AQUATIC PESTICIDES APPLICATION PLAN (APAP)

For

Bel Marin Keys Community Service District (BMKCSD)

Marin County, California

In partial fulfillment of requirements for coverage under the

STATEWIDE GENERAL NPDES PERMIT FOR THE DISCHARGER OF AQUATIC PESTICIDES FOR AQUATIC WEED CONTROL IN WATERS OF THE UNITED STATES

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

BMKCSD
4 Montego Key
Novato, CA 94949

November 10, 2025

Contents

Picture 1: Bel Marin Keys
Photo Courtesy of the San Francisco Chronicle

INTRODUCTION

The Bel Marin Keys Community Service District (BMKCSD) an unincorporated portion of northeastern Marin County, California. It was created via resolution on June 26, 1961, by the Marin County Board of Supervisors BMKCSD Enabling Resolution 6797. The BMKCSD is a non-enterprise Special District; the District is a public entity that derives much of its revenue from a percentage of the property taxes collected by the County of Marin.

The BMKCSD is subject to statutory requirements such as public meetings and public contracting laws and is governed by a five-member Board of Directors elected to a staggered four-year term; by voters residing within the boundaries of Bel Marin Keys. All parcels within BMK are subject to Covenant Codes and Restriction (CC&R's) designed for each unit within Bel Marin Keys.

Many of the homes abut the man-made North & South Lagoons or Novato Creek. Both lagoons have access to Novato Creek through navigational locks which allow residents to take their boats into San Pablo Bay.

Picture 2: Bel Marin Keys
Photo courtesy of Bob Minkin

1 DESCRIPTION OF THE WATER SYSTEM

These saltwater Lagoons are located southeast of the city of Novato in Marin County. The Receiving Water for the Lagoons is San Pablo Bay by way of Novato Creek. The Lagoon is owned and operated by the Bel Marin Keys Community Service District.

The North Lagoon has a surface area of 113 acres with a maximum depth estimated around 10 feet. The South lagoon is 158 acres with several deep coves over 35 feet in depth. The lagoons serve as recreation areas, aesthetic amenities, and natural habitat.

