommendation

1. Operator of the Property	2. Recommendation Expiration Date
Address / City / County	

3. Location to be Treated

4. Commodity to be Treated

5. Acres or Units to be Treated

6. Method of Application:
☐ Air ☐ Ground ☐ Fumigation ☐ Other _____

7. Pest(s) to be Controlled

8. Name of Pesticide(s)	Rate Per Acre or Unit	Dilution Rate	Volume Per Acre or Unit

9. Hazards and/or Restrictions:
- ☐ 1. Highly toxic to bees
- ☐ 2. Toxic to birds, fish and wildlife
- ☐ 3. Do not apply during irrigation or when run-off is likely to occur
- ☐ 4. Do not apply near desirable plants
- ☐ 5. Do not allow to drift onto humans, animals, desirable plants or property
- ☐ 6. Keep out of lakes, streams and ponds
- ☐ 7. Birds feeding on treated area may be killed
- ☐ 8. Do not apply when foliage is wet (dew, rain, etc.)
- ☐ 9. May cause allergic reaction to some people
- ☐ 10. This product is corrosive and reacts with certain materials (see label)
- ☐ 11. Closed system required
- ☐ 12. Restricted use pesticide (California and/or Federal)
- ☐ 13. Hazardous area involved (see map and warnings)
- ☐ 14. Other (see attachment)

10. Schedule, Time or Conditions

11. Surrounding Crop Hazards

12. Proximity of Occupied Dwellings, People, Pets or Livestock

13. Non-Pesticide Pest Control, Warnings and Other Remarks

14. Criteria Used for Determining Need for Pest Control Treatment:
☐ Sweep Net Counts ☐ Leaf or Fruit Counts ☐ Preventive
☐ Field Observation ☐ Pheromone or Other Trap ☐ Soil Sampling
☐ History ☐ Other

15. Crop and Site Restrictions:
- ☐ 1. Worker reentry interval _____ days
- ☐ 2. Do not use within ____ days of harvest/slaughter
- ☐ 3. Posting required ☐ Yes ☐ No _____ days
- ☐ 4. Do not irrigate for at least _____ days after application
- ☐ 5. Do not apply more than _____ application(s) per season
- ☐ 6. Do not feed treated foliage or straw to livestock
- ☐ 7. Plantback restrictions (see label)
- ☐ 8. Other (see attachment)

16. I certify that alternatives and mitigation measures that would substantially lessen any significant adverse impact on the environment have been considered and, if feasible, adopted.

Adviser Signature / Date

Adviser License Number

Employer

Employers Address

N / W / E / S

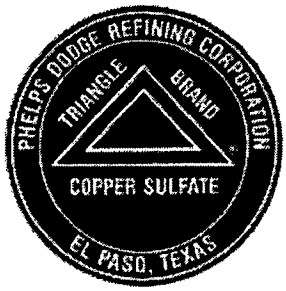
PR-ENF-092 (Est. 8/94)

Explanation and Instructions For Completing the Written Recommendation

1. Include the name and address of the grower, agency or firm for whom the recommendation is written.
2. Include the date the recommendation expires.
3. Provide information on how to locate the property or site to be treated.
4. Indicate the commodity, crop or site to be treated.
5. Indicate the total acres or units to be treated.
6. Check the box adjacent to the method of application.
7. Identification of pest or pests to be controlled by recognized common name.
8. Name of pesticide (common name or trade name), dosage rate per acre or other units, dilution rate and volume per acre.
9. Check the box adjacent to the applicable hazard(s) and/or restriction(s).
10. Indicate the schedule, time or conditions for the application in relation to temperature, time of day, irrigation, etc. Also, include any label restrictions on use or disposition of crop or crop by-product.
11. Indicate any surrounding crops that may be sensitive to the recommended treatment.
12. Identify any occupied dwellings, fieldworkers, pets or livestock in the proximity of the treatment area.
13. Indicate any non-pesticide substance, pest control method or device that will be used to control pest(s). Warning of the possibility of damages by the pesticide applicator that reasonable should have been known to exist at the time of the recommendation.
14. Check the box adjacent to the criteria used for determining need for pest control treatment.
15. Check the box adjacent to the applicable crop and site restrictions.
16. Signature of the licensed pest control adviser or person acting in the capacity of a pest control adviser in accordance with the licensing exemption under Section 12001 of the California Food and Agriculture Code, the date the recommendation was made, and if applicable the adviser's license number. Also, include the name and address of the adviser's employer.

Map -Sketch the property or site to be treated and any surrounding hazards that are known to exist.

Appendix B



TRIANGLE BRAND
COPPER SULFATE INSTANT POWDER

Not for medicinal use

ACTIVE INGREDIENT:

Copper sulfate pentahydrate*	99.0%
INERT INGREDIENTS:	1.0%
TOTAL	100.0%

*Metallic copper equivalent 25.2%

KEEP OUT OF REACH OF CHILDREN

DANGER/PELIGRO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand this label, find someone to explain it to you in detail.)

Information for Right-to-Know States:
Copper sulfate pentahydrate/CAS Reg. No. 7758-99-8: sulfuric acid, copper (2+) salt (1:1)/ CAS Reg. No. 7758-98-7; Water/CAS Reg. No. 7732-18-5

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED: Drink promptly a large quantity of milk, egg white, gelatin solution, or if these are not available, large quantities of water. Avoid alcohol. Do not give anything by mouth to an unconscious person.
NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsions may be needed.
IF IN EYES: Immediately flush eyes with plenty of water for at least 15 minutes and get medical attention.
IF ON SKIN: Immediately wash skin with soap and plenty of water and get medical attention.

EPA Reg. No. 1278-5

EPA Est. No. 1278-TX-1

Manufactured by
Phelps Dodge Refining Corporation
El Paso, Texas 79998

Net Weight
50 Lbs./22.68 Kg.

PRECAUTIONARY STATEMENTS
DANGER
HAZARDS TO HUMANS AND DOMESTIC ANIMALS

Causes severe eye and skin irritation. Harmful if swallowed or absorbed through the skin. Avoid contact with skin, eyes, or clothing. Causes substantial but temporary eye injury. May cause skin sensitization reactions in certain individuals.

PERSONAL PROTECTIVE EQUIPMENT

Applicators and other handlers must wear long-sleeved shirt and long pants, waterproof gloves, shoes plus socks, and protective eyewear.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS

Users should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish and aquatic organisms. For terrestrial uses, do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Drift and runoff from treated areas may be hazardous to fish and aquatic organisms in adjacent sites. 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 to avoid depletion of oxygen levels due to decaying vegetation. Allow one to two 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 water increases. Do not contaminate water when disposing of equipment washwaters. Consult your State Fish and Game Agency before applying this product to public waters. Permits may be required before treating such waters.

STORAGE AND DISPOSAL
DO NOT CONTAMINATE WATER, FOOD, OR FEED BY STORAGE OR DISPOSAL.
STORAGE

Store unused product in original container only in a cool, dry area out of reach of children and animals. If container or bag is damaged, place the container or bag in a plastic bag. Shovel any spills into plastic bags and seal with tape.

DISPOSAL

PESTICIDE DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of 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. Open dumping is prohibited.

CONTAINER DISPOSAL: Do not reuse empty container. Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Place the pesticide into application equipment. Then dispose of liner in a sanitary landfill or by incineration if allowed by State and local authorities. If burned, stay out of smoke.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.
For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forest, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for 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. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry 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.

SEWER TREATMENT FOR ROOT AND FUNGUS CONTROL*

Triangle Brand Copper Sulfate Instant Powder is effective in keeping sewer lines free of roots.

FOR PARTIAL STOPPAGE: Add 1/2 pound of Phelps Dodge Refining Triangle Brand Copper Sulfate Instant Powder to sewer or drain and flush toward blockage with 5 gallons of water. Repeat at 6 month intervals to prevent growth of new roots.

FOR COMPLETE STOPPAGE: Physically remove the root blockage and repeat as above.

***State law prohibits the use of this product in sewage systems in the State of Connecticut.**

TO CONTROL PLANT DISEASES

A. Apply Triangle Brand Copper Sulfate Instant Powder as directed below:

POTATOES (except California): To enhance vine-kill and suppress late blight, apply 10 lbs. per acre in 10 to 100 gallons of water (ground equipment) or in 5 to 10 gallons (aerial equipment) with Diquat at vine-kill to enhance vine desiccation and suppress late blight. Additional applications can be made with Diquat if needed within 7 days of harvest. Triangle Brand Copper Sulfate Instant Powder may be applied alone until harvest to suppress late blight. **NOTE:** This product can be mixed with Diquat for use on potatoes in accordance with the most restrictive of label limitations and precautions. No label dosage rates should be exceeded.

APPLES (except California): For fireblight, mix 5 lbs. of Triangle Brand Copper Sulfate Instant Powder in 100 gallons of water and spray uniformly to the point of runoff. Apply in dormant only at silver tip stage. After silver tip, severe burn will occur on any exposed green tissue. Do not mix lime to make a Bordeaux spray for this treatment.

GRAPES, DORMANT (except California) : For powdery mildew, apply in spring before bud-swell and before any green tissue is present. Use 4 to 8 lbs. of Triangle Brand Copper Sulfate Instant Powder per 100 gallons of water. Apply in a high volume spray of 300 gallons water per acre. Direct spray to thoroughly wet the dormant vine, especially the bark of the trunk, head, or cordons.

B. Apply Triangle Brand Copper Sulfate Instant Powder in a Bordeaux spray on the crops below:

Triangle Brand Copper Sulfate Instant Powder may be used as an ingredient in Bordeaux mixture sprays as a fungicide to control some plant diseases. If a Bordeaux mix is stated as 10-10-100, the first figure indicates the number of pounds of Triangle Brand Copper Sulfate Instant Powder; the second is the number of pounds of hydrated spray lime, and the third figure indicates the number of gallons of water to be used per acre.

To prepare a Bordeaux mixture, fill the tank 1/4 full with water while the agitator is running. Wash Triangle Brand Copper Sulfate Instant Powder into the tank through a copper, bronze, stainless steel or plastic screen. Fill the tank 3/4 full with more water and wash the hydrated spray lime through the screen and then fill the tank. Agitate for several minutes to insure thorough mixing.

ALMONDS, APRICOTS, PEACHES, NECTARINES: For shot hole fungus, prepare a 10-10-100 Bordeaux mixture and apply as a dormant spray in late fall or early spring.

ALMONDS, APRICOTS, CHERRIES, PEACHES, NECTARINES, PLUMS, PRUNES: For brown rot blossom blight, prepare a 10-10-100 Bordeaux mixture and apply when buds begin to swell.

BLUEBERRIES: For bacterial canker, prepare and apply an 8-8-100 Bordeaux mixture in the fall before heavy rains begin and again 4 weeks later.

BULBS (EASTER LILY, TULIP, GLADIOLUS): For botrytis blight, prepare a 10-10-100 Bordeaux and apply as a foliar spray to one acre. Apply for thorough coverage beginning at the first sign of disease and repeat as needed to control disease at 3 to 10 day intervals. Use the shorter intervals during periods of frequent rains or when severe disease conditions persist. Avoid spray just before flower cutting season if residues are a problem.

CANEBERRIES: For leaf and cane spot and Pseudomonas blight, prepare and apply an 8-8-100 Bordeaux mixture in the fall before heavy rains begin and again 4 weeks later.

CHERRIES (SOUR): For leaf spot, prepare a 10-10-100 Bordeaux mixture and apply as a full coverage spray after petal fall or as recommended by State Extension Service.

CHERRIES (SWEET): For dead bud and bacterial canker (Pseudomonas syringae), prepare a 12-12-100 Bordeaux. Apply at leaf fall and again in late winter before buds begin to swell. In wet, cool Northwest U.S. winters, a third spray may be needed between above sprays.

CITRUS: For bacterial blast, prepare a 10-10-100 Bordeaux spray and apply a spray in late October to early November or before fall rains begin. Make a complete coverage spray using 10 to 25 gallons per mature tree.

GRAPES: For downy mildew, prepare and apply a 2-6-100 Bordeaux spray beginning when downy mildew is detected. Repeat as needed to achieve and maintain control. This mixture and its use will exhibit some phytotoxicity on most varieties.

