



Twain Harte CSD

Aquatic Pesticide Application Plan (APAP)

For coverage under

WATER QUALITY ORDER NO. 2013-0002-DWQ

GENERAL PERMIT NO. CAG990005

STATEWIDE 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

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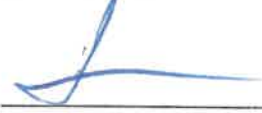
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CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direct supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated 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."

Signed and Agreed,

X  _____

Lewis Giambruno, Operations Manager, Twain Harte CSD

X  _____

James Joyce, Aquatic Biologist, SOLitude Lake Management, LLC

INTRODUCTION

In March of 2013, the State Water Resources Control Board (State Water Board) adopted the Statewide General National Pollutant Discharge Elimination System (NPDES) Permit (General Permit) for residual aquatic pesticide discharges to Waters of the United States from applications of aquatic pesticides (algaecides and aquatic herbicides) for algae and aquatic weed control. This General Permit covers only those aquatic pesticides that are currently registered with the State of California or that become registered for use in California.

To obtain permit coverage, the General Permit requires Dischargers submit to the Water Board an application consisting of a Notice of Intent (NOI) and an Aquatics Pesticide Application Plan (APAP). This application will be posted for 30 days for public review and comment. Within 90 days of the receipt of the permit application, State Water Board's Deputy Director of the Division of Water Quality (Deputy Director) will either issue a Notice of Applicability (NOA) or deny the application. The Discharger is authorized to begin discharging waters treated with aquatic pesticides starting on the date of the NOA. Alternatively, the Deputy Director may issue a Notice of Exclusion (NOE) denying the permit and justifying why the proposed Discharger is not eligible for coverage under this General Permit and stating the reason why.

The APAP describes the methods and procedures that will be used to:

- Determine the need for aquatic pesticide use;
- Evaluate and use alternatives to pesticides when feasible;
- Identify the pesticides proposed for use;
- Describe application methods and application rate determination;
- Assess treatment effectiveness;
- Describe the self-monitoring procedures and annual reporting, and;
- Generally describe how compliance with the permit requirements will be documented.

Should methods and procedures change significantly during the 5-year term of the permit (change in pesticide or quantity), Twain Harte CSD (hereby known as "CSD") will submit these proposed amendments to the APAP to the Deputy Director of the State Water Board for review and approval as required by the General Permit. Following is Twain Harte CSD's APAP for the ShadyBrook Reservoirs.

LOCATION DESCRIPTION

The Shadybrook Reservoir is located northeast of Twain Harte, California (Figure 1, Site Location). It is owned by the Twain Harte CSD (CSD), which will be responsible for maintenance. The project site is bounded on the north and west by residential development and on the south and east by private residences. The reservoirs are located in the Sullivan creek watershed and are a tributary of the Tuolumne River

The 2.15-acre managed drinking water reservoir system is made of two water bodies the upper reservoir has an approximate length of 400 feet and a width of 115 feet. The lower reservoir has an approximate length of 300 ft and a width of 170 ft. The pond slopes range from 1:2 to 1:6 with an average depth of 4.6 feet. The system has a capacity of 3.3 million gallons or approximately 10 acre-feet which is filled by surface water to maintain an elevation of 3600 feet above mean sea level. Both reservoirs are constructed with earthen dams along the southern edge that contain the water.

Surface water enters the system from an upstream control structure into the upper reservoir. From there water fills the basin until it reaches the top of the 10ft wide spillway. The spillway is a concrete channel that feeds into the lower reservoir. The lower reservoir is controlled by a 5 ft diameter culvert that drain into a creek below. Both overflows can be adjusted via a gate made of wooden planks that hold back the water and can be adjusted by a control structure.