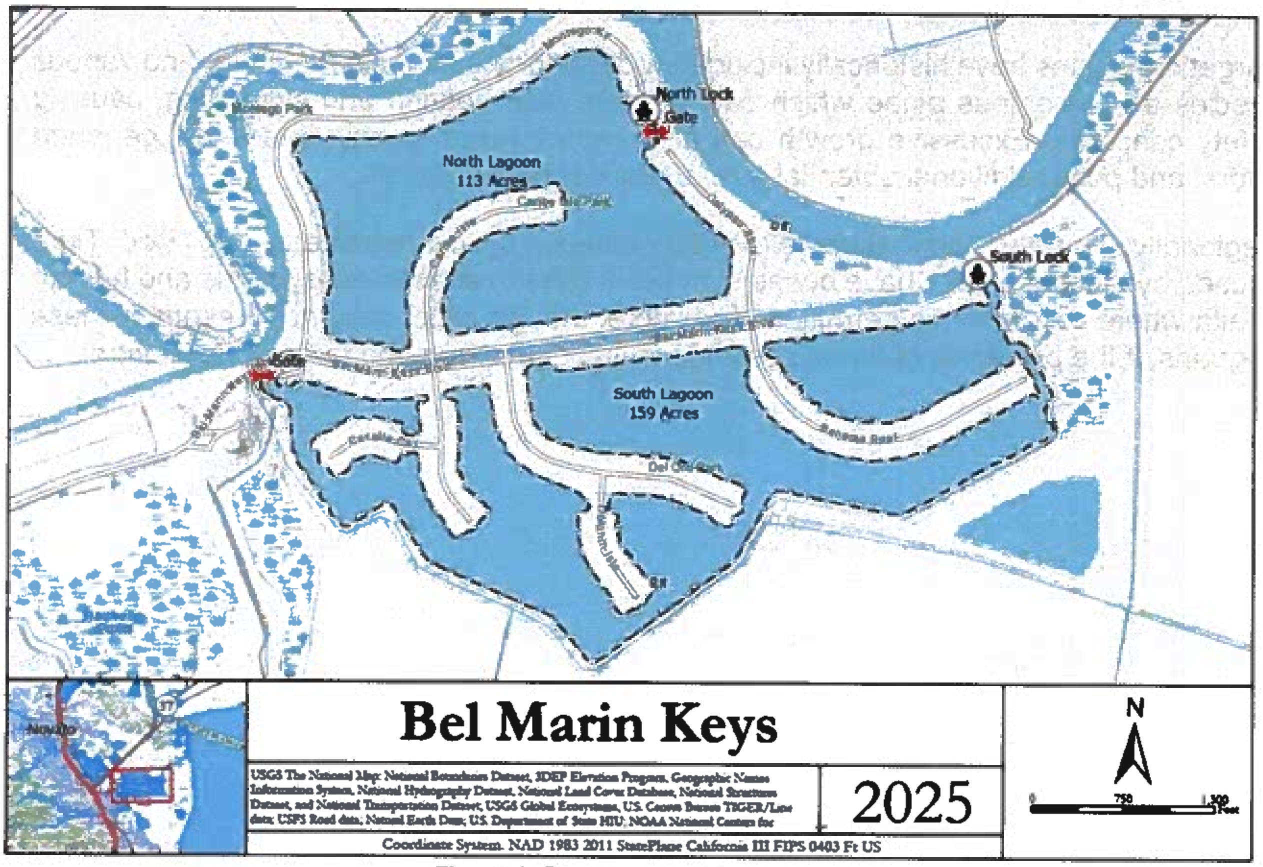


Figure 1: Bel Marin Keys Site Map

Source water for the Lagoons is partly from stormwater runoff from the neighborhood. The South Lagoon receives runoff from Pacheco Pond and via the gates and locks connected to Novato Creek.

2 TREATMENT AREA

Application locations and their extent will vary depending on the target species, time of year, and other environmental conditions. Generally, the treatment area will be the littoral zone of the lagoons and applications will be made to maintain the Lagoon's beneficial uses including but not limited to recreation and the water quality objectives in the Basin Plan[i].

3 WEEDS AND ALGAE SUBJECT TO CONTROL

Target organisms have historically included widgeongrass (*Ruppia maritima*) and various species of filamentous algae which can interfere with boating and swimming, causing safety concerns. Excessive growth can also impact water quality objectives, generate odors, and pose additional potential risks to residents and guests.

Regionally, Harmful Algal Blooms (HABS) caused by cyanobacteria and Red Tide, caused by dinoflagellates have posed significant risks to aquatic ecosystems and human health where recreation is permitted. Therefore, though historically not present in these Lagoons, if the presence of these pests is identified, they may be targeted for control.

4 AQUATIC PESTICIDES USED AND APPLICATION METHODS

Table 1: Pesticide products to be used

Pesticide Active Ingredient	Example Brand Names	Method of Application	Surfactant
Imazamox	Imox, Top Deck, Castaway	Subsurface injection, broadcast, aerial	CA DPR approved aquatic surfactants
Diquat	Reward, Tribune, Alligare Diquat	Subsurface injection, broadcast, aerial	CA DPR approved aquatic surfactants
Copper Complexes	Argos, Captain XTR, Cutrine Ultra	Subsurface injection, broadcast, aerial	CA DPR approved aquatic surfactants
Hydrogen Peroxide & PAA	GreenClean 5.0	Subsurface injection, broadcast, aerial	N/A
Sodium Carbonate Peroxyhydrate	GreenClean Pro, PAK27	Slurry injection/broadcast, granular spreader, aerial	N/A
Fluoridone *(pending Section 24 approval)*	Fluoridone, Sonar AS,	Slurry injection/broadcast, granular spreader, aerial	CA DPR approved aquatic surfactants

5 DECISION FACTORS FOR USING AQUATIC PESTICIDES

Integrated Pest Management (Physical and cultural) tactics are employed to inhibit the growth of nuisance organisms; however, environmental conditions have the potential to cause these tactics to become infeasible and/or to have an adverse impact on the Lagoons' ecosystems. Therefore, chemical control tactics may at times be the least intrusive method to control a target organisms.

