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. X New Applicator
B. Change of Information: WDID# ____________
C. □ Change of ownership or responsibility: WDID# ____________

II. DISCHARGER INFORMATION

A. Name
Department of Water Resources, Division of Environmental Services, SWP Mitigation and Restoration Branch

B. Mailing Address
3500 Industrial Blvd

C. City
West Sacramento

D. County
Yolo

E. State
California

F. Zip
95691

G. Contact Person
Krista Hoffmann

H. E-mail address
Krista.Hoffmann@water.ca.gov

I. Title
Environmental Scientist

J. Phone
916-376-9749

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):

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<tr>
<td>1.</td>
<td>□ Canals, ditches, or other constructed conveyance facilities owned and controlled by Discharger. Name of the conveyance system:</td>
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<td>2.</td>
<td>□ Canals, ditches, or other constructed conveyance facilities owned and controlled by an entity other than the Discharger. Owner's name:</td>
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<td>Name of the conveyance system:</td>
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<td>3.</td>
<td>X Directly to river, lake, creek, stream, bay, ocean, etc. Name of water body: Blacklock Restoration Site tidal wetland</td>
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B. Regional Water Quality Control Board(s) where treatment areas are located (REGION 1, 2, 3, 4, 5, 6, 7, 8, or 9): Region 2 (List all regions where algaecide and aquatic herbicide application is proposed.)

### V. ALGAECIDE AND AQUATIC HERBICIDE APPLICATION INFORMATION

A. Target Organisms: Common reed (*Phragmites australis*)

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

- Rodeo (Glyphosate)
- Habitat (Imazapyr)

C. Period of Application: Start Date 09/01/2019 End Date 12/31/2023

D. Types of Adjuvants Used: non-ionic adjuvant or or crop oil concentrate, such as LI-700, Agridex, or Competitor

### 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
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: Dean F. Messer
B. Signature: __________________________ Date: 5/24/19
C. Title: Chief, Division of Environmental Services

XI. FOR STATE WATER BOARD STAFF USE ONLY

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AQUATIC PESTICIDE APPLICATION PLAN

Blacklock Restoration Site, Solano County, CA

STATEWIDE GENERAL NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT FOR THE DISCHARGE OF AQUATIC PESTICIDES FOR AQUATIC WEED CONTROL IN WATERS OF THE UNITED STATES

GENERAL PERMIT NO. CAG990005

WATER QUALITY ORDER NO. 2013-0002-DWQ

June 3, 2019

The Department of Water Resources
State Water Project Mitigation and Restoration Branch
3500 Industrial Blvd.
West Sacramento, California 95691
CERTIFICATION

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

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

[Signature]

Dean F. Messer
Chief, Division of Environmental Services

[Signature]

6/4/19
Date
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Blacklock Restoration Site
Aquatic Pesticide Application Plan
Introduction
The proposed herbicide use is part of a study comprised of a series of test plots to assess the feasibility, efficacy, and environmental impacts of control methods used on the invasive common reed, *Phragmites australis* (hereafter referred to as *Phragmites*). We will use herbicides and mowing treatments alone and in combination, on a small scale within the tidal wetlands of the Blacklock Restoration Site in Suisun Marsh. The invasive Eurasian lineage of *Phragmites* has invaded the San Francisco Estuary and Suisun Marsh, and has negative impacts in tidal ecosystems. A variety of studies have investigated methods for *Phragmites* control across regions of the United States; however, few controlled studies have occurred in the Bay-Delta environment.

This study will evaluate the efficacy of foliar spray applications of glyphosate (as Rodeo formulation) and imazapyr (as Habitat formulation) treatments alone and in combination with mowing (as an integrated approach), over multiple years beginning in 2019. The goal is to determine the optimal integration of approaches that provides the best control while minimizing impacts to the environment and sensitive resident species. Treatment areas are 24 10-meter x 10-meter plots placed in *Phragmites* stands throughout the 90 acre Blacklock wetland.