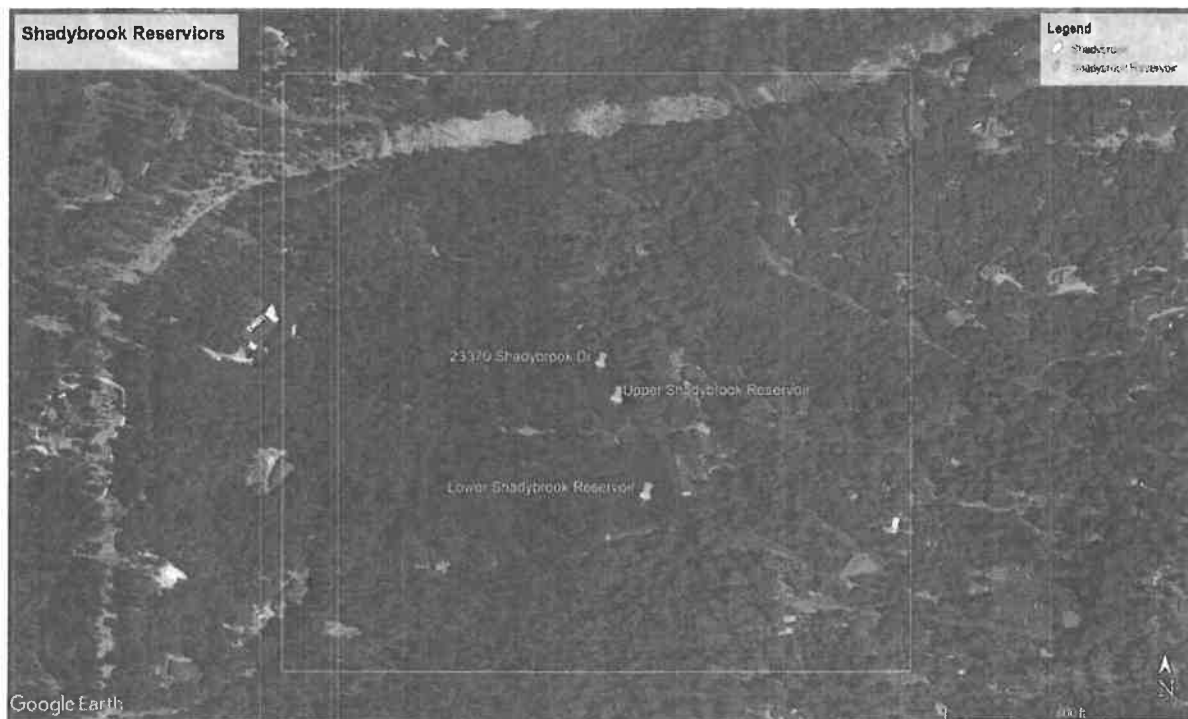


FIGURE 1: SITE LOCATION

ALGAE SUBJECT TO CONTROL

1. Planktonic Algae

Typical genera are: *Microcystis*, *Anabaena*, *Chlorella* and *Oocystis*. Microscopic plants, usually suspended in the upper few feet of water, that often reach bloom proportions. This causes the water to appear pea-soup-green or brownish. Planktonic algae are at the mercy of wave/wind action and often accumulate along windward shores. Certain genera of planktonic algae are capable of creating toxic Harmful Algal Blooms (HABs) which are detrimental towards the environment and human health.

2. Filamentous Algae

Water silk (*Spirogyra spp.*). Filamentous alga that grows rapidly in shallow, warm water. Long, unbranched filaments form huge floating, yellow-green to bright-green mats. Appears cottony but is slimy to touch. Water silk can give water a “grassy” taste.

Lyngbya (*Lyngbya wollei*) is a large-celled, filamentous, mat-forming cyanobacterium (blue-green alga). Lyngbya mats may be several inches thick and can cover large areas of the water surface or bottom sediments. Mats composed of entangled Lyngbya filaments may cover entire coves and small ponds and be several feet deep. Mats can cover and smother submersed plants, and clog water intakes. In addition, they emit a strong and unpleasant earthy or musk-like odor.

Horse hair clump (*Pithophora spp.*). Filamentous alga that grows quickly in shallow water in warm weather. Initially it grows attached, but later as dense growth occurs, gases are captured forming floating mats that resemble masses of wet wool. Strands are as narrow as a thread and coarse. The mat is yellow on the surface and dark green below.

TABLE 1. TREATMENT AREA DESCRIPTION

Water Body	Target Organism	Treatment Area
Nature Pond	Planktonic Algae	Whole Lake
	Filamentous Algae	Whole Lake

The entire waterbody, or parts of it, requires occasional to regular treatment with aquatic pesticides.

Manual removal will be employed as spot treatments where small patches of or algae can be effectively removed through the use of nets and Y-cutters. However, in large growths or infestations will require chemical treatment.

The NPDES Permit defines the “application area” as the area to which aquatic pesticides are applied, and defines “treatment area” as the area (including drift from the application area) that is treated (affected) by aquatic pesticide to control the target pest. Treatment of nuisance growth is not intended to be accomplished by employing “drift” within the water body; rather, applications are made at the point that control is desired. Therefore, the application area and treatment area are the same. “Application area” is the term used in this document. An application area may be located anywhere within the lake or ponds where an action level has been reached.

The NPDES Permit defines “application event” as the time that introduction of the aquatic pesticide to the application area takes place; that is, the time that the product is applied, not the length of time that it releases to the environment.

For the purpose of establishing the total number of application events, “application event” is further defined as a contiguous area of treatment using the same pesticide or pesticide combination. Use of a different pesticide or pesticide combination immediately adjacent to an application area is a separate application event.

AQUATIC PESTICIDES USED AND APPLICATION METHODS

The following Table 2 describes the aquatic pesticides likely to be used to control algae in the Shadybrook Reservoirs and their application methods.

Table 2. Aquatic Pesticides Expected to be Used at the Nature Pond

Active Ingredient	Degradation by-products	Application Method
Copper Formulations	Copper is an element and is not broken down like other herbicides into byproducts	Drop hose boom system/surface spray/granular spreader
Peroxyacetic Acid	Water, oxygen and carbon dioxide	Drop hose boom system/surface spray
Sodium Carbonate Peroxyhydrate	Breaks down to sodium carbonate and hydrogen peroxide in water. Hydrogen Peroxide breaks down into water and oxygen.	Granular spreader

DECISION FACTORS FOR USING AQUATIC PESTICIDES

The decision to use aquatic algaecides is based on: visual inspection of the pest species and its developmental stage, history of the pest species, water levels, short- and long-term weather forecasts, geology, topography, and tolerance. Alternative control methods are always considered when practical. This is discussed more in detail under section titled, “EXAMINATION OF POSSIBLE ALTERNATIVES”.

