# Aquatic Pesticide Application Plan for Lake Henshaw and the Warner Ranch

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## INTRODUCTION

The Vista Irrigation District (District) located in northern San Diego County, California, occasionally requires the use of aquatic algaecides and/or aquatic herbicides as part of a larger program for managing water resources, maintaining designated beneficial uses, and controlling nuisance growths of algae and aquatic vegetation within the water system (Figure 1). Management of water resources via the occasional use of chemicals must be undertaken carefully so that their use does not impair the resources they strive to protect.

### Regulatory Background

In March 2001, the State Water Resources Control Board (SWRCB) prepared Water Quality Order # 2001-12-DWQ which created Statewide General National Pollutant Discharge Elimination System (NPDES) Permit # CAG990003 for the discharges of aquatic herbicides to waters of the United States. The purpose of Order # 2001-12-DWQ was to minimize the areal extent and duration of adverse impacts to beneficial uses of water bodies treated with aquatic herbicides. The purpose of the general permit was to substantially reduce the potential discharger liability incurred for releasing water treated with aquatic herbicides into waters of the United States. The general permit expired January 31, 2004.

On May 20, 2004, the SWRCB adopted the statewide general NPDES Permit for Discharge of Aquatic Pesticides for Aquatic Weed Control in Waters of the United States #CAG 990005. Dischargers were required to have the general permit to perform aquatic herbicide applications. In May 2009, the general permit expired, but was administratively continued until November 30, 2013.

The Statewide General NPDES Permit (Permit) for Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications #CAG 990005 was adopted on March 5, 2013 and became available on December 1, 2013. The Permit requires compliance with the following:

- Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries in California, a.k.a. the State Implementation Plan, or SIP (2005);
- California Toxics Rule (CTR); and,
- Applicable Regional Water Quality Control Board (RWQCB) Basin Plan Water Quality Objectives (WQO's) San Diego Regional Board Basin Plan (SDRBBP 1994).

Coverage under the Permit is available to single dischargers and potentially to regional dischargers for releases of potential and/or actual pollutants to waters of the United States. Dischargers eligible for coverage under the Permit are public entities that conduct resource or pest management control

measures, including local, state, and federal agencies responsible for control of algae, aquatic weeds, and other organisms that adversely impact operation and use of drinking water reservoirs, water conveyance facilities, irrigation canals, flood control channels, detention basins and/or natural water bodies.

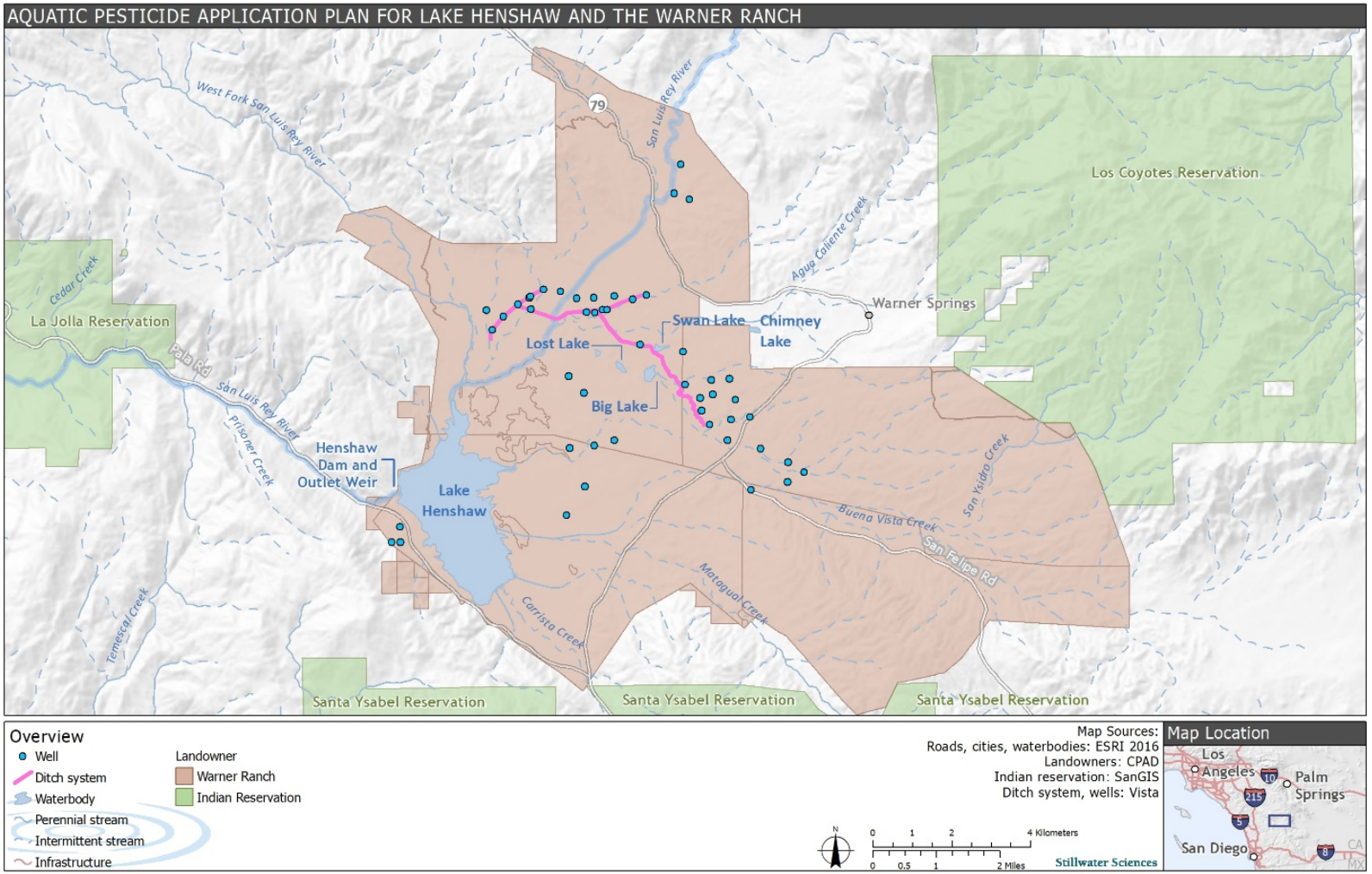



**Figure 1. Vista Irrigation District water system, including Warner Ranch groundwater wells and ditches, Lake Henshaw, and Henshaw Dam.**

The Permit does not cover indirect or non-point source discharges, whether from agricultural or other applications of pesticides to land, that may be conveyed in storm water or irrigation runoff. The Permit only covers algaecides and aquatic herbicides that are applied according to label directions and that are registered for use on aquatic sites by the California Department of Pesticide Regulation (DPR).

State Water Board Water Quality Order 2013-0002-DWQ (as amended by Orders 2014-0078-DWQ, 2015-0029-DWQ, and 2016-0073-EXEC) is the most up-to-date Water Quality Order for NPDES Permit # CAG990005 covering algae and aquatic weed control via aquatic pesticides in California. The Order expired in 2018, however it remains in effect until the State Water Board updates the Order.

**Scope**

This Aquatic Pesticides Application Plan (APAP) describes the best management practices (BMPs) and precautions that will be implemented to protect surface waters within the Warner Ranch, and Lake Henshaw, while maintaining sufficient storage in the lake to meet water delivery demands. This APAP addresses the application of algaecides/herbicides for controlling algae and aquatic weeds in the District's water supply system.

Specifically, this APAP contains the following eleven (11) elements:

1. Description of the water system to which algaecides and aquatic herbicides will be applied.
2. Description of the treatment area in the water system.
3. Description of types of weed(s) and algae that will be controlled and why.
4. Algaecide and aquatic herbicide products or types of algaecides and aquatic herbicides expected to be used and if known their degradation byproducts, the method in which they will be applied, and if applicable, the adjuvants and surfactants that will be used.
5. Discussion of the factors influencing the decision to select algaecide and aquatic herbicide applications for algae and weed control.
6. A listing of the gates or control structures to be used to control the extent of receiving waters potentially affected by algaecide and aquatic herbicide application and an inspection schedule of those gates or control structures to ensure they are not leaking.
7. Description of any applicable Short Term Seasonal Exceptions.
8. Description of procedures used to prevent sample contamination from persons, equipment, and vehicles associated with algaecide and aquatic herbicide application.
9. Description of the BMPs to be implemented:

a. Measures to prevent algaecide and aquatic herbicide spill and for spill containment during the event of a spill.
b. Measures to ensure that only an appropriate rate of application consistent with product label requirements is applied for the targeted weeds or algae.
c. The District's plan to educate its staff and algaecide and aquatic herbicide applicators on how to avoid any potential adverse effects from the algaecide and aquatic herbicide applications.
d. Discussion on planning and coordination so that designated beneficial uses of the water are not impacted during the treatment period; and,
e. A description of measures that will be used for preventing fish kill when algaecides and aquatic herbicides will be used for algae and aquatic weed controls.

10. An examination of possible alternatives to algaecide and aquatic herbicide use to reduce the need for applying algaecides and herbicides.

    a. An evaluation of the following management options, in which the impact to water quality, impact to non-target organisms including plants, algaecide and aquatic herbicide resistance, feasibility, and cost effectiveness is considered:
        i. No action
        ii. Prevention
        iii. Native species establishment
        iv. Mechanical or physical methods
        v. Cultural methods
        vi. Biological control agents
        vii. Algaecides and aquatic herbicides

    If there are no alternatives to algaecides and aquatic herbicides, dischargers shall use the minimum amount of algaecides and aquatic herbicides that is necessary to have an effective control program and is consistent with the algaecide and aquatic herbicide product label requirements.

    b. Using the least intrusive method of algaecide and aquatic herbicide application; and
    c. Applying a decision matrix concept to the choice of the most appropriate formulation.

11. Monitoring provisions including sampling procedures, record retention, device calibration, mapping, certification, and reporting schedules.

This APAP is organized to address the aforementioned elements.