This Aquatic Pesticide Application Plan (APAP) is a comprehensive plan for aquatic herbicide applications that will occur as a part of our study on the Blacklock Restoration Site. This plan will describe the applications, the need for the applications, best management practices to be implemented to reduce water quality impacts, and how those impacts will be monitored in accordance with Water Quality Order No. 2013-0002-DWQ.
Description of the water system to which algaecides and aquatic herbicides are being applied

The Blacklock Restoration Site (hereafter referred to as Blacklock) is located in Northern California approximately 13 miles south of Suisun City, and about 13 miles east of Fairfield, within Suisun Marsh (Latitude 38.17884, Longitude -121.910710, see Figure 1). Blacklock contains a total of 47 acres of tidal wetland and 55 acres of open water. The Blacklock parcel is bordered by one adjacent property located to the east and separated by a 1,100-foot long cross levee, that serves as the property line. Little Honker Bay (north), Denverton Slough/Nurse Slough (northeast and northwest), and Arnold Slough (south) border the site.

Figure 1. Regional map showing the Blacklock Restoration Site study location.
Description of the treatment area in the water system

The treatment area contains soils that are a mixture of Tamba mucky clay; a clay-heavy soil composed of alluvium from the hills upstream with a significant organic component, and tidal wetlands, a soil composed primarily of organic matter with some layers of clay-heavy alluvium. This site had been used for livestock grazing and duck hunting activities since at least 1946. Management in the project area was minimal, consisting primarily of flooding and water circulation during duck hunting season. The site was breached and returned to tidal influence in 2006, which resulted in the spread of *Phragmites australis*. The site is now dominated by the invasive species, with sparse patches of *Schoenoplectus acutus* and other native plants remaining.

Herbicide treatments will occur within dense *Phragmites* stands within the 47 acres of tidal wetland on the site (Figure 2).

![Legend](image)

**Legend**
- **Treatment Plots**
- **Monitoring Sites**

![Map](image)

Figure 2. Example of treatment plot locations where herbicide applications could occur.
Description of types of weed(s) and algae that are being controlled and why

The proposed herbicide application will occur on a single species, the invasive common reed, *Phragmites australis*. *Phragmites* is the most widespread invasive species of concern in Suisun Marsh (VegCAMP 2017). As reported in the 2015 Vegetation Map Update for Suisun Marsh (VegCAMP 2017), since 1999, *Phragmites* has increased by 325.2% over the entire marsh, from 693.1 acres in 1999 to 2,947.0 acres in 2015. As of 2015, *Phragmites* covers 1,764.2 acres (3.1%) of the leveed marsh and 1,182.8 acres (11.8%) of the tidal marsh. It has more than doubled in the tidal marsh since 1999, up by 227% (821.2 acres), and has expanded 432.1% (1,432.6 acres) in the leveed areas.

*Phragmites* can have profound effects on tidal marsh ecosystems due to its ability to spread aggressively transforming mixed-statured communities into tall grass mono-cultures and its use of root allelopathy may aid in decreasing native plant biodiversity and habitat quality for wildlife species such as the salt marsh harvest mouse (*Reithrodontomys raviventris*) and large waterfowl. Their branching growth form causes inter- and intra-species competition for light.

Effective methods for *Phragmites* control are well established; however, no control method is currently permitted in tidal marshes, as there is concern with negative impacts on sensitive species in the Bay-Delta environment. For example, uncertainty exists regarding the toxic effects of herbicide overspray/runoff on listed fish species such as Delta Smelt (*Hypomesus transpacificus*), and disturbance of wetland habitat associated with *Phragmites* control practices may interfere with other listed species that may occur within the wetland, such as the salt marsh harvest mouse and California black rail (*Laterallus jamaicensis coturniculus*). Our goal is to determine the optimal *Phragmites* treatment(s) that provides the best control while minimizing impacts to the environment and sensitive resident species.