Nuisance conditions are established by the sensibilities of the community. Primary impacts resulting from nuisance growth include visual aesthetics, odors, mechanical system interference, and potential health human health hazards.

Nuisance conditions are defined as an accumulation of algae in the water column and mats at the surface. Growth at these levels also has potential to fragment and wash ashore to form aesthetic and odor nuisances.

Action levels are established to ensure that community values are protected while containing costs and minimizing pesticide use. The action level, or threshold, is the point in which the nuisance plant growth

cycle where a control action should be taken in order to head off a probably nuisance condition. An appropriate threshold ensures that aquatic pesticides will not be used prior to there being evidence of an impending nuisance condition, but at the same ensuring that action is taken early enough so that projected growth does not result in routine development of a nuisance condition.

GATES, CONTROL STRUCTURES AND INSPECTION SCHEDULE

At the time the inspection schedule for the gates and control structures is with the CSD.

CATEGORICAL EXCEPTION

Twain Hart CSD has not applied for a Categorical Exception per Section 5.3 of the *Policy for Implementation of Toxic Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California*.

PUBLIC NOTIFICATION OF AQUATIC PESTICIDE APPLICATIONS

The General Permit requires that every calendar year, at least 15 days prior to the first application of algaecide or aquatic herbicides, dischargers notify potentially affected public agencies. Because the Reservoirs overflows into Creek which discharges into the Phoenix Lake, notification will be given to the Tuolumne Utilities District per the permit's requirements.

The CSD will notify its community and residents of aquatic pesticide applications at the start of the application season via a posting on its website. The website posting will provide the CSD's phone number where interested residents could obtain information on application locations for a particular day. The website postings will include the following information:

- A statement of the CSD's intent to apply algaecide or aquatic herbicide(s);
- Name of algaecide and aquatic herbicide(s);
- Purpose of use;
- General time period and locations of expected use;
- Any water use restrictions or precautions during treatment; and
- A phone number that interested persons may call to obtain additional information.

The CSD will provide a phone number or other specific contact information to all persons who request the CSD's application schedule. The CSD will provide the requester with the most current application schedule and inform the requester if the schedule is subject to change.

AQUATIC PESTICIDE APPLICATION LOG

The CSD, or the CSD's contractor, will maintain a log for each application of aquatic pesticide on District property. The application log contains the following information:

- Date of application;
- Location of application;
- Name of applicator;
- Type and amount of each pesticide used;
- Application details, such as the water level, time the application started and stopped, pesticide application rate and concentration;

- Visual monitoring assessment; and
- Certification that applicator followed the APAP.

MONITORING AND REPORTING PROGRAM

The CSD’s Monitoring and Reporting Program (MRP) is structured to meet the requirements described in Attachment C of the General Permit. As such, the MRP is designed to answer two key questions.

Question No. 1: Do the residual algaecides discharge cause an exceedance of receiving water limitations?

Question No. 2: Does the discharge of residual algaecides, including active ingredients, and degradation products, in any combination cause or contribute to an exceedance of the “no toxics in toxic amount” narrative toxicity objective?

For a monitoring program to satisfactorily answer the above two questions, its sampling locations must be representative of the discharge characteristics for all treatment areas, and its sampling schedule must encompass the time periods of interest appropriate to each active ingredient in the environment to which it has been applied. Factors that can determine the answers to the questions stated above include:

- Application practices (application method and ensuring that the manufacturer’s recommended application rate of the pesticide is not exceeded);
- Transport, fate, and effects understanding for each pesticides active ingredient (copper ultimately binds to the sediment and is no longer bioavailable; sodium carbonate peroxhydrate breaks down into sodium carbonate and hydrogen peroxide which oxidizes the target pest and then breaks down into water and oxygen; fluridone photo degrades and has a half-life of 20 days in water and is rapidly adsorbed to sediment particles).

Potential Impacts. Potential adverse impacts of an aquatic pesticide are both direct and indirect. Exceedance of an active ingredient’s chronic or acute criterion for receiving water limitations is assumed to cause stress, illness, or death to sensitive aquatic biota. Copper added to a water body will cause a temporary reduction in dissolved oxygen levels in the treatment area. Treating too large a portion of a water body at one time may result in the decomposition of large amounts of aquatic plant biomass sufficient to severely lower dissolved oxygen levels and cause a fish kill. To answer Question No. 1, the following receiving water limitations, expressed as instantaneous maximum concentrations, for the active ingredients of the aquatic pesticides planned for use in Shadybrook reservoirs are shown in Table 3 below.