## 1.0 WATER SYSTEM

The District owns and operates the 43,000-acre Warner Ranch in the northern portion of San Diego County (Figure 1). Its primary interest in Warner Ranch is water production, and it operates wells, ditches, and the 52,000-acre-foot Lake Henshaw to produce an average annual yield of 13,500 acre-feet of water for use by the District, the City of Escondido, and the Rincon Band of Indians for the period 1953 through 2020. During years of inadequate surface runoff, the District pumps water from the Warner Basin aquifer into 6.2 miles of ditches for delivery to Lake Henshaw (Figure 2). Water in the ditch system flows by gravity into an approximately 1,800-foot unnamed stream reach (Figure 3) before entering the ephemeral San Luis Rey River upstream of Lake Henshaw, and then flows for approximately one mile before entering the lake.

**Figure 2. Groundwater Wells Discharging to Ditch at Location 1 on the Warner Ranch.**

**Figure 3. Terminus of the Warner Wellfield ditch system (left), which flows downstream into the San Luis Rey River and then Lake Henshaw (right).**

Lake Henshaw was artificially created in 1923 with the building of the Henshaw Dam, an earth dam 123 ft (37m) tall, and 650 (200m) long. The original capacity of Lake Henshaw was approximately 200,000 acre-feet. The spillway was lowered in 1981 to address seismic concerns,

which brought the reservoir capacity to its current 52,000 acre-feet and 2,256 lake surface acres (at full capacity).

Lake Henshaw designated beneficial uses include the following (San Diego Regional Water Quality Control Board 2012):

- municipal and domestic water supply
- agricultural water supply
- industrial process and service supply
- freshwater replenishment
- rare, threatened, or endangered species habitat
- hydropower generation
- warm freshwater habitat
- contact[1] and noncontact recreation
- wildlife habitat

Lake Henshaw water supply includes tribal water rights for the Indian Water Authority.

Water is released from the Lake Henshaw outlet at the base of Henshaw Dam through valves and into an open concrete channel that flows for approximately 125 feet and across an outlet weir before entering the San Luis Rey River (Figure 4).

[1] Fishing from shore or boat is permitted in Lake Henshaw, but other water contact recreational (REC-1) uses are prohibited.

**Figure 4. Henshaw Dam outlet channel to the San Luis Rey River.**

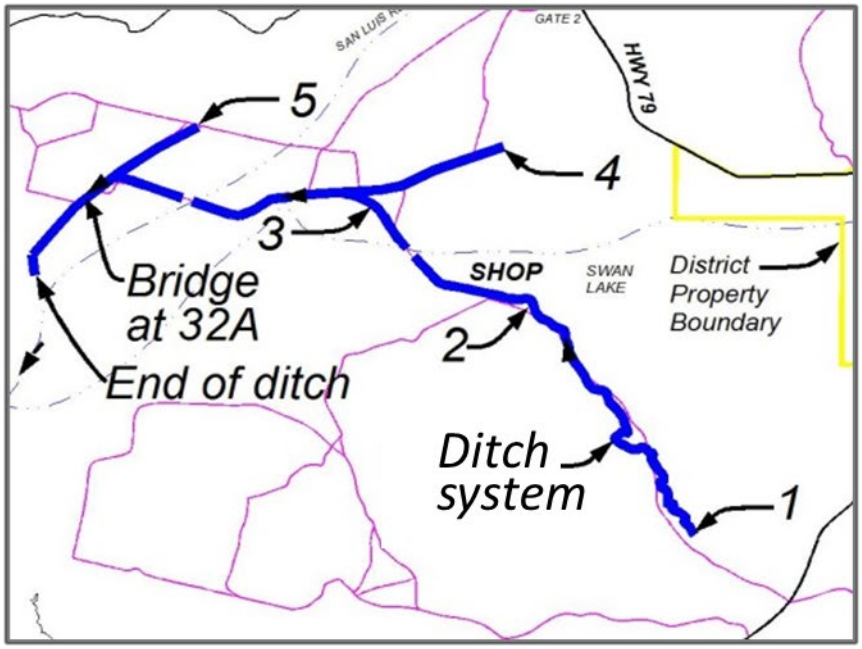
## 2.0 TREATMENT AREA

### 2.1 Warner Ranch

The Warner Ranch *treatment area* is represented by the 6.2-mile length of the ditch system. Aquatic algaecides/herbicides will be applied to the Warner Ranch ditches at strategic treatment locations. *Treatment locations* are defined as the specific sites at which aquatic pesticides will be directly applied. For the Warner Ranch, up to five tentative treatment locations are shown in Figure 5, located at the start of each ditch and at two locations along the main ditch length. However, spot treatments just upstream of areas where aquatic macrophytes and/or filamentous algae have established are likely to be most effective for maintaining the ditch segments and thus the ultimate treatment locations will depend on growth of aquatic macrophytes and/or filamentous algae in the ditch system. While there are multiple small off-channel watering ponds (e.g., see Swan Lake, Big Lake, Lost Lake in Figure 1) for cattle within the Warner Ranch, one of these ponds (Swan Lake) is supplied by the ditch system and once in the pond, surface water containing macrophytes or algae does not move back into the ditches. Thus, the off-channel watering ponds are not part of the treatment area for this APAP.

## 2.2 Lake Henshaw

Treatments to Lake Henshaw will be applied to the lake surface or sub-surface at various locations to be determined on an as-needed basis, with the treatment area extending 2,256 acres at full capacity. Treatment locations in Lake Henshaw are defined as the specific sites at which aquatic pesticides will be directly applied. Note that for some aquatic algaecide/herbicide products, as specified on the label, treatment locations in the lake cannot extend beyond one-third of the lake surface area during a single treatment event.




| Tentative Treatment Locations | Position (Latitude / Longitude) |
|---|---|
| Location 1 | N 33° 15' 26.1" W 116° 40' 43.9" |
| Location 2 | N 33° 16' 0.56" W 116° 41' 11.5" |
| Location 3 | N 33° 16' 55.9" W 116° 42' 33.8" |
| Location 4 | N 33° 17' 13.7" W 116° 41' 44.6" |
| Location 5 | N 33° 17' 18.9" W 116° 43' 21.5" |

**Figure 5. Warner Ranch ditch system treatment area with five tentative treatment locations for aquatic macrophytes and/or filamentous algae. Blue line indicates the 6.2-mile length of the ditch system.**

# 3.0 WEED AND ALGAE GROWTH IN WARNER RANCH DITCHES AND LAKE HENSHAW

## 3.1 Warner Ranch Ditches

The majority of the water conveyance ditches on the Warner Ranch are not covered, such that aquatic weeds and algae grow throughout the year under direct sunlight. A 4,500-foot length of ditch was recently covered by installing reinforced concrete pipe within a section of open ditch that had been damaged during heavy precipitation and flooding in February of 2019. Aquatic macrophyte and filamentous algae growth limits the hydraulic capacity of open ditches delivering

water to Lake Henshaw and results in the need for periodic mechanical removal that is costly, is not consistently successful at restoring unimpeded flows, and can exacerbate root damage to ditch linings through physical disturbance.

**Figure 6: Weeds growing on the ditch downstream of the trash rack.**

Although not taxonomically identified, there are aquatic macrophytes and filamentous algae that grow in the Warner Ranch ditch system and require control. Filamentous algae masses and uprooted aquatic weeds that break off and float down the ditches (either open or covered lengths) are caught by one of the eight trash racks on the Warner Ranch (Figure 6). Some portions of the open ditches are temporarily covered by chain link fencing that is laid across the ditch to keep tumbleweed from becoming lodged in the ditches. The lengths of fencing and captured tumbleweed are periodically removed as part of normal maintenance operations. Trash racks are distributed throughout the ditch system to prevent the obstruction of ditch siphons. Maintenance requires that all trash racks routinely be cleaned; otherwise, algae and weeds would block ditches and impede flow.

Aquatic macrophyte and filamentous algae growth have not been observed at the terminus of the Warner Ranch ditch system (Figure 3), which flows into the San Luis Rey River approximately one mile upstream of Lake Henshaw.

### 3.2 Lake Henshaw

The main impacts to Lake Henshaw designated beneficial uses from nuisance growths of filamentous, benthic, and/or planktonic algae are related to drinking water quality (decaying organic matter, algal toxins), drinking water supply (clogging of screens and contamination of water treatment basins), aesthetics, and recreational fishing (low dissolved oxygen, high pH, algal toxins). Algae control on an as-needed basis along the lake shoreline and within the main body of the lake is intended to reduce or eliminate the occurrence of harmful algal blooms (HABs) that produce cyanotoxins at levels that exceed California voluntary posting guidance for planktonic sources of microcystin and anatoxin-a in recreational inland surface waters. Cyanobacteria, a type of photosynthetic bacteria also known as blue-green algae, are often the cause of algal blooms in freshwater and occasionally in marine water. Cyanotoxins can have harmful effects on people, fish, birds and livestock. The human illnesses caused by HABs though rare, can be debilitating, or even fatal. The most common cyanobacterial HAB toxins in the U.S. are microcystins, a group of liver toxins that can cause gastrointestinal illness in humans, and mortality in pets, livestock, and wildlife.

The volume of water in the area targeted for cyanobacteria control will vary based on water levels in the lake, which in drier years range approximately 2,500 to 6,000 acre-feet and in wetter years range approximately 25,000 to 52,000 acre-feet. The types of cyanobacteria to be controlled in the District's system may include, but are not limited to the following:

- *Microcystis sp.*
- *Planktothrix sp.*
- *Snowella sp.*
- *Aphanizomenon sp.*
- *Woronichinia sp.*
- *Dolichospermum sp.*

The presence of algae, cyanobacteria, and other aquatic weeds reduces the water quality and clarity.