LEMONS, ORANGES, GRAPEFRUIT: For phytophthora brown rot, prepare a 3-4-5-100 Bordeaux mixture where there is no history of copper injury, or a 3-2-6-100 (zinc sulfate-copper sulfate-hydrated lime-gallons of water) Bordeaux mixture. Spray 6 gallons on skirt of tree 3 to 4 feet high, and 2 to 4 gallons on trunk and ground under the tree. If Phytophthora hibernalis is present, use 10 to 25 gallons to completely cover each tree. Apply in November or December just before or after first rain. In severe brown rot season, apply second application in January or February.

LEMONS, ORANGES, GRAPEFRUIT: For septoria fruit and leaf spot (central California), brown rot, zinc and copper deficiencies, prepare a 3-2-6-100 Bordeaux mixture (zinc sulfate-copper sulfate-hydrated lime-gallons of water) and use 10 to 15 gallons to cover completely each tree. Apply in October, November or December just before or after first rain.

WALNUTS: For walnut blight, apply 15 pounds copper sulfate with 10 pounds of hydrated lime in 100 gallons of water plus 1/2 gallon summer oil emulsion. Apply in early pre-bloom and at 10% to 20% pistillate (not when catkin blooms are showing) just before or after rain. Use only if Bordeaux mixture has been proven to be non-phytotoxic in your area.

OLIVES: For peacock spot and olive knot, prepare a 10-10-100 Bordeaux mixture and apply in autumn before heavy winter rains to prevent peacock spot. In areas of less than 10 inches rainfall, use a 5-10-100 Bordeaux mixture. To help protect against olive knot, apply a 10-10-100 Bordeaux mixture before heavy rains and again in the spring. Injury may occur in areas of less than 10 inches of rainfall.

CHEMIGATION: Refer to supplemental labeling for use directions for chemigation. Do not apply this product through any irrigation system unless supplemental labeling on chemigation is followed. Supplemental labeling is entitled: **"Supplemental Labeling for Copper Sulfate Pentahydrate, EPA Reg. No. 1278-5, EPA Est. No. 1278-TX-1, Chemigation."**

NOTICE TO BUYER

Seller makes no warranty, expressed or implied, concerning the use of this product other than indicated on the label. Buyer assumes all risk of use and/or handling of this material when such use and/or handling is contrary to label instructions.

DOT Hazard Class
RQ, Environmentally Hazardous Substances,
Solid, n.o.s., (Cupric Sulfate), UN 3077, III

Copper Sulfate Pentahydrate

Date Prepared: April 11, 2000

NFPA RATING

HEALTH	3
FLAMMABILITY	0
REACTIVITY	0
PROTECTIVE EQUIPMENT	

HMIS RATING

MATERIAL SAFETY DATA SHEET

SECTION I. PRODUCT IDENTIFICATION

Product Name: Copper Sulfate Pentahydrate

Manufacturer/Vendor Information: PHELPS DODGE REFINING CORP.
P.O Box 20001
El Paso, Texas

24-Hour Emergency Phone: (800)424-9300
Chemtrec
Other Information Phone: (915)778-9881

SECTION II. COMPOSITION / INFORMATION ON INGREDIENTS

CAS No.	Chemical Name	Exposure Limits	% by wt.
7758-99-8	Copper sulfate pentahydrate ($CuSO_4 \cdot 5H_2O$), (Cupric sulfate), (Blue Vitriol), (Bluestone)	ACGIH TLV TWA: 1.0 mg/m^3 (as copper dust/mist) OSHA PEL TWA: 1.0 mg/m^3 (as copper dust/mist)	99
	Anhydrous Cupric Sulfate (CAS# 7758-98-7)	*Phelps Dodge Triangle Brand Copper Sulfate* *Copper Sulfate Pentahydrate (CAS 7758-99-8)* *Contains copper sulfate* *Contains water of crystallization* *Metallic copper equivalent*	 *=99%* *=63.3%* *=35.7%* *=25.2%*

SECTION III. HAZARDS IDENTIFICATION

Emergency Overview: Odorless, transparent blue crystals, granules or powder. Can cause irreversible eye damage and severe skin irritation. Harmful if swallowed or absorbed through the skin. Avoid breathing mist or dust and contact with skin, eyes or clothing. May cause skin sensitization reactions in certain individuals.
Route(s) of Entry: Inhalation, eye, skin and ingestion.
Acute Exposure: Can cause skin, eye and respiratory irritation.
Chronic Exposure: Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated eye contact may cause conjunctivitis.
Carcinogenicity (NTP) (IARC) (OSHA): Not listed.
Eye: Can cause severe eye irritation and may result in irreversible eye damage.
Skin Contact: Can cause severe skin irritation. May cause localized discoloration of the skin.
Inhalation: Can result in irritation of the upper respiratory tract and in excessive quantities may cause ulceration and perforation of the nasal septum.
Ingestion: Can result in digestive tract irritation with abdominal pain.

SECTION IV. FIRST AID MEASURES

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes and get medical attention.
Skin: Remove contaminated clothes and shoes; immediately wash skin with soap and plenty of water and get medical attention.
Ingestion: Drink promptly a large quantity of milk, egg white, gelatin solution, or if they are not available, large quantities of water. Avoid alcohol. Do not give anything by mouth to an unconscious person.
Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

SECTION V. FIRE FIGHTING MEASURES

Flash Pt:	Not available
Flammable Limits in Air-Lower:	Not available
Flammable Limits in Air – Upper:	Not available
Auto Ignition Temperature:	Not available
Fire Fighting Extinguishing Media:	Does not burn or support combustion. Use extinguishing media appropriate for surrounding fire (CO_2, dry chemical or water).
Fire Fighting Equipment:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.
Fire Fighting Instructions:	Evacuate area and fight fire from a safe distance.
Fire and Explosion Hazards:	Sealed containers may rupture when heated due to release of water from crystals.
Unusual Hazards:	Material is acidic when dissolved in water, contact with magnesium metal may evolve hydrogen gas. Anhydrous cupric sulfate formed on water loss (white color). Anhydrous salt will ignite hydroxylamine, if present.

SECTION VI. ACCIDENTAL RELEASE MEASURES

Accidental Release Measures: Use clean-up methods that avoid dust generation (vacuum, wet). Wear a NIOSH or MSHA approved respirator if dust will be generated in clean-up. Use protective clothing if skin contact is likely. If spilled solution is in a confined area, introduce lime or soda ash to form insoluble copper salts and dispose of by approved method. Prevent accidental entry of solution into streams and other water bodies. Shovel any spills into plastic bags and seal with tape. Copper sulfate solution may deteriorate concrete.

SECTION VII. HANDLING AND STORAGE

Signal Word: Danger.

Handling Information: Avoid breathing dust or solution mist. Sweep up crystals or powder, vacuum is preferred. Eye wash stations should be available in work areas. Users should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Storage Information: Store in closed containers in a cool, dry, well-ventilated area away from heat sources and reducing agents. Store copper sulfate in stainless steel, fiberglass, polypropylene, PVC's or plastic equipment. Keep away from galvanized pipe and nylon equipment. If container or bag is damaged, place the container or bag in a plastic bags. Use good housekeeping practices to prevent dust accumulation.

SECTION VIII. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls: Use adequate general or local ventilation to keep airborne concentrations below the exposure limits.

Eye Protection: Use safety glasses with side-shields or goggles.

Skin Protection: Use protective clothing to prevent repeated or prolonged skin contact. Applicators and other handlers must wear long-sleeved shirt and long pants, waterproof gloves, shoes plus socks, and protective eyewear. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with product's concentrate. Do not reuse them. Keep and wash PPE separately from other laundry.

Respiratory Protection: A respiratory protection program that meets OSHA 29 CFR 1910.134 requirements must be followed whenever workplace conditions warrant respirator use. For concentrations up to 10 times the exposure limit, use NIOSH or MSHA approved half- or full-face, air-purifying respirator. For higher concentrations, consult a professional industrial hygienist.

SECTION IX. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Transparent blue crystals, granules or powder.
Melting Point:	Decomposition above 110 °C with –4 H_2O
Boiling Point:	-5H2O @ 150 °C (760 mmHg)
Decomposition Temperature:	Not available
Density/Specific Gravity:	2.284 @ 15.6 °C
Vapor Pressure:	Not applicable
Vapor Density:	Not applicable
Solubility in Water:	83.1 g/100 cc water @ 30 °C
Molecular Weight:	249.68

SECTION X. STABILITY AND REACTIVITY

Stability: Stable.
Incompatibility: Acetylene gas, aluminum powder, hydroxylamine, magnesium, moist air. Contact with magnesium metal can generate dangerous levels of hydrogen gas.
Hazardous Decomposition Products: At temperatures >600 °C material decomposes to cupric oxide and sulfur dioxide.
Hazardous Polymerization: Will not occur.

SECTION XI. TOXICOLOGICAL INFORMATION

Toxicology Tests: (Triangle Brand Copper Sulfate Crystal)

Test: 1
LD/LC: LD_{50}
Test Type: Acute
Test Route: Percutaneous
Test Species: Rabbit
Results Amounts: >8.0 g/kg

Test: 3
LD/LC: LC_{50}
Test Type: Acute
Test Route: Inhalation
Test Species: Rats
Results Amounts: >2.95 mg/L

Test: 2
LD/LC: LD_{50}
Test Type: Acute
Test Route: Oral
Test Species: Rat
Results Amounts: 472.5 mg/kg

Primary Eye Irritation: Corrosive, irreversible eye damage
Primary Skin Irritation: No skin irritation.
Subacute dietary LC_{50}: >10,000 ppm (quail and duck).
96 hr acute toxicity LC_{50}: 0.65 ppm (bluegill), 0.056 ppm (trout), 16 ppm (pink shrimp)
48 hr EC_{50}: 54 ppb (eastern oysters)
48 hr LC_{50}: 17 ppm (pink shrimp), 600 ppb (daphnia)
24 hr LC_{50}: 6.9 ppm (blue crab), 600 ppb (daphnia)
Carcinogenic: Not listed by NTP, IARC or OSHA.

Additional Information: Inhalation of dust and mists of copper salts can result in irritation of nasal mucous membranes, sometimes of the pharynx and, on occasion ulceration with perforation of the nasal septum. Exposure to copper dust causes discoloration of the skin.
Note to Physician: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsions may be needed. Wilson's disease or G6PD deficiency (individual who absorbs, retains and stores copper) can be aggravated by excessive exposure. Symptoms may include nausea, vomiting, epigastric pain, diarrhea, dizziness, jaundice, and general debility.

SECTION XII. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Waste must be disposed of in accordance with federal, state and local environmental control regulations. Improper disposal is a violation of Federal law. Do not reuse empty container. If allowed by State and local authorities, dispose of container in a sanitary landfill or by incineration.

SECTION XIII. TRANSPORT INFORMATION

	Proper Shipping Name:	Technical Name (If N.O.S.):	Hazard Class:	ID:	PG:
DOT:	*Environmentally Hazardous Substance, Solid, n.o.s., (Cupric Sulfate)**		9	UN3077	III
	Reportable Quantity (RQ) = 10 pounds (4.54 kg)				

*Applicable when product is shipped in packaging of 10 pounds or greater. If shipped in less than 10 pound packaging it is not regulated by DOT Hazardous Material Regulations.

SECTION XIV. REGULATORY INFORMATION

US Federal

Federal Drinking Water Standards: *(Copper)* EPA 1300µg/L (action level), 1000 µg/L

Clean Water Act: *(Copper)* 5.6 µg/L as a 24-hour average in freshwater; *(Copper)* 4.0 µg/L as a 24-hour average and not in excess of 23 µg/L at any time in saltwater.

TSCA: Listed

EPCRA, SARA Title III, Section 313 (40 CFR 372) Chemicals subject to reporting requirements (see Section II for CAS number and percentage in mixture): *(Copper)* >1%.

CERCLA Hazardous Substances: RQ is not assigned to the broad class of copper compounds.

DOT: RQ 10 pounds (4.54 kg), See Section XIII TRANSPORT INFORMATION

SECTION XV. OTHER INFORMATION

Prepared By:	Department of Occupational Health and Safety Phelps Dodge Corporation
Reason for Revision:	Revised statements in SECTION I; minor formatting changes

Disclaimer: This information is based on available scientific evidence known to the Phelps Dodge Corporation. It is provided solely for compliance to the Hazard Communication Standard. This information is furnished without warranty, expressed or implicit.