Table 3. Receiving Water Limitations for Pesticides used in the Nature Pond

Active Ingredient	Instantaneous Maximum Concentration ¹
Copper (dissolved)	Dissolved Freshwater ² Copper Chronic = $0.960 \exp\{0.8545 [\ln(\text{hardness}^3)] - 1.702\}^4$

1 From the General NPDES Permit Order No. 2013-0002-DWQ Section VI.A Table 3.

2 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.

3 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.

4. Values should be rounded to two significant figures.

Should the Post-Application monitoring result for the active ingredient in the aquatic pesticide be found at a concentration higher than the standard shown in Table 3, then the State Water Board and Regional Water Board will be notified by phone within 24 hours. A written report to these agencies must follow within 5 days of being aware of the “non-compliance” (criterion exceeded). More details on reporting requirements are provided in “MONITORING PROGRAM REQUIREMENTS”

The determination of an answer to Question No. 2 is based partly on the results of the general water quality parameters measured at the sampling locations at the time of the aquatic pesticide residue monitoring, plus visual observation of the surrounding aquatic conditions. The Basin Plan states that receiving waters should contain a minimum of 5 mg/L dissolved oxygen. As such, any reading less than the 5 mg/L Basin Plan objective is considered to be non-compliant with the General Permit and must be reported to regulatory agencies as described above. However, should the dissolved oxygen for the Post-Application reading be greater than the dissolved oxygen level for the Pre-Application (background) sample, then it is in compliance even though it may be less than the 5 mg/L Basin Plan objective. Otherwise this evaluation largely depends on a subjective assessment of the following (include summarized notes on water conditions in the monitoring report):

- Floating or suspended matter;
- Discoloration;
- Bottom deposits;
- Aquatic life;
- Visible films, sheens, or coatings;
- Fungi, slimes, or objectionable growths; and
- Potential nuisance conditions.

An understanding of the aquatic biota and ecosystem of an area are essential in subjectively assessing if the environmental conditions described above violate the narrative descriptions of the Basin Plan by harming aquatic biota. Furthermore, this evaluation must take into consideration the following considerations:

- The basic geographic and hydrographic features of the area, particularly application points and the logical pathway(s) of residue flow;
- Algaecides and aquatic herbicide application practices and how they are distributed in time and space;
- Relevant knowledge about the transport, fates, and effects of aquatic pesticides, including best- and worst-case scenarios;
- The designated beneficial uses of the water body;
- Relevant knowledge of the action of cumulative and indirect effects;

- Mechanisms through which aquatic pesticide applications could lead to designated use impacts, given the basic features of the area;
- Known and potential impacts of aquatic pesticide applications on water quality, ranked in terms of relative risk based on factors such as magnitude, frequency and duration;
- Sufficient numbers of sampling areas to assess the entire area of influence; and
- An understanding of the sampling methods and sampling schedule.

MONITORING PROGRAM REQUIREMENTS

Monitoring requirements in regard to constituents/parameters monitoring and sampling depths are provided in Attachment C of the General Permit and reproduced below as Table 4. There are two items from the notes of Table 4 to which particular attention should be paid, plus one note of caution in regard to copper sampling. Be aware of the following:

- Samples shall be collected at 3 feet below the surface of the water or at mid-water column depth if the water depth is less than 3 feet.
- The minimum number of aquatic pesticide application monitoring is six events, unless the total number of pesticide application events are less than six, in which case all application events must be monitoring (more details on this are provided under "Sampling Frequency").
- Because the applicable copper criterion (see Table 3) is expressed as "dissolved copper", the analysis of the water sample must be for dissolved copper, not total copper. As such, the water sample should be filter through a 0.45-micron filter within 15 minutes of collection. Therefore, the water sample must be filtered in the field at the time of collection. This is best accomplished with a peristaltic pump with a disposable 0.45-micron filter on the end of the sampling tube incorporated into the sampling procedure.

Table 4. Monitoring Requirements

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, etc.)	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	ug/L	Grab ⁴	5	Background, Event and Post-event Monitoring	6
	2. Nonylphenol ⁸	ug/L				
	3. Hardness (if copper is monitored; freshwater only)	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 exceedance of the receiving water limitation/trigger for an active ingredient in an environmental setting, then sampling shall return to six application events for that active ingredient in each environmental setting. For glyphosate, collect samples from one application event from each environmental setting (flowing water and non-flowing water) per year. 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, endosulfan, flurofenox, glyphosate, imazamox, imazapyr, penoxsulam, and triclopyr. ⁸ It is required only when a surfactant is used.						

Monitoring Frequency. The number of aquatic pesticide application events required to be monitored each year is six events for each pesticide. If the total number of aquatic pesticide application events is less than six events for the year, then all of these events must be monitored. Should six consecutive monitoring show that the active ingredient of concern is within the stated criterion concentration (see Table 3), then monitoring for that particular pesticide can be reduced to one application event per year for the remaining years of the permit. However, if a following year's monitoring shows that the criterion is exceeded, then the CSD must resume with monitoring six application events per year. Note that this requirement is for six consecutive "monitoring" events annually, not six consecutive "application" events annually.