Treatment thresholds are based on the abundance and/or extent of the organism as well as environmental conditions including the weather forecast, water quality conditions, and knowledge of the historical patterns of growth. BMKCSD on-site staff, Board of Directors and committee members will use their discretion, in consultation with professionally licensed aquatic pesticide applicators (QAL, category F) and/or a Pest Control Advisor (PCA), when warranted, to implement chemical control tactics.

A control threshold shall be considered immediately met if any of the beneficial uses of the Lagoons are threatened.

6 GATES, CONTROL STRUCTURES, AND INSPECTION SCHEDULE

Each Lagoon has a navigation lock as well as a gate. The locks are used to bring water into the lagoons while the gates are used to release water. All structures are routinely inspected and maintained by the BMKCSD Waterways Manager.

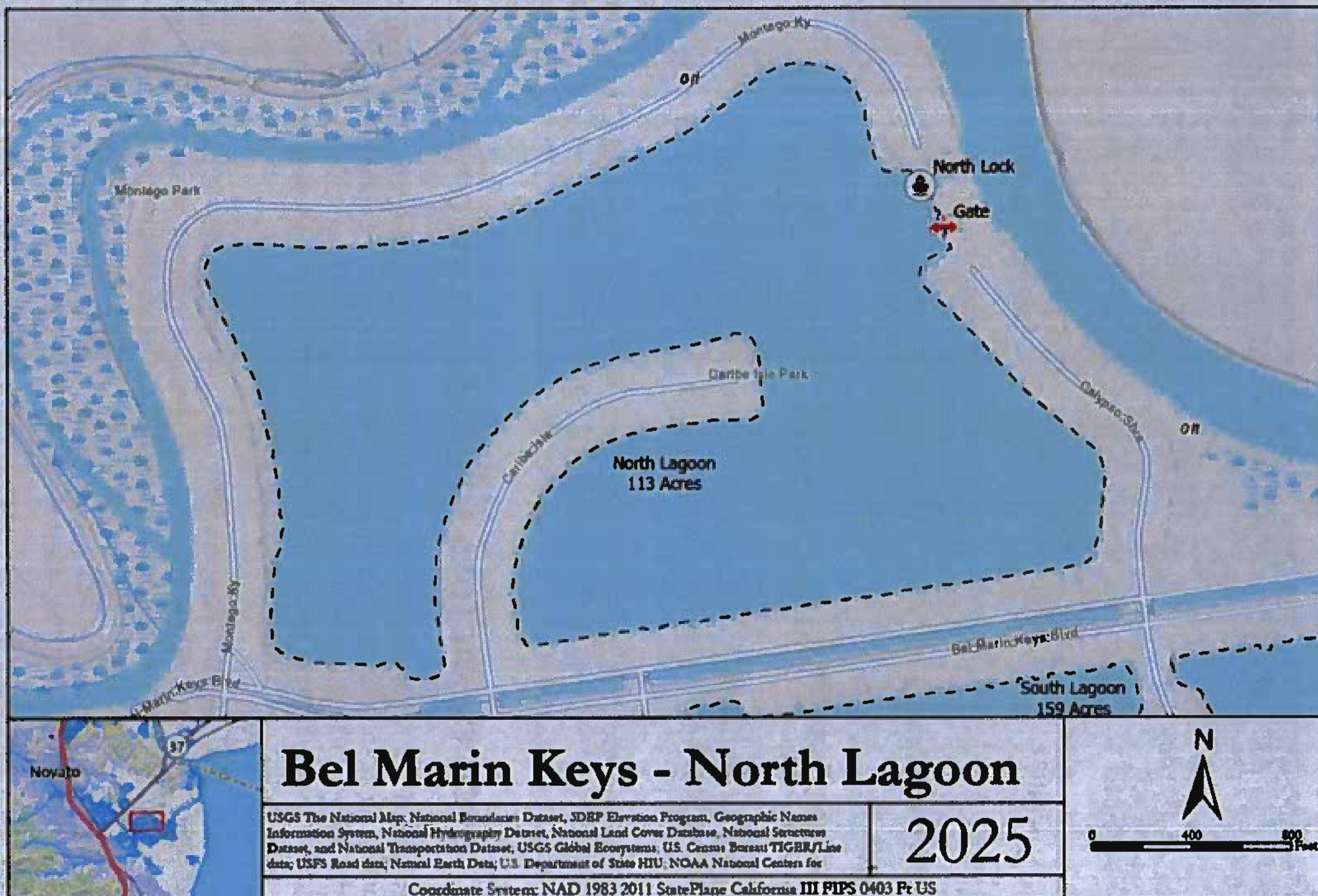


Figure 2: North Lagoon Control Structures

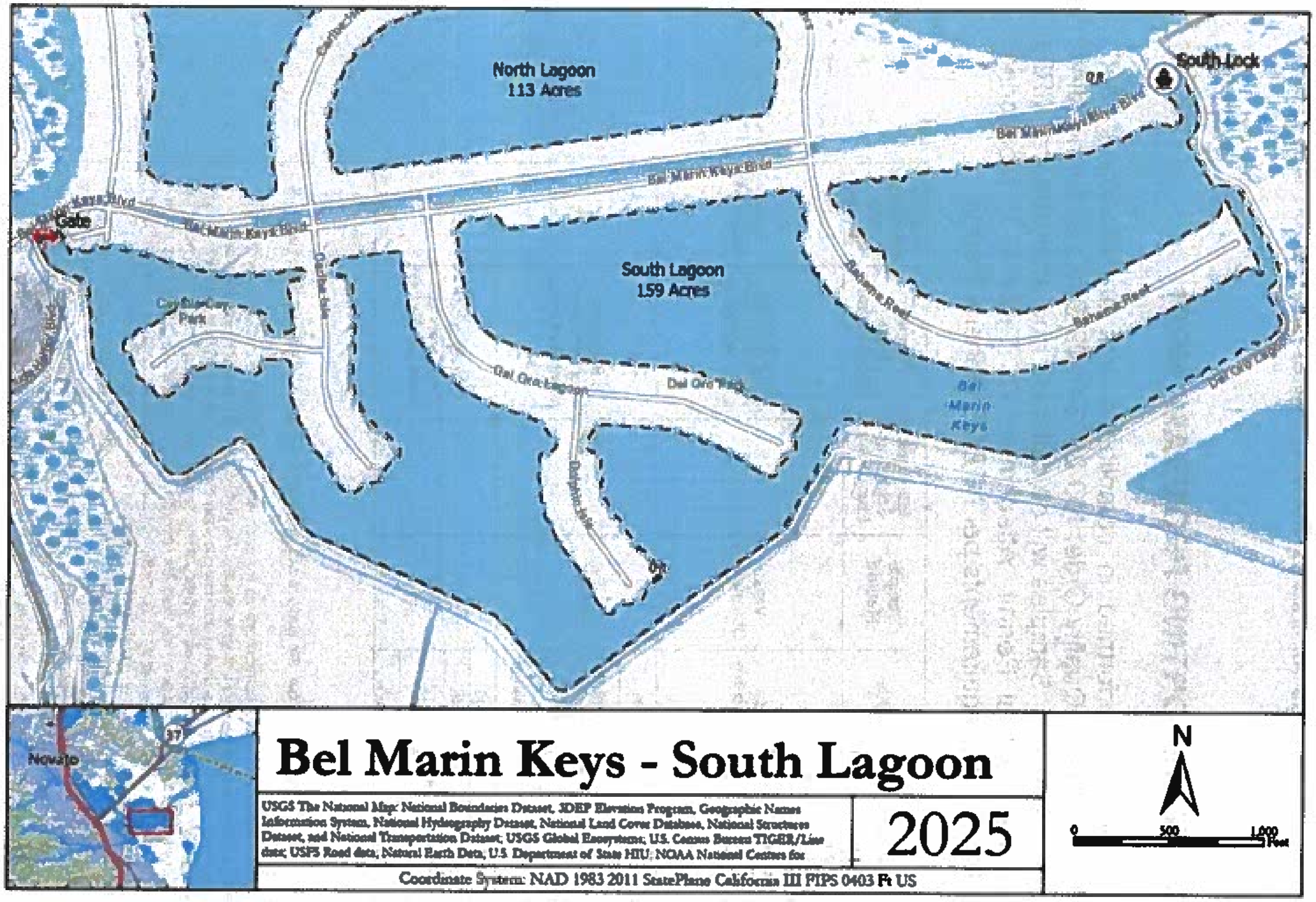


Figure 3: South Lagoon Control Structures

While these gates provide manual control, water flow direction is driven by gravity and therefore dependent on tides. At high tide, when the gates are opened, water from Novato Creek can flow by gravity through the locks or control gates into the lagoons; at low tide, water can flow from the lagoon through the open locks or control gates into the Creek. BMKCSD Staff controls the gates in coordination with tides to control the Lagoon's operating levels and to meet water quality objectives.

Water levels in the Lagoons are controlled to achieve winter operating level (WOL) which is focused on storm water control for the protection of property, and summer operating level (SOL) focused on maintaining beneficial uses.

7 SIP CATEGORICAL EXCEPTION

The BMKCSD 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.

8 MONITORING AND REPORTING PROGRAM (MRP)