## 4.0 AQUATIC ALGAECIDES AND HERBICIDES EXPECTED TO BE USED AND APPLICATION METHODS

If needed, the District proposes to apply various forms/formulations of aquatic herbicides and algaecides (see Appendix B) of various products with active ingredients such as copper, Endothall,

Diaquat, Imazamox, and Peroxyhydrate. When the rate of aquatic macrophyte and/or filamentous algae in the Warner Ranch ditch system and/or filamentous, planktonic and/or benthic algae growth in Lake Henshaw indicates the need for an aquatic herbicide or algaecide (see also Section 5.1), the District will begin a program of dosing the ditches and/or lake with one or more of these chemicals, as needed. The aquatic herbicides and algaecides will be applied at the strategic points within the treatment area (see also Section 2.0) and the frequency of dosing may be adjusted throughout the season based on weather conditions, actual algae growth patterns, and the treatment area calculations. Applications will be made by a drip system, and/or surface and subsurface application methods, dependent upon product type and nuisance aquatic macrophyte or algal/cyanobacteria species at a rate consistent with the label requirements and California Department of Pesticide Regulation licensed Pest Control Adviser (PCA) recommendations. As noted in Section 2, label requirements for some aquatic algaecide/herbicide products (e.g., Endothall) include limitations on the extent of treatment locations in a lake to no more than one-third of the lake surface area for a single treatment event. The District and/or its agent may use a variety of application vehicles or vessels including boats to apply algaecides and herbicides. Application techniques may include injection, granular spreaders or liquid sprays. Combined with the need to hold, safely transport and properly apply algaecides and aquatic herbicides, the District and/or its agent will utilize techniques that are the least intrusive as possible.

As required, aquatic-labeled adjuvants may be used to enhance the efficacy of an herbicide. All herbicide applications will be made in accordance with the product label. Table 1 summarizes the algaecides and aquatic herbicides that may be used by the Vista Irrigation District.

**Table 1: Algaecides/Aquatic Herbicides That May be Used Within the Treatment Area**

| Herbicide | Application Method | Adjuvant | Primary Degradation Products |
|---|---|---|---|
| Copper – Chelated | Sprayer, injection boom, granular spreader | Not Applicable | None |
| Copper Sulfate | Sprayer or injection boom | Not Applicable | None |
| Diquat Dibromide | Sprayer or injection boom | Aquatic labeled adjuvants | Teir 2 organic products |
| Endothall | Sprayer, injection boom or granular spreader | Not Applicable | Glutamic Acid |
| Glyphosate | Power or backpack sprayer | Aquatic labeled adjuvants | Aminomethyl-phosphonic acid |
| Sodium Carbonate Peroxyhydrate | Boom injector or spreader | Not Applicable | Water, bicarbonate |
| Ammonium Salt of Imazamox | Sprayer, injection boom, power or backpack sprayer | Aquatic Labeled Adjuvants | Nicotinic acid and di- and tricarboxylic acids |

## 5.0 DECISION TO USE AQUATIC PESTICIDES

The decision to treat aquatic vegetation and algae using aquatic pesticides is best made within the framework of Integrated Pest Management (IPM) techniques. One of the primary operational goals of an IPM program is to establish a general and reasonable set of control measures that not only aid in managing aquatic vegetation populations, but also address public health and safety, economic, legal, and aesthetic requirements. An IPM control threshold level is the point at which action should be taken to control aquatic vegetation before the water body is significantly impacted; moreover, established threshold levels for implementing selected control measures may change based on public expectations. A central feature of IPM is to determine when control measures are absolutely necessary and when they are not, for the presence of some aquatic vegetation species may be a sign of a well-balanced, flourishing ecosystem. Examples of when or how thresholds are met are when algae or aquatic vegetation causes complaints with odor or creates a nuisance or safety concerns with water contact activities. Typical problems associated with aquatic vegetation or algae blooms are adverse impacts to water quality and nuisance odors. If vegetation or algae equals or exceeds a threshold, a control method is implemented. Control methods may include mechanical, cultural controls, biological, and/or chemical, consistent with the IPM techniques. Algaecide and aquatic herbicide use may or may not be employed as a last resort control method, and is considered a critical part of the IPM program. For some aquatic weed varieties, herbicides offer the most effective control; sometimes, they may be the only control

available. Ultimately, the decision to use an algaecide or aquatic herbicide is based on the recommendation of a California Department of Pesticide Regulation licensed Pest Control Adviser (PCA). The PCA considers a variety of control options that may include mechanical and/or cultural techniques that alone or in combination with algaecide or aquatic herbicide use are the most efficacious and protective of the environment.

Algaecide and aquatic herbicide applications may be made prior to IPM control threshold exceedance. For example, based on predicted growth rate and density, historical algae and aquatic weed trends, weather, water flow, and experience, aquatic weeds or algae may reasonably be predicted to cause future problems. Accordingly, they may be treated soon after emergence or when appropriate based on the algaecide and aquatic herbicide to be used. Even though algae and aquatic weeds may not be an immediate problem at this phase, treating them before they mature reduces the total amount of algaecide and aquatic herbicide needed because the younger aquatic weeds and more susceptible and there is less biomass to target. Furthermore, treating aquatic weeds and algae within the ideal time frame of its growth cycle ensures that the selected control measures will be most effective. Managing aquatic weed populations before they produce seeds, tubers or other reproductive organs is an important step in a comprehensive aquatic weed control program. Generally, treating algae or aquatic weeds earlier in the growth cycle results in fewer controls needed and less total herbicide use. Selection of appropriate algaecide and aquatic herbicide(s) and rate of application is done based on the identification of the algae and aquatic weed, its growth state and the appearance of that algae or aquatic weed on the product label. Further, the quantity of algaecide and aquatic herbicide required for an application is determined by a PCA that has followed the label directions in making a recommendation. The rate at which an algaecide and aquatic herbicide is used is highly variable and depends on the type, time of year, location, and density and type of aquatic weeds, water presence, and goal of the application. All these factors are considered by the PCA prior to making a recommendation for an application.

Consistent with general IPM practices, the District's use of aquatic herbicides and/or algaecides to control nuisance aquatic macrophytes, filamentous algae, planktonic algae, benthic algae, and/or cyanobacteria in the Warner Ranch and Lake Henshaw water system will be reserved for conditions when this control measure is necessary. If algaecides and aquatic herbicides are used, the District will use the minimum amount of algaecides and/or aquatic herbicides necessary to have an effective control program and that is consistent with the algaecide and aquatic herbicide product label requirements. During the summer and fall months, generally between May and November, the growth rate of aquatic weeds and/or filamentous algae can outpace the District's

ability to effectively remove them from by physical means, and in the case of planktonic and benthic algae, the natural growth forms of these organisms can preclude physical removal and subsequent disposal of large amounts of biomass, such that there are no feasible alternatives to algaecides and aquatic herbicides for effective management of HABs. During high growth rate periods, the District proposes to apply the aquatic herbicides and/or algaecides listed in Table 1 at up to five locations along the Warner Ranch ditch system (see Figure 5) as well as in Lake Henshaw. As treatment of algae, cyanobacteria, and/or aquatic weeds earlier in the growth cycle is expected to result in fewer controls needed and less total herbicide use, the District may also apply the aquatic herbicides and/or algaecides listed in Table 1 during spring months (March and April).

## 5.1 Thresholds for Using Pesticides as a Control Measure

As seasonal insolation (i.e., the amount of solar radiation reaching a given area) affects filamentous algal and aquatic weed growth throughout the year, the District maintains a year-round monitoring program for nuisance algal and aquatic weed growth at the Warner Ranch to ensure sufficient water supply to Lake Henshaw. Especially during summer months, the increased insolation, extended daylight hours, and warmer temperatures accelerate the growth of filamentous algae and aquatic weeds in the District's ditch system. The District tolerates moderate growth of filamentous algae and aquatic weed patches until the number of patches and/or the extent of the patches threaten to break off and float down the ditches (either open or covered lengths) where they will be caught by one of the eight trash racks and impede flow behind the racks. The District will apply chemical treatment when this condition appears imminent, and when alternatives to chemical control would not be reasonably effective. Limiting growth to a minimal size helps maintain wellfield production and keep maintenance down.

With regard to Lake Henshaw, the District also monitors algae, cyanobacteria, and aquatic weeds year-round to maintain adequate water quality. The District tolerates moderate filamentous algae and aquatic weed growth at levels that do not create nuisance conditions in the lake, including but limited to impeding fishing boat access, fouling fishing gear, and degrading water quality (e.g., dissolved oxygen, pH). The District will apply chemical treatment when filamentous algae or aquatic weed growth creates nuisance conditions, and when alternatives to chemical control would not be reasonably effective. The District will apply algaecides to control HABs in Lake Henshaw as needed and when alternatives to chemical control would not be reasonably effective at reducing algal toxin concentrations below California Tier 1 voluntary posting guidance for planktonic sources in recreational inland surface waters (i.e., total microcystins = 0.8 ug/L and anatoxin detection).

Alternatives to chemical control are discussed in Section 10.

## 6.0 CONTROL STRUCTURES

The District has no gates or control structures within the Warner Ranch ditch system that supplies groundwater to Lake Henshaw. The ditches remain free-flowing throughout the year, except during periods when groundwater pumping is not occurring.

As applicable or necessary, the controllable valves at the Henshaw Dam intake tower will be closed during an algaecide or aquatic herbicide application to control the extent, if any, that the receiving waters of the San Luis Rey River would be affected by residual algaecides or aquatic herbicides.

## 7.0 SHORT TERM OR SEASONAL EXCEPTION

The District has not applied for a short term or seasonal exception.

## 8.0 PROCEDURES USED TO PREVENT SAMPLE CONTAMINATION

Collection of samples for the monitoring program described in Section 11 will not be undertaken in close proximity to algaecide or aquatic herbicide application equipment and will be preferably upwind of the application point. Sampling will be done in a manner that prevents contact with algaecide or aquatic herbicide application equipment, containers, or personal protective equipment (PPE). Care will be taken by samplers to minimize contact with any treated water, vegetation, or application equipment.

It is possible that actual field conditions may require a modification of the procedures outlined herein. Specifically, water levels, weather, other environmental parameters and hazards including stream flow, rainfall, and wave action may pose access and/or sampling problems. In such instances, variations from standard procedures and planned sampling locations and frequencies will be documented by means of appropriate entry into the field logbook.

In the event that sampling equipment will be used in more than one location, the equipment will be thoroughly cleaned with a non-phosphate cleaner, triple-rinsed with distilled water, and then rinsed once with the water being sampled prior to its first use at a new sample collection location.