Appendix C

A limited Habitat Assessment of the North Marin Water District project site was conducted by Ardea Consulting and Blankinship & Associates, Inc. personnel to characterize the habitats present on-site and the likelihood of special status species (i.e., federally-listed or proposed to be listed as endangered, threatened, species of concern, or candidate species; and state-listed as species of concern, endangered, threatened, fully protected, rare, candidate endangered, or candidate threatened) occurring on the project site. Other species lacking such designation that may occur on California Department of Fish & Game (CDFG) lists, such as the Special Animals List, were not included.

A list of these special species was compiled using a records search of the California Natural Diversity Database (CNDDB), and current species information from the U.S. Fish and Wildlife Service, Sacramento Office website. Location specific species data is available from both of these sources, and organized geographically into 7.5 minute U.S.G.S. quads. The U.S. Fish and Wildlife Service was queried using the boundary map for the District, and selecting all 4 quads that intersect with the District's boundaries. In addition, a buffer area made up of the outlying quads adjacent to the original 4 quads was selected for the query, resulting in a total of 16 quads that were queried in the CNDDB database. This approach was used to identify species that might be located in the surrounding areas, but not necessarily reported to CNDDB as a sighting event within the District boundaries.

The approach used for the internet query of the U.S. Fish and Wildlife Service local office website, was somewhat different given that their data is not organized geographically based on reported occurrences of species. The quads selected in this query were the quads that represented the largest overall percentage of the District's area. This approach was appropriate for this database due to the fact that the geographical designation provided by the website is conservative in nature and includes all species in the selected area and surrounding areas.

Habitat requirements of each of the species were reviewed to determine whether habitat existed within the project area that would meet that species' needs. The breeding or foraging habitat of animals and the habitat requirements of plant species likely to occur in the project area are described below.

Amphibians

California Red-legged Frog (*Rana aurora draytonii*)
California red-legged frogs occur in dense, shrubby riparian vegetation associated with deep (< 0.7 m), still or slow-moving water (Jennings 1988 in Jennings and Hayes 1994, Hayes and Jennings 1988 in Jennings and Hayes 1994). The shrubby riparian vegetation that structurally seems to be most suitable for California red-legged frogs is that provided by arroyo willow (*Salix lasiolepis*), and cattails (*Typha* sp.) and bulrushes (*Scirpus* sp.) also provide suitable habitat (Jennings 1988 in Jennings and Hayes 1994). Juvenile frogs seem to favor open, shallow aquatic habitats with dense submergents (pers. observ. in Jennings and Hayes 1994). Postmetamorphs have a highly variable animal food diet (Hayes and Tennant 1986 in Jennings and Hayes 1994). Frogs and small mammals may contribute significantly to the diet of adults and subadults (Arnold and Halliday 1986 in Jennings and Hayes 1994, Hayes and Tennant 1986 in Jennings and Hayes 1994). The movement ecology of California red-legged frogs is not well understood (Jennings and Hayes 1994). California red-legged frogs are not likely to be present

in a lake with populations of predatory fish such as largemouth bass (pers. comm. Bill Cox, CDFG Fisheries Biologist).

Western Spadefoot Toad (*Spea (=Scaphiopus) hammondii*)
Western spadefoot toads are almost completely terrestrial, entering water only to breed (see Dimmitt and Ruibal 1980 in Jennings and Hayes 1994). Western spadefoots become surface active following relatively warm (> 10.0-12.8°C) rains in late winter-spring and fall, emerging from burrows in loose soil to a depth of at least 1 m (Stebbins 1972 in Jennings and Hayes 1994, A. McCready, pers. comm. in Jennings and Hayes 1994), but surface activity may occur in any month between October and April if enough rain has fallen (Morey and Guinn 1992 in Jennings and Hayes 1994, S. Morey, pers. comm. in Jennings and Hayes 1994). Since western spadefoot toads are not likely to enter water during the season when aquatic weeds will need to be controlled in reservoirs, it is not likely that they would be exposed to herbicides introduced to a reservoir for the control of aquatic weeds.

Foothill Yellow-legged Frog (*Rana boylii*)
Foothill yellow-legged frogs occur in partially shaded, rocky streams at low to moderate elevations, in areas of chaparral, open woodland, and forest. (Nussbaum et al. 1983 in NatureServe 2004, Hayes and Jennings 1988 in NatureServe 2004). They seek cover at pool bottoms when startled. They breed in pools of streams and attach their eggs to gravel or rocks at edge of pools or streams (Nussbaum et al. 1983 in NatureServe 2004). Tadpoles seem to be capable of growing much more rapidly on epiphytic diatoms than other types of algae, and have been observed to preferentially graze on this algal type (S. Kupferberg, pers. comm. in Jennings and Hayes 1994). Upon metamorphosis, juveniles show a marked differential movement in an upstream direction (Twitty et al. 1967 in Jennings and Hayes 1994). Postmetamorphs probably eat both aquatic and terrestrial insects, but few dietary data exist for this species (see Storer 1925 in Jennings and Hayes 1994, Fitch 1936 in Jennings and Hayes 1994). Foothill yellow-legged frogs are not likely to be present Stafford Lake watershed (pers. comm. Bill Cox, CDFG Fisheries Biologist).

Mammals

Pallid Bat (*Antrozous pallidus*)
Pallid bats inhabit arid deserts and grasslands, often near rocky outcrops and water. They are less abundant in evergreen and mixed conifer woodland. They usually roost in a rock crevice or building, less often in cave, tree hollow, mine, etc. (NatureServe 2004). In Oregon, night roosts were in buildings, under rock overhangs, and under bridges; bats generally were faithful to particular night roosts both within and between years (Lewis 1994 in NatureServe 2004). They prefer narrow crevices in caves as hibernation sites (Caire *et al.* 1989 in NatureServe 2004). The primary diet is arthropods which are captured on the ground, after an aerial search. They also capture some food (large insects) in flight, within a few meters of ground vegetation. Food items include flightless arthropods, Jerusalem crickets, moths, beetles, etc.; may eat small vertebrates (NatureServe 2004). Since the feeding habits do not focus on emergent insects or other aquatic prey items, the risk to big-eared bats from treatment of a reservoir with herbicides would not be significant.

Pacific Western (Townsend's) Big-Eared Bat (*Corynorhinus (Plecotus) townsendii townsendii*)
Townsend's big-eared bats live in a variety of communities, including coastal conifer and broad-leaf forests, oak and conifer woodlands, arid grasslands and deserts, and high-elevation forests and meadows. Throughout most of its geographic range, it is most common in mesic sites (Kunz and Martin 1982 in Williams 1986). Known roosting sites in California include limestone caves, lava tubes, mine tunnels, buildings, and other human-made structures (Dalquest 1947 in Williams 1986, Graham 1966 in Williams 1986, Pearson *et al.* 1952 in Williams 1986). Both sexes hibernate in buildings, caves, and mine tunnels, either singly (males) or in small groups (Pearson *et al.*, 1952 in Williams 1986). They feed on various flying insects near the foliage of trees and shrubs and may feed primarily on moths (Barbour and Davis 1969 in NatureServe 2004). Since the feeding habits do not focus on emergent insects or other aquatic prey items, the risk to big-eared bats from treatment of a reservoir with herbicides would not be significant.

Greater Western Mastiff-Bat (*Eumops perotis californicus*)
Mastiff bats favor rugged, rocky areas where suitable crevices are available for day-roosts. Characteristically, day-roosts are located in large cracks in exfoliating slabs of granite or sandstone. The crevices must open downward, be at least 5 cm wide and 30 cm deep, and narrow to at least 2.5 cm at their upper end (Vaughan 1959 in Williams 1986). Mastiff bats also frequently roost in buildings, provided these have sheltering spaces with conditions similar to those described above. Vaughan (1959 in Williams 1986) estimated that they foraged as much as 2000 ft above the ground. He noted that in some places they regularly foraged at 100 to 200 ft over the substrate. They probably forage for considerable distances from their roosting sites. The foraging height of these bats precludes any exposure from applications of copper-containing aquatic pesticides.

Long-eared Myotis Bat (*Myotis evotis*)
Long-eared myotis bats occur mostly in forested areas, especially those with broken rock outcrops, but they also occur in shrubland, over meadows near tall timber, along wooded streams, and over reservoirs. Often roosts in buildings, also in hollow trees, mines, caves, fissures, etc. (Barbour and Davis 1969 in NatureServe 2004). They forage over water or among trees and usually feed by picking prey from surface of foliage, tree trunks, rocks, or ground; may fly slowly around shrub searching for emerging moths or perhaps nonflying prey (Manning and Jones 1989 in NatureServe 2004). Since the feeding habits do not focus on emergent insects or other aquatic prey items, the risk from copper-containing aquatic pesticides is insignificant.

Fringed Myotis Bat (*Myotis thysanodes*)
Fringed myotis bat inhabit cliffs, deserts, grassland/herbaceous areas, suburban/orchard areas, urban areas, and coniferous and mixed woodland; primarily at middle elevations of 1,200-2,150 m in desert, grassland, and woodland habitats. They have been recorded at low elevations along Pacific Coast. They roost in caves, mines, rock crevices, buildings, and other protected sites. Nursery colonies occur in caves, mines, and sometimes buildings (NatureServe 2004). They are insectivorous with beetles as a common prey item. Wings have a high puncture strength, which is characteristic of bats that forage by gleaning from the ground or near thick or thorny vegetation (O'Farrell and Studier 1980 in NatureServe 2004). Since the feeding habits do not focus on emergent insects or other aquatic prey items, the risk from copper-containing aquatic pesticides is insignificant.

Long-Legged Myotis Bat (*Myotis volans*)
Primarily in montane coniferous forests, in the south most often at 2000-3000 m; also riparian and desert (Baja California) habitats. May change habitats seasonally. Uses caves and mines as hibernacula, but winter habits are poorly known. Roosts in abandoned buildings, rock crevices, under bark, etc. In summer, apparently does not use caves as daytime roost site. In some areas hollow trees are the most common nursery sites, but buildings and rock crevices are also used (NatureServe 2004). Feeds primarily on moths. Also consumes a wide variety of invertebrates: fleas, termites, lacewings, wasps, small beetles, etc. (Warner and Czaplewski 1984 in NatureServe 2004). Follows prey for relatively long distances around, through, over forest canopy, forest clearings, and over water. In New Mexico, forages primarily in open areas, feeds mainly on small moths (Black 1974 in NatureServe 2004). The diet of long-legged myotis consists of mostly terrestrial insects, so the exposure to copper-containing aquatic pesticides introduced into a reservoir for control of aquatic weeds would not be significant.

Yuma Myotis Bat (*Myotis yumanensis*)
Yuma myotis bats inhabit deserts, coniferous and mixed forests, grassland/herbaceous areas, shrubland/chaparral, suburban/orchard, urban, and coniferous and mixed woodlands. They are more closely associated with water than most other North American bats, but are also found in a wide variety of upland and lowland habitats, including riparian, desert scrub, moist woodlands and forests. Nursery colonies usually are in buildings, caves and mines, and under bridges. Yuma myotis bats are insectivorous, with small moths believed to be the primary food source in some areas; dipterans and ground beetles are other common prey items. They often feed over ponds and streams, flying just above the water surface (NatureServe 2004). Hazard to copper-containing aquatic pesticides is negligible because insects emerging from the treated areas would be unavailable through direct toxicity to immature life stages.

Reptiles

Western Pond Turtle (*Clemmys marmorata*)
The northwestern pond turtle is primarily riparian, most often living in sloughs, streams (both permanent and intermittent), and large rivers, although some may inhabit impoundments, irrigation ditches, and other artificial water bodies. In streams, pools are preferred over shallow reaches (Bury 1972 in Ernst *et al.* 1994). Habitats may be either rocky or mud bottomed, but usually contain some aquatic vegetation and basking sites (Ernst *et al.* 1994). Western pond turtles are opportunistic feeders and eat a variety of food items including carrion, aquatic invertebrates, insects and worms (Larsen 1997). Their habitat requirements and feeding habits indicate northwestern pond turtles may be exposed to pulses of herbicide-treated water. Following the procedures provided by U.S. EPA (1993), the estimated exposure of the western pond turtle from a water concentration of 2.0 ppm is 22.3 mg copper/kg diet. Concentrations over 3.5 days would diminish to a copper concentration no longer deemed to pose a risk to ponds turtles.