Monitoring Locations and Number of Samples per Monitoring Event. Each monitored application event results in the collection of three water samples for laboratory analysis for the pesticide's active ingredient. This occurs over two visits to the sampling site within 7 days of the application event. The three collected samples are as follows:

Pre-Application (background) Sample – This sample is taken within the treatment area up to 24 hours in advance of the pesticide application event.

Event Sample – In the Shadybrook Reservoirs, this consists of locating oneself 50-70 feet outside of the treatment boundary, waiting 5 minutes after the pesticide application has occurred along this boundary, and collecting the “Event” sample at this location outside the treatment area.

Post-Application Sample – Within 7 days of the pesticide application event, return to the same area within the treatment area and collect one post-event water sample for laboratory analysis.

Recording of Field Data. During the collection of each water sample for pesticide residue analysis, field measurements of general water quality constituents are recorded on the field form along with visual observations of water quality conditions. Listed in Table 4, these field measurements are for: air and water temperature; dissolved oxygen; pH; salinity; and turbidity.

In addition to recording all field measurements and observations on the field sheet, the following information shall also be on the field sheet:

- The date, exact place (GPS coordinates, plus narrative description), and time of the sampling or measurements;
- The individual(s) who performed the sampling or measurements;
- Date of the application event being monitored (on the Post-Event sample sheet).

Field Instrument Calibration. All field instruments used to monitor water quality shall be properly maintained and calibrated as necessary to ensure their accuracy. The dissolved oxygen meter and the turbidity meter should be calibrated each morning just prior to the first sampling. The pH meter should be calibrated weekly.

It is important to note that calibration fluids for the turbidimeter and pH meter should be replaced annually or at least every 2 years. The membrane fluid for the dissolved oxygen meter should also be replaced every 2 years.

The CSD and its contractor(s) institute a Quality Assurance–Quality Control Program for any onsite field measurements such as salinity, pH, turbidity, temperature, and dissolved oxygen. A manual containing the steps followed in this program is kept in the CSD offices and is available for inspection by the State Water Board and the appropriate Regional Water Board staff. The Quality Assurance–Quality Control Program must conform to U.S. EPA guidelines or to procedures approved by the State Water Board and the appropriate Regional Water Board.

Sampling Procedures and Contamination Avoidance. Measurements of dissolved oxygen, temperature, pH, turbidity, and salinity are conducted in the field. These parameters, and water samples for laboratory testing, shall be taken from 3 feet below the surface of the water. If the water depth is less than 3 feet, then the sample is taken from the mid-depth of the water column.

If sample collection is achieved using a discrete–depth sampling bottle such as a Kemmerer bottle, the Kemmerer bottle or equivalent shall be rinsed three times in the water to be sampled prior to collecting the water samples from that site.

Samples for dissolved copper testing shall be collected using a length of silicone tubing sufficient to reach 3 feet deep in the water column, a peristaltic pump, and a 0.45-micron disposable filter the end feeding into a plastic sampling bottle. The sampling bottles for dissolved copper should contain an acid preservative provided by the analytical laboratory. Should a peristaltic pump and filter be unavailable, the sample should not be acidified but merely put on ice in a cooler for delivery to the analytical laboratory.

All samples shall be stored in a cooler with ice packs until delivery to a certified laboratory for analyses. All sample containers shall be labeled before storing them in the cooler.

Sampling will be conducted using sampling procedures which minimize loss of monitored constituents during sample collection and analysis and maintain sample integrity. To minimize the risk of contamination during sampling, the following protocols are followed:

- Water sample collection will not be conducted out of the “treatment” boat (residue risk);
- Latex gloves will be worn during sampling;
- Sample container labels will be filled out with permanent ink prior to attachment to the container;
- Sample labels will include: location, date, and time of sample collection.
- The discrete-depth sampling device will be rinsed three times with water from the sampling site before retaining the sample;
- Silicon tubing and the 0.45-micron disposable filter for the peristaltic pump will be used for one application event for that day only, then replaced or thoroughly decontaminated before future use;
- Samples will be kept out of the sun and stored in a cooler with ice packs;
- A chain-of-custody form will be used at all stages of sample transfer;

Laboratory Analysis for Pesticide Residue. All laboratory analyses shall be conducted at a laboratory certified for such analyses by the California Department of Public Health in accordance with California Water Code section 13176. Laboratories that perform sample analyses shall be identified in all monitoring reports.

All laboratory analyses for the pesticide’s active ingredient shall be conducted in accordance with the latest edition of “Guideline Establishing Test Procedures for Analysis of Pollutants” promulgated by the U.S. EPA in title 40 Code Federal Regulation (40 C.F.R.) 136 or equivalent methods that are commercially and reasonably available and that provide quantification of sampling parameters and constituents sufficient to evaluate compliance with applicable effluent limits and to perform reasonable potential analysis. Equivalent methods must be more sensitive than those specified in 40 C.F.R.136 and must be approved for use by the Regional Water Board Executive Officer.

