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AUG 15 2014
DIVISION OF WATER QUALITY

Attachment E – Notice of Intent

WATER QUALITY ORDER NO. 2013-0002-DWQ
GENERAL PERMIT NO. CAG990005

STATEWIDE GENERAL NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT FOR RESIDUAL AQUATIC PESTICIDE DISCHARGES TO WATERS OF THE UNITED STATES FROM ALGAE AND AQUATIC WEED CONTROL APPLICATIONS

I. NOTICE OF INTENT STATUS (see Instructions)

Mark only one item A. New Applicator B. Change of Information: WDID# Enrollee # 4 19AP00002
Regulatory measure # 396934
C. ☐ Change of ownership or responsibility: WDID# _____

II. DISCHARGER INFORMATION

A. Name Clean Lakes, Inc.			
B. Mailing Address 31320 Via Colinas, # 114			
C. City Westlake Village	D. County Los Angeles	E. State CA	F. Zip 91362
G. Contact Person Thomas Moorhouse	H. E-mail address tmoorhouse@cleanlake.com	I. Title	J. Phone 818-201-5982

III. BILLING ADDRESS (Enter Information *only* if different from Section II above)

A. Name			
B. Mailing Address			
C. City	D. County	E. State	F. Zip
G. E-mail address	H. Title	I. Phone	

IV. RECEIVING WATER INFORMATION

A. Algaecide and aquatic herbicides are used to treat (check all that apply):

1. ☐ Canals, ditches, or other constructed conveyance facilities owned and controlled by Discharger.
   Name of the conveyance system: _____
2. ☐ Canals, ditches, or other constructed conveyance facilities owned and controlled by an entity other than the Discharger.
   Owner's name: _____
   Name of the conveyance system: _____
3. XXX Directly to river, lake, creek, stream, bay, ocean, etc.
   Name of water body: Lake Machado - Ken Malloy Harbor Regional Park, City of Los Angeles Department of Parks and Recreation

B. Regional Water Quality Control Board(s) where treatment areas are located (REGION 1, 2, 3, 4, 5, 6, 7, 8, or 9): Region 4
(List all regions where algaecide and aquatic herbicide application is proposed.)

V. ALGAECIDE AND AQUATIC HERBICIDE APPLICATION INFORMATION

A. Target Organisms: ____ Various Cyanobacteria, planktonic alage (Blue Green Algae)

B. Algaecide and Aquatic Herbicide Used: List Name and Active ingredients

Active ingredient - triclopyr, glyphosate and/or imazamox (Renovate3, AquaMaster, Clearcast or equivalents) and Hydrogen dioxide/peroxyacetic acid (GreenClean)

C. Period of Application: Start Date August 15, 2014 End Date through life of project or life of permit

D. Types of Adjuvants Used: None

VI. AQUATIC PESTICIDE APPLICATION PLAN

Has an Aquatic Pesticide Application Plan been prepared and is the applicator familiar with its contents?
☒ Yes ☐ No

If not, when will it be prepared? _____

VII. NOTIFICATION

Have potentially affected public and governmental agencies been notified? ☐ Yes ☒ No*
* Potentially impacted agency is the LA County Flood Control District who will be notified in advance of treatment.

VIII. FEE

Have you included payment of the filing fee (for first-time enrollees only) with this submittal?
☐ YES ☒ NO ☐ NA Fee paid previously

IX. CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment. Additionally, I certify that the provisions of the General Permit, including developing and implementing a monitoring program, will be complied with."

A. Printed Name: ~~Thom~~as Moorhouse

B. Signature: _____ **Date:** August 15, 2014

C. Title: Vice President

XI. FOR STATE WATER BOARD STAFF USE ONLY

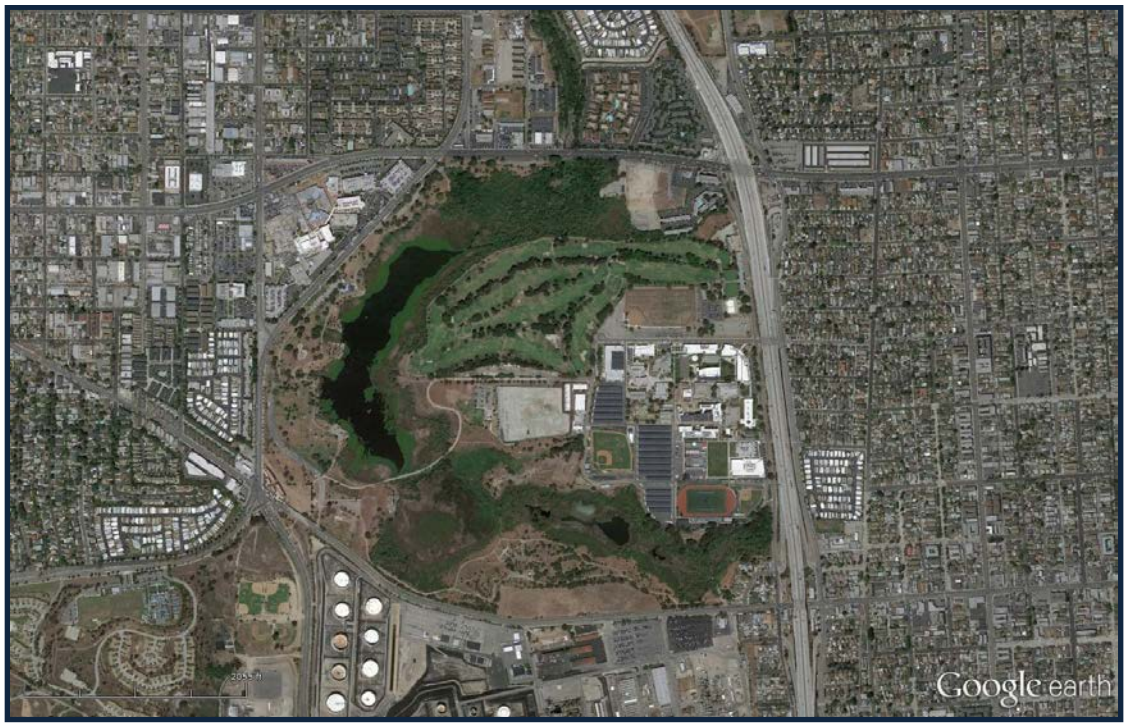
WDID:	**Date NOI Received:**	**Date NOI Processed:**
Case Handler's Initial:	**Fee Amount Received:** **$**	**Check #:**
☐ **Lyris List Notification of Posting of APAP**	**Date** _____	**Confirmation Sent** _____

CLEAN LAKES INC.

AQUATIC PESTICIDE APPLICATION PLAN (APAP)

For

Machado Lake



Prepared By

CLEAN LAKES INC.
31320 Via Colinas, # 114
Westlake Village, CA 91362
www.cleanlake.com

Prepared For

OHL USA,
1920 Main Street, Suite 310, Irvine, CA 92614
and
City of Los Angeles, Department of Recreation and Parks,
221 N. Figueroa Street, Suite 1550, Los Angeles, CA 90012

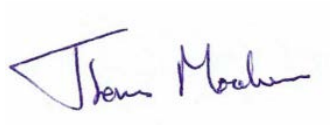
June 2014, Amended August 2014

Purpose: To meet the requirements and ensure compliance with Water Quality Order No. 2013-0002-DWQ, Statewide General National Pollutant Discharge Elimination System Permit for Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications, General Permit No. CAG990005, adopted by the State Water Resource Control Board on March 5, 2013

CERTIFICATION

In accordance with Attachment B, Section V.B.1. Standard Provisions – Reporting, Signatory and Certification Requirements, Water Quality Order No. 2013-0002-DWQ Statewide General National Pollutant Discharge Elimination System Permit for Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications, General Permit No. CAG 990005:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." (40 C.F.R. § 122.22(d).)



6/20/14, updated 8/15/14

Thomas G. Moorhouse
Vice President
Clean Lakes, Inc.
31320 Via Colinas, # 114
Westlake Village, CA 91362

Date

Contents

BACKGROUND INFORMATION

This Aquatic Pesticide Application Plan (APAP) is a comprehensive plan developed by the discharger to comply with the provisions of Water Quality Order No. 2013-0002-DWQ, Statewide General National Pollutant Discharge Elimination System Permit for Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications, General Permit No. CAG990005, adopted by the State Water Resource Control Board on March 5, 2013.