Northwestern Pond Turtle (*Clemmys marmorata marmorata*)
See Western Pond Turtle

Birds

Bell's sage sparrow (*Amphispiza belli belli*)
They prefer semiopen habitats with equally spaced shrubs 1 – 2 m high. They occur in dry chaparral and coastal sage scrub along coastal lowlands, in lower foothills of local mountains (Grinnell and Miller 1944 in Martin and Carlson 1998, Unitt 1984 in Martin and Carlson 1998, Gaines 1988 in Martin and Carlson 1998, Shuford 1993 in Martin and Carlson 1998). They have an omnivorous diet taken from the ground (DeGraaf *et al.* 1985 in Martin and Carlson 1998, Polis 1991 in Martin and Carlson 1998). They eat adult and larval insects, spiders, seeds, small fruits, and succulent vegetation (Martin and Carlson 1998). The terrestrial nature of their habits and diet preclude exposure to copper-containing aquatic herbicides applied to the reservoir for the control of algae.

Great Blue Heron (*Ardea herodias*)
Great blue herons can travel long distances from a nesting colony to a feeding area, up to 34.1 km from the nesting colony (Pfeifer 1979). Because they can range so widely, the nesting colony with its large nest trees does not need to be adjacent to sufficient foraging habitat for all nesting adults and great blue herons can forage in water bodies that do not have adjacent nest trees. They forage in any kind of calm, shallow freshwater (Kaufman 1996) as well as in grasslands, marshes, and along riverbanks. Great blue herons consume a variety of prey, including fish, insects, mammals, amphibians, and crustaceans. Fish are the predominant prey (Butler 1992). The potential exists for great blue herons to feed on prey exposed to copper in a reservoir. For the great blue heron, an average water copper concentration of 1 ppm was used to represent the exposure possible during the first day following application after applying a half-life of approximately 20 hours. This concentration could lead to a dietary concentration of 15.2 mg/kg/day that would not exceed the TRV of 46.97 mg/kg/day. The risk of applying copper to reservoirs for the control of aquatic weeds is insignificant.

Snowy Egret (*Egretta thula*)
In the West, the snowy egret prefers willows along large rivers (Alcorn 1988 in Parsons and Masters 2000); reservoirs, grassy marshes, and wet meadows (Andrews and Righter 1992 in Parsons and Masters 2000, Oakleaf et al. 1992 in Parsons and Masters 2000); inland lakes and canals in the Harney Basin in Oregon (Gilligan et al. 1994 in Parsons and Masters 2000); and irrigation channels, estuarine habitats, marshes, and river courses (Garrett and Dunn 1981 in Parsons and Masters 2000). They generally breed along inland lakes and rivers. Nesting substrate varies from emergent vegetation such as common reed to shrubs and small trees. Snowy egrets favor shallow water (< 15 cm) including near emergent vegetation for foraging (Parsons and Masters 2000). Snowy egrets sometimes forage in dry fields (Kaufman 1996). Snowy egrets consume a wide variety of prey items, including earthworms, annelid worms, aquatic and terrestrial insects, crabs, shrimp, prawns, crayfish, other crustaceans, snails, freshwater and marine fish, frogs/toads, and snakes/lizards (Kushlan 1978a, 1978b in Parsons and Masters 2000). The potential exists for snowy egrets to feed on prey exposed to herbicides in reservoirs. For the snowy egret, an average water copper concentration of 0.5 ppm was used to represent the exposure possible during the first day following application after applying a half-life of approximately 20 hours. Since snowy egrets feed primarily in shallow water (< 15 cm), and there is very little of this habitat available in Stafford Lake, at most is likely they would only consume 50% of their diet from Stafford Lake in any day. This concentration and proportion of their diet would lead to an exposure via the diet of 27.69 mg/kg/day that would not exceed the

TRV of 46.97 mg/kg/day (see Appendix D). The risk of applying copper to reservoirs for the control of aquatic weeds is insignificant.

Great Egret (*Ardea alba*)
Great egrets use similar habitat to that of the great blue heron. They forage in open areas, such as along the edges of lakes, large marshes, and shallow coastal lagoons and estuaries. They also forage along rivers in wooded areas (Kaufman 1996). Great egrets forage in freshwater, marine, and estuarine wetlands, shallow water of ponds, and regularly use uplands habitats (Palmer 1962 in NatureServe 2004; McCrimmon *et al.* 2001). They forage in water up to about 28 cm (Powell 1987 in McCrimmon *et al.* 2001). Great egrets use similar habitat to that of the great blue heron. They forage in open areas, such as along the edges of lakes, large marshes, and shallow coastal lagoons and estuaries. They also forage along rivers in wooded areas (Kaufman 1996). Great egrets forage in freshwater, marine, and estuarine wetlands, shallow water of ponds, and regularly use uplands habitats (Palmer 1962 in NatureServe 2004; McCrimmon *et al.* 2001). They forage in water up to about 28 cm (Powell 1987 in McCrimmon *et al.* 2001). In the Sacramento Valley, they commonly forage in rice fields. Great egrets eat mostly fish. Aside from fish, they also eat crustaceans, frogs, salamanders, snakes, and aquatic insects. In open fields, they might eat grasshoppers, and rodents (Kaufman 1996). Great egrets feed their nestlings many small fish during each feeding bout (Mock 1985). The potential exists for great egrets to feed on prey exposed to herbicides in reservoirs. For the great egret, an average water copper concentration of 1 ppm was used to represent the exposure possible during the first day following application after applying a half-life of approximately 20 hours. This concentration would lead to an exposure via the diet of 40.95 mg/kg/day that would not exceed the TRV of 46.97 mg/kg/day. The risk of applying copper to reservoirs for the control of aquatic weeds is insignificant.

Burrowing Owl (*Athene cunicularia*)
Burrowing owls inhabit dry, open, shortgrass, treeless plains, and are often associated with burrowing mammals. They can also be found at golf courses, cemeteries, road allowances within cities, airports, vacant lots in residential areas and university campuses, and fairgrounds. The presence of a nest burrow seems to be a critical requirement for western burrowing owls (Thomsen 1971 in Haug *et al.* 1993, Martin 1973 in Haug *et al.* 1993, Zarn 1974 in Haug *et al.* 1993, Wedgwood 1978 in Haug *et al.* 1993, Haug 1985 in Haug *et al.* 1993). They typically forage in shortgrass, mowed, or overgrazed pastures; golf courses and airports (Thomsen 1971 in Haug *et al.* 1993). They are opportunistic feeders, eating primarily arthropods, small mammals, and birds. Amphibians and reptiles constitute a minor component to the diet and possibly only in Florida (Wesemann and Rowe 1987 in Haug *et al.* 1993). The terrestrial nature of their foraging habitats and prey base indicate that exposure to herbicides applied to reservoirs will be insignificant.

Western Burrowing Owl (*Athene cunicularia hypogaea*)
See Burrowing Owl.

White-Tailed Kite (*Elanus leucurus*)
White-tailed kites inhabit low elevation grassland, agricultural, wetland, oak-woodland, or savannah habitats. Riparian areas adjacent to open areas are also used. Lightly grazed or ungrazed fields generally support larger prey populations, and are therefore preferred. Intensively cultivated areas are also used (Dunk 1995). Nests in trees (Stendell 1972 in Dunk

1995). They prefer to forage in ungrazed grasslands (Bammann 1975 in Dunk 1995). Wetlands dominated by grasses, and fence rows and irrigation ditches with residual vegetation adjacent to grazed lands (Bammann 1975 in Dunk 1995). They primarily eat small mammals (Dunk 1995). Because they prey mostly on small mammals, the risk posed by treating reservoirs for the control of aquatic weeds is insignificant.

American Peregrine Falcon (*Falco peregrinus anatum*)
The habitat of peregrine falcons generally includes cliffs, for nesting, with open areas of air and generally open landscapes for foraging. In addition to natural habitats peregrine falcons also use urban, human-built environments such as towers, buildings, etc.). Most prey is captured in the air while in flight, but they also capture prey from the surface of water or the ground. The most common prey include birds, from song birds to small geese, occasionally mammals, and rarely amphibians, fish, and insects (White *et al.* 2002). Since peregrine falcons feed almost exclusively on birds and mammals, the risk posed by treating reservoirs for the control of aquatic weeds is insignificant.

Osprey (*Pandion haliaetus*)
Osprey feed along rivers, marshes, reservoirs, and natural ponds and lakes, where individuals feed in both shallow littoral zones as well as deeper water (Poole et al. 2002). They do not favor foraging in water with thick emergent and submerged vegetation (Postupalsky and Stackpole 1974 in Poole et al. 2002, Prevost 1977 in Poole et al. 2002). Live fish constitute 99% of prey (Poole et al. 2002), and it is possible for osprey to forage over reservoirs treated with herbicides and consume fish. For the osprey, an average water copper concentration of 1 ppm was used to represent the exposure possible during the first day following application after applying a half-life of approximately 20 hours. This concentration could lead to a dietary concentration of 36.02 mg/kg/day that would not exceed the TRV of 46.97 mg/kg/day (see Appendix D). The risk of applying copper to reservoirs for the control of aquatic weeds is insignificant.

Double-crested Cormorant (*Phalacrocorax auritus*)
Cormorants occupy a wide variety of aquatic habitats. In addition to feeding habitats, they require suitable places for daytime resting nighttime roosts. They perch on exposed sites such as rocks or sandbars, pilings, or trees near favored fishing sites. They forage in shallow water (< 8 m deep), typically less than 30 km from colony or roost. They occur on ponds, lakes, artificial impoundments, slow-moving rivers, lagoons, estuaries, and open coastlines (Hatch and Weseloh 1999). They consume almost entirely fish, in the size range of 3 – 40 cm, but mostly < 15 cm. Less frequently, they consume other aquatic prey, including insects, crustaceans, and amphibians (Palmer 1962 in Hatch and Weseloh 1999). An average copper water concentration of 1 ppm was used to represent the exposure possible during the first day following application. After using a half live of approximately 20 hours, the resulting water concentration could lead to a dietary concentration of 34.5 mg/kg/day. This dietary concentration is less than the TRV of 47 mg/kg/day and as a result, the application of copper-containing aquatic pesticides is insignificant.

Loggerhead Shrike (*Lanius ludovicianus*)
Loggerhead shrikes breed in open country with short vegetation, including pastures with fence rows, old orchards, mowed roadsides, cemeteries, golf courses, agricultural fields, riparian areas, and open woodlands (Yosef 1994 in Yosef 1996). They feed in open habitats characterized by well-spaced, often spiny, shrubs and low trees, usually interspersed with short

grasses, forbs, and bare ground, including scrub lands, steppes, deserts, savannas, prairies, agricultural lands (particularly pastures and meadows with hedges or shrubs), and some suburban areas (Yosef 1996). They focus on arthropods, amphibians, small to medium-sized reptiles, small mammals and birds (Yosef 1996). Insects generally make the majority of the diet (up to 68%, Bent 1950 in Yosef 1996). Vertebrates are favored in the winter (Graber *et al.* 1973 in Yosef 1996, Kridelbaugh 1982 in Yosef 1996). Since insects such as beetles and grasshoppers are the major insect prey (Kridelbaugh 1982 in Yosef 1996), the risk posed by treating reservoirs for the control of aquatic weeds is insignificant.

Lewis' woodpecker (*Melanerpes lewis*)
Important aspects of Lewis' woodpeckers include an open canopy, a brush understory offering ground cover, dead or downed woody material, available perches, and abundant insects (Bock 1970 in Tobalske 1997). One of the major habitats is open riparian woodland dominated by cottonwood and logged or burned pine forest. Breeding birds are also found in oak woodland, nut and fruit orchards, piñon pine-juniper woodland, a variety of pine and fir forests, and agricultural areas including farm- and ranchland (Bock 1970 in Tobalske 1997, Raphael and White 1984 in Tobalske 1997, Siddle and Davidson 1991 in Tobalske 1997, Linder 1994 in Tobalske 1997, Tashiro-Vierling 1994 in Tobalske 1997, Viering 1997 in Tobalske 1997, Saab and Dudley 1996 in Tobalske 1997). They feed in the air, on tree trunks and branches, in bushes, and on the ground. They eat free-living (not wood-boring) insects, acorns or other nuts, and fruit (Tobalske 1997). Their terrestrial diets indicate the risk posed by treating reservoirs for the control of aquatic weeds is insignificant.