Water quality monitoring will be performed in compliance with the Monitoring and Reporting Program (MRP) for Water Quality Order NO 2013-0002-DWQ and amending orders as of the writing of this APAP. Samples will be collected and analyzed per MRP guidelines as stated in the General Permit, Attachment C, Table C-1. Monitoring Requirements. Table 2: Monitoring requirements per NPDES General Permit

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]	µg/L	Grab[4]	5	Background, Event and Post-event Monitoring	6
	2. Nonylphenol[8]	µg/L				
	3. Hardness (if copper is monitored)	mg/L				
	4. Dissolved Oxygen[2]	mg/L				

1 All applications at all sites.
2 Field testing.
3 Field or laboratory testing.
4 Samples shall be collected at three feet below the surface of the water body or at mid water column depth if the depth is less than three feet.
5 Collect samples from a minimum of six application events for each active ingredient in each environmental setting (flowing water and non-flowing water) per year, except for glyphosate. If there are less than six application events in a year, collect samples during each application event for each active ingredient in each environmental setting (flowing water and non-flowing water). If the results of monitoring from six consecutive application 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. To support a reduction in monitoring frequency, the six sampling events showing concentrations that are less than the receiving water limitation/trigger for an active ingredient must be consecutive and can span more than one year or application season. The reduction in monitoring frequency under this provision applies to all listed active ingredients including SIP listed active ingredients 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, chlorine, dissolved copper, diquat, endothall, flumioxazin, fluridone, glyphosate, imazamox, imazapyr, penoxsulam, and triclopyr.