REPORTING PROGRAM REQUIREMENTS

There are three types of reporting to the State Water Board: 1) Annual Reporting (due March 1 describing the results of the previous year’s monitoring); 2) 24 hour Reporting (provided orally); and 3) Five Day Reporting (a written report following up the oral report). There is also a fourth type of

reporting that involves reporting an adverse incident to a threatened or endangered species to the National Marine Fisheries Service (NMFS) and/or the U.S. Fish and Wildlife Service. The requirements and purpose of each of these types of reports are explained in the following sections.

Annual Report. The CSD will submit to the Deputy Director and the Regional Water Board Executive Officer an annual report consisting of a summary of the past year's activities, and certify compliance with all requirements of the General Permit. If there is no discharge of algaecides and aquatic herbicides, their residues, or their degradation byproducts, the CSD will provide a certification that algaecide and aquatic herbicide application activities did not result in a discharge to any water body. The annual report shall contain the following information:

- An executive summary discussing compliance or violation of the General Permit and the effectiveness of the APAP; and
- A summary of monitoring data, including the identification of water quality improvements or degradation as a result of the algaecide or aquatic pesticide application.

The annual report will be submitted according to the following schedule in Table 5:

Table 5. Annual Reporting Schedule

Reporting Frequency	Reporting Period	Annual Report Due
Annual	January 1 through December 31	March 1

Annual Report Protocols. The District shall adhere to the following protocols when preparing an Annual Report.

- Each sample result will include the applicable reported Minimum Level (ML) and the current Minimum Detection Limit, as determined by the procedure in 40 C.F.R. part 136.
- The results of analytical determinations for the presence of the pesticide's active ingredient will use reporting protocols listed on page C-9 of Order No. 2013-0002-DWQ. These protocols describe the reporting procedures to follow regarding Method Detection Limits and Reporting Limits.
- All reported data will be arranged in a tabular format. The data will be summarized to clearly illustrate whether the algaecide and aquatic herbicide applications are conducted in compliance with effluent and receiving water limitations.
- The CSD will attach a cover letter to the annual report that clearly identifies violations of the permit; discusses corrective actions taken or planned; and provides a time schedule for corrective actions. Identified violations will include a description of the requirement that was violated and a description of the violation.
- The annual report will be submitted to the State Water Board and the Central Valley (Region 5) Regional Water Board, signed and certified as required by the Standard Provisions (Attachment B, Standard Provision, of the Order No. 2013-0002-DWQ).

Electronic Submittal of the Annual Report. The CSD will submit electronic copies of the certified Annual Report to NPDES_Wastewater@waterboards.ca.gov.

Twenty-Four Hour Report. The District will report to the State Water Board (Gurgagn Chand; Gurgagn.Chand@waterboards.ca.gov, 916-341-5780) and the Central Valley Regional Water Board (Sacramento Office, 916-464-3291) any noncompliance, including any unexpected or unintended effect of an algaecide or aquatic herbicide use that may endanger health or the environment. Information will be provided orally within 24 hours from the time the CSD becomes aware of the circumstances and will include the following information:

- The caller's name and telephone number;
- Applicator name and mailing address;
- Waste Discharge Identification (WDID) number;
- The name and telephone number of a contact person;
- How and when the CSD became aware of the noncompliance;
- Description of the location of the noncompliance;
- Description of the noncompliance identified and the U.S. EPA pesticide registration number for each product applied in the area of the noncompliance; and
- Description of any steps that the CSD has taken or will take to correct, repair, remedy, cleanup, or otherwise address any adverse effects.

In the event that the CSD or its contractor(s) are unable to notify the State and Regional Water Boards within 24 hours, the CSD will do so as soon as possible and also provide the rationale for why it was unable to provide such notification within 24 hours.

Five-Day Written Report. The CSD will provide a written submission within five (5) days of the time it becomes aware of the noncompliance. The written submission shall contain the following information:

- Date and time the CSD contacted the State Water Board and the Regional Water Board notifying of the noncompliance and any instructions received from the State and/or Regional Water Board; information required to be provided in Section D.1 (24-Hour Reporting);
- A description of the noncompliance and its cause, including exact date and time and species affected, estimated number of individual and approximate size of dead or distressed organisms (other than the pests to be eliminated);
- Location of incident, including the names of any waters affected and appearance of those waters (sheen, color, clarity, etc.);
- Magnitude and scope of the affected area (e.g. aquatic square area or total stream distance affected);
- Algaecide and aquatic herbicide application rate, intended use site (e.g., banks, above, or direct to water), method of application, and name of algaecide and herbicide product, description of algaecide and herbicide ingredients, and U.S. EPA registration number;
- Description of the habitat and the circumstances under which the noncompliance activity occurred (including any available ambient water data for aquatic algaecides and aquatic herbicides applied);
- Laboratory tests performed, if any, and timing of tests. Provide a summary of the test results within five days after they become available;

- If applicable, explain why the Coalition or Discharger believes the noncompliance could not have been caused by exposure to the algaecides or aquatic herbicides from the Coalition's or Discharger's application; and
- Actions to be taken to prevent recurrence of adverse incidents.