Bank Swallow (*Riparia riparia*)
Barn swallows breed along ocean coasts, rivers, streams, lakes, reservoirs, and wetlands (Cramp *et al.* 1988 in Garrison 1999, Turner and Rose 1989 in Garrison 1999, American Ornithologists' Union 1998 in Garrison 1999). They require vertical banks, cliffs, and bluffs in alluvial, friable soils for nesting. Bank swallows forage while flying and consume flying or jumping insects and occasionally eat terrestrial and aquatic insects or larvae (Garrison 1999). They feed over lakes, ponds, rivers and streams, meadows, fields, pastures, and bogs. They occasionally feed over forests and woodlands (Stoner 1936 in Garrison 1999, Gross 1942 in Garrison 1999, Turner and Rose 1989 in Garrison 1999). During the breeding season, they generally forage within 200 m of their nests for feeding the nestlings (Mead 1979 in Garrison 1999, Turner 1980 in Garrison 1999). The only area where bank swallows might nest is along the Sacramento River. They generally forage within 200 m of nesting areas while they have young in June and July (Garrison 1999). Bank swallows could feed on emergent insects from the reservoir. Hazard to copper is negligible insects emerging from the treated areas would be unavailable through direct toxicity to immature life stages.

Yellow Warbler (*Dendroica petechia brewsteri*)
Yellow warblers breed most commonly in wet, deciduous thickets, especially those dominated by willows, and in disturbed early successional habitats (Dunn and Garrett 1997 in Lowther *et al.* 1999). They also frequent thickets and hedgerows in human-altered habitats such as power transmission lines, cultivated farmland, orchards, roadsides, and suburban parks (Campbell *et al.* 1999 in Lowther *et al.* 1999). In the northern Rocky Mountain dryland habitats, yellow warblers were more commonly associated (listed in order) with streamside riparian stands, cottonwood bottomland stands, aspen stands, and mid-successional clearcuts than in early successional burned forests (Hutto 1995). In summer near Jackson Hole, Wyoming, yellow

warblers were most common in taller alder, aspen or cottonwood situations (Hutto 1981). Yellow warblers prefer to forage on small limbs to large limbs, tips and dead limbs in either coniferous or deciduous trees (Morse 1973 in Lowther *et al.* 1999). The main diet of yellow warblers consists of insects and other arthropods, but may eat wild fruit occasionally (Stevenson and Anderson 1994 in Lowther *et al.* 1999). Since the feeding habits do not focus on emergent insects or other aquatic prey items, the risk from treating reservoirs with herbicides would be insignificant.

Invertebrates

Marin Elfin Butterfly (*Incisalia mossii marinensis*)
Opler and Wright (1999 in NatureServe 2004) describes habitat as moist slopes and canyons. They also live in wooded canyons, cliffs, rocky areas are also used (NatureServe 2004). Habitat is usually, but not always, mountainous areas, often with steep topography, with the larval food plants *Sedum* species, including *S. spathulifolium* (Emmel and Ferris 1972 in NatureServe 2004), *S. obtusatum* (Emmel and Emmel 1973 in NatureServe 2004) and *S. lanceolatum*, and *sedella* (Butte County, California). Thin-soiled or rocky north-facing slopes are most frequently used (NatureServe 2004). In some areas, adult males require small shrubs for perching substrates. Coyotebrush (*Baccharis pilularis*) is used as a perching substrate along the coast of California. Caterpillars eat reproductive portions of host plants, primarily *Sedum spathulifolium* (Emmel and Ferris 1972 in NatureServe 2004), *S. obtusatum* (NatureServe 2004), and *S. lanceolatum* (Ferris and Stanford 1970 in NatureServe 2004). Caterpillars are known to feed on *Sedella* in Butte County, California. Adults feed on nectar at a variety of flowers such as dandelion and *Lomatium utriculatum*. Eggs are laid on host inflorescences and larvae feed on developing flowers and fruits (NatureServe 2004). Because Marin Elfin Butterflies utilize only terrestrial habitats, they would not be exposed to risk from applications of copper to the reservoir for control of algae.

Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*)
These beetles live in very dense vegetation, often in vernal pools or fishless lakes. They spend summers buried in soil near the edge of the lake or once the vernal pool has dried up. They remain in the soil until the next winter's rain (pers. comm. Christopher Rogers, Ecoanalysts, Inc.). Because they are inactive and buried in soil outside of the reservoir for the duration of the project, they would not be exposed to risk from applications of copper to the reservoir for control of algae.

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Appendix D

Toxic Reference Values
The U.S. EPA (1989) suggests applying a 20X safety factor to median toxicity values for aquatic threatened or endangered species and a 10X safety factor for terrestrial threatened or endangered species. In this analysis, we applied these safety factors to all species regardless of their designation. Therefore, species listed as California species of special concern received similar consideration in the analyses as federally threatened or endangered species.

Since no published TRVs for available for reptiles for copper, the approach used here was to select the most sensitive available TRV from either birds or mammals, and apply a safety factor of 10X. The published TRV for mammals of 12.0 mg copper/kg diet is lower than that for birds of 46.97 mg copper/kg diet (EPA 1999), and applying the safety factor provides a reptilian TRV of 1.20 mg copper/kg diet.

Exposure Assessment
For terrestrial wildlife species, we used the procedures suggested in the U.S. EPA's Wildlife Exposure Factors Handbook (1993). These procedures entailed determining the dietary habits of each species from published literature, determining food intake levels using body weights and metabolic rates, and herbicide uptake values for each dietary component. We used uptake rates or equations to calculate uptake rates published by the U.S. EPA (1999). For fish, exposure to contaminated water was the primary route considered and dietary exposure. For terrestrial plants, exposure only to incidental drift during aquatic pesticide application was considered.

For copper exposure to aquatic invertebrates, we were able to calculate a bioconcentration factor (BCF) adjusted for dissipation through time. Rodgers *et al.* (1992 in Washington Department of Ecology 2004) provides the body burdens and water concentrations in mollusks following an application of Komeen® (0.4 ppm Cu) to Guntersville Reservoir in Alabama. They report that the concentration in water returns to its pretreatment concentration of 0.015 ppm by 21 hours post-treatment. The body burden of mollusks increased to 82.667 mg/kg from a pretreatment level of 37.867 mg/kg—a change of 44.8 mg/kg. Using an average concentration of 0.2 ppm for this period, a 21-hr BCF is 224. Since this work was done with Komeen rather than copper sulfate and using mollusks to represent all aquatic invertebrates, we applied a 10X safety factor to arrive a BCF for our exposure assessments of 2240 for aquatic invertebrates. Uptake of copper for all other dietary items used the more conservative approach of instantaneous uptake.

Risk Assessment
To determine whether adverse effects were likely, the anticipated exposure was compared to the TRV. Whenever the exposure estimate exceeded the TRV, we concluded a potential risk was present. For terrestrial animals, exposure to drinking the treated water, consuming treated sediments, and consuming exposed prey items or vegetation were included in the exposure estimate. For fish, only exposure to treated water was considered. The only herbicide with available dietary toxicity data for fish was copper.

COPPER

Persistence:	Hydrolysis – Not Available Photodegradation in water – Not Available Photodegradation on soil – Not Available Aerobic soil metabolism – Not Available Anaerobic aquatic metabolism – Not Available Terrestrial Field Dissipation – Not Available

Physical Properties

Water Solubility:	Copper Sulfate: 230.5 g/kg (25°C) (Tomlin 2002)
Volatility:	Not Volatile (Tomlin 2002)
Octanol/Water Partitioning Coefficient (K_{ow})	Not Available (K_{ow} > 100 indicates EPA may require Fish Bioaccumulation Test)

Bioaccumulation

Edwards *et al.* 1998

The uptake of copper in common nettle (*Urtica dioica*) and earthworms (*Eisenia fetida*) from a contaminated dredge spoil was measured. In the aerial portions of the common nettle, the biological absorption coefficient (concentration in plant tissue ÷ concentration in soil) was 0.072 to 0.265. In root tissue, the biological absorption coefficient was 0.075 to 0.303. To determine the uptake of copper in earthworms, contaminated soil was brought into the laboratory and earthworms introduced for 28 days. Soil copper levels were 16 times higher in the contaminated soil than in control soil, but the concentrations in the earthworms only differed by 2.6 times. The earthworms did absorb copper from the contaminated soils, but not to an extent reflecting the level of contamination.

Gintenreiter *et al.* 1993

Copper concentrations in the tissues of the gypsy moth (*Lymantria dispar*) increased from earlier to later developmental stages, but the trend was not smooth. Fourth instars showed a decrease when compared to 3rd instars, and adults had lower concentrations than pupae. Concentration factors were 2 to 5. Copper concentrations were passed from one generation to the next.

Gomot and Pihan 1997

Bioconcentration of copper was evaluated in two subspecies of land snails, *Helix aspersa aspersa* and *Helix aspersa maxima*. These snails showed a tendency to accumulate copper in excess of the amount available from its diet. The subspecies exhibited different bioconcentration factors for different tissues. For the foot, *H. a. aspersa* had factors ranging from 2.3 to 13.2, whereas *H. a. maxima* had factors ranging from 1.7 to 10.2. For the viscera, *H. a. aspersa* had factors ranging from 2.1 to 9.1, whereas *H. a. maxima* had factors ranging from 1.9 to 9.0. Differences in the bioconcentration factor appear to be more related to the other components of the diet, not the copper concentration in the diet.

Gomot de Vaufleury and Pihan 2000

Copper concentrations were measured in terrestrial snails (*Helix aspersa*). Differences were demonstrated among laboratory and field values. However, no soil or vegetation samples for the laboratory and field sites were analyzed for copper, so it is not possible to determine whether

copper was accumulated at rates above background or whether they reflect some fraction of background levels.

Han *et al.* 1996
Shellfish accumulated copper in natural and aquaculture ponds in Taiwan. The sediments in the aquaculture ponds were finer grain and contained 4X concentrations of copper. Five mollusks were collected, but only purple clams (*Hiatula diphos*) and hard clams (*Meretrix lusoria*) were collected from both environments. The relative accumulation in each environment did not show a consistent pattern for both species indicating that the concentration in the shellfish was not controlled only by total copper concentrations in the sediments.

Haritonidis and Malea 1999
Copper concentrations in green algae (*Ulva rigida*) (2.2 ± 0.2 µg/g dry weight) collected from Thermaikos Gulf, Greece were less than seawater concentrations (1.5 ± 0.08 µg/L) and sediment (2.7 ± 0.5 µg/g dry weight). This suggests that copper will not bioconcentrate in algae.

Harrahy and Clements 1997
Bioaccumulation factors were calculated for the benthic invertebrate, *Chironomus tentans,* to be 16.63 and 12.99 during two uptake tests. Depuration was rapid. Copper concentrations were similar to background within four days. The authors caution that the bioaccumulation factors presented may be related to bioavailability that is driven by sediment characteristics.

Hendriks *et al.* 1998
Bioaccumulation ratios were determined for zebra mussels (*Dreissena polymorpha*) from the Rhine-Meuse Delta in the Netherlands. For copper, the ratio between mussels and suspended solids was 0.31 indicating tissue concentrations did not exceed environmental concentrations and that copper had not bioaccumulated

Janssen and Hogervorst 1993
Concentration factors were calculated for nine arthropod species inhabiting the forest litter layer in a clean reference site and a polluted site in The Netherlands: pseudoscorpion (*Neobisium muscorum*), harvestman (*Paroligolophus agrestis*), carabids (*Notiophilus biguttatus* and *Calathus melanocephalus*), mites (*Pergamasus crassipes*, *P. robustus*, and *Platynothrus peltifer*), dipluran (*Campodea staphylinus*), and collembolan (*Orchesella cincta*). Copper concentration factors for the eight species ranged from 0.85 – 4.08 in the reference site versus 0.40 – 1.62 in the polluted site. Copper was concentrated more when copper leaf litter concentrations were lower.