8 It is required only when a surfactant is used.

Monitoring Frequency and Locations

Monitoring for BMKCSD may be performed by a contractor or by in-house staff. Monitoring locations will be determined for each treatment event, based on the treatment area within the Lagoon. Monitoring frequency will follow the schedule set forth by the NPDES general permit and is summarized below:

Background Monitoring

Background monitoring samples shall be collected in the application area just prior to (up to 24-hours in advance of) an application event.

Event Monitoring

Event monitoring samples shall be collected outside of the treatment area, immediately after the application event, but after sufficient time has elapsed such that treated water would have exited the treatment area.

Post-event Monitoring

Post-event monitoring samples shall be collected within the treatment area within one week after application.

One full set of three samples (Background, Event and Post-Event) will be collected during each treatment from the representative site(s) treated within the Lagoon.

Sample Analysis

All laboratory analysis shall be conducted at a laboratory certified for such analysis by the California Department of Health. All analyses shall be conducted in accordance with the latest edition of "Guidelines Establishing Test Procedures for Analysis of Pollutants" (Guidelines), promulgated by the USEPA (Title 40 CFR Part 136)[ii].

Sample Preservation and Delivery

Samples will be collected in appropriate containers as instructed by the lab performing the analysis. Should an analytical method require preservation or filtration in the field, that will occur. Once collected and labeled, samples will be immediately placed in a dark, cold (~4C) environment, typically a cooler with ice. Delivery of samples to the laboratory will be accomplished within the labs specified hold times for the sample method.