The State Water Board staff or Regional Water Board staff may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours.

Adverse Incident Notification. During aquatic pesticide operation, if an adverse incident should occur to a federally designated threatened or endangered anadromous or marine species or their critical habitat, the National Marine Fisheries Service in Sacramento should be contacted by phone (916-930-3600) within 24 hours. Should the adverse incident occur to a threatened or endangered terrestrial or freshwater species, the Fish and Wildlife Service (916-414-6464) should be verbally contacted within 24 hours.

EVALUATION OF OTHER MEANS OF PEST CONTROL

When developing an aquatic vegetation management program, all applicable aquatic plant management technologies should be considered along with their limitations and applicability to the situation experienced in the lake. An Integrated Pest Management (IPM) approach is developed with this principle in mind.

Aquatic algae management technologies are broadly categorized within the following framework:

- No action
- Mechanical or physical methods
- Biological control agents
- Cultural methods
- Chemical control through algaecides and aquatic herbicides

No Action

Whenever possible, this is the preferred BMP. The “less is more” approach is optimal in regard to cost as well as environmental impact. If pre-determined nuisance levels have not been reached, then this may be a feasible approach.

Prevention

Beneficial Bacteria Beneficial bacteria has the potential to reduce the bioavailability of nutrients in the Lake substrate. Beneficial bacteria consume the same nutrients that are available to algae and nuisance plants. In effect, beneficial bacteria deprive aquatic nuisance growth of a ready food source, thereby inhibiting growth.

Bottom Barriers Bottom or benthic barriers are materials that come in sheets and are negatively buoyant. They can be attached to the bottom and rolled over the top of existing plants beds, they are then weighted or pinned to the lake bottom. These systems provide immediate and long-term control of all aquatic vegetation where they are placed. The drawbacks are generally the high costs of materials. These barriers cost from \$1.50 to \$2.00 per square foot installed. At this rate they can be

cost effective for small application such as along a dock line or private swim beach, but the per acre cost is calculated using the 43,560 square feet in an acre. In addition, barriers can trap gases between the lake sediment and the barrier causing them to lift into propellers or become visual nuisances. Regular maintenance and inspections are required.

Aquatic Dyes Aquatic dye has the potential to discourage algae growth in a water by limiting light penetration.

Mechanical or Physical Removal

Manual Removal Manual removal should be employed to small infestations of nuisance algae when feasible. This is the first response method that should be considered prior to chemical applications.

Mechanical Harvesting At the shadybrook reservoirs, mechanical harvesting appears to be severely limited by mobility to the site. While both reservoirs have deep bottoms with minimal places for aquatic inference there is low maneuverability and no solid ramps around the site for large equipment to be dropped into the water

Biological Control Biological control methods for algae are very limited. Tilapia are the only freshwater fish that feed on filamentous algae. However these fish are illegal to stock in California except in indoor aquaculture applications so they are not a viable option for algae control at this location.

Cultural Control Measures are actively in place to reduce as much nutrient runoff as possible. For example, no fertilizers will be used on riparian plantings, periodic water quality testing and monitoring will ensure that the pond is balanced and that issues will be quickly identified and addressed.

Chemical Control Algaecides and aquatic herbicides are most applicable as other methods have been deemed impractical, harmful, expensive or inefficient. Algaecides or aquatic herbicides application rates will be based on minimum amounts necessary for effective control as per product label requirements.

DECISION MATRIX FOR THE MOST APPROPRIATE FORMULATION

Deciding the most appropriate formulation will be based on the inspection and assessment program, set action thresholds, and the Pest Control Advisor's recommendations. The Pest Control Advisor will advise based on the nuisance species, water quality parameters, non-target organisms, and which formulation will have the least impact on the surrounding environment.

BEST MANAGEMENT PRACTICES

The following best management practices (BMPs) will be implemented to minimize the amount of aquatic pesticides used in an area, to minimize the extent and duration of impacts caused by the discharge of aquatic pesticides, and to allow for restoration of water quality and protection of beneficial uses of the waters to pre-application quality following completion of a treatment event.

- Licenses and Permits.
 - The CSD will obtain all necessary regulatory permits prior to application of aquatic pesticides.
 - Aquatic pesticide applications by the CSD and its contractors will be conducted in conformance with licensing and other requirements of the Cal-EPA Department of Pesticide Regulation.

- **Inspection and Assessment.** The CSD or its contractors will conduct visual observations of the entire lake and ponds at a frequency deemed prudent to identify emerging nuisance conditions, need for treatment, and type of treatment. The following actions will be employed:
 - Initiate inspections in May; conduct weekly, as the nuisance growth season dictates.
 - Observe for indicators of nuisance growth, such as accumulation of bottom or floating algae, and spot “raking” for evidence of growth if not otherwise visible.
 - Utilize predetermined “action levels” to qualify treatment decision making.
 - Measure and record ambient environmental conditions and physical water quality characteristics that may provide clues to impending nuisance conditions.
 - Record the inspection event on daily work report.
 - Schedule subsequent inspection and/or application event, as applicable.