## 9.0 DESCRIPTIONS OF ALGAECIDE AND AQUATIC HERBICIDE BMPs

The District or its agent will utilize the following BMPs when applying aquatic herbicides and/or algaecides:

- Structural BMPs will prevent accidental spillage and contain any chemicals from coming into contact with the surrounding environment. Structural BMPs will include:
    - Making spill kits available in the copper sulfate storage locker.
    - Providing spill containment precautions in the copper sulfate storage locker.
    - Implementing spill prevention during transportation of aquatic herbicides and algaecides to the point(s) of application (e.g., spill tray, restraining system, no open containers).
    - Applying aquatic herbicides and/or algaecides under favorable weather conditions (e.g., calm-to-light wind conditions and no precipitation) to reduce exposure to the surrounding habitat in accordance with label recommendations.
    - Utilizing closed system application equipment when possible.

- To ensure that the rate of algaecide/herbicide application is consistent with product label requirements for the targeted weeds or algae, total ditch flow will be assessed before each application to determine proper dosing, and ditch conditions will be assessed to verify the need for treatment. Only areas deemed in need of aquatic plant maintenance will be treated.
- Provide periodic training sessions (as necessary) for District staff conducting treatment.
- District/Contractor Staff will be required to use proper protection from algaecide/herbicide exposure, including the use of gloves, aprons, and ventilation masks (if needed). The District/agent will take all precautions necessary to ensure employees are suitably protected from exposure.
- Before each algaecide/herbicide treatment application, the District, City of Escondido, San Luis Rey Indian Water Authority and other interested parties that utilize the watershed and discharge waters from Lake Henshaw will be notified.
- Mitigating measures to prevent potential fish kills will include:
    - Application rates consistent with label requirements and PCA recommendations.

- Pre-application water sampling to verify pH and DO, to determine if an algaecide/herbicide application could adversely affect oxygen levels.
- Application of products that have been approved by the DPR or an exemption has been granted.

## 10.0 POSSIBLE ALTERNATIVE CONTROL METHODS

### 10.1 Warner Ranch

The various alternatives to using aquatic algaecides/herbicides for controlling of algae and weed growth in the Warner Ranch ditches include the following:

- **No Action —** As feasible, no action is used as a control measure prior to reaching a threshold for using aquatic pesticides as a control measure (see also Section 5.1).
- **Physical Removal —** District staff manually clean ditches and trash racks to remove aquatic weed and filamentous algae year-round when the well field is in use. Physical removal is more effective in the winter months and may not keep up with plant and algae growth from May to November each year (see also Section 3.0).
- **Alternative Chemical Controls —** The only algaecides registered for use in ditches are endothall, 2-4D, Diaquat, peroxyhydrate, copper, copper sulfate, and chelated copper compounds, thus there are no currently available alternative chemical controls.
- **Constructing Covered Ditches —** Wholesale replacement of the existing 6.2 miles of open water supply ditches at the Warner Ranch with covered ditches or buried piping would not be economically feasible due to the significant cost of construction and environmental permitting associated with the project scale. The projected cost of this alternative is several million dollars, not including environmental mitigation. Due to the potential presence of endangered species on the Warner Ranch (i.e., Stephens kangaroo rat [*Dipodomys stephensi*] and the arroyo toad [*Anaxyrus californicus*]), it is likely that such a project would require extensive environmental mitigation at significant additional cost. While sections of the existing supply ditches on the Warner Ranch may be replaced over time, aquatic herbicide and/or algaecide applications may be needed in sections that remain open for the foreseeable future.
- **Cease Pumping Operations —** Wellfield operations are suspended when practical, typically following normal or above-normal rainfall/runoff seasons resulting in above normal reservoir storage. When natural watershed runoff provides sufficient storage volume in Lake Henshaw to meet annual delivery objectives of local water, the District

minimizes or otherwise halts groundwater pumping into the ditch system. This strategy allows for periods when maintenance in the ditch system is greatly reduced, and algaecide use is not needed. This strategy is not suitable for periods of low runoff production, however, due contractual obligations to produce water for the Rincon Band of Indians and the cost of replacement water for the District and the City of Escondido.

- **Biological Control Agents —** Not considered practical due to an inability to hold the waters so that biological agents can be effective (i.e., microbes/enzymes, zooplankton, and macrophytes).

### 10.2 Lake Henshaw

The various alternatives to using aquatic algaecides/herbicides for controlling algae and weed growth in Lake Henshaw and the outlet weir are listed below.

- **No Action —** As feasible, no action is used as a control measure prior to reaching a threshold for using aquatic pesticides as a control measure (see also Section 5.1).
- **Prevention: Habitat Modification —** While aquatic macrophytes are currently not a problem in Lake Henshaw, this alternative may become necessary if they were to establish at nuisance levels in the future. After the removal of non-native nuisance or invasive species, the introduction and re-establishment of native species may be successful. This technique is intended to provide competition for non-desirable species and reduce the need for aquatic weed abatement only around the perimeter. This approach would not directly affect algae populations.

  The District may also consider other habitat modifying techniques appropriate for the individual target areas: for example, dredging, oxygenation or aeration, shading with dyes, and bio-manipulation. In areas where sedimentation has significantly impacted the capacity of the water body, dredging can increase the water volume; reduce organic matter generated in the water body; and remove nutrient-containing sediment. Aeration, oxygenation and mixing are methods that can mechanically add oxygen directly to the water, and they can result in the reduction of nuisance algae growth.

  Shading the water column using non-toxic, inert dyes can reduce unwanted submerged plants and algae. Use of dyes works on algae and submerged vegetation by limiting their ability to photosynthesize when the dye is present, but is not a long-term solution and is generally not applicable for drinking water sources.

  Bio-manipulation utilizes various natural mechanisms that can reduce suspended algae, and this method involves increasing biological controls in the habitat. The biological

controls are typically done by top-down or bottom-up changes to the food-web structure aimed at increasing populations of algae-consuming zooplankton. Bio-manipulation may be more efficient when used in conjunction of other habitat modification methods.

- **Native Species Establishment** — While aquatic macrophytes are currently not a problem in Lake Henshaw, this alternative may become necessary if they were to establish at nuisance levels in the future. No appropriate submersed aquatic native plants have been found to establish with the lake to out compete aquatic weed species present and not create similar or other operational problems. As such, aquatic vegetation in the lake must be controlled to maintain the aquatic weed density tolerances established by Vista Irrigation District and/or its agent.
- **Mechanical or Physical Methods** — While aquatic macrophytes are currently not a problem in Lake Henshaw, this alternative may become necessary if they were to establish at nuisance levels in the future. Mechanical removal in the lake would require various methods including hand cutting from shore or while wading, hand-pulling aquatic weeds, use of motor-driven aquatic weed harvesters to cut and harvest vegetation, aquatic weed-whacking, or mowing.

  Generally, these techniques are very labor intensive per unit acre of water treated. Mechanical removal places personnel at risk of general water, boating, slip, trip and fall hazards, drowning, risks of spilling of motor oil and fuel, and can increase air pollution. The cost per area of mechanical removal is significantly higher than the cost of labor, product and equipment of the application of aquatic herbicides.

  In some instances, the use of mechanical techniques may be necessary when the use of algaecides or aquatic herbicides is not practical, or vegetation is not at an appropriate growth state. In general, mechanical removal and disposal of cut vegetation is significantly higher than chemical control of the same area desired for control.
- **Cultural Methods** — Cultural methods used to reduce the amount of aquatic herbicides used include modifying the timing of algaecide and aquatic herbicide and non-herbicide controls. The District and/or its agent may make algaecide and aquatic herbicide applications before the density of algae or aquatic vegetation is high enough to require higher algaecide or aquatic herbicide application rates or additional applications to maintain algae or aquatic weed populations below threshold levels.

Further, evaluating alternative control techniques is part of the District's overarching IPM approach, and additional alternatives to chemical treatment may be selected as part of the IPM

program. Alternative control techniques may include mechanical removal, native species establishment, introduction of microbes/enzymes, zooplankton, and macrophytes, or enhancement of aeration/circulation methods to help improve water quality.

## 11.0 AQUATIC PESTICIDE MONITORING AND REPORTING PROGRAM

The Aquatic Pesticide Monitoring and Reporting Program (APMRP) described below has been developed in compliance with the requirements of Attachment C of Order 2013-0002-DWQ (as amended by Orders 2014-0078-DWQ, 2015-0029-DWQ, and 2016-0073-EXEC) for NPDES Permit # CAG990005.

The APMRP addresses the following two key questions:

*Does the residual algaecides and aquatic herbicides discharge cause an exceedance of the receiving water limitations?*

*Does the discharge of residual algaecides and aquatic herbicides, including active ingredients, inert ingredients, and degradation byproducts, in any combination cause or contribute to an exceedance of the "no toxics in toxic amount" narrative toxicity objective?*

Under the APMRP, visual, physical, and chemical monitoring will be performed in association with all algaecide and/or aquatic herbicide treatment events undertaken by the District at the Warner Ranch and Lake Henshaw. Results of the monitoring will be recorded by qualified personnel. Additional details regarding District APMRP procedures and policies are presented below. An example Aquatic Pesticide Treatment Log is provided in Appendix C.

Note that in 2020, the District began a cyanotoxin monitoring program for microcystin and anatoxin-a concentrations in Lake Henshaw to inform operational decisions related to meeting downstream water supply obligations. The cyanotoxin monitoring program is separate and distinct from the monitoring requirements of the APAP. While algaecide application to an existing HAB in Lake Henshaw has the potential to lyse cyanobacteria cells and temporarily increase the concentration of dissolved cyanotoxins in the lake, such treatment will also decrease the extent of the HAB and thereby reduce total cyanotoxin concentrations in the lake and in waters that are released downstream of Henshaw Dam following algaecide treatment (see also Section 6 regarding control structures during algaecide application).