Annual Reporting

An annual report will be submitted to the appropriate Regional Water Quality Control Board (RWQCB) by March 1 of the year following treatment. If no algaecide or aquatic herbicide treatments are done that year, a letter stating no applications have been done will be sent to the appropriate RWQCB in lieu of an annual report.

Chemical Application

Bel Marin Keys
North Lagoon
Bel Marin Keys, CA 94949, USA

General Info

66 F

Clear Sky

Wind: 21 mph South

[illegible] humidity

Log ID: [illegible]

Log #: 1

Start Date/Time*: 11/21/2025 1:59 PM

End Date/Time*: 11/21/2025 2:59 PM

Lead Staff*: Brian Clark

Additional Staff: [illegible]

Water Conditions

Water Body Type: Lagoon

Water Temp (F): [illegible]

Water Depth (ft): 6

Water Flow (ft/s cfs): 0

Percent Cloud Cover: 50

Water Color: Green

Water Clarity: Fair

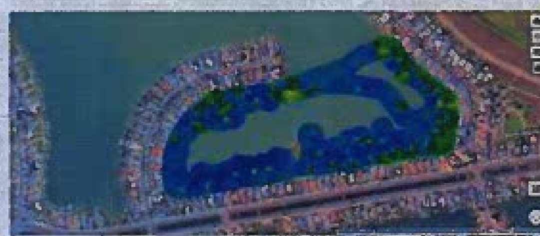
Water Sheen: (check if present)

Application Info

Target Species: Widgeongrass

Percent Covered: 75

Application Method: Boat



Area 1: 2.90 acres

Area 2: 1.83 acres

Area 3: 1.11 acres

Water Quality - Pre-Application Monitoring

+ Add Row

Date	Parameter	Mode	Value	Units
10/16/2024 12:26 am	Specific Conductivity			µS/cm
[illegible]	Dissolved Oxygen			mg/L
[illegible]	Turbidity			NTU
[illegible]	pH			pH

Rows per page: 10 1-4 of 4

Chemicals

Chemical: Triclopyr 3a

Stock: General Stock

Rate: 1.5

Rate Units: ppm

Product Type:

EPA #: 81927-13

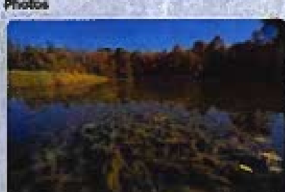
Total Amount: 6.6

Units: gal

State #:

Active Ingredient: Triclopyr 44.4%

Photos



Description

[illegible]

Notes

9 PREVENTING SAMPLE CONTAMINATION

BMKCSD will require that samples collected shall be, when possible, collected upwind and not in close proximity to application equipment. BMKCSD shall require there be no contact between a sampler and any pesticides or application equipment including spray tanks, containers, application boats or vehicles or applicators' personal protective equipment.

When sampling is completed in a given location, all equipment will be cleaned with an appropriate detergent and triple-rinsed. Once at a new sampling location, the equipment will be rinsed once with the water being sampled prior to collection.

Samples will be tightly sealed at the point of collection and placed upright within an ice chest used solely for sample transport.

10 DESCRIPTIONS OF BMPS TO BE IMPLEMENTED

BMKCSD will implement the following BMPs

Spill Prevention and Containment

All pesticide applications will be contracted out to a California Department of Pesticide Regulation – licensed Pest Control Business (PCB). PCB staff are required to undergo training according to the California Department of Pesticide Regulation's Pesticide Safety Information Series, including Leaflet PSIS N-2 "Storing, Moving, and Disposing of Pesticides in Non-Agricultural Settings"[iii] . This leaflet includes accepted BMPs to prevent spills or contamination and in the event of a spill, it includes measures to contain pesticide products, apply absorbent material, and remove products to a proper disposal location. Label and SDS sheet instructions for the products being applied will be followed and reporting will commence as required by local, state, and federal laws.