This Aquatic Pesticide Application Plan (APAP) describes the project site, aquatic plant and algae nuisances, aquatic pesticide or algaecide products expected to be used, the monitoring program, and Best Management Practices to be followed, as well as the other conditions addressed in the General Permit, Section VIII C, Aquatic Pesticide Use Requirements, Aquatic Pesticide Application Plan.

The use of aquatic herbicides and algaecides within Machado Lake's Aquatic Vegetation Control Program is necessary for the project goal of eradicating water primrose (*Ludwigia spp.*) s and for management of cyanobacteria or planktonic algae blooms in support of a large scale lake restoration effort being implemented by OHL, USA, the Project Manager, under contract with the City of Los Angeles. Clean Lakes, Inc. has been subcontracted by OHL, USA for the preparation of this APAP and aquatic herbicide and algaecide applications. Eradication of water primrose is designed to support vector control activities as well as to maintain beneficial uses that include water quality, recreation, aesthetics, and fishing. The Aquatic Vegetation Control Program is an undertaking necessary to control a specific type of aquatic vegetation and cyanobacteria that has become a nuisance to the management of the water body and is impacting its health and beneficial uses. The need for aquatic pesticide application as part of this lake restoration program will vary from week to week, season to season, and year to year due to such things as water temperature, sunlight, nutrient levels, plant and alage growth, construction activities and schedule, and other factors. This APAP, per the General Permit requirements described below, provides the outline to ensure that the Aquatic Vegetation Control Program is successful.

PERMIT COVERAGE: The General Permit (No. CAG990005) addresses the discharge of aquatic pesticide residues related to the application of 2,4-D, acrolein, copper, diquat, endothall, fluridone, imazapyr, glyphosate, sodium carbonate peroxyhydrate, triclopyr-based algaecides and aquatic pesticides, and adjuvants containing ingredients represented by the surrogate nonylphenol. Aquatic pesticides that are applied to application areas within waters of the United States in accordance with FIFRA label requirements and Use Permit restrictions are not considered pollutants. However, residues associated with aquatic pesticide application require coverage under the General Permit. These include over-applied or misdirected pesticide products and pesticide residues. Residues are any pesticide byproduct, or breakdown product, or pesticide product that is present after the use of the pesticide to kill or control the target weed.

The General Permit does not cover agricultural storm water discharges or return flows from irrigated agriculture because these discharges are not defined as "point sources" and do not require coverage under an NPDES permit. The General Permit also does not cover other indirect or non point source discharges from applications of pesticides, including discharges of pesticides to land that may be conveyed in storm water or irrigation runoff. The General Permit does not cover the discharge of pollutants related to applications of pesticides other than 2,4-D, acrolein, copper, diquat, endothall, fluridone, imazapyr, glyphosate, sodium carbonate peroxyhydrate, triclopyr - based algaecides and aquatic pesticides, and adjuvants containing ingredients represented by the surrogate nonylphenol based pesticides; however, the General Permit includes a re-opener statement specifying that the permit may be reopened for the specific purpose of modifying the list of pesticides whose associated discharge is authorized by this General Permit.

WATERS OF THE UNITED STATES: The General Permit regulates the discharge of residues associated with the application of aquatic pesticides to waters of the United States. "Waters of the United States" are defined by the General Permit as follows:

> 1. All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

2. All interstate waters, including interstate “wetlands”;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sand flats, “wetlands,” sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:
    a. Which are or could be used by interstate or foreign travelers for recreational or other purposes;
    b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    c. Which are used or could be used for industrial purposes by industries in interstate commerce.
4. All impoundments of waters otherwise defined as waters of the United States under this definition;
5. Tributaries of waters identified in items 1 through 4 of this definition;
6. The territorial sea; and
7. "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (1) through (6) of this definition. Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 C.F.R. section 423.11(m) which also meet the criteria of this definition) are not waters of the United States. This exclusion applies only to manmade bodies of water which neither were originally created in waters of the United States (such as disposal area in wetlands) nor resulted from the impoundment of waters of the United States [See Note 1 of this Section.] Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with U.S. EPA.

WATER QUALITY STANDARDS: The Clean Water Act (CWA) defines Water Quality Standards as “Provisions of state or federal law which consist of designated uses for the waters of the United States, water quality criteria for waters based upon such uses, and antidegradation policies. Water quality standards are to protect the public health or welfare, enhance the quality of water and serve the purposes of the Act.” [40 Code of Federal Regulations (CFR) section 131.3(i)].

In California, *Water Quality Control Plans* designate the beneficial uses of waters of the State and water quality objectives (WQOs) to protect those uses. The *Water Quality Control Plans* are adopted by the State and Regional Boards through a formal administrative rulemaking process, and, upon approval by USEPA, the WQOs for waters

of the United States (generally surface waters) become State water quality standards. USEPA has established water quality criteria in California for priority pollutants in the National Toxics Rule and the California Toxics Rule (CTR). The CTR criteria are also water quality standards.

EFFLUENT LIMITATIONS: NPDES permits for discharges to surface waters must meet all applicable provisions of sections 301 and 402 of the CWA. These provisions require controls that utilize best available technology economically achievable (BAT), best conventional pollutant control technology (BCT), and any more stringent controls necessary to reduce pollutant discharge and meet water quality standards.

Title 40, CFR section 122.44 states that if a discharge causes, has the reasonable potential to cause, or contributes to an excursion (Reasonable Potential) of a numeric or narrative water quality criterion, the permitting authority must develop effluent limits as necessary to meet water quality standards. Title 40, CFR section 122.44(k)(3) allows these effluent limits to be requirements to implement BMPs if numeric effluent limits are infeasible. It is infeasible for the State Board to establish numeric effluent limitations in this General Permit, because the application of aquatic pesticides is not necessarily considered a discharge of pollutants according to the Talent decision. The regulated discharge is the discharge of residues associated with the application of aquatic pesticides. These include over-applied and misdirected pesticide product and pesticide residue. At what point the pesticide becomes a residue is not precisely known and varies depending on such things as target weed, water chemistry, and flow. Therefore, the effluent limitations contained in the General Permit are narrative and include requirements to develop and implement this APAP that describes appropriate BMPs, including compliance with all pesticide label instructions, and to comply with receiving water limitations.

The BMPs required herein constitute BAT and BCT and will be implemented to minimize the area and duration of impacts caused by the discharge of aquatic pesticides in the treatment area, and to allow for the restoration of water quality and protection of

beneficial uses of the receiving waters to pre-application quality following completion of a treatment event.

Once an aquatic pesticide has been applied to an application area, the pesticide product can actively treat the target species within the treatment area. During the treatment event, the aquatic pesticide is at a sufficient concentration to actively kill or control the target weeds plants or algae. When active ingredient concentrations are below this effective concentration, the aquatic pesticide becomes a residue. The minimum effective concentration, and the time required to reach it, vary due to site specific conditions, such as flow, target species, and water chemistry. The Receiving Water Limitations require that an application event does not result in an exceedence of water quality standards in the receiving water. The receiving water includes:

- Anywhere outside of the treatment area at any time, and
- Anywhere inside the treatment area after completion of the treatment event.

In recognition of the variability in the temporal extent of a treatment event, the General Permit does not require it to be discretely defined. Instead, post-event monitoring of the water is required no more than a week from the time of aquatic pesticide application.

Receiving water limitations are provided in the General Permit and are provided as follows: The instantaneous maximum receiving water limitations are based on promulgated water quality criteria such as those provided in the CTR, water quality objectives adopted by the State and Regional Water Boards in their Basin Plans, water quality criteria adopted by the California Department of Fish and Wildlife, water quality standards such as drinking water standards adopted by U.S. EPA or the California Department of Public Health (CDPH), or the U.S. EPA's National Recommended Ambient Water Quality Criteria.

This General Permit provides receiving water limitations based on the lowest water quality criteria/objectives to protect all designated beneficial uses of the receiving water. The receiving water limitations in this General Permit are similar as those in Order No.

2004-0009-DWQ, with the exception of copper, which has an updated formula to calculate copper exceedence limits based on the CTR.