## 11.1 Monitoring Types

A *treatment event* is defined as a discrete event involving the application of algaecide and/or aquatic herbicide to control nuisance growths of filamentous algae and/or weeds within the treatment area for Warner Ranch and/or filamentous, benthic, and/or planktonic algae and/or aquatic macrophytes within the treatment area for Lake Henshaw (see also Section 2). During treatment event monitoring, water samples will be collected at all applicable *treatment locations* (i.e., the specific sites at which aquatic pesticides will be directly applied) and analyzed for the parameters and constituents described in Section 11.3. If algaecides or aquatic herbicides are applied at only one treatment location per treatment event, then at least one set of treatment location samples must be collected. If multiple locations are treated per treatment event, then separate sets of treatment location samples must be collected for the event.

At a **minimum**, three types of monitoring are required for each treatment event:

**Background Monitoring —** Background monitoring (BG) samples must be collected upstream of the treatment location at the time of the treatment event, or they may be collected in the treatment area just prior to the treatment event (i.e., up to 24 hours in advance of treatment).

**Event Monitoring —** Event monitoring (EM) samples must be collected immediately downstream of the treatment location in flowing waters, or proximally adjacent to the treatment location in non-flowing (static) waters, in the portion of the treatment area that is exposed to the algaecide plume immediately or shortly after the treatment event.

The location and timing of the EM sample may be based on a number of factors including, but not limited to, algae and aquatic weed density and type, flow rates, size of the treatment area and duration of treatment.

The lake EM sample for non-flowing (static) waters must be collected immediately outside the treatment area immediately after the treatment event, but after sufficient time has elapsed such that treated water would have exited the treatment area.

**Post-Event Monitoring —** Post-event monitoring (PE) samples must be collected within the treatment area, or depending on where treatment locations occur, immediately downstream of the treatment area in flowing waters or adjacent to the treatment area in non-flowing waters, within one week after the treatment event.

One full set of three samples (i.e., BG, EM and PE samples) will be collected during each treatment event according to the monitoring frequency and locations described in Section 11.2.

Additionally, one Field Duplicate (FD) and one Field Blank (FB) will be collected and submitted for analysis for each analyte, once per year. The FD and FB samples will most likely be collected during Event Monitoring.

For products that contain sodium carbonate peroxyhydrate, no treatment event monitoring for residuals is required before or after treatment because peroxyhydrate breakdown products are water and bicarbonate. For application of all other algaecides and aquatic herbicides listed on the APAP, monitoring will be conducted for each active ingredient utilized at the time of treatment event.

## 11.2 Monitoring Locations and Frequency

In general, monitoring locations for treatment event monitoring will include one background monitoring (BG) location, one event monitoring (EM) location, and one post-event monitoring (PE) location for each treatment event. Monitoring frequency will be based on the number of treatment locations and will address the two questions stated in Section 11.0. (Refer to Section 11.1 for a description of BG, EM and PE monitoring types.)

### 11.2.1 Warner Ranch

For the Warner Ranch treatment area, placement of the BG monitoring locations will be immediately upstream of the treatment location (Figure 7). If the treatment location is Location 1, 4, or 5 in Figure 7, then the BG monitoring location will be at the groundwater pump before water enters the ditch. The EM location will be directly downstream of the treatment location in the flowing waters outside of the treatment location itself. The PE monitoring location will be at the terminus of the ditch system before the water is released to the San Luis Rey River leading into Lake Henshaw (Figure 7). The EM sample will be taken within one week after the treatment event. Monitoring frequency will be based on the number of treatments, treatment areas, and duration of the application, but at a minimum will be one per treatment event.

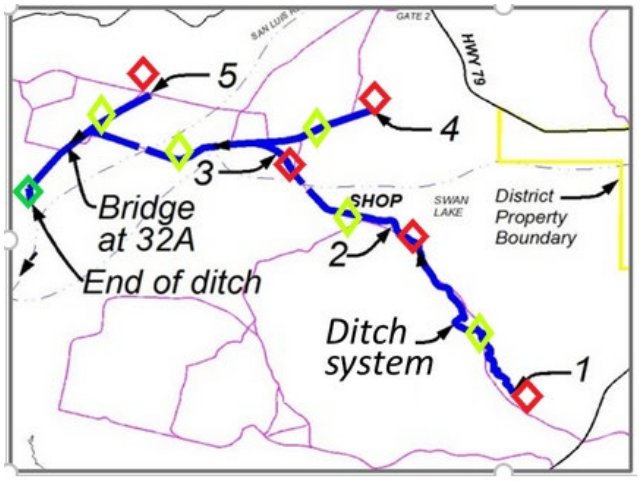



**Figure 7: Warner Ranch Treatment Event Monitoring Locations. Red Diamonds represent background (BG) monitoring locations directly upstream of treatment location/s (numbered); Yellow Diamonds represent event monitoring (EM) location/s; Green Diamond represents post-event monitoring (PE) location at the terminus of the ditch system.**

### 11.2.2 Lake Henshaw

For Lake Henshaw, the BG monitoring location will be at the treatment location itself prior to any treatment (i.e., pre-treatment event) (Figure 8). The EM monitoring will be immediately outside of the treatment location immediately after the application of algaecides and aquatic herbicides and downwind of the prevailing wind direction. The PE location will be within the treatment area; however, in some instances, the PE location will be at the Henshaw Dam outlet channel (Figure 4) when the treatment location is within the vicinity of the intake tower. PE receiving water sampling will be collected within one week after treatment event. In the event of a subsurface application in the lake, the EM and PE locations may be dependent upon hydraulic currents as well as prevailing wind direction. Monitoring frequency will be based on the number of treatments and treatment areas, but at a minimum will be one per treatment event.

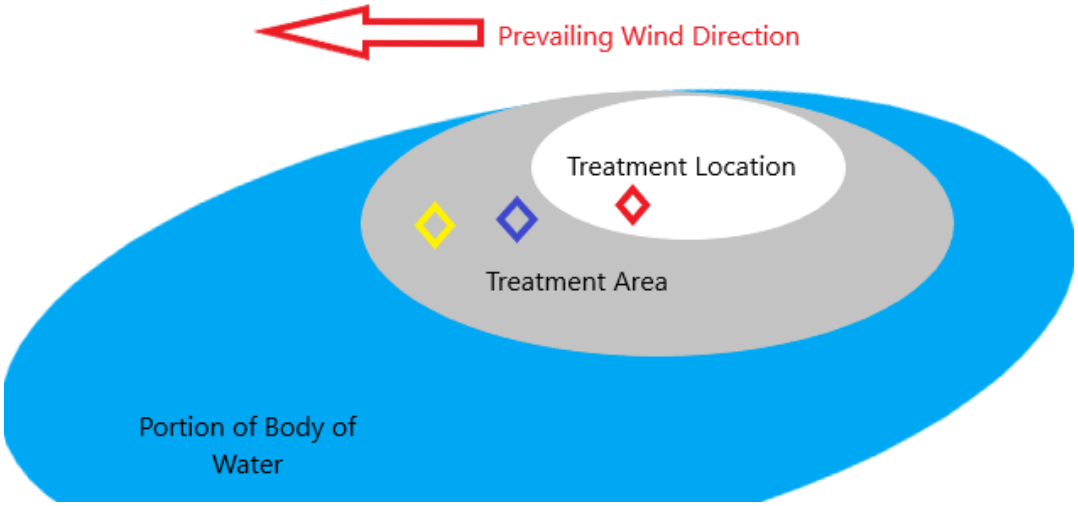



**Figure 8: Lake Henshaw Treatment Event Monitoring Locations. Red Diamond represents background (BG) sampling location; Blue Diamond represents event monitoring (EM) sampling location; Yellow Diamond represents post-event (PE) monitoring location. Note that the sampling locations are dependent on prevailing wind direction and/or current direction for subsurface applications.**

## 11.3 Monitoring Procedures

A recording logbook must be maintained by members of the monitoring team to provide a record of monitoring location, including a map showing the location of each treatment area and treatment location); and significant events, observations, and measurements taken during monitoring. Monitoring records are intended to provide sufficient data and observations to enable project team members to reconstruct events that occurred during the monitoring and must be legible, factual, detailed, and objective. As appropriate, and at the discretion of Vista Irrigation District and/or it's agent staff, observations and measurements can be supplemented with pictures of site conditions at the time of sampling.

When recording observations in the field book, the monitoring team will note the presence or absence of the following:

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

The District will collect field measurements and grab samples for laboratory analysis for the set of monitoring constituents and parameters listed in Table 2. Monitoring procedures for field measurements and grab samples are discussed in Section 11.3.1 and 11.3.2 below.

**Table 2. Monitoring Constituents and Parameters.**

| Sample Type | Constituent/ Parameter | Sample Method | Laboratory Method | Frequency |
|---|---|---|---|---|
| Visual | Site description (lake, open waterway, channel, estimate of percent covered by vegetation, etc.)<br>Appearance of waterway (sheen, color, clarity, etc.)<br>Weather conditions (fog, rain, wind, etc.) | Visual Observation | Not Applicable | All applications at all sites treated |
| Physical | Temperature[1]<br>Turbidity[2]<br>Conductivity[2] | Grab[3] | See EPA Guidelines | All applications at all sites treated |
| Chemical | Active Ingredient[4]<br>pH[2]<br>Dissolved Oxygen[2]<br>Hardness (CaCO3) | Grab[3] | See EPA Guidelines | All applications at all sites treated |

[1] Field measurements with electronic instrumentation, probes, or mercury thermometers.
[2] Field measurement or sample collection for analytical laboratory testing.
[3] Samples shall be collected at 3 feet below the surface, or mid-depth if water body is less than 6 feet deep.
[4] For products that contain sodium carbonate peroxyhydrate, no residual sampling is required before or after treatment because the peroxyhydrate breakdown products are water and bicarbonate.

### 11.3.1 Field Sampling

In conjunction with treatment event monitoring, water temperature will be measured in the field. Turbidity, electrical conductivity, pH, and dissolved oxygen may be measured in the field using field meters as available, or these constituents may be collected as grab samples and analyzed in the laboratory. Turbidity, pH, and dissolved oxygen meters are calibrated according to manufacturer's specifications at the recommended frequency and will be checked with a standard prior to each use. Conductivity meters are calibrated by the manufacturer and will be checked according to manufacturer's specifications with standards throughout the year to evaluate instrument performance. If the calibration is outside the manufacturer's specifications, the probe will be recalibrated. Calibration logs will be maintained for all instruments to document calibration.