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 are applied, and if applicable, the adjuvants and surfactants used

The proposed study will employ established *Phragmites* control methods individually and as integrated approaches, including mowing and application of two herbicides, glyphosate and imazapyr. Herbicides will be mixed with water and adjuvants, per label instructions. All herbicide applications will occur by an authorized and certified aquatic pest control applicator with experience in the Bay-Delta.
An amphibious mower, mounted with an herbicide applicator, will be used to apply herbicides to the designated 10-meter x 10-meter treatment plots. The amphibious vehicle will navigate around the perimeter of the plot in order to access all sides for even pesticide treatment. A total of 18 plots will be treated with herbicides once per year during the late Summer and Fall, between August and December. Herbicide applications will occur first when the plants are mature and beginning to reallocate resources from aboveground to belowground tissues, between August and October, and mowing will occur at least two weeks later (within the plots designated for mowing), to allow the herbicide(s) time to take effect. Mowed waste will be removed from the site the same day that mowing occurs.

The aquatic formulation of glyphosate, Rodeo, will be mixed with a non-ionic adjuvant, such as LI-700 or Agridex, per specimen label recommendations. Glyphosate’s loss from water is through sediment adsorption and microbial degradation. The primary metabolites of glyphosate are aminomethylphosphonic acid (AMPA) and glyoxylic acid. Both products are further degraded to carbon dioxide.

The aquatic formulation of imazapyr, Habitat, will be mixed with a crop oil concentrate such as Agridex or Competitor, per specimen label recommendations. The three major metabolites of imazapyr are pyridine hydroxyl-carboxylic acid, pyridine dicarboxylic acid, and nicotinic acid (Niacin, or Vitamin B3). The two pyridine acid metabolites are more polar than imazapyr, no more toxic than the parent compound, and more rapidly excreted by aquatic species. Nicotinic acid is a possible neurotoxin at high doses, but there is no concern for low dose exposures.

All herbicide applications will occur during low tide to maximize plant coverage and minimize water contamination (Figure 3).
Herbicide treatments will be tested alone and in combination with mowing to test whether efficacy is improved by mowing (refer to Figure 4, Experimental Treatments, below).

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<td>Rodeo + Habitat + Mow</td>
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**Figure 4. Experimental Treatments**

**Discussion of the factors influencing the decision to select algaecide and aquatic herbicide applications for algae and weed control**

The proposed herbicide use is part of a study comprised of a series of test plots to assess the feasibility, efficacy, and environmental impacts of control methods used on the invasive common reed, *Phragmites australis* (hereafter referred to as *Phragmites*). We selected established *Phragmites* control methods, recommended by Suisun Marsh land managers and relevant literature. These include glyphosate and imazapyr herbicide applications and mechanical mowing. Individual and integrated methods will be tested, with the goal of determining the optimal treatment that provides the best control while minimizing impacts to the environment and sensitive resident species.

**Gates or control structures**

The Blacklock Restoration site is tidally connected and there are no gates or control structures that are currently operated.

**Exceptions**

We are not filing for any exceptions under the State Water Board Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California (Policy) (section 5.3) from meeting acrolein and copper receiving water limitations.

**Description of monitoring program**

Monitoring will occur to characterize the efficacy of treatments tested, water quality impacts, and non-target impacts on nearby vegetation and the aquatic food web. Efficacy monitoring will occur regularly over the course of the three-year study, and water quality monitoring will be strategically timed to capture pesticide overspray and fate/transport over several tidal cycles after each control method is applied.
The study will evaluate efficacy by measuring *Phragmites* health over time, before and after mowing and herbicide applications, within each plot via aerial imagery. Drones equipped with multispectral cameras will capture images for analysis. Vegetation health will be quantified using a standardized index, such as the Normalized Difference Vegetation Index (NDVI), which measures photosynthetic capacity. Changes in proximal non-target vegetation will be monitored using the same technique in designated reference locations.

The study will assess water quality impacts prior to and after each control action. Grab water samples will be collected for herbicide analytical chemistry within the immediate vicinity of each plot. One sample will be collected prior to herbicide application, within 24-hours before applications occur, as well as during the subsequent high slack tide after herbicide application, with a goal to quantify overspray or pesticide runoff. Samples will be collected at all locations again, on the outgoing tide two and four tidal cycles later, to assess the fate and transport of herbicides.