The rationale for each limitation is summarized in the table below:

Constituent/ Parameter	BENEFICIAL USE[1]				Basis
	MUN, µg/L	WARM or COLD, µg/L	Other than MUN, WARM, or COLD, µg/L	All Designations	
2,4,-D	70				U.S. EPA MCL
Acrolein[2]	320	21	780		U.S. EPA Water Quality Criteria, 1986.
Copper[2]				Dissolved Freshwater[3] Copper Chronic = 0.960exp{0.8545 [ln(hardness[4])] – 1.702}[5, 6] Dissolved saltwater[3] Copper Chronic = 0.83exp{0.8545 [ln(hardness[4])] – 1.702}[5,6]	California Toxics Rule
Diquat	20				U.S. EPA MCL
Endothall	100				U.S. EPA MCL
Fluridone	560				U.S. EPA Integrated Risk Information System
Glyphosate	700				U.S. EPA MCL
Nonylphenol				Freshwater Chronic Criterion = 6.6 µg/L Saltwater Chronic Criterion = 1.7 µg/L	U.S. EPA National Recommended Ambient Water Quality Criteria
Toxicity	Algaecide and aquatic herbicide applications shall not cause or contribute to toxicity in receiving water(s).				Regional Water Boards' Basin Plans

Notes:

1. See Regional Water Boards' Water Quality Control Plans (Basin Plans) for beneficial use definitions.
2. Public entities and mutual water companies listed in Attachment G are not required to meet this receiving water limitation during the exception period described in Section VIII.C.10, Limitations
3. For waters in which the salinity is equal to or less than 1 part per thousand 95% or more of the time, the freshwater criteria apply. For waters in which the salinity is equal to or greater than 10 parts per thousand 95% or more of the time, saltwater criteria apply. For waters in which the salinity is between 1 and 10 parts per thousand, the applicable criteria are the more stringent of the freshwater or saltwater criteria.
4. For freshwater aquatic life criteria, waters with a hardness 400 mg/L or less as calcium carbonate, the actual ambient hardness of surface water shall be used. For waters with a hardness of over 400 mg/L as calcium carbonate, a hardness of 400 mg/L as calcium carbonate shall be used with a default Water-Effect Ratio of 1.
5. Values should be rounded to two significant figures.
6. This limitation does not apply to the Sacramento River and its tributaries above the State Highway 32 Bridge at Hamilton City. See Table III – 1 of the Basin Plan for the Sacramento and San Joaquin River Basins for copper limitation.

In the absence of Receiving Water Limitations, the Receiving Water Monitoring Triggers shown in Table 4 below will be used to assess compliance with the narrative receiving water toxicity limitation. However, exceeding the monitoring trigger does not constitute a violation of this General Permit as long as the Discharger performs the following actions: (1) initiates additional investigations for the cause of the exceedance; (2) implements additional BMPs to reduce the algaecide and aquatic herbicide residue concentration to be below the monitoring triggers in future applications; and (3) evaluates the appropriateness of using alternative products.

Table 4. Receiving Water Monitoring Triggers

Ingredient	Unit	Instantaneous Maximum Monitoring Trigger	Basis
Imazapyr	mg/L	11.2	U.S. EPA Office of Pesticides *Ecotoxicity Database*
Triclopyr Triethylamine	mg/L	13.0	U.S. EPA Office of Pesticides *Ecotoxicity Database*

MONITORING REQUIREMENTS: The General Permit requires dischargers to comply with the Monitoring and Reporting Program (MRP). The goals of the MRP are to:

1. Identify and characterize algaecide or aquatic herbicide application projects conducted by the Discharger;
2. Determine compliance with the receiving water limitations and other requirements specified in this General Permit;
3. Measure and improve the effectiveness of the APAP;
4. Support the development, implementation, and effectiveness of BMPs;
5. Assess the chemical, physical, and biological impacts on receiving waters resulting from algaecide or aquatic herbicide applications;
6. Assess the overall health and evaluate long-term trends in receiving water quality;
7. Demonstrate that water quality of the receiving waters following completion of resource or weed management projects are equivalent to pre-application conditions; and
8. Ensure that projects that are monitored are representative of all algaecide or aquatic herbicide (treatments) and application methods used by the Discharger.

This APAP was prepared to address the above requirements and those detailed in the General Permit.

DESCRIPTION OF THE WATER SYSTEM

Machado Lake is located in the community of Harbor City within Los Angeles, CA. Machado Lake lies within the Ken Malloy Harbor Regional Park managed by the City of Los Angeles Department of Recreation and Parks. The source of Machado Lake water is the Wilmington Drain, a channelized stream that conveys urban runoff and stormwater

flows to Machado Lake and ultimately the Los Angeles Harbor. The lake is approximately forty (40) surface acres in size with an average depth of approximately four (4) foot containing approximately 160 acre feet of water. Water flowing over the low water bridge/dam during part of the year discharges into a swampy area of the park to the southeast. A storm drain at the southeast end of the park conveys water from this swampy area through a storm water tunnel to the Los Angeles Harbor. The climate is typical of the southern California coastal region with wide swings in temperature during the same day with a winter rainy season that typically extends from about November through March.

DESCRIPTION OF THE TREATMENT AREA

Based on vegetation growth conditions, shallow parts of the lake system where water primrose typically grows will require aquatic herbicide treatment and re-treatment to achieve the goal of eradication. Cyanobacteria or Blue Green Algae blooms typically occur lake wide. The aquatic vegetation and cyanobacteria growth will require treatments during the year when algae and plants are actively growing, in coordination with construction activities, and also in consideration of waterfowl use patterns.

Machado Lake was originally a natural lake that is now impounded by a low water bridge/dam. The low water bridge/dam does not contain a discharge valve.

APPLICATION SCHEDULE

Clean Lakes, Inc. will carry out algae and aquatic herbicide application to cyanobacteria and water primrose and will provide a phone number or other specific contact information to all persons who request the application schedule and will inform the requester if the schedule is subject to change. The application schedule will be dependent upon cyanobacteria and water primrose growth; waterfowl use patterns, and construction activities managed by OHL USA.

PUBLIC NOTICE REQUIREMENTS

Every calendar year at least 15 days prior to the first application of algaecide or aquatic herbicide, Clean Lakes, Inc. will notify potentially affected public agencies. The notification will include all of the information outlined in Section VIII. B.

DESCRIPTION OF THE TYPES OF AQUATIC WEEDS AND ALGAE TO BE CONTROLLED:

There are three basic types of aquatic plants known to occupy southern California lakes; Free Floating, Submerged, and Emergent. This aquatic plant control project is concerned solely with water primrose, an emergent aquatic plant that causes nuisances to Machado Lake (see pictures below).

Cyanobacteria, or Blue Green Algae, which constitute a variety of species including *Anabaena, Aphanizomenon, Cylindrospermopsis* and others, will be target for control when causing nuisance conditions or odors. Attempts will be made to carry out treatment prior to severe conditions developing.

AQUATIC PESTICIDES AND ADJUVANTS EXPECTED TO BE USED AND APPLICATION METHODS

Provided in the table below are those aquatic herbicides that may be used in the water primrose control program for Machado Lake. The need for treatments is based on physical inspections, potential and existing impacts, plant growth stage, planned construction activities, and other relevant factors.

	Water Use Restrictions			
Herbicide* Algaecide*	***Days for Swimming***	***Days for Fish Consumption***	***Days for Irrigation of Turf/Food Crops***	***Degradation Byproducts***
Renovate 3 or equivalent (triclopyr 31.8%)	0	0	120	Oxamic acid
Aquamaster, **Rodeo or equivalent** (*glyphosate, 53.8%)*	0	0	0	Aminomethylphosphonic acid (AMPA)
Clearcast or equivalent (Imazamox 12.1%)	0	0	24 hours and/or until < 50ppb	nicotinic acid and di- and tricarboxylic acids
GreenClean (Hydrogen dioxide /Peroxyacetic acid)	0	0	0	None

****Refer to Product Labels and MSDS's for Further Information***

Aquatic herbicide and algaecide applications are performed utilizing Best Management Practices (BMP's) by licensed personnel in accordance with a Pest Control Recommendations (PCR) issued by a State of California, Department of Pesticide Regulation (DPR) Pest Control Advisor. Clean Lakes, Inc. performs aquatic plant control applications and water quality monitoring. Clean Lakes, Inc.'s application staff holds State of California, Department of Pesticide Regulation (DPR), Pest Control Advisor licenses and Qualified Applicator Licenses or Certificates. Applications are performed from a boat as surface or subsurface application based on the target species. Water primrose treatment is expected to take place as surface foliar applications by airboat due to the shallow nature of the lake. Aquatic herbicide applications are carried out using GPS technology to track treatment location, date, time and boat speed.

FACTORS INFLUENCING ALGAE AND WEED CONTROL

The decision to implement algae and aquatic vegetation control treatments is based on plant growth stage and re-evaluated during the growing season. Other factors such as construction activities, waterfowl use patterns, aesthetics, and odors, will also be considered for the Machado Lake project. A Pest Control Advisor (PCA) will review control options and based on the PCA's findings, a Pest Control Recommendation (PCR) will be developed for aquatic pesticide applications.