- **Water Temperature** — A standard direct-reading, instrument-grade thermometer shall be partially submerged in the treatment location flow until it reaches equilibrium before being read.

- **pH** — A Hach "pH Pocket Pal Tester" or equivalent will be used for field measurement of pH. It shall be calibrated with at least two prepared buffer solutions (e.g., pH 4 and pH 8) before each day of testing (if applicable). Calibrations and field testing shall be performed in adherence with the manufacturer's instructions.
- **Turbidity** — A Hach 2100P Portable Turbidimeter or equivalent shall be utilized for field measurement of turbidity. The instrument shall be calibrated before each analysis (if applicable), and the calibrations and tests shall be performed in adherence with the manufacturer's instructions.
- **Dissolved Oxygen** — A Hach Portable Oxygen Meter or equivalent shall be utilized for determining dissolved oxygen concentrations in the field. The meter shall be calibrated before each analysis (if applicable), and the calibrations and tests shall be performed in adherence with the manufacturer's instructions. The probe's membrane shall be inspected before each sampling event and replaced per manufacturer's recommendation, with membrane replacement occurring at the onset of each new testing season (i.e., spring).
- **Electrical Conductivity** — A Hach Conductivity/TDS Meter (Model 44600) or equivalent shall be utilized for field measurement of electrical conductivity in water. The instrument shall be calibrated before each analysis (if applicable), and the calibrations and tests shall be performed in adherence with the manufacturer's instructions.

### 11.3.2 Grab Sampling and Laboratory Analyses

If the water depth is 6 feet or greater, the grab sample will be collected at a depth of 3 feet. If the water depth is less than 6 feet the sample will be collected at the approximate mid-depth. As necessary, an intermediary sampling device will be used for locations that are difficult to access. Sampling containers will be inverted before being lowered into the water to the desired sample depth, where it will be turned upright to collect the sample (if applicable). An alternative testing method to the bottle inversion method it to utilize a Van Dorn bottle or similar device.

Grab samples will be collected using sampling procedures that minimize the loss of the constituents sampled for and that maintain sample integrity. Clean, empty sample containers with caps will be supplied in protective cartons or ice chests by the primary laboratory. The containers will be certified clean by either the laboratory or the container supplier. To ensure data quality control, the sampler will utilize the appropriate sample container as specified by the laboratory for each sample type. Sample container type, holding time, and appropriate preservatives are listed in

Table 3. Each container will be affixed with a label indicating a discrete sample number for each sample location. The label will also indicate the date and time of sampling and the sampler's name.

Samples may either be collected with bottles containing the correct preservatives(s), or collected in unpreserved bottles and preserved upon receipt at the analytical lab. After collection, samples will be refrigerated at approximately four degrees Celsius, stored in a dark place, and transported to the laboratory.

All samples will be packed and transported the day the samples are collected to provide ample time for samples to be analyzed within the required holding time.

Ice will be included in coolers containing samples that require temperature control and transported to the laboratory for analysis in the following manner:

- Sample container stickers will be checked for secure attachment to each sample container.
- The sample containers will be placed in the lined cooler.
- The chain of custody (COC) will be placed inside a plastic bag and placed inside the cooler. The COC will indicate each unique sample identification name, time and place of sample collection, the sample collector, the required analysis, turn-around-time, and location to which data will be reported. An example COC is provided in Appendix C.
- The cooler will then be readied for pick-up by a courier or delivered directly to the laboratory.

Table 3 presents the set of analytes associated with each treatment event monitoring sample that is collected. All laboratory analyses will be conducted by a California Department of Health Services certified laboratory in accordance with the latest edition of *Guidelines Establishing Test Procedures for Analysis of Pollutants* (40 CFR part 136).

**Table 3: Laboratory Analytical Methods for Grab Samples.**

| Analyte | EPA Method | Method Reporting Limit | Hold Time (Days) | Sample Container | Chemical Preservative |
|---|---|---|---|---|---|
| Water Temperature[1] | N/A | N/A | N/A | N/A | N/A |
| Dissolved Oxygen[1] | 360.1 or 360.2 | 0.0 mg/L | 1 | 1L Amber Glass | None |
| Turbidity[2] | 180.1 | 0.00 NTU | 2 | 100 mL HDPE | None |
| Conductivity[2] | 120.1 | 0 µS/cm | 28 | 100 mL HDPE | None |
| pH[2] | 150.1 or 150.2 | 1-14 s.u. | Immediately | 100 mL HDPE | None |
| Nonylphenol[3] | 550.1 | 0.5µg/L | 7 | 2x40 mL VOA | None |
| Hardness [4] | SM2340B | 0.7 $CaCO_3$/L | 1 day unpreserved; 180 days if preserved | 250 mL HDPE | $HNO_3$ |
| Copper | 200.8 | 0.2 µg/L | 180 days | 250 mL polypropylene | $HNO_3$ |
| *Diquat | 549 | 40 µg/L | 7 | 500 mL Amber HDPE | $H_2SO_4$ |
| *Endothall | 548.1 | 40 µg/L | 7 | 100 mL Amber Glass or 2x40 mL VOA | None |
| *Glyphosate | 547 | 0.5 µg/L | 14 | 2x40 mL VOA | None |
| *Imazamox | **FasTEST-05.03 | 1.0mg/L | 14 | 30 ml HDPE | None |

Notes:

*Signifies algaecide or aquatic herbicide active ingredient. Chemical analysis is only required for the active ingredients(s) used in treatment.

**Per Sepro (manufacture) no listed EPA method was noted for Imazamox. The fasTEST method from SePro is currently available.

Analysis not required for algaecides and aquatic herbicides containing sodium carbonate peroxyhydrate.

EPA Methods are taken from NEMI 2004

1 – Field Measured

2 – May be field or laboratory measured

3 – Required only when a nonylphenol-based surfactant is used

4 – Required for copper applications only

HPLC – High Performance Liquid Chromatography

m – Modified extraction or analysis technique

## 11.4 Monitoring Records

Records of treatment event monitoring information will include the following:

- Date, exact place, and time of sampling or measurements.
- Individuals who performed the sampling or measurements.
- Dates analyses were performed.
- Individuals who performed the analyses.
- Analytical techniques or method used.
- Results of such analyses.

## 11.5 Retention of Records

The District will retain records of the following:

- Monitoring information including all calibration and maintenance records.
- Copies of all reports required by the general permit.
- Records of all data used to complete the application for this general permit.

Records must be maintained for a minimum of 3 years from the date of the sampling, measurement, or report. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Board Executive Officer.

## 11.6 Device Calibration and Maintenance

All monitoring instruments and devices that are used by the District for the APMRP must be properly maintained and calibrated as necessary to ensure their continued accuracy.

## 11.7 Treatment Area Inspections

District staff will routinely inspect the integrity of the Warner Ranch water supply system, the Henshaw Dam, and the associated treatment areas for the ranch and Lake Henshaw, prior to every algaecide/herbicide application to ascertain that treated water is not unintentionally discharged to streams, rivers, lakes, or other natural waterways.

## 11.7 Maximum Copper Concentration

Note that relative to the District's use of copper sulfate as an algaecide, Section C of Order 2013-0002-DWQ specifies that "discharges shall not cause or contribute to an exceedance of the following in the receiving water."

Maximum Copper Concentration = exp[0.8545(ln(harness))-1.702]

For monitoring associated with each treatment event, the District will evaluate compliance with this copper limitation and provide the compliance assessment in the Annual Report to the Regional Board.

## 11.8 Reporting

All APMRP reports submitted to the San Diego Regional Board must comply with the provisions stated in "Standard Provisions and Reporting for Waste Discharge Requirements (NPDES)" (see Appendix A, Attachment D).

On an annual basis, the District will compile all monitoring forms, summarize monitoring data, and present an evaluation of the monitoring results for the calendar year in an APMRP Annual Report. APMRP Annual Reports will contain the following:

- An Executive Summary discussing compliance with Order 2013-0002-DWQ as amended by Orders 2014-0078-DWQ, 2015-0029-DWQ, and 2016-0073-EXEC) and the

effectiveness of the APAP to reduce or prevent the discharge of pollutants associated with aquatic pesticide applications.

- A summary of all monitoring data, including the identification of water quality improvements or degradation, and recommendations for improvements to this APAP (including proposed BMPs) based on the monitoring results. Monitoring results will be tabulated in summary form based on analytical laboratory reports and post-event (PE) monitoring results including receiving water monitoring sample results will be compared to applicable water quality standards. Monitoring results will indicate:
    - The name of the monitoring agency or organization
    - Detailed monitoring location information (including latitude and longitude or township/range/section if available)
    - A map showing each treatment area and each treatment location
    - The amount of algaecide/herbicide used during each treatment event
    - Information on surface area and/or volume of treatment area and any other information used to calculate dosage and quantity of each pesticide used
    - Sample collection date(s)
    - Name of constituent/parameter(s) and the concentration detected
    - Minimum allowable levels for each constituent/parameter
    - Method detection limits for each constituent/parameter
    - Name or description of water body and a comparison with applicable water quality standards
    - Description of analytical quality assurance/quality control
    - Identification of BMPs and a discussion of their effectiveness in meeting APAP requirements
    - A discussion of BMP modifications addressing violations of this General Permit
    - Recommendations to improve the APMRP, BMPs, and APAP to ascertain compliance with Order 2013-0002-DWQ
    - Any proposed changes to the APAP and APMRP

### 11.8.2 Certification

Each Annual Report submitted to the Regional Board must be signed by a responsible officer or duly authorized representative of the District. The following certification statement must be provided with each submittal:

> "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."