Khan *et al.* 1989
Bioconcentration factors in grass shrimp (*Palaemonetes pugio*) were determined for two populations, one from an industrialized site and another from a relatively pristine site. Levels of copper measured in shrimp from the industrialized site were greater than from the pristine site, but the industrialized site showed a concentration factor of 0.07, whereas the pristine site showed a concentration factor of 1.1 when compared to sediment concentrations.

Marinussen *et al* 1997a
Earthworms (*Dendrobaena veneta*) were exposed to soils containing various levels of copper. Earthworm tissue concentrations increased proportionally to the soil copper concentrations up to 150 ppm. Above 150 ppm in the soils, tissue concentrations leveled off at about 60 ppm.

Marinussen *et al* 1997b
Soil, containing 815 ± 117 ppm Cu, was collected from a contaminated site in The Netherlands. Earthworms (*Dendrobaena veneta*) were introduced to the soil in the laboratory. Earthworms appeared to reach equilibrium with the soil exhibiting tissue concentrations of *c.* 60 ppm through 56 days of exposure. At 112 days exposure, the tissue concentrations increased to *c.* 120 ppm. The authors did not have an explanation for this anomaly. After being transferred to uncontaminated soil, the earthworms eliminated the copper according to a two-compartment model with the half-life times being, $t_{1/2\text{-}1}$ = 0.36 d and $t_{1/2\text{-}2}$ = 37 d.

Morgan and Morgan 1990
Earthworms (*Lumbricus rubellus*) were collected from an uncontaminated site and four metalliferous mine sites. Copper concentrations in soil and in tissues were measured. The worms were held under clean conditions to allow eliminate soil from their alimentary canal. The concentrations of copper in earthworm tissues reflected the concentrations in the soil. The authors conclude that there was no evidence that copper was sequestered in earthworms.

Morgan and Morgan 1999
Copper concentrations in earthworm (*Aporrectodea caliginosa* and *Lumbricus rubellus*) tissue were lower than in their ingesta. This suggests that copper does not bioaccumulate in earthworms.

Neuhauser *et al.* 1995
Overall, copper did not bioconcentrate in earthworm in contaminated soil, but showed a slight tendency to bioconcentrate when soil copper concentrations were low.

Pyatt *et al.* 1997
Appreciable concentrations (0.3 – 4.6%) of copper were measured in all tissues of the freshwater snail (*Lymnaea stagnalis*), whereas no measurable quantities of copper were found in food or water. The authors conclude that bioaccumulation occurred.

Svendsen and Weeks 1997a,b
There is an inverse relationship between the bioconcentration factors and soil concentrations under laboratory conditions for the earthworm *Eisenia andrei* and under field conditions for the earthworm *Lumbricus rubellus.* Bioconcentration factors ranged from 4.0 using control soil and 0.30 using soil amended with 339 ppm Cu under laboratory conditions. Bioconcentration factors in the field ranged from 4.1 under control conditions to 0.4 when the soil plots contained 231 ppm Cu.

Fish Dietary Toxicity
Berntssen *et al.* 1999
Laboratory tests were conducted to determine the effects of dietary copper on Atlantic salmon (*Salmo salar*). Dietary concentrations were 0, 35, and 700 mg Cu/kg diet for an experiment lasting 28 days. Addition of the copper supplemented diet did not cause an increase in the water concentrations of copper. Dietary exposure significantly increased intestinal cell proliferation and apoptosis (degeneration of cells into membrane-bound particles that are then phagocytosed by other cells). The copper exposed groups did not grow during the trial.

Lundebye *et al.* 1999
Laboratory tests were conducted to determine the effects of dietary copper on Atlantic salmon (*Salmo salar*). Dietary concentrations were 0, 35, and 700 mg Cu/kg diet for an experiment lasting 28 days, and 5, 35, 500, 700, 900, and 1750 mg Cu/kg diet in an experiment lasting 12 weeks. Mean weights of fish used in the tests were 72 and 0.9 g in the first and second experiments, respectively. No mortality was observed in the first experiment, and only 2% died in the second experiment. Food consumption was not altered in either experiment at any dietary concentration. Cells of the intestinal lining were damaged in fish at both dietary concentrations in the first experiment. Growth of fish in the second experiment was reduced at dietary concentrations ≥900 mg/kg after 10 weeks and at dietary concentrations ≥700 mg/kg after 12 weeks.

Miller *et al.* 1993
When rainbow trout (*Oncorhynchus mykiss*) were exposed in the laboratory simultaneously to dietary Cu concentrations of up to 684 µg/g dry weight and water concentrations of up to 127 µg/L, no overt signs of toxicity were noted. Fish were fed to satiation three times daily. Dietary exposure was the principal source of tissue Cu, but as water concentrations were increased, uptake from water increased. However, exposure to waterborne Cu was more effective at inducing tolerance to subsequent exposure to toxic concentrations of Cu.

Handy 1993
Rainbow trout (*Oncorhynchus mykiss*) were fed commercial trout chow with and without 10 mg Cu/kg dry weight for 28 days. The water concentrations of Cu remained below 1 ppb. Fish were hand-fed to satiation daily. No outward signs of toxicity were noted and a single mortality occurred in the Cu-treated fish on day 6 of treatment. Despite some regurgitation of diet pellets, no body weight loss was noted. Dietary copper increased tissue concentrations at day 28 to 2.52, 72.66, and 0.636 µg Cu/g weight in the gills, liver and muscle. Concentration in the kidneys were not elevated.

Murai *et al.* 1981
Channel catfish were provided diets containing supplemental copper at concentrations of 0, 2, 4, 8, 16, and 32 mg/kg for 16 weeks. At the end of 4 weeks, average weight gain had been reduced in the group receiving 32 mg/kg in the diet. After 16 weeks, average weight gain was reduced in the group receiving 16 mg/kg also. Weight gain/diet consumed was reduced for catfish receiving ≥ 8 mg/kg dietary Cu after 16 weeks. Packed cell volume in the blood and hemoglobin were not adversely affected, but the number of erythrocytes was reduced in the group receiving 16 mg/kg.

Mount *et al.* 1994
Rainbow trout (*Oncorhynchus mykiss*) were fed brine shrimp (*Artemia* sp.) enriched with Cu, Cd, Pb, and Zn alone or as a mixture along with As for 60 days. The water contained 12 µg/L Cu, 1.1 µg/L Cd, 3.2 µg/L Pb, and 50 µg/L Zn. Cu concentrations in the shrimp were 20, 40, and 80 µg/g fresh weight when trout were exposed to Cu alone. Survival of trout was decreased in the medium and high Cu treatments with 69 and 72% survival, respectively. Weight and length of trout were not impacted by feeding on brine shrimp containing Cu. Cu concentrations in whole fish were elevated as compared to controls either in clean water or metal-containing water, but the Cu concentrations did not differ among dietary treatment levels. No detrimental impacts

were observed in the exposures to multiple metals via the diet. In that exposure scenario, concentrations in the diet were 0.5, 1, 1.5 and 2X the low concentrations from the first scenario.

Farag *et al.* 1994
Rainbow trout were fed invertebrates collected from the Clark Fork River, Montana and from an uncontaminated reference site for 21 days. Juvenile fish received invertebrates containing 1.54 As, 0.10 Cd, 18.57 Cu, 0.86 Pb, 32.09 Zn (all µg/g wet weight). Adult fish received invertebrates containing 3.20 As, 0.24 Cd, 26.13 Cu, 1.77 Pb, 68.99 Zn (all µg/g wet weight). Water was either standard laboratory water or contained metal concentrations based on the U.S. EPA's water-quality criteria with concentrations of 2.2 µg Cd/L, 24 µg Cu/L, 6.4 µg Pb/l and 100 µg Zn/L. Mortality of juveniles was significantly greater in tanks with metal-treated water regardless of whether the dietary invertebrates contained metals. Mortality was slightly increased in juveniles in laboratory water that received invertebrates with metals. No differences in growth were observed in any treatment. No mortality was observed in adult trials. Exposure to metals either in the water or via diet caused scale loss in adults. Juveniles were too small to evaluate scale loss. Physiological condition of fish fed invertebrates containing metals was compromised.

Woodward *et al.* 1995
Rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*) were held in standard laboratory water or contained metal concentrations based on 50% the U.S. EPA's water-quality criteria with concentrations of 1.1 µg/L Cd, 12 µg/L Cu, 3.2 µg/L Pb, and 50 µg/L Zn from hatching to 88 days of age. Three diets were provided that comprised of benthic invertebrates collected from three locations on the Clark Fork River, Montana. Fish received pelleted invertebrates containing 6.5 As, no Cd, 87 Cu, 6.9 Pb, and 616 Zn (all mg/g dry weight); 19 As, no Cd, 178 Cu, 15 Pb, and 650 Zn (all mg/g dry weight); or 19 As, 0.26 Cd, 174 Cu, 15 Pb, and 648 Zn (all mg/g dry weight). Survival was not affected for either species by any combination of water or diet. Growth of brown trout was reduced in the groups receiving the diets with higher metals concentration and by exposure to metal-containing water from day 26 onward in the test. In rainbow trout, no effects were seen on growth at day 18, but by day 53, growth was reduced in fish exposed to higher metal concentrations in diet or water. However, the rainbow trout exposed to diets with higher metals concentrations had similar growth patterns regardless of whether they were also exposed to metals-containing water. Also, the growth of the rainbow trout exposed to treated water and the diet with low metal concentrations recovered by day 88 and were no longer significantly different from fish in untreated water.

Draves and Fox 1998
In a reach of the Montreal River in northern Ontario contaminated from gold mine tailings, water concentrations were significantly higher for Cu, Cd, and Pb, but not for Zn. Juvenile yellow perch (*Perca flavescens*), a benthic feeding species, had significantly less food in their stomachs in the contaminated reach than perch in an uncontaminated reach. However, body weights of juvenile perch did not differ between the contaminated and uncontaminated reaches. Within the contaminated reach, Cu body burdens were significantly negatively correlated with body weight. Concentrations of Cu in Chironomidae, Hemiptera, Cladocera, Odonata, and Amphipoda were compared between reaches. Concentrations in Chironomidae, Hemiptera, Cladocera, and Amphipoda were greater in the contaminated reach, but Cu concentrations were greater in Odonata in the uncontaminated reach.

Sublethal Effects
Folmar 1976
Rainbow trout (*Oncorhynchus mykiss*) fry showed strong avoidance to copper ($CuSO_4 \cdot 5H_2O$) at concentrations of 0.0001 to 0.01 ppm in the laboratory.

Folmar 1978
Mayfly nymphs (*Ephemerella walkeri*) showed strong avoidance to copper ($CuSO_4 \cdot 5H_2O$) at a concentration of 0.1 ppm but not 0.001 or 0.01 ppm in the laboratory.