No plant density scale is established for this project as the goal is eradication of water primrose from the lake and applications will be coordinated with the construction project manager to achieve this goal. Cyanobacteria control will be carried out to reduce undesirable algae bloom conditions from developing or persisting. Aquatic herbicide and algaecide treatments are determined based on the following characteristics:

Site Characteristics:

- The surface area of Machado Lake is estimated to be 40 surface acres.
    - The areas that may be targeted for herbicide control with the active ingredient triclopyr or glyphosate are selected locations within the lake system (approximately 5 to 10 acres).

- The water volume of Machado Lake is approximately 160 acre feet (~40 surface acres x 4 foot average depth).
- The water volume of the area that may be targeted for submerged aquatic plant control is approximately 20 to 40 acre feet.
- The water volume of the area targeted for an planktonic algae treatment is the top three (3) acre feet of the entire lake, or approximately 120 acre feet.
- Water movement through the system includes a seasonal flow during the rainy season with daily discharge once the level rises to the low water bridge/dam, and static non flowing conditions during the summer months. No water releases are required for downstream purposes. Applications would not take place when water flows would be forecast during the winter months. In the summer months, there are no alterative water delivery methods to sustain lake water level. The Wilmington Drain is a manmade drainage channel that does deliver low volumes of urban run-off into the lake system.

MONITORING AND REPORTING PROGRAM

Monitoring Requirements: The General Permit requires that dischargers comply with the Monitoring and Reporting Program (MRP) outlined in the General Permit. The goals of the MRP are to:

1. Identify and characterize algaecide or aquatic herbicide application projects conducted by the Discharger;
2. Determine compliance with the receiving water limitations and other requirements specified in this General Permit;
3. Measure and improve the effectiveness of the APAP;
4. Support the development, implementation, and effectiveness of BMPs;
5. Assess the chemical, physical, and biological impacts on receiving waters resulting from algaecide or aquatic herbicide applications;
6. Assess the overall health and evaluate long-term trends in receiving water quality;
7. Demonstrate that water quality of the receiving waters following completion of resource or weed management projects are equivalent to pre-application conditions; and
8. Ensure that projects that are monitored are representative of all algaecide or aquatic herbicide and application methods used by the Discharger.

General Monitoring

1. Machado Lake water primrose treatments will occur as spot or shoreline treatments. Water sample locations will be established according to pre and post event monitoring schedules outlined in the General Permit. The Event Monitoring sample will be adjacent to the treatment area while the pre and post event monitoring will occur within the treatment area.
2. Aquatic herbicide application practices will be established based on the Pest Control Recommendations (PCR) from a DPR licensed Pest Control Advisor (PCA). Aquatic plant growth will be evaluated to determine the potential for creating impacts or nuisances to lake use and management prior to any treatments. The aquatic herbicide label directions are factored into treatments to determine timing and application rates. Application practices utilize the most appropriate application technique to comply with BMP's via surface or subsurface treatment methods. GIS and GPS technology allow a high level of precision when calculating area and for guiding treatments, respectively.
3. Aquatic herbicides are registered by the US Environmental Protection Agency (USEPA) nationally, and the CA Department of Pesticide Regulation (CADPR) within California. Manufacturers of products must provide information to the USEPA for registration or re-registration purposes that includes information with regard to transport, environmental fate and effects of algaecides and aquatic herbicides. Algaecides and aquatic herbicides that may be used in Machado Lake are registered for use by both the USEPA and the CADPR. Detailed information about transport, fate and effects of aquatic herbicides are addressed in USEPA's Re-registration Eligibility Decisions (RED) or State prepared documents for each of the active ingredients, as follows:
    - Triclopyr (Renovate 3 and equivalents) http://www.epa.gov/oppsrrd1/REDs/2710red.pdf
    - Glyphosate (Aquamaster and equivalents): http://www.epa.gov/oppsrrd1/REDs/old_reds/glyphosate.pdf
    - Imazamox (Clearcast and equivalents) http://dnr.wi.gov/lakes/plants/factsheets/imazamoxfactsheet.pdf

- Hydrogen dioxide/Peroxyacetic acid (GreenClean) http://www.epa.gov/pesticides/chem_search/reg_actions/registration/decision_PC-128860_16-Sep-02.pdf

4. Cumulative and indirect effects of aquatic herbicides are discussed in USEPA Re-registration Eligibility Documents (RED) discussed in item 3 above. No known negative impacts have been observed from algaecide or aquatic herbicide applications in other lakes in the past.
5. The potential for aquatic herbicide applications leading to designated use impacts is unlikely since DPR licensed Qualified Applicators implement the treatments based on a Pest Control Recommendation (PCR) following herbicide label directions. Misuse, over use, or use of incorrect products are not expected to occur due to the preparations and planning that take place prior to implementing a treatment.
6. No known or potential impacts from algaecide or aquatic herbicide applications on water quality are anticipated based on following herbicide label requirements, the infrequent applications that are anticipated to take place, and the short duration that aquatic herbicides are present in the water column. A Risk Assessment is provided for each of the active ingredients in the USEPA REDs discussed in Item 3 above.
7. Pre and post water quality sampling stations are sufficient to assess aquatic herbicide applications due to the small nature of the lake, the size of the treatments, and the relative ease that sample locations can be visited.
8. The monitoring plan prepared for this APAP is described below.

Receiving Water Monitoring

Treatment Maps: For each application, a treatment map will be developed with a convenient scale showing the application area, treatment area, immediately adjacent untreated areas (if entire water body is not treated), and water bodies receiving treated water. Information about surface area and/or volume of the application area, treatment area, and any other information used to calculate dosage and quantity of each pesticide used at each application site will be included with the aquatic herbicide

application monitoring log forms (see below). Sampling locations will be noted on the treatment map and global positioning systems (GPS) coordinates for each sampling site will be noted on application monitoring log forms.

Control Structure Inspections: No control system inspections will take place as no discharge valves or control structures exist at Machado Lake.

Aquatic Pesticide Monitoring Frequency: Samples will be collected from a minimum of six application events for each active ingredient. If there are less than six application events in a year, samples will be collected during each application event for each active ingredient. If the results from six consecutive sampling events show concentrations that are less than the receiving water limitation/trigger for an active ingredient, sampling shall be reduced to one application event per year for that active ingredient. If the yearly sampling event shows exceedence of the receiving water limitation/trigger for an active ingredient, then sampling shall return to six application events for that active ingredient.

Aquatic Pesticide Monitoring: The following monitoring activities will be performed for a minimum of six application events, or as many applications as occur in a year if there are less than six application events, at representative locations:

1. Background Monitoring. Background monitoring samples will be collected upstream at the time of the application event or in the application area just prior to (up to 24 hours in advance of) the application event.
2. Event Monitoring. Event monitoring samples will be collected immediately downstream of the treatment area in flowing waters or immediately outside of the treatment area in non-flowing waters immediately after the application event, but after sufficient time has elapsed that treated water would have exited the treatment area.
3. Post-Event Monitoring**.** Post-event monitoring samples will be collected within the treatment area within one week after application.

Sample Analysis: All samples requiring laboratory analyses will be collected and analyzed by a laboratory certified for such analyses by the California Department of Health Services. All analyses will be conducted in accordance with the latest edition of "Guidelines Establishing Test Procedures for Analysis of Pollutants" (Guidelines), promulgated by the U.S. Environmental Protection Agency (USEPA) (Title 40 Code of Federal Regulations part 136). Field analysis for the parameters of temperature, dissolved oxygen (DO), electrical conductivity, and pH will be performed using a Portable Multi-Parameter Meter (YSI or equivalent) with a sufficiently long probe cable, and will be maintained and calibrated at regular intervals according to the manufacturer specifications. Secchi Disk measurements will be performed using a standard Secchi disk. Water samples collected for laboratory analysis will be accompanied with a completed chain of custody form identifying the chemical constituents requiring analysis, and delivered to a State of California Certified Laboratory per the NPDES Permit requirements.