Signed _____

Brett Hodgkiss

Title _____

General Manager

Date _____

### 11.8.3 Reporting Schedule

Annual monitoring reports (covering the calendar year, January 1 – December 31) must be submitted to the San Diego Regional Board Executive Officer by March 1 of each year. Annual Reports should be submitted to:

Executive Officer

San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

(858) 467-2952
(858) 571-6972 (fax)

# Appendix A

Executed Notice of Intent (NOI)

## 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# _____

C. ☐ Change of ownership or responsibility: WDID# _____

### II. DISCHARGER INFORMATION

| | | | |
|---|---|---|---|
| A. Name<br>Vista Irrigation District | | | |
| B. Mailing Address<br>1391 Engineer Street | | | |
| C. City<br>Vista | D. County<br>San Diego | E. State<br>California | F. Zip<br>92081 |
| G. Contact Person<br>Mark Saltz | H. E-mail address<br>msaltz@vidwater.org | I. Title<br>Water Resources Specialist | J. Phone<br>760-597-3112 |

### 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. X Canals, ditches, or other constructed conveyance facilities owned and controlled by Discharger.
   Name of the conveyance system: Warner Ranch Ditch 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. X Directly to river, lake, creek, stream, bay, ocean, etc.
   Name of water body: _Lake Henshaw _____

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

## V. ALGAECIDE AND AQUATIC HERBICIDE APPLICATION INFORMATION

A. Target Organisms: _Ditch System: aquatic macrophytes and filamentous algae
Lake Henshaw: cyanobacteria, including but not limited to: *Microcystis sp., Planktothrix sp., Anabaena sp., Aphanizomenon sp., Woronichinia sp., and Dolichospermum sp.*

B. Algaecide and Aquatic Herbicide Used: List Name and Active ingredients
Copper sulfate and chelated copper; diquat dibromide; endothall; glyphosate; sodium carbonate peroxyhydrate; ammonium salt of imazamox

More detail provided in Appendix C of Aquatic Pesticide Application Plan

C. Period of Application: Start Date_(to be determined)_____ End Date_(to be determined)_____

D. Types of Adjuvants Used: Aquatic-labeled adjuvants

## VI. AQUATIC PESTICIDE APPLICATION PLAN

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

If not, when will it be prepared? _____

## VII. NOTIFICATION

Have potentially affected public and governmental agencies been notified? X Yes ☐ No

## VIII. FEE

Have you included payment of the filing fee (for first-time enrollees only) with this submittal?
X YES ☐ NO ☐ NA (Under separate cover)

**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:** Brett Hodgkiss

**B. Signature:** _____ **Date:** 04/06/2021

**C. Title:** General Manager

**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** _____ |

## INSTRUCTIONS FOR COMPLETING NOI

## 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

These instructions are intended to help you, the Discharger, to complete the Notice of Intent (NOI) form for the Statewide General NPDES permit. **Please type or print clearly when completing the NOI form**. For any field, if more space is needed, submit a supplemental letter with the NOI.

Send the completed and signed form along with the filing fee and supporting documentation to the Division of Water Quality, State Water Resources Control Board. Please also send a copy of the form and supporting documentation to the appropriate Regional Water Quality Control Board (Regional Water Board).

### ***Section I – Notice of Intent Status***

Indicate whether this request is for the first time coverage under this General Permit or a change of information for the discharge already covered under this General Permit. Dischargers that are covered under Order No. 2004-0009-DWQ before effective date of this General Permit should check the box for change of information. For a change of information or ownership, please supply the eleven-digit Waste Discharge Identification (WDID) number for the discharge.

### ***Section II – Discharger Information***

Enter the name of the Discharger.
Enter the street number and street name where correspondence should be sent (P.O. Box is acceptable).
Enter the city that applies to the mailing address given.
Enter the county that applies to the mailing address given.
Enter the state that applies to the mailing address given.
Enter the zip code that applies to the mailing address given.
Enter the name (first and last) of the contact person.
Enter the e-mail address of the contact person.
Enter the contact person's title.
Enter the daytime telephone number of the contact person

### ***Section III – Billing Address***

Enter the information **only** if it is different from Section II above.

**A.** Enter the name (first and last) of the person who will be responsible for the billing.

**B.** Enter the street number and street name where the billing should be sent (P.O. Box is acceptable).
**C.** Enter the city that applies to the billing address.
**D.** Enter the county that applies to the billing address.
**E.** Enter the state that applies to the billing address.
**F.** Enter the zip code that applies to the billing address.
**G.** Enter the e-mail address of the person responsible for billing.
**H.** Enter the title of the person responsible for billing.
**I.** Enter the daytime telephone number of the person responsible for billing.

## ***Section IV – Receiving Water Information***

Please be reminded that this General Permit does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code §2050 et. seq) or the Federal Endangered Species Act (16 U.S.C.A. §1531 et. seq). This General Permit requires compliance with effluent limitations, receiving water limitations, and other requirements to protect the beneficial uses of waters of the state. The Discharger is responsible for meeting all requirements of the applicable Endangered Species Act.

Additional information on federally-listed threatened or endangered species and federally-designated critical habitat is available from NMFS (www.nmfs.noaa.gov) for anadromous or marine species or FWS (www.fws.gov) for terrestrial or freshwater species.

**A.** Check all boxes that apply. At least one box must be checked.
1. Check this box if the treatment area is a canal, ditch, or other constructed conveyance system owned and controlled by Discharger. Print the name of the conveyance system.
2. Check this box if the treatment area is a canal, ditch, or other constructed conveyance system owned and controlled by an entity other than the Discharger. Print the owner's name and names of the conveyance system.
3. Check this box if the treatment area is not a constructed conveyance system (including application to river, lake, creek, stream, bay, or ocean) and enter the name(s) of the water body(s).

**B.** List all Regional Water Board numbers where algaecide and aquatic herbicide application is proposed. Regional Water Board boundaries are defined in section 13200 of the California Water Code. The boundaries can also be found on our website at http://www.waterboards.ca.gov/waterboards_map.shtml

| Regional Water Board Numbers | Regional Water Board Names |
|---|---|
| 1 | North Coast |
| 2 | San Francisco Bay |
| 3 | Central Coast |

| Regional Water Board Numbers | Regional Water Board Names |
|---|---|
| 4 | Los Angeles |
| 5 | Central Valley (Includes Sacramento, Fresno, Redding Offices) |
| 6 | Lahontan (South Lake Tahoe, Victorville offices) |
| 7 | Colorado River Basin |
| 8 | Santa Ana |
| 9 | San Diego |

***Section V – Algaecide and Aquatic Herbicide Application Information***

- **A.** List the appropriate target organism(s).
- **B.** List the name and active ingredients of each algaecide and aquatic herbicide to be used.
- **C.** List the start and end date of proposed aquatic algaecide and aquatic herbicide application event.
- **D.** List the name(s) and type(s) of adjuvants that will be used.

The Discharger must submit a new NOI if any information stated in this section will be changed. If the Discharger plans to use an algaecide and aquatic herbicide product not currently covered under its Notice of Applicability (NOA), and the algaecide and aquatic herbicide product may be discharged to a water of the United States as a result of algaecide and aquatic herbicide application, the Discharger must receive a revised NOA from the State Water Board's Deputy Director of the Division of Water Quality before using that product.

***Section VI – Aquatic Pesticide Application Plan***

The Coalition or Discharger must prepare and complete an Aquatic Pesticide Application Plan (APAP). The minimum contents of APAP are specified in the permit under Section VIII.C, Limitations and Discharge Requirements, of the General Permit. The Discharger must ensure that its applicator is familiar with the APAP contents before algaecide and aquatic herbicide application.

If an APAP is not complete at the time of application, enter the date by which it will be completed.

***Section VII – Notification***

Indicate if you have notified potentially affected public and governmental agencies, as required under item VIII.B of the General Permit.

***Section VIII – Fee***

The amount of Annual fee shall be based on Category 3 discharge specified in section 2200(b)(9) of title 23, California Code of Regulations. Fee information can be found at http://www.waterboards.ca.gov/resources/fees/docs/fy1112fee_schdl_npdes_prmt.pdf.

Check the YES box if you have included payment of the annual fee. Check the NO box if you have not included this payment. **NOTE:** You will be billed annually and payment is required to continue coverage.

***Section IX– Certification***

- **A.** Print the name of the appropriate official. The person who signs the NOI must meet the signatory and certification requirements stated in Attachment B Standard Provisions item V.B.
- **B.** The person whose name is printed above must sign and date the NOI.
- **C.** Enter the title of the person signing the NOI.

# Appendix B

## Approved Algaecide Products Additional Information

Approved algaecide/herbicide product labels are available at the below weblinks.

Algimycin PWF
https://www.appliedbiochemists.com/uploads/7/6/9/4/76946485/ab_algimycin_info_sheet.pdf

Aquathol K
http://www.cdms.net/ldat/ld195001.pdf

Aquathol Super K
http://www.cdms.net/ldat/ld2AE011.pdf

Captain
https://www.sepro.com/Documents/Captain_Label.pdf

Captain XTR
https://www.sepro.com/Documents/Captain-XTR_Label.pdf

Chem 1 Copper Sulfate
https://brandt.co/media/1638/copper-sulfate-crystals-label.pdf

Clearcast
https://www.sepro.com/Documents/Clearcast_Label.pdf

Cleargate EC9
https://www.appliedbiochemists.com/uploads/7/6/9/4/76946485/ab_clearigate_ec9_info_sheet.pdf

Cleargate
https://www.appliedbiochemists.com/uploads/7/6/9/4/76946485/ab_clearigate_info_sheet.pdf

Cutrine Plus Granular
https://www.appliedbiochemists.com/uploads/7/6/9/4/76946485/ab_cutrine_plus_gran_info_sheet.pdf

Cutrine Plus
https://www.appliedbiochemists.com/uploads/7/6/9/4/76946485/ab_cutrine_plus_info_sheet.pdf

Cutrine Ultra
https://www.appliedbiochemists.com/uploads/7/6/9/4/76946485/cutrine_ultra_specimen_label.pdf

Harpoon
https://www.appliedbiochemists.com/uploads/7/6/9/4/76946485/harpoon_specimen_label.pdf

Harpoon Granular
https://www.appliedbiochemists.com/uploads/7/6/9/4/76946485/harpoon_granular_specimen_label.pdf