Standard water quality parameters will be monitored in concert with water sample collection. Impacts on primary productivity will be measured in receiving waters as chlorophyll-a via handheld YSI. Turbidity, dissolved oxygen, pH, salinity, and temperature will also be measured. Environmental conditions will also be recorded (e.g. wind speed, weather, recent precipitation, tidal stage, presence of species of concern).

**Description of procedures used to prevent sample contamination from persons, equipment, and vehicles associated with algaecide and aquatic herbicide application**

Water quality sampling is conducted by trained DWR staff following established procedures designed to prevent contamination of samples. Sampling guidelines are contained in “Collection of Water Quality Samples for Laboratory Analysis” produced by DWR.

All samples will be collected in clean, amber glass bottles and properly labeled, including the date and time the sample is collected. Proper personal protective equipment will be worn, including disposable nitrile gloves, to prevent contamination. Samples will be collected without interference from any equipment or vehicles. Samples will be accounted for utilizing a standard "Chain of Custody" form supplied by the laboratory performing the analysis to ensure the integrity of the sample collection and transfer process. Samples will be stored on ice and transported to the lab within appropriate hold times for the required tests. Samples will be transported separately from the aquatic herbicides and application equipment on the day of the application event.
Description of the BMPs to be implemented. The BMPs shall include, at the minimum:

a. Measures to prevent algaecide and aquatic herbicide spill and for spill containment during the event of a spill

The project proponents and/or their contractor(s) will develop and implement a Spill Prevention and Control Plan (SCPC) to minimize effects of spills of hazardous, toxic, or petroleum substances during study activities. The SCPC will be kept on site during Phragmites control and monitoring activities and will be made available upon request.

b. Measures to ensure that only an appropriate rate of application consistent with product label requirements is applied for the targeted weeds or algae

- Herbicide applications will occur by an authorized and certified aquatic pest control applicator with experience in the Bay-Delta.
- Herbicides will be applied using precision methods by foliar spray with a backpack sprayer or small boom sprayer.
- Herbicide label recommendations will be followed regarding tank mixture, application rate, and spray nozzle adjustments. Spray nozzles will be adjusted to the coarsest setting possible while maintaining efficacy, to minimize overspray.
- Herbicide treatment will not occur when wind speeds are greater than 10 mph.
- All herbicide applications will occur during low tide to maximize plant coverage and the non-wetted portion of the plant will be targeted to minimize water contamination.
- A water-safe dye will be added to the pesticide formulations to enhance the precision and evenness of pesticide applications.

c. The Discharger’s plan in educating its staff and algaecide and aquatic herbicide applicators on how to avoid any potential adverse effects from the algaecide and aquatic herbicide applications

All aquatic herbicide applicators will possess state certification for applying pesticides and be trained to follow the storage, mixing, transport, application, and spill response procedures per USEPA and DPR rules, regulations, and label instructions. DWR will train all personnel applying herbicides and pesticides on the Water Quality Order No. 2013-0002-DWQ State General Permit and the requirements of this APAP annually.

d. Discussion on planning and coordination with nearby farmers and agencies with water rights diversion so that beneficial uses of the water (irrigation, drinking water supply, domestic stock water, etc.) are not impacted during the treatment period

Aquatic herbicide applications for treatment of Phragmites at Blacklock are not expected to impact any beneficial uses of water. Aquatic herbicides will never be applied directly to flowing water. Aquatic herbicides will not be applied during any wet weather or 12 hours before or
after a rain event. Aquatic herbicides will not be applied when wind speeds are greater than 10 mph.

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.
Aquatic herbicide applications at Blacklock are not expected to have any potential for fish kill. Several measures will be taken to limit the impact of the herbicides in water. Aquatic herbicides will never be applied directly to flowing water. Aquatic herbicides will not be applied during any wet weather or 12 hours before or after a rain event. Aquatic herbicides will not be applied when wind speeds are greater than 10 mph.

Examination of Possible Alternatives. Dischargers should examine the alternatives to algaecide and aquatic herbicide use to reduce the need for applying algaecides and herbicides. Such methods include:

a. Evaluating 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 should be considered:
   i. No action;
   Phragmites is