Monitoring Parameters: The following parameters will be collected or analyzed:

Sample Type	Constituent/ Parameter	Units	Sample Method	Minimum Sampling Frequency	Sample Type Requirement	Required Analytical Test Method
Visual	1. Monitoring area description (pond, lake, open waterway, channel, etc.) 2. Appearance of waterway (sheen, color, clarity, etc.) 3. Weather conditions (fog, rain, wind,	Not applicable	Visual Observation	[1]	Background, Event and Post- event Monitoring	Not applicable
Physical	1. Temperature[2]	°F	Grab[4]	[5]	Background, Event and Post- event Monitoring	[6]
	2. pH[3]	Number				
	3. Turbidity[3]	NTU				
	4. Electric Conductivity[3] @ 25°C	µmhos/cm				
Chemical	1. Active Ingredient[7]	µg/L	Grab[4]	[5]	Background, Event and Post- event Monitoring	[6]
	2. Nonylphenol[8]	µg/L				
	3. Hardness (if copper is monitored)	mg/L				
	4. Dissolved Oxygen[2]	mg/L				

1: All applications at all sites.
2: Field testing.
3: Field or laboratory testing.
4: Samples shall be collected at three feet below the surface of the water body or at mid water column depth if the depth is less than three feet.
5: Collect samples from a minimum of six application events for each active ingredient in each environmental setting (flowing water and non-flowing water) per year, except for glyphosate. If there are less than six application events in a year, collect samples during each application event for each active ingredient in each environmental setting (flowing water and non-flowing water). If the results from six consecutive sampling events show concentrations that are less than the receiving water limitation/trigger for an active ingredient in an environmental setting, sampling shall be reduced to one application event per year for that active ingredient in that environmental setting. If the yearly sampling event shows exceedence of the receiving water limitation/trigger for an active ingredient in an environmental setting, then sampling shall return to six application events for that active ingredient in each environmental setting. For glyphosate, collect samples from one application event from each environmental setting (flowing water and non-flowing water) per year.
6: Pollutants shall be analyzed using the analytical methods described in 40 C.F.R. part 136.
7: 2,4-D, acrolein, dissolved copper, diquat, endothall, fluridone, glyphosate, imazamox, imazapyr, penoxsulam, and triclopyr.
8: It is required only when a surfactant is used.

Sampling Procedures: Samples will be collected using sampling procedures which minimize loss of monitored constituents during sample collection and analysis to maintain sample integrity.

Sampling protocols: Samples will be retrieved, stored, recorded, and shipped to a third party laboratory using the following methods and precautions. Any deviation from these methods and precautions will be recorded and explained.

Materials for in field sampling:

1) New sampling bottles, one per sample with sample ID label.
2) Cooler(s) sufficient to hold ample bottles, with ice- or gel-packs
3) Plastic gloves
4) Subsurface grab sampler
5) Depth finder, marked pole, Secchi Disk (cord marked with half foot increments), or water quality monitoring probe with depth sensor.
6) Instrument(s) for measurement of temperature, pH, dissolved oxygen, hardness, electrical conductivity, depth.
7) GPS for sample location coordinates.
8) Field data sheets and clipboard
9) A clean boat and a transport vehicle

Method to collect a single sample: Samples will be simple grab samples.

1) When approaching a sampling location, care will be taken to not stir up sediments and to approach from downstream or down wind direction. If anchoring is required, lower anchor gently.
2) Immediately prior to collecting the sample, the sample bottle label details will be completed (i.e. date, time, sample collector…)
3) When taking the sample, the cap will be left on the bottle until it is at three feet of depth or at midpoint in the water column if less than three feet, per the monitoring forms outlined below.
4) Once the bottle is at the appropriate depth, the cap will be removed below the surface. Stirring of the sediments will be avoided.
5) The bottle will be rinsed with sample water and emptied twice, then filled completely
6) Once the bottle is full, it will be capped.
7) The bottle will be placed in the appropriate cooler. The bottles will be kept in contact with ice packs
8) Other water quality measurements will be taken and recorded
9) The Water Sampling Data Sheet will be filled out with information for the sample

10) In the office, the bottle will be placed into a refrigerator, unless samples are taken immediately to a laboratory.

SPECIAL NOTES:

1) For a spot treatment, a sketch map will be made showing the site of the treatment and the location of the sample relative to the treated area
2) In addition, a Global Positioning System (GPS) reading will be taken, noting the latitude and longitude in WGS 1984 datum to six decimal places and recording on the application monitoring form.

Submitting sample to lab:

1) Samples will be submitted within 48 hours of sample collection or sooner to a laboratory.
2) Samples will be packed in a cooler with ice packs between each bottle
3) Chain of Custody (COC) form will be prepared to include details on the sample bottle labels.
4) If the samples are shipped to the lab, the pick-up person will sign the COC and a copy will be made before sending out the shipment. If the samples are delivered to the lab, the delivering person will have the receiving person sign the COC form and provide a copy before turning over the shipment.

Retention of Records: Records of all monitoring information including all calibration and maintenance records, copies of all reports required by the General Permit, and records of all data used to complete the application per the General Permit will be retained. Records will be maintained for a minimum of three years from the date of the sampling event. This period may be extended during the course of any unresolved litigation regarding a discharge, or when requested by the appropriate Regional Board Executive Officer.

Monitoring Records: Records of monitoring events will include the following information:

a. The date, exact place, and time of sampling or measurements;
b. The individuals who performed the sampling or measurements;
c. The date's analyses were performed;
d. The individuals who performed the analyses;
e. The analytical techniques or method used; and
f. The results of such analyses.

The following forms will be used to collect and track information required for each treatment event as required by the General Permit:

AQUATIC WEED CONTROL
NPDES AQUATIC PESTICIDE APPLICATION LOG

Date of Application:	**Location:**	**App. Start Time:** **App. Stop Time:**
Applicator Name:	**APAP Certification:**	
Attach map showing application area, treatment area, immediately adjacent untreated area, and water bodies receiving treated water.		

Discharge Gates or Control Structures				
Name	**Date Closed**	**Time Closed**	**Date Opened**	**Time Opened**
1.				

Calculations to Determine Opening and Closures:	
2. Provide information on surface area and/or volume of application area and treatment area and other information used to calculate dosage and quantity of each pesticide used at each application site:	
2.a Application Area – Surface Area:	**2.b Application Area – Volume:**
2.c Treatment Area – Surface Area:	**2.d Treatment Area – Volume:**
2.e Dosage and Quantity Information for each pesticide used:	

Application Details					
Plot Number	**Area (ac. or sq. ft.)**	**Average Depth**	**Product**	**Product Quantity**	**Concentration or Rate**

For additional treatment areas use additional forms.

AQUATIC WEED CONTROL
NPDES RECEIVING WATER MONITORING

Visual Observation Form (Background Monitoring)

Monitoring Date:	**Location:**		**Sampled by:**
Monitoring Area Description (pond, lake, waterway, channel,…):			
Site Conditions/Appearance of Waterway			
Floating or suspended matter: **Present ☐ Absent ☐**	**Discoloration:** **Present ☐ Absent ☐**	**Bottom deposits:** **Present ☐ Absent ☐**	**Aquatic life:** **Present ☐ Absent ☐**
Visible films, sheens or coatings: **Present ☐ Absent ☐**	**Fungi, slimes, or objectionable growths:** **Present ☐ Absent ☐**		**Potential nuisance conditions:** **Present ☐ Absent ☐**
Weather conditions and other observations (fog, rain, wind, wind direction…):			

Visual Observation Form (Event Monitoring)

Monitoring Date:	**Location:**		**Sampled by:**
Monitoring Area Description (pond, lake, waterway, channel,…):			
Site Conditions/Appearance of Waterway			
Floating or suspended matter: **Present ☐ Absent ☐**	**Discoloration:** **Present ☐ Absent ☐**	**Bottom deposits:** **Present ☐ Absent ☐**	**Aquatic life:** **Present ☐ Absent ☐**
Visible films, sheens or coatings: **Present ☐ Absent ☐**	**Fungi, slimes, or objectionable growths:** **Present ☐ Absent ☐**		**Potential nuisance conditions:** **Present ☐ Absent ☐**
Weather conditions and other observations (fog, rain, wind, wind direction…):			

Visual Observation Form (Post Event Monitoring)

Monitoring Date:	**Location:**		**Sampled by:**
Monitoring Area Description (pond, lake, waterway, channel,…):			
Site Conditions/Appearance of Waterway			
Floating or suspended matter: **Present ☐ Absent ☐**	**Discoloration:** **Present ☐ Absent ☐**	**Bottom deposits:** **Present ☐ Absent ☐**	**Aquatic life:** **Present ☐ Absent ☐**
Visible films, sheens or coatings: **Present ☐ Absent ☐**	**Fungi, slimes, or objectionable growths:** **Present ☐ Absent ☐**		**Potential nuisance conditions:** **Present ☐ Absent ☐**
Weather conditions and other observations (fog, rain, wind, wind direction…):			

AQUATIC WEED CONTROL
NPDES RECEIVING WATER MONITORING

Physical and Chemical Monitoring **Location:** _____ **Sampled by:**_____

(Physical and chemical monitoring required for six (6) applications for each type of pesticide at each waterbody site. See General Permit)

1. Background Monitoring Parameters (u/s or at treatment area up to 24 hours before or at time of treatment)			**Date:**
Physical Sample Type (3 feet below water surface or mid depth if < 3 feet)	**Temperature (F)** [1]	**Turbidity (NTU)** [2]	**Electrical Conductivity (µmhos/cm)** [2]
Chemical Sample Type (3 feet below water surface or mid depth if < 3 feet)	**Active Ingredient (µg/l)**	**Nonylphenol (µg/l)** [3]	**pH** [2]
	Dissolved Oxygen (mg/L) [2]	**Hardness ($CaCO_3$)** [4]	**GPS latitude and longitude coordinates**
2. Event Monitoring Parameters (d/s or immediately adjacent to treatment area immediately after application)			**Date:**
Physical Sample Type (3 feet below water surface or mid depth if < 3 feet)	**Temperature (F)** [1]	**Turbidity (NTU)** [2]	**Electrical Conductivity (µmhos/cm)** [2]
Chemical Sample Type (3 feet below water surface or mid depth if < 3 feet)	**Active Ingredient (µg/l)**	**Nonylphenol (µg/l)** [3]	**pH** [2]
	Dissolved Oxygen (mg/L) [2]	**Hardness ($CaCO_3$)** [4]	**GPS latitude and longitude coordinates**
3. Post Event Monitoring Parameters (w/i treatment area + immediately d/s in flowing water or adjacent to treatment area w/i 1 week)			**Date:**
Physical Sample Type (3 feet below water surface or mid depth if < 3 feet)	**Temperature (F)** [1]	**Turbidity (NTU)** [2]	**Electrical Conductivity (µmhos/cm)** [2]
Chemical Sample Type (3 feet below water surface or mid depth if < 3 feet)	**Active Ingredient (µg/l)**	**Nonylphenol (µg/l)** [3]	**pH** [2]
	Dissolved Oxygen (mg/L) [2]	**Hardness ($CaCO_3$)** [4]	**GPS latitude and longitude coordinates**

[1] Field Test; [2] Field or Laboratory Test; [3] Required when nonylphenol is used; [4] Required for copper applications.

Device Calibration and Maintenance: All monitoring instruments and devices that will be used by the discharger to fulfill the prescribed monitoring program will be properly maintained and calibrated as necessary to ensure their continued accuracy.

Reporting

All reports submitted to the appropriate Regional Board Executive Officer or State Water Board Deputy Director for the Division of water Quality and will be submitted in response to the Water Quality Order will comply with the provisions stated in the Standard Provisions (Attachment B) and Monitoring and Reporting Program (Attachment C), of the General Permit. The Annual reports will contain the following information:

- An executive summary discussing compliance or violation of the General Permit, and the effectiveness of the APAP to reduce or prevent the discharge of pollutants associated with aquatic herbicide applications;
- A summary of monitoring data, including the identification of water quality improvements, or degradation as a result of the aquatic pesticide application, if appropriate, and recommendations for improvements to the APAP (including proposed best management practices (BMPs) and monitoring program based on the monitoring results). All receiving water monitoring data will be compared to receiving water limitations and receiving water monitoring triggers;
- Identification of BMPs currently in use and a discussion of their effectiveness in meeting the requirements in this General Permit;
- A discussion of BMP modifications addressing violations of this General Permit;
- A map showing the location of each treatment area;
- Types and amounts of aquatic herbicides used at each application event;

- Information on surface area and/or volume of treatment areas and any other information used to calculate dosage, concentration, and quantity of each aquatic herbicide used;
- Sampling results will indicate the name of the sampling agency or organization, detailed sampling location information (including latitude and longitude or township/range/section if available), detailed map or description of each sampling area (address, cross roads, etc.), collection date, name of constituent/parameter and the concentration detected, minimum levels, method detection limits for each constituent analysis, name or description of water body sampled, and a comparison with applicable water quality standards, and a description of the analytical QA/quality control plan. Sampling results will be tabulated so that they are readily discernible; and
- A summary of the aquatic herbicide application logs.

24 Hour Report and Five Day Reporting : The discharger and or applicator will orally report any non-compliance. This includes any unexpected or unintended effect of the use of an algaecide or aquatic herbicide that may danger health or the environment. This information will be provided orally within 24 hours from the time the discharger or applicator becomes aware o the circumstances. A written report of the non-compliance will be provided within five (5) days of the time the discharger and or applicator becomes aware of the noncompliance. The 24 hour report as well as the 5 day written report will follow the format in Attachment C.

Data Storage: All data will be recorded on supplied forms. At the end of each day, all data forms will be double copied. The original will stay in specified notebooks. The first copy will be stored in a file cabinet. The second copy will be stored and shipped with the samples.

Quality Assurance Audits and Personnel: The discharger will provide a Quality Assurance Officer and the Certified Laboratory will provide one Quality Assurance Officer. In addition, the Water Quality Control Board is welcome to provide third party validation of the sampling procedures.

Methods for Determination of Other Water Quality Parameters: Water quality parameters such as pH, dissolved oxygen, and temperature will be measured by appropriate instrumentation within the manufacturer's tolerances. These parameters will be measured at the same sites where water samples for aquatic pesticides are retrieved. These parameters will be measured at the same depths from which the water samples for aquatic pesticides are retrieved, within +/- 0.5 meters. Data and deviations will be recorded on specified forms and/or lab notebooks.

Methods for Data Summarization, Analysis, Review, and Reporting: All data will be included in the final report. The final report will also contain narrative and numerical summaries as appropriate. Final data reports will also be reviewed by a Quality Assurance Officer.

Training on Sampling Techniques: All personnel performing water sampling will have been trained before water sampling is scheduled to begin, a training session will be held reviewing sampling technique; equipment and instrument calibration, maintenance, and operation; sample storage and delivery; the proper use of COC and other forms; and other records and deviations.

DESCRIPTION OF PROCEDURES TO PREVENT SAMPLE CONTAMINATION

Measures will be taken to prevent sample collection contamination from persons, equipment and vehicles associated with aquatic herbicide applications, as follows:

- Background monitoring sample collection will be carried out prior to application equipment or algaecides/aquatic herbicides being loaded into a boat. Background monitoring sampling, as well as post event monitoring sampling (within one

week), if appropriate, sampling may be carried out from shore at a dock within the sampling areas to eliminate the potential for contamination. Sampling equipment, with particular emphasis on cooler and sample bottles, will be transported separately from algaecides or aquatic herbicides and application equipment on the day of the application event. Background monitoring will take place immediately prior to the application event.

- For event monitoring, sampling will be carried out after application equipment and all application related equipment and devices including personal protection equipment (PPE) used during the application has been removed from the boat, if no other boats are available to support sampling efforts. If there are multiple personnel supporting applications, one will be designated the sample collector while the other will be responsible for boat operation. Hands will be washed with soap and clean potable water before handling sampling equipment, cooler and sample bottle. During sample bottle handling and sample collection, disposable rubber gloves will be used to collect a water sample. The pre labeled sample bottle will be completed with time and date of sample collection immediately after removing from the sample cooler and replaced in the cooler immediately after sample collection. Once sampling has been completed, water samples will be delivered immediately to the laboratory, if possible. If background and event samples cannot be delivered the same day, sample bottles will be stored in a clean refrigerator at the office until samples can be delivered the next business day.

DESCRIPTION OF BEST MANAGEMENT PRACTICES (BMPs) TO BE IMPLEMENTED:

A variety of approaches will be utilized to minimize the impacts of aquatic pesticides used while still achieving their goals.

- Techniques that help reduce pesticide impacts include:
    - Non-pesticide control methods as outlined below (Alternatives) have been attempted or considered.