- **Action Levels.** The CSD has established action levels for nuisance control that protects community values while ensuring that use of aquatic pesticides is minimized. An appropriate threshold ensures that herbicides will not be used prior to visual evidence of growth, while at the same time ensuring that projected growth rates do not result in routine exceedance of the threshold. Action levels are defined as follows:
 - **Algae:** Dots of floating algae begin to accumulate on the surface, or the alga is at a life stage when, in the opinion of the qualified applicator (a holder of a Department of Pesticide Regulation Qualified Applicator License), a detachment is probably imminent.

- **Integrated Control Strategy.** Once action levels have been reached, the CSD will implement the following sequence of chemical and mechanical controls action:
 - **Algae.** Initiate applications for algae control. If and when rate of algal accumulations on water surface result in formation of substantial biomass, augment chemical applications with manual removal

- **Pesticide Application Protocols.**
 - Always apply product in accordance with product labeling.
 - Apply aquatic pesticides only to infested areas.
 - Calibrate application equipment as needed to assure the desired application rate. Check tank mix level frequently to ensure proper dosage rates are being applied.
 - Close chemical intake valve when pump is not in use.
 - Upon completion, flush the tank and pump system with water for a minimum of three minutes in the application area.
 - Ensure that applicators practice herbicide use safety and that applicator equipment is properly inspected to prevent accidental leaks, spills, and hazards to applicators and the environment.
 - When copper-based herbicides are called for, a chelated form of copper that offers the greatest affinity for adherence to the target and least likelihood of settling to the bottom shall be used.

- **Applicator Education on Avoiding Adverse Environmental Impacts.**

- The CSD will contract only with California licensed aquatic pesticide applicators. Licensed applicators are required to take periodic training on spill avoidance, proper application techniques, and avoiding environmental impacts.
 - A copy of this APAP will be provided to the contracted licensed applicator at least 30 days prior to aquatic pesticide application, and require that all primary applicators used on the Shadybrook reservoirs sign an affidavit that they have reviewed the contents and are familiar with all requirements.
 - The CSD's licensed applicator will be made aware of the need to request the irrigation pumps be shut down for a minimum of 3 days when aquatic pesticides are applied to the Shadybrook reservoir and treatments have the potential to harm irrigated ornamentals and turf.
- Preventing Fish Kills.
 - Experienced, licensed, and trained applicators have had training on avoiding potential fish kills; however,
 - This section is to remind applicators that they should avoid treating all of a relatively enclosed embayment or side channel at once in a manner that leaves no escape route for fish seeking higher levels of dissolved oxygen.
 - Pesticide applications in an embayment should begin at the shore furthest from the opening to the embayment and apply the pesticide outward toward this opening. Never begin pesticide applications at the mouth of the embayment and work inward as fish can be trapped by zones of low levels of dissolved oxygen.
 - The pond should never be treated in their entirety with a single treatment. By treating half or less of the water body at one time, fish are left with a refugium with higher levels of dissolved oxygen should it be needed.
 - An exception to the above rule is Sonar (fluridone), as it is a systemic pesticide that settles into the sediment and enters the root system of the aquatic weeds over time, so there is no danger of fish kills, particularly at the 40 ug/l concentration at which it is typically applied.
- General Handling, Storage and Disposal of Pesticides.
 - Always handle, store, and dispose of product in accordance with label instructions
 - Mix or load herbicides in a safe and prudent manner so as to minimize potential for spillage of raw or mixed product.
 - Mix only as much material as is necessary for treatment.
 - When changing pesticides or cleaning spray tanks, use tank rinse water as product within the application area.
 - Triple rinse empty pesticide containers and dispose in accordance with label instructions recommendations of the County Agricultural Commissioner and the manufacturer.
 - Provide spill kits, store the kits near pesticides, and train employees to use them.
 - Keep raw product in original container. Mix and use pesticides only in labeled containers and in accordance with local law.

Annual Information Collection

The CSD will complete and retain all information on the previous reporting year beginning January 1 and ending December 31. When requested by the Deputy Director or Executive Officer of the Regional Water Board, the CSD will submit the annual information including:

1. 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 algaecide applications;
2. A summary of monitoring data, including the identification of water quality improvements or degradation as a result of the algaecide or aquatic pesticide application, if appropriate, and recommendations for improvements to the APAP (including proposed 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;
3. Identification of BMPs currently in use and a discussion of their effectiveness in meeting the requirements in the General Permit;
4. A discussion of BMP modifications addressing violations of the General Permit;
5. A map showing the location of each treatment area;
6. Types and amounts of algaecides and aquatic herbicides used at each application event;
7. Information on surface area and/or volume of treatment areas and any other information used to calculate dosage, concentration, and quantity of each algaecide and aquatic herbicide used;
8. Sampling results shall 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 its 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, description of analytical QA/quality control plan. Sampling results shall be tabulated so that they are readily discernible; and
9. Summary of algaecide and aquatic herbicide application log.

-END OF AQUATIC PESTICIDE APPLICATION PLAN-