Ensure Appropriate Rate

BMKCSD shall obtain a written recommendation from a licensed Pest Control Advisor (PCA) to ensure that applications are made in accordance with the product labels. BMKCSD will further ensure that applications are performed by licensed or qualified individual from the PCB contracted to perform an application.

Education

BMKCSD shall confirm that the contracted PCB provides evidence that its staff have active licenses and/or have undergone pesticide handler safety training including the products selected for use at their site, as required by DPR. Applicators shall be familiar and comply with the contents of this APAP prior to making an application.

Planning and Coordination

The General Permit requires that every calendar year, at least 15 days prior to the first application of algaecide or aquatic herbicides, a discharger shall notify potentially affected public agencies and post the notification on its website.

BMKCSD will post on its website and submit a notification in accordance with Section VIII.B Public Notice Requirements. The notification will include the following entities:

- Marin County Department of Agriculture[iv]
- Marin County Flood Control and Water Conservation District[v]
- California Department of Fish and Wildlife, Region 3[vi]

Preventing Fish Kills

All herbicide applications will be performed by a professional applicator who has received training specific to the herbicide and surfactant products to be used. The PCA written recommendation will include rates of application and any warnings or conditions that limit the application so that fish are not adversely affected. All manufacturers label instructions for rates and mixing and precautions to prevent fish kills will be followed.

11. EXAMINATION OF POSSIBLE ALTERNATIVES

Physical Controls.

Mechanical and manual removal of aquatic weeds and filamentous algae is performed throughout the late spring and summer. BMKCSD utilizes manual and mechanical tools to this end.

Artificial circulation is accomplished via the manipulation of the circulation gates. BMKCSD or individual homeowners may also choose to install dock mounted circulators to reduce the stagnant conditions which encourage the growth or accumulation of nuisance organisms.

Cultural Controls

Light Attenuating Dyes. Aquatic dyes have not historically been used in the Lagoons. Applications of dye, if selected as a control tactic would begin when turbidity is sufficiently low that sunlight can begin to stimulate plant growth. Applications would typically begin in March and continue through November to maintain light attenuating conditions.

Stakeholder Outreach and Education. Education of homeowners regarding measures to prevent nutrients and pesticides from entering the Lagoon from rainfall, bird droppings and irrigation runoff is discussed in the District's regular newsletter.

Maintaining Low Salinity. When feasible, BMKCSD will maintain lower salinity to reduce the growth of the marine organisms that cause nuisance conditions. This is achieved by keeping the gates closed after the rainy season and only adding enough water from Novato Creek to maintain its beneficial uses.

Maintaining Cooler Water Temperature. When feasible, BMKCSD will maintain cooler water temperatures to prolong the number of degree days required for nuisance organisms to germinate or grow. This tactic can be employed once salinity has exceeded a threshold that no longer warrants use of that tactic.

Biological Controls

Use of Predators and Competitors. BMKCSD may implement the use of biological control strategies if suitable solutions become available/permissible. Examples may include the introduction of species that pray on nuisance organisms or the introduction of competitors such as organisms that rely on the same food or energy/nutrient source as the pests. Floating wetland islands are one tool used to increase periphyton. Ther are also products manufactured to increase periphyton and to manipulate the microbial loop within the Lagoon's food chain. These may be considered for use to compete with pests for phosphorus, nitrogen, or other micronutrients.

Non-Pesticidal Chemical Controls

Use Of Nutrient Sequestering Products. BMKCSD may implement the application of products designed to sequester nutrients to reduce pest growth. These products may be applied to the water itself or installed in filter bags at storm drains, gates or suspended in the water column. Examples include but are not limited to: BioChar, PhosFlow, Poseidon Pellets, flocculants containing aluminum, lanthanum, or equivalent products.

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[i] https://www.waterboards.ca.gov/sanfranciscobay/basin_planning.html

[ii] https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-136

[iii] https://www.cdpr.ca.gov/docs/whs/pdf/hs1743.pdf

[iv] https://www.marincounty.gov/departments/AWM

[v] https://flooddistrict.marincounty.gov/marin-county-flood-control-district-contact-form/

[vi] https://wildlife.ca.gov/Regions/3