COPPER

Test	Scientific Name	Common Name	Category	Test Result	Value (C.I.)	Toxicity Class	Slope	NOEL	Information Source
Aquatic Plant Toxicity – Frond Count ($CuSO_4$)	*Lemna minor*	Duckweed	Aquatic Plant	EC_{50}	0.8 ppm (0.7 – 0.9)	N.A.	N.R.	N.R.	Bishop and Perry 1981
Aquatic Plant Toxicity – Dry Weight ($CuSO_4$)	*Lemna minor*	Duckweed	Aquatic Plant	EC_{50}	0.8 ppm (0.4 – 1.2)	N.A.	N.R.	N.R.	Bishop and Perry 1981
Aquatic Plant Toxicity – Root Length ($CuSO_4$)	*Lemna minor*	Duckweed	Aquatic Plant	EC_{50}	0.6 ppm (0.3 – 0.8)	N.A.	N.R.	N.R.	Bishop and Perry 1981
Aquatic Plant Toxicity – Growth Rate ($CuSO_4$)	*Lemna minor*	Duckweed	Aquatic Plant	EC_{50}	1.2 ppm (1.1 – 1.3)	N.A.	N.R.	N.R.	Bishop and Perry 1981
2-day Contact toxicity (Copper Sulfate)	*Eisenia fetida*	Earthworm	Oligochaeta	LC_{50}	0.00198 mg/L (N.R.)	N.A.	N.R.	N.R.	Callahan *et al.* 1994
2-day Contact toxicity (Copper Chloride	*Eisenia fetida*	Earthworm	Oligochaeta	LC_{50}	0.000596 mg/L (N.R.)	N.A.	N.R.	N.R.	Callahan *et al.* 1994
2-day Contact toxicity (Copper Nitrate)	*Eisenia fetida*	Earthworm	Oligochaeta	LC_{50}	0.000429 mg/L (N.R.)	N.A.	N.R.	N.R.	Callahan *et al.* 1994
2-day Contact toxicity (Copper Sulfate)	*Eisenia fetida*	Earthworm	Oligochaeta	LC_{50}	638 mg/L (N.R.)	N.A.	N.R.	N.R.	Callahan *et al.* 1994
14-day Soil toxicity (Copper Nitrate)	*Eisenia fetida*	Earthworm	Oligochaeta	LC_{50}	0.000353 mg/kg (N.R.)	N.A.	N.R.	N.R.	Callahan *et al.* 1994
14-day Soil toxicity (Copper Sulfate)	*Eisenia fetida*	Earthworm	Oligochaeta	LC_{50}	0.000522 mg/kg (N.R.)	N.A.	N.R.	N.R.	Callahan *et al.* 1994
Freshwater Acute Toxicity ($Cu(NO_3)2 \cdot 3H_2O$)	*Ceriodaphnia dubia*	Ceriodaphnia	Freshwater Crustacea	LC_{50}	*c.* 1.1 ppm (N.R.)	Moderately Toxic	N.R.	*c.* 0.1 ppm	Cowgill and Milazzo 1991

Test	Scientific Name	Common Name	Category	Test Result	Value (C.I.)	Toxicity Class	Slope	NOEL	Information Source
3-Brood Toxicity Test ($Cu(NO_3)2 \cdot 3H_2O$)	*Ceriodaphnia dubia*	Ceriodaphnia	Freshwater Crustacea	LC_{50}	*c.* 0.2 ppm (N.R.)	Highly Toxic	N.R.	N.R.	Cowgill and Milazzo 1991
Sediment Acute Toxicity ($CuSO_4$)	*Chironomus tentans*	Midge (2nd Instar)	Aquatic Insect	LC_{50}	1.170 ppm (N.A.)	N.A.	N.A.	N.R.	Dobbs *et al.* 1994 in EPA 2003
Filter Paper Acute Toxicity (Copper Sulfate)	*Eisenia fetida*	Earthworm	Oligochaeta	LC_{50}	26.0 µg/cm^2 (17.1 – 34.9)	N.A.	N.R.	N.R.	Edwards and Bater 1992
Artificial Soil Acute Toxicity (Copper Sulfate)	*Eisenia fetida*	Earthworm	Oligochaeta	LC_{50}	1104.9 ppm (727.6 – 1482.2)	N.A.	N.R.	N.R.	Edwards and Bater 1992
Freshwater Acute Toxicity (Copper Sulfate)	*Anguilla rostrata*	American Eel	Freshwater Fish	LC_{50}	3.20 ppm (2.17 – 13.35)	Moderately Toxic	N.R.	N.R.	Hinton and Eversole 1979
Freshwater Acute Toxicity (Copper form N.R.) (24 hr static)	*Brachionus calyciflorus*	Rotifer	Freshwater Crustacea	LC_{50}	0.026 ± 0.0026 ppm (N.R.)	Very Highly Toxic	N.R.	N.R.	Janssen *et al.* 1994
Chronic Life Cycle (Copper form N.R.)	*Brachionus calyciflorus*	Rotifer	Freshwater Crustacea	LOEC	0.005 ppm[1] (N.A.)	N.A.	N.A.	0.0025 ppm	Janssen *et al.* 1994
48-hr Freshwater Acute Toxicity ($Cu(NO_3)_2 \cdot 3H_2O$)	*Gambusia affinis*	Mosquitofish	Freshwater Fish	LC_{50}	0.140 ppm (0.11 – 0.16)	Highly Toxic	1.47	N.R.	Joshi and Rege 1980
96-hr Freshwater Acute Toxicity ($Cu(NO_3)_2 \cdot 3H_2O$)	*Gambusia affinis*	Mosquitofish	Freshwater Fish	LC_{50}	0.093 ppm (0.08 – 0.15)	Very Highly Toxic	1.56	N.R.	Joshi and Rege 1980
48-hr Freshwater Acute Toxicity ($CuSO_4 \cdot 5H_2O$)	*Gambusia affinis*	Mosquitofish	Freshwater Fish	LC_{50}	0.460 ppm (0.25 – 0.83)	Highly Toxic	1.82	N.R.	Joshi and Rege 1980

Test	Scientific Name	Common Name	Category	Test Result	Value (C.I.)	Toxicity Class	Slope	NOEL	Information Source
96-hr Freshwater Acute Toxicity ($CuSO_4 \cdot 5H_2O$)	*Gambusia affinis*	Mosquitofish	Freshwater Fish	LC_{50}	0.20 ppm (0.11 – 0.33)	Highly Toxic	1.70	N.R.	Joshi and Rege 1980
96-hr Freshwater Acute Toxicity (Cutrine Formulation)	*Salmo trutta*	Brown Trout	Freshwater Fish Fingerlings	LC_{50}	0.198 ppm (0.11 – 0.33)	Highly Toxic	1.70	N.R.	Simonin and Skea 1977
Sediment Acute Toxicity ($CuSO_4$)	*Tubifex tubifex*	Tubifex	Freshwater Worm	LC_{50} (Dry wt.)	> 1000 ppm (N.A.)	N.A.	N.A.	500 ppm	Meller *et al.* 1998
Sediment Acute Toxicity ($CuSO_4$)	*Limnodrilus hoffmeisteri*	Limnodrilus	Freshwater Worm	LC_{50} (Dry wt.)	516 ppm (458 – 581)	N.A.	N.R.	250 ppm	Meller *et al.* 1998
Earthworm Reproduction ($CuCl_2 \cdot H_2O$)	*Enchytraeus crypticus*	Earthworm	Terrestrial Worm	EC_{50}	477 ppm (345 – 658)	N.A.	N.R.	N.R.	Posthuma *et al.* 1997
Freshwater Acute Toxicity ($CuCl_2$)	*Balanus amphitrite*	Acorn Barnacle (nauplii)	Freshwater Crustacea	LC_{50}	0.480 ppm (0.310 – 0.740)	Highly Toxic	N.R.	N.R.	Sasikumar *et al.* 1995
Freshwater Acute Toxicity ($CuCl_2$)	*Artemia* sp.	Brine Shrimp	Freshwater Crustacea	LC_{50}	1.280 ppm (1.01 – 1.560)	Highly Toxic	N.R.	N.R.	Sasikumar *et al.* 1995
14-day Acute Toxicity [$Cu(NO_3)_2 \cdot 3H_2O$]	*Eisenia fetida*	Earthworm	Oligochaeta	LC_{50}	683 µg/g (570 – 812)	N.A.	N.R.	N.R.	Spurgeon *et al.* 1994
56-day Toxicity [$Cu(NO_3)_2 \cdot 3H_2O$]	*Eisenia fetida*	Earthworm	Oligochaeta	LC_{50}	555 µg/g (460 – 678)	N.A.	N.R.	210 µg/g	Spurgeon *et al.* 1994
56-day Cocoon Production [$Cu(NO_3)_2 \cdot 3H_2O$]	*Eisenia fetida*	Earthworm	Oligochaeta	EC_{50}	53.3 µg/g (32.5 – 186)	N.A.	N.R.	32 µg/g	Spurgeon *et al.* 1994

[1] No criteria for LOEC provided.

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STATE OF CALIFORNIA - THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME
ENVIRONMENTAL FILING FEE CASH RECEIPT
DFG 753.5a (8-03)

249838

Lead Agency: North Marin Water Date: 9-23-04

County / State Agency of Filing: Marin County Clerk Document No.:

Project Title: Use of Cooperative Weed Control

Project Applicant Name: N. Marin Water District Phone Number:

Project Applicant Address: 3015 N Novato Blvd, Novato

Project Applicant *(check appropriate box)*: Local Public Agency ☐ School District ☐ Other Special District ☒
State Agency ☐ Private Entity ☐

CHECK APPLICABLE FEES:

( ) Environmental Impact Report	$850.00	$	
(x) Negative Declaration	$1,250.00	$	1250.00
( ) Application Fee Water Diversion *(State Water Resources Control Board Only)*	$850.00	$	
( ) Projects Subject to Certified Regulatory Programs	$850.00	$	
(✓) County Administrative Fee	$25.00	$	30.00
( ) Project that is exempt from fees			
	TOTAL RECEIVED	$	1280.00

Signature and title of person receiving payment:

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Invoice	Ref	Inv Date	Inv Amt	Discount	Adj Amt	Amt Pai
CKRQ091504		09/15/04	1250.00	0.00	0.00	1250.0

Reviewing Agencies Checklist

Form A, continued

KEY
S = Document sent by lead agency
X = Document sent by SCH
Δ = Suggested distribution

___**Resources Agency**
___Boating & Waterways
___Coastal Commission
___Coastal Conservancy
___Colorado River Board
___Conservation
__Δ__Fish & Game
___Forestry & Fire Protection
___Office of Historic Preservation
___Parks & Recreation
__Δ__Reclamation Board
___S.F. Bay Conservation & Development Commission
__Δ__Water Resources (DWR)

Business, Transportation & Housing
___Aeronautics
___California Highway Patrol
___CALTRANS District #
___Department of Transportation Planning (headquarters)
___Housing & Community Development

__Δ__**Food & Agriculture**

Health & Welfare
___Health Services_____

State & Consumer Services
___General Services
___OLA (Schools)

Environmental Protection Agency
___Air Resources Board
___California Waste Management Board
___SWRCB: Clean Water Grants
___SWRCB: Delta Unit
__**S**__SWRCB: Water Quality ***(Attn: Jim Maughn, Phil Isorena)***
___SWRCB: Water Rights
__**S**__Regional WQCB# 5b ***(Attn: Emily Alejandrino)***

Youth & Adult Corrections
___Corrections

Independent Commissions & Offices
___Energy Commission
___Native American Heritage Commission
___Public Utilities Commission
___Santa Monica Mountains Conservancy
___State Lands Commission
___Tahoe Regional Planning Agency

___Other_____

Public Review Period (to be filled in by lead agency)

Starting Date: July 29, 2004 Ending Date: August 30, 2004

Signature Philip C. McKenstrie Date July 21, 2004

Lead Agency (Complete if applicable):

Consulting Firm: ***Blankinship & Associates, Inc.***
Address: ***2940 Spafford Street, Suite 110***
City/State/Zip: ***Davis, CA 95616***
Contact: ***Michael Blankinship***
Phone: ***(530) 757-0941***

Applicant: ***North Marin Water District***
Address: ***999 Rush Creek Place***
City/State/Zip: ***Novato, CA 94945***

For SCH Use Only:

Date Received at SCH_____
Date Review Starts_____
Date to Agencies_____
Date to SCH_____
Clearance Date_____
Notes:

Form A

Notice of Completion & En onmental Document Transmitt

Mail to. State Clearinghouse, PO Box 3044, Sacramento CA 95814-3044 916/445-0613

SCH #_____

Project Title: ***Use of Copper to Control Aquatic Weeds in Stafford Lake***

ead Agency: ***North Marin Water District***
.ailing Address: ***999 Rush Creek Place***
City ***Novato*** Zip: ***94945***

Contact Person: ***Michael McMaster***
Phone: ***(415) 897-4133***
County: ***Marin County***

Project Location:

County: ***Marin County***
Cross Streets. ***Novato Blvd.***
Assessor's Parcel No.
Within 2 Miles: State Hwy #:
Airports Railways:

City/Nearest Community: ***Novato***
Zip Code: ***94945*** Total Acres: ***~870***
Section: ***various*** Twp: ***02N*** Range: ***07W*** Base: ***Mt. Diablo***
Waterways: ***Novato Creek***
Schools: ***None***

Document Type:

CEQA: □ NOP □ Supplement/Subsequent EIR
□ Early Cons (Prior SCH No.)
X Neg Dec □ Other
□ Draft EIR

NEPA: □ NOI
□ EA
□ Draft EIS
□ FONSI

Other: □ Joint Document
□ Final Document
□ Other

Local Action Type:

□ General Plan Update
□ General Plan Amendment
□ General Plan Element
□ Community Plan
□ Specific Plan
□ Master Plan
□ Planned Unit Development
□ Site Plan
□ Rezone
□ Prezone
□ Use Permit
□ Land Division (Subdivision, etc.)
□ Annexation
□ Redevelopment
□ Coastal Permit
X Other: ***NPDES Permit and SIP Section 5.3 Exception***

Development Type:

□ Residential: *Units* *Acres*
Office: *Sq.ft* *Acres* *Employees*
Commercial: *Sq.ft.* *Acres* *Employees*
□ Industrial: *Sq.ft* *Acres* *Employees*
□ Educational
□ Recreational

□ Water Facilities: *Type* *MGD*
□ Transportation: *Type*
□ Mining: *Mineral*
□ Power: *Type* *Watts*
□ Waste Treatment: *Type*
□ Hazardous Waste: *Type*
X Other. ***NPDES Permit and State Implementation Plan (SIP) Sec 5.3 Exception***

Funding (approx.): Federal: ***None*** State: ***None*** Total: ***None***

Project Issues Discussed in Document:

X Aesthetic/Visual
X Agricultural Land
X Air Quality
□ Archeological/Historical
□ Coastal Zone
□ Drainage/Absorption
□ Economic Jobs
□ Fiscal
□ Flood Plain/Flooding
□ Forest Land/Fire Hazard
□ Geologic/Seismic
□ Minerals
X Noise
□ Population/Housing Balance
□ Public Services/Facilities
□ Recreation/Parks
X Schools/Universities
□ Septic Systems
□ Sewer Capacity
□ Soil Erosion/Compaction/Grading
□ Solid Waste
X Toxic/Hazardous
□ Traffic/Circulation
X Vegetation
X Water Quality
X Water Supply/Groundwater
X Wetland/Riparian
X Wildlife
□ Growth Inducing
□ Landuse
□ Cumulative Effects
X Other: ***Pesticide Application***

Present Land Use/Zoning/General Plan Designation: ***Residential, Commercial, Agricultural, Open Space***

Project Description: Copper is proposed for use to control algae and other aquatic weeds in Stafford Lake. The North Marin Water District is preparing this Initial Study/Mitigated Negative Declaration to meet requirements of 1) The State Implementation Plan (SIP) Section 5.3 and 2) NPDES Permit #CAG990005 See CEQA Initial Study and Mitigated Negative Declaration for details.

4) **Project Approval.** The District Board hereby approves the Project and authorizes the General Manager to proceed with Project implementation in accordance with District policies and requirements.

5) **Notice of Determination.** The Board of Directors of the North Marin Water District hereby authorizes and directs the General Manager to prepare, sign and file a CEQA Notice of Determination with the Marin County Clerk and the State Clearinghouse within 5 days from the date of this Mitigated Negative Declaration, and to pay the California Department of Fish and Game fee for review of the Mitigated Negative Declaration in accordance with Fish and Game Code section 711.4.

* * * * *

I hereby certify that the foregoing is a true and complete copy of a resolution duly and regularly adopted by the Board of Directors of NORTH MARIN WATER DISTRICT at a regular meeting of said Board held on the seventh day of September 2004 by the following vote:

AYES:	Directors Baker, Fraites, Petterle, Rodoni and Schoonover
NOES:	None
ABSENT:	None
ABSTAINED:	None

Joyce S. Arnold, Secretary
North Marin Water District

(SEAL)

RESOLUTION 04-36

OF THE BOARD OF DIRECTORS OF NORTH MARIN WATER DISTRICT ADOPTING A CEQA MITIGATED NEGATIVE DECLARATION FOR USE OF COPPER TO CONTROL AQUATIC WEEDS IN STAFFORD LAKE

The Board of Directors of North Marin Water District finds and states as follows:

WHEREAS, The North Marin Water District (herein referred to as the District) proposes to apply copper to Stafford Lake to control a variety of aquatic weeds for purposes of maintaining adequate water conveyance capacity and drinking water quality (the "Project");

WHEREAS, pursuant to the California Environmental Quality Act (CEQA) guidelines, the District has prepared a CEQA Initial Study and Mitigated Negative Declaration for the Project dated July 23, 2004;

WHEREAS, the District's Initial Study concluded that with the implementation of mitigation measures described in the initial study, the project will not have a significant effect on the environment;

WHEREAS, the District therefore has proposed to adopt a CEQA Mitigated Negative Declaration for the Project;

WHEREAS, pursuant to CEQA guidelines, the District has circulated for public review and comment a Notice of Intent to Adopt the Mitigated Negative Declaration and the Initial Study;

WHEREAS, the District has not received any public comments concerning the Mitigated Negative Declaration and the Initial Study; and therefore has not had to respond in kind;

WHEREAS, the District General Manager has recommended that the District Board of Directors adopt the Mitigated Negative Declaration and authorize the filing of a CEQA Notice of Determination;

NOW, THEREFORE BE IT RESOLVED by the Board of Directors of the North Marin Water District as follows:

1) **Mitigated Negative Declaration.** The District hereby adopts this Mitigated Negative Declaration for the Project pursuant to CEQA.

2) **Findings.** The Board has reviewed the proposed project, Initial Study, Mitigated Negative Declaration, public comments received, and other information provided by District staff. On the basis of this information and the whole record before the District, the Board hereby finds and determines as follows:

   a. The Initial Study and Mitigated Negative Declaration reflect the District's independent judgment and analysis;

   b. Although the project could have a significant effect on the environment, without mitigation, there will not be a significant effect because the District has put appropriate mitigation measures in place; and

   c. There is no substantial evidence, in light of the whole record in front of the District, that the Project may have a significant effect on the environment.

3) **Location and Custodian of Documents.** The Mitigated Negative Declaration, the Initial Study, Notice of Intent to Adopt the Initial Study are on file at the District office located at 999 Rush Creek Place in Novato, CA. The General Manager at this address is the custodian of these documents that constitute the record of proceedings upon which the decision in this matter is based.

NOTICE OF INTENT

To Adopt a Mitigated Negative Declaration for the
North Marin Water District

Use of Copper to Control Aquatic Weeds In Stafford Lake

The North Marin Water District (NMWD) is proposing to continue to use copper-based aquatic pesticides to control aquatic weeds in Stafford Lake.

The proposed project would include the following elements:

- Application of copper-based aquatic pesticides; and
- Monitoring and reporting to the State Water Resource Control Board (SWRCB) and the Regional Water Quality Control Board (RWQCB)

To comply with the requirements of the California Environmental Quality Act (CEQA), NMWD authorized Blankinship & Associates, Inc. to prepare an Initial Study for the proposed project. The Initial Study includes an environmental checklist that evaluates the potential environmental impacts of the proposed project. Based on the results of the Initial Study, NMWD has determined that the proposed project can be carried out without significant impacts on the environment. Therefore, NMWD proposes to adopt a Mitigated Negative Declaration in order to meet its obligation under CEQA.

Prior to taking final action on the proposed Mitigated Negative Declaration, NMWD will consider public comments on the Initial Study and proposed Mitigated Negative Declaration. All interested parties are invited to submit written comments to:

Mike McMaster
North Marin Water District
PO Box 146
Novato, CA 94948-0146

The Initial Study and proposed Mitigated Negative Declaration are available for public review at the District's Office located at 999 Rush Creek Place in Novato, California during normal working hours (8:00 a.m. to 5:00 p.m). The public review period begins on July 29, 2004, and ends on August 30, 2004. All written comments must be received by 5:00 p.m. on August 30, 2004.

A public hearing on the proposed Negative Declaration will be held during a NMWD Board Meeting on September 7, 2004 at 7:30 PM at the District's Office located at 999 Rush Creek Place Novato, California. After consideration of all comments, the NMWD Board of Directors will either certify or reject the proposed Mitigated Negative Declaration.

Notice of Determination

To: Marin County Clerk
3501 Civic Center Dr., Rm 247
San Rafael, CA 94903

Public Clearinghouse
P.O. Box 3044
Sacramento, CA 95814-3044

From: North Marin Water District
999 Rush Creek Place
Novato, CA 94945

Subject: FILING OF NOTICE OF DETERMINATION IN COMPLIANCE WITH SECTION 21108 OF THE PUBLIC RESOURCES CODE

Project Title: Use of Copper to Control Aquatic Weeds in Lake Stafford

Contact Person: Michael McMaster, 415-897-4133

A copy of the Mitigated Negative Declaration adopted for this project and related documents are available for public examination at the District office at the above address and telephone number.

- Project Location: within Marin County, California
- Project Description: The use of acrolein and/or copper to treat algae and aquatic weeds in water conveyances, including irrigation canals and ditches. The North Marin Water District has prepared the Initial Study/Mitigated Negative Declaration to meet requirements of 1) The State Implementation Plan (SIP) Section 5.3 and 2) NPDES Permit #CAG990005

Determination: This notice is to advise that North Marin Water District approved the above-described project on September 7, 2004, and has made the following determinations:

1. The project ☐ will have a significant effect on the environment.
   ☒ 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 Mitigated 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 this project.
4. A statement of Overriding Considerations ☐ was, ☒ was not, adopted for this project.
5. California State Department of Fish & Game fees (AB 3158)
   a) ☐ The project has been found to be de minimis thus not subject to the provisions of AB 3158
   b) ☒ The project is not de minimis and is, therefore, subject to the following fees:
      ☒ $1,250 for review of a Negative Declaration
      ☐ $850 for review of an Environmental Impact Report
      ☒ $25 for County Fish and Game administrative fee

Michael C. McMaster

Michael McMaster,
Operations Superintendent
North Marin Water District

September 15, 2004
Date

State Implementation Plan (SIP) Section 5.3 Exception Information Sheet

The Control of Aquatic Weeds in Stafford Lake Using Copper

North Marin Water District

September 8, 2004

1. **Notification.** North Marin Water District (District) will notify potentially effected public and governmental agencies of the project. The project is described in the District's Initial Study/Mitigated Negative Declaration (IS/MND) dated August 31, 2004.
2. **Description of the Proposed Action.** The proposed action is the application of copper aquatic pesticides to Stafford Lake for the purposes of controlling weeds and algae. For a more detailed description, see the District's aforementioned IS/MND.
3. **Method of Completing the Action.** The action (the application of copper aquatic pesticides) will be completed according to the copper product's label directions. Refer to the aforementioned IS/MND.
4. **Schedule.** The schedule for the action will be according to Integrated Pest Management (IPM) principles. For example, the application of aquatic pesticides will be done at times and frequencies when the concentration of weeds equals or exceeds thresholds established by the District.
5. **Discharge and Receiving Water Quality Monitoring Plan.** The District has prepared and will use an Aquatic Pesticide Application Plan (APAP) as required in the Statewide General NPDES Permit for the Discharge of Aquatic Pesticides for Aquatic Weed Control In Waters of the United States (No. CAG 99005). The APAP describes in detail the requirements for sampling, analysis, and reporting before, during, and after the project. Further, the APAP contains a Quality Assurance Project Plan (QAPP) that describes in detail the quality assurance and quality control procedures used for the project.
6. **Contingency Plans.** In the event that the District cannot use the SIP exception regarding the use of copper to control aquatic weeds, manual control and/or aeration may be an option in some areas.
7. **Identification of Alternate Water Supply.** Stafford Lake provides only 20% of Novato's water supply. The majority (80%) of its supply is from Sonoma County Water Agency (SCWA) who collects the water from Raney Collectors (specialized riverside filtration systems) adjacent to the Russian River. Both sources of water are needed for the City of Novato during the summer months in order to allow for the recapture of water storage and keep up with peak water demands.
8. **Residual Waste Disposal Plans.** The District's use of copper to control aquatic weeds does not create residual waste.
9. **Certification by a Qualified Biologist.** At the completion of the project, the District will provide certification by a qualified biologist that the receiving water beneficial uses have been maintained. Post-project certification will take into account natural variations in project site conditions and the influence these conditions have on beneficial uses.