  - Pre Treatment surveys are carried out to identify potential treatment areas and timing
  - Adjustments will be made to treatment protocols based upon survey results
  - Choice of pesticides based on toxicity
  - All attempts will be made to time treatments when no water is being discharged from the lake system
  - Aquatic Pesticide use rates will be per the EPA label and will be limited to ensure compliance with Receiving Water Limitations
  - Partial waterbody treatments or split treatments will be utilized to minimize impacts that might otherwise occur

- From the aquatic herbicides available, the most effective and safest options have been selected for use in this program. The Pest Control Advisor (PCA) and herbicide application personnel (Qualified Applicators) know the strengths and weaknesses of the various available options, and take them into consideration when choosing a treatment protocol for a specific site.
- In order to avoid inadvertent or accidental soil or water contamination with aquatic pesticides, application personnel follow the storage, transport, and spill control procedures per USEPA and DPR rules, regulations and label instructions.
- Over application is avoided by following the specific product labels for the aquatic pesticides used in the program. Aquatic herbicide quantities required for each treatment are calculated at the office and only sufficient material to carry out the treatment is transported for the day's application. Application equipment is routinely cleaned and maintained, and all label directions and DPR guidelines are followed as to acceptable application methods as well as weather conditions. Surface applications are not made in winds above 10 miles per hour.
- The various BMP's being implemented ensures that the Aquatic Vegetation Control Program will meet the requirements of the general NPDES Permit for the use of aquatic pesticides.
- Licensing: All crew leaders and biologists that apply or supervise the application of aquatic pesticides are certified and or licensed by DPR.

- Notification: As detailed elsewhere in this document, whenever pesticides are used potentially affected users in the area are informed of the treatments so that means can be taken to avoid using the treated water.
- Site Evaluations: As has been detailed in this section and elsewhere, both preliminary and secondary site evaluations are a major aspect of the program, as represented by the extensive surveying carried out by the field crews.
- Alternative Treatments: Staff considers a number of potential alternative control strategies in every situation, and will make use of non-herbicide options when conditions are suitable.
- Treatment Conditions: Every application is made according to label directions and other requirements as directed by DPR or the agricultural commissioner, which not only specify the amounts and situations where pesticides may be applied, but the atmospheric and environmental conditions under which they may be applied. If there are conditions where it is determined that the treatment would be ineffective, application staff wait for other conditions or use a different treatment method.
- Post-treatment: Surveys are also carried out for post-treatment assessment of treatment efficacy and non-target impacts. Survey crews are instructed to look for possible non-target impacts that can be seen with the naked eye, such as dead fish or damage to plants on the shoreline.
- The applicator follows all pesticide label instructions and any Use Permits issued by a CAC;
- The discharger's applicator are licensed by DPR, or work with or under the supervision of someone who is licensed;
- The discharger's applicator comply with effluent limitations
- The discharger's applicator will follow this Aquatic Pesticide Application Plan (APAP);
- The discharger's applicator comply with applicable receiving water limitations; and

- The discharger's applicator will comply with the monitoring and reporting requirements outlined in this APAP.

Aquatic Pesticide Use Requirements:

- **License Requirements.** Discharger's applicators will be licensed by DPR if such licensing is required for the aquatic pesticide application project
- **Application Requirements.** The pesticide will be consistent with FIFRA pesticide label instructions and any Use Permits issued by CACs.
- **Application Schedule.** When requested, the discharger will provide a phone number to persons who request the discharger's application schedule. The discharger shall provide the requester with the most current application schedule and inform the requester if the schedule is subject to change. Information may be made available by electronic means.
- **Public Notice Requirements.** Every calendar year, at least 15 days prior to the first application of aquatic pesticides, the Discharger will notify potentially affected public agencies. The Discharger will post the notification on its website if available. The notification will include the following information:

    1. A statement of the discharger's intent to apply algaecide or aquatic herbicide(s);
    2. Name of algaecide and or aquatic herbicide to be used;
    3. Purpose of use;
    4. General time period and locations of expected use;
    5. Any water use restrictions or precautions during treatment; and
    6. A phone number that interested persons may call to obtain additional information from the Discharger.

EXAMINATION OF AQUATIC VEGETATION CONTROL ALTERNATIVES

All appropriate aquatic plant management technologies, within the context of the identified beneficial uses and impacted areas of the lake have been evaluated, and include all available cultural, biological, mechanical, and aquatic herbicide/algaecide

formulations. Aquatic weed and algae control options can be divided into four basic categories that include:

- Watershed Management
- Biological Control
- Physical and Mechanical Control
- Aquatic Herbicides and Algaecides

A discussion on each of the alternatives as well as their limitations follows:

Watershed Management and the Runoff Impacts: Watershed management is one of the most important control parameters as it deals with limiting nutrients and runoff into the lake system from the watershed. It entails implementing practices in the watershed that will support the reduction of nutrient and other pollutant runoff into the lake system. Residential and commercial development, with its increasing areas of concrete, asphalt and buildings, leaves more of the urban environment impermeable to rainwater (see table). This leads to an increasing volume of runoff water and a reduced ability for water to naturally infiltrate back into the soil. In natural areas, 10 % is runoff and 50 to 60 % is direct infiltration. In urban areas, roughly 50 to 60 % (at times up to 90 %) of all water that falls as rain runs off in urban areas; only 10 to 15% will actually infiltrate into the ground (*Runoff Coefficients for the Rational Method of Estimating Rainfall (McCuen, 1989)).*

Description of Area	Runoff Coefficients
Business	
Downtown	0.70-0.95
Neighborhood	0.50-0.70
Residential	
Single –family	0.30-0.50
Multiunit, detached	0.40-0.60
Multiunit, attached	0.60-0.75
Residential (suburban)	0.25-0.40
Apartment	0.50-0.70
Industrial	
Light	0.50-0.80
Heavy	0.60-0.90
Parks, cemeteries	0.10-0.25
Playgrounds	0.20-0.35
Railroad yard	0.20-0.35
Unimproved	0.10-0.30

It often is desirable to develop a composite runoff coefficient based on the percentage of different types of surface in the drainage area.

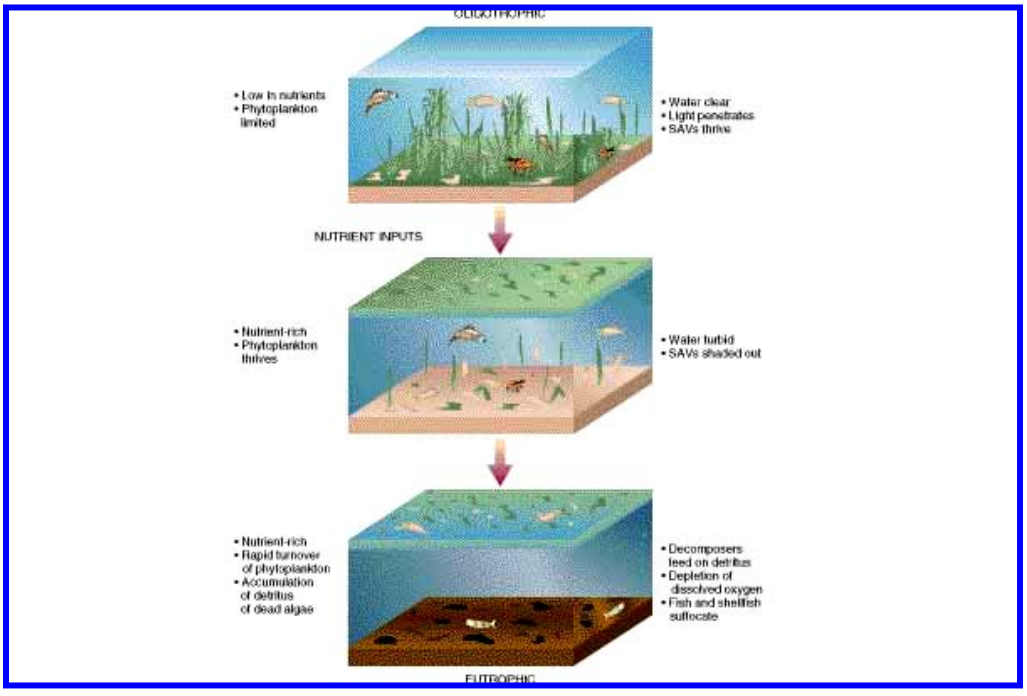
- Runoff Impacts
  - Non-point source pollution poses the most serious threat to the water quality of urban lakes.
  - Non-point pollution in runoff includes: sediments, oil, anti-freeze, road salt, pesticides, yard wastes and pet and waterfowl droppings.

- Urban runoff often contains excessive quantities of nutrients that accelerate eutrophication.

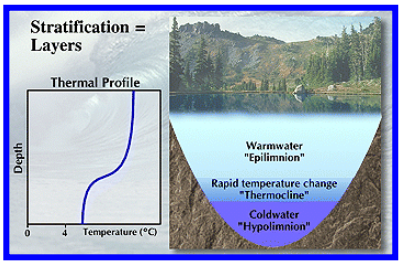
o Nutrient Effects

- Increase in algae blooms
- Odor problems
- Oxygen supply depletion
- Fish kills
- Decrease in water clarity
- Increase in the amount of rooted aquatic plants growing in the shallow near shore waters of a lake
- Reduction in the recreational value of the lake
- Hinders swimming, boating, fishing
- Reduces overall aesthetics of the lake

Eutrophication Process and Impacts:



- Impacts of Eutrophication



  - Fish kills due to low oxygen or high metals
  - Taste and odor problems, resulting in an increase in water treatment costs
  - Floating algae mats, decaying vegetation
  - Increased littoral vegetation in shallow areas
  - Mobilization of sediment bound metals and ions during anoxic conditions (e.g., copper, ammonia, iron, sulfur, phosphorus)
  - Increased temperature
  - Reduced water clarity
  - Nuisance algal blooms
  - Reduced dissolved oxygen in hypolimnion
  - Earlier onset and/or longer duration of periods of anoxia in hypolimnion

- Bacterial Contaminants: Wildlife can contribute significant amounts of fecal matter to a natural system. Estimates of microbial flora in animal feces have been summarized by Rheinheimer, (1991). Fecal Coliform (FC) and streptococci (FS) estimates for duck, mice, rabbits, and chipmunks were estimated as follows:
  - Ducks: FC = 33,000,000 FS = 54,000,000
  - Mice: FC = 330,000 FS = 7,700,000
  - Rabbits: FC = 20 FS = 47,000
  - Chipmunks: FC = 148,000 FS = 6,000,000

- Categories of management practices and remedial alternatives to protect urban lakes (http://mnlakes.org/main_dev/news/uniquechallenge.cfm)
  - Administrative alternatives: Local governmental units have jurisdiction over land use around urban lakes and can therefore play a major role in the

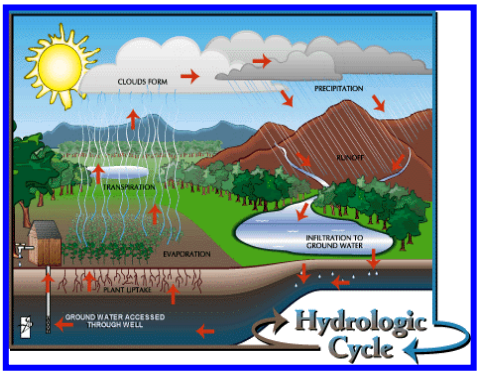
prevention of lake degradation. Several tools are available to control the use and misuse of this land including:

- Comprehensive Plans to guide long-term growth;
- Zoning Ordinances to regulate land use of private lands;
- Storm water and Surface Water Management Planning that considers data collection, land use, system site considerations, and design criteria for structures in setting goals for watershed runoff; and
- Rules for Lake Uses such as where, when and how a lake can be used recreationally to control shoreline erosion, nutrient recirculation and overuse.

o Other administrative alternatives may include the development of fertilizer, yard waste, shoreline erosion and sedimentation control management programs. Education is still probably the best way to combat urban water quality issues.

- Non-structural alternatives: Seasonal street cleaning, to capture sediments before they are conveyed through storm sewer systems to lakes, and urban best management practices, such as buffer strips around water bodies to filter out sediments and reduce nutrients, are examples of non-structural alternatives. Chemical inactivation/precipitation of in-lake phosphorus, chemical control of algae, dredging of accumulated sediments, and mechanical harvesting of aquatic vegetation are additional examples.

- Structural alternatives: Storm water detention basins and wetland treatment systems are structural alternatives that detain runoff to control peak flow rates and control downstream



flooding. They also allow pollutants to settle out of the water before reaching the lake. Diversions routing storm water away from the lake and in-lake aeration systems to oxygenate the water are other structural alternatives

Summary: Much of the problem with rural lakes in farming communities is with sediment, nutrient, and organic loading. Rural lakes can sometimes be described as having an excessive growth of weeds and algae, and watershed management techniques, or implementation of removal/inactivation methods are required to address the problem. Urban lakes can suffer similar problems due to over fertilization or turf areas, use of reclaimed water for irrigation purposes, and over abundant water fowl, for example.

- Biological Control
  - The Triploid Grass Carp is a biological control agent for aquatic plants, and is considered an attractive long-term method. The Grass Carp has been used successfully for the control of Hydrilla in the Imperial Irrigation Districts water delivery system for the past ten plus years. One of the concerning issues is the potential Grass Carps impact on native fisheries, as well as the plant species that it prefers to graze. The California Department of Fish and Game have started issuing permits for the introduction of the Grass Carp for use in lakes and ponds in California, but its benefits for water primrose control at Machado Lake are not expected to be good due to the fibery and emergent nature of this plant. It is also not clear whether the Permit has been renewed to allow introductions to continue outside the area east of the Tehachapi Mountains.

- Cultural/Physical

  - Aeration & Water Quality Alteration: Aeration or water circulation would not benefit the control of water primrose which is an emergent plant. Aeration and circulation can benefit ponds and lakes suffering from other impacts. Aeration can support reduction of planktonic algae blooms based on circulating sufficient quantities of water and achieving water quality improvements. An aeration/circulation system is palnned for installation at Machado Lake.

- Shading/Light Attenuation: A basic environmental manipulation method for aquatic plant control is light reduction or attenuation. Shading has been achieved in lakes by the application of natural and synthetic dyes. This action effectively inhibits photosynthesis in young, bottom plant growth. Aquashade, or generics are primarily effective at depths of 2 feet or greater. Inhibition of planktonic algae blooms has also been proven. Aquashade is non-corrosive and will not stain bathing suits, fountain surfaces or other water features at use dilution rates. Aquashade and or a generic lake dye would not control water primrose due to its emergent nature.

- Hand harvesting of water primrose by pulling and raking is not practical due the scale of the plant growth. Urban lakes typically require this practice as part of their operations due to low tolerance levels and typically larger quantities of manmade debris that get entangled with weeds. The harvested plant materials can be transported via specially designed barges and loaded into dumpsters for disposal, for example. Emergent vegetation growing along portions of a lake's perimeter is trimmed and hand harvested on a regular basis to keep emergent vegetation growths from having negative impacts on the beneficial uses of the system.

- Sediment Removal: Dredging is usually not performed solely for aquatic plant management, but to restore lakes that have been filled in with sediments, have excess nutrients, have inadequate hypolimnetic zones, need deepening, or require removal of toxic substances (Peterson 1982). This method is effective in that dredging typically forms an area of the lake too deep for plants to grow, thus opening an area for riparian use (Nichols 1984). By opening more diverse habitats and creating depth gradients, dredging may also create more diversity in the plant community (Nichols 1984). Dredging to deepen Machado Lake is a scheduled activity.

- Mechanical Harvesting utilizes specialized equipment that cuts and removes emergent aquatic vegetation. The Machado Lake project has and will continue to utilize a mechanical control option for water primrose removal as well as other emergent plant removal (see picture at right). The efficiency of the mechanical removal system drops considerably where shore based unloading sites are not available close by and where docks and other obstructions disrupt access. Productivity reduction is primarily related to the amount of travel time required for a mechanical unit to move between the actual harvesting areas to the shore based unloading area, and the time spent maneuvering around obstructions. When a mechanical harvesting unit is full, it transports the harvested vegetation to an onshore unloading location where it is deposited, allowed to dry and then picked up and hauled away or spread to decompose further. The disadvantages to mechanical harvesting are that the process is expensive, time consuming, and the harvested materials must typically be hauled away from the site for final disposal. As such, this equipment is only used on a limited basis.

A matrix that presents the control methods that have been reviewed for implementation at Machado Lake as follows:

Matrix of Control Options

OPTION	METHOD	PRACTICAL	RANK
Watershed Management	Structural Non Structural	Very Very	10 10
Biological Control	Grass Carp	No	0
Cultural Control	Aeration Light Limitation Benthic Barriers Draw Down Hand Harvesting Sediment Removal	Not Practical Not Practical Not Practical Not Practical Not Practical Very	0 0 0 0 0 8
Mechanical Control	Diver Dredging Harvesting Emergent Cutting	Not Practical Implemented Implemented	1 8 8
Herbicides/ Algaecides	Various	Very	8

APAP UPDATES: This APAP will be updated as the General Permit conditions change, any new algaecides or aquatic herbicides are needed for the aquatic vegetation management program, or as new control technologies are developed and become available.

END OF APAP

Attachments: Project Site Maps

References

- Water Quality Order No. 2013-0002-DWQ, General Permit No. CAG990005, Statewide General National Pollutant Discharge Elimination System Permit for Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications.

Project Site Map