Hydrothol 191
http://www.cdms.net/ldat/ld225004.pdf

Hydrothol Granular
http://www.cdms.net/ldat/ld8UG006.pdf

Komeen
https://www.sepro.com/Documents/Komeen_Label.pdf

Komeen Crystal
https://www.sepro.com/Documents/Komeen-Crystal_Label.pdf

K-tea
https://www.sepro.com/Documents/K-Tea_Label.pdf

Littora
https://www.sepro.com/Documents/Littora_Label.pdf

Pax 27
https://www.sepro.com/Documents/Pak-27_Label.pdf

Phycomycin SCP
https://www.appliedbiochemists.com/uploads/7/6/9/4/76946485/ab_phycomycin_info_sheet.pdf

Pond-Klear
https://www.appliedbiochemists.com/uploads/7/6/9/4/76946485/ab_pond-klear_info_sheet.pdf

Round Up Custom
http://horizon.wiki/images/a/a6/Monsanto_Roundup_Custom_Herbicide_Label.pdf

Teton
http://www.cdms.net/ldat/ld9JU000.pdf

# Appendix C

Example Chain-of-Custody Record Example Aquatic Pesticide Treatment and Monitoring Event Log

**Enthalpy Analytical - San Diego**
4340 Vandever Avenue, San Diego, CA 92120
Phone 858-587-7333
info@enthalpy.com

ENTHALPY ANALYTICAL

# Chain of Custody

Date_____ Page___ of ___

**Sample Collection By:**

**Report to:**

**Company**
**Address**
**City/State/Zip**
**Contact**
**Phone**
**Email**

**Invoice To:** **Same as Report to** ☐

**Company**
**Address**
**City/State/Zip**
**Contact**
**Phone**
**Email**

**ANALYSES REQUIRED**

Enthalpy Matrix Codes:
G = Grab
C = Composite
FW = Freshwater
SW = Seawater
Sed = Sediment
STRM = Stormwater
GW = Groundwater
WW = Wastewater
O = Other (specify)

**Receipt Temperature (°C)**

| | SAMPLE ID | SAMPLE Date | SAMPLE Time | SAMPLE Type (G or C) | MATRIX CODE (FW, SW, Sed, STRM, GW, WW, O) | Container Type | Container Qty | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |

**PROJECT INFORMATION**

**Project Name:**
**PO No.:**
**Shipped Via:**

**SAMPLE RECEIPT**

**Total No. of Containers**
**Received Good Condition?**
**Matches Test Schedule?**

**SPECIAL INSTRUCTIONS/COMMENTS:**

**1) RELINQUISHED BY (CLIENT)**
(Signature) (Time)
(Printed Name) (Date)
(Company)

**2) RECEIVED BY (COURIER)**
(Signature) (Time)
(Printed Name) (Date)
(Company)

**3) RELINQUISHED BY (COURIER)**
(Signature) (Time)
(Printed Name) (Date)
(Company)

**4) RECEIVED BY (LABORATORY)**
(Signature) (Time)
(Printed Name) (Date)
(Company) (Log-in #s)

**Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.**
**Shaded areas are for lab use only**
**Report turn-around-time varies depending on length of test; please inquire with your project manager.**

**http://enthalpy.com/environmental-toxicology-2/**

# Herbicide/Algaecide Application and Monitoring Event Log

## Warner Ranch Treatment Event

**BG Sample Location:**

Date:_____ Time:_____

Latitude:_____

Longitude:_____

**EM Sample Location:**

Date:_____ Time_____

Latitude:_____

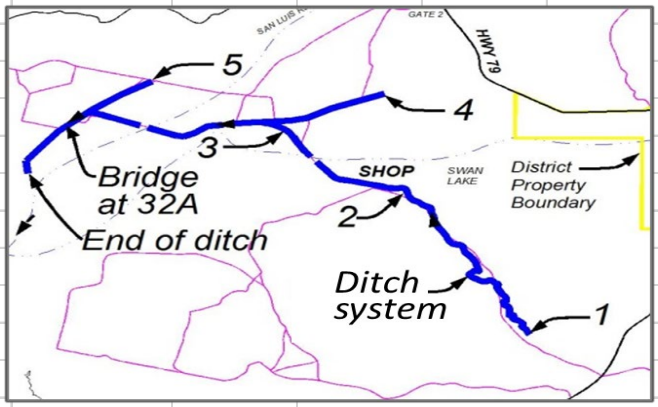
Longitude:_____

**PE Sample Location:**

Date:_____ Time:_____

Latitude:_____

Longitude:_____




**Indicate sample Locations on map (BG, EM, PE)**

**Instructions**

***Background Sample (BG) for active ingredient, will be taked within 24 hours prior to application directly upstream of the treatment location; Event Monitoring (EM) of active ingredient will be taken immediately downstream of the treatment location after application in the flowing waters adjacent to the treeatment area; Post-Event Monitoring (PE) for active ingredient will be taken at the end of ditch within 1 week after the treatment event.***

**Additional Parameters:**

| (BG) | (EM) | (PE) |
|---|---|---|
| Temp:_____ | Temp:_____ | Temp:_____ |
| pH:_____ | pH:_____ | pH:_____ |
| Turbidity:_____ | Turbidity:_____ | Turbidity:_____ |
| DO:_____ | DO:_____ | DO:_____ |
| Conductivity:_____ | Conductivity:_____ | Conductivity:_____ |
| Hardness:_____ | Hardness:_____ | Hardness:_____ |

**Field Book Observations:**

_____

_____

_____

**Algaeicide/Herbicide Applied:**

**1)_____ Amount:_____ Rate:_____**

**2)_____ Amount:_____ Rate:_____**

**3)_____ Amount:_____ Rate:_____**

**Sample/s Taken By:_____ Date:_____**

**Sample/s Taken By:_____ Date:_____**

**Application Completed By:_____ Date:_____**

# Herbicide/Algaecide Application and Monitoring Event Log

**Lake Henshaw Treatment Event Page 1**

**BG Sample Location:**

Date:_____ Time:_____

Latitude:_____

Longitude:_____

**EM Sample Location:**

Date:_____ Time_____

Latitude:_____

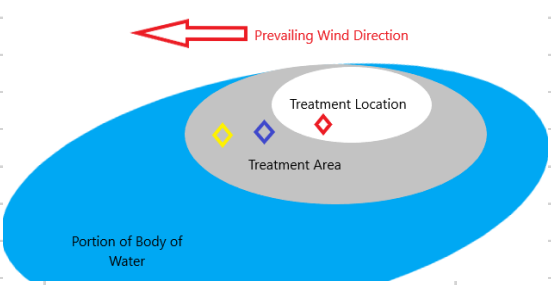
Longitude:_____

**PE Sample Location:**

Date:_____ Time:_____

Latitude:_____

Longitude:_____




**Red Diamond represents (BG) sample location; Blue Diamond represents (EM) location; Yellow Diamond represents (PE) location.**

**Instructions**

***Background Sample (BG) for active ingredient, will be taked within 24 hours prior to application within the treatment location; Event Monitoring (EM) of active ingredient will be taken downwind of the treatment location within the treatment area immediately after application; Post-Eventing Monitoring sample (PE) for active ingreident will be taken within 1 week in the treatment area, in some instances the PE sample location will be taken at the dam outlet channel.***

**Additional Parameters:**

| (BG) | (EM) | (PE) |
|---|---|---|
| Temp:_____ | Temp:_____ | Temp:_____ |
| pH:_____ | pH:_____ | pH:_____ |
| Turbidity:_____ | Turbidity:_____ | Turbidity:_____ |
| DO:_____ | DO:_____ | DO:_____ |
| Conductivity:_____ | Conductivity:_____ | Conductivity:_____ |
| Hardness:_____ | Hardness:_____ | Hardness:_____ |

**Field Book Observations:**

_____

_____

_____

**Algaeicide/Herbicide Applied:**

1)_____ Amount:_____ Rate:_____

2)_____ Amount:_____ Rate:_____

3)_____ Amount:_____ Rate:_____

Sample/s Taken By:_____ Date:_____

Sample/s Taken By:_____ Date:_____

Application Completed By:_____ Date:_____

# Herbicide/Algaecide Application and Monitoring Event Log

**Lake Henshaw Treatment Event Page 2**


**Indicate on the provided map the Treatment Location (TL), the Treatment Area (TA) See page 1 for example. Also indicate sample locations (BG, EM & PE) as well as relative wind direction.**

# Appendix D

Reference List

WATER QUALITY ORDER NO. 2001-12-DWQ (CAG990003)
WATER QUALITY ORDER NO. 2004-0009-DWQ 9 (CAG 990005)
WATER QUALITY ORDER NO. 2013-0002-DWQ (CAG990005)
https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/

WATER QUALITY CONTROL PLAN FOR THE SAND DIEGO BASIN (9)
https://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/docs/R9_Basin_Plan.pdf

California Toxics Rule (CTR)
https://www.federalregister.gov/documents/2000/05/18/00-11106/water-quality-standards-establishment-of-numeric-criteria-for-priority-toxic-pollutants-for-the

Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries in California, a.k.a. the State Implementation Plan, or SIP (2005)
https://www.waterboards.ca.gov/water_issues/programs/state_implementation_policy/docs/sip2005.pdf

STATE WATER RESOURCES CONTROL BOARD ORDER WQ 2014-0078-DWQ AMENDING STATE WATER RESOURCES CONTROL BOARD WATER QUALITY ORDER 2013-0002-DWQGENERAL PERMIT NO. CAG 990005
https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2014/wqo2014_0078_dwq.pdf

STATE WATER RESOURCES CONTROL BOARDORDERWQ 2015-0029-DWQ AMENDING STATE WATER RESOURCES CONTROL BOARD WATER QUALITY ORDER 2013-0002-DWQ (AS AMENDED BY ORDER 2014-0078-DWQ) GENERAL PERMIT NO. CAG 990005
https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2015/wqo2015_0029_dwq.pdf

STATE WATER RESOURCES CONTROL BOARD ORDER 2016-0073-EXEC AMENDING WATER QUALITY ORDER 2013-0002-DWQ GENERAL PERMIT NO. CAG 990005
https://www.waterboards.ca.gov/water_issues/programs/npdes/pesticides/docs/weedcontrol/2016_00743exec_wcpa.pdf

National Environmental Methods Index (NEMI 2004)
https://www.nemi.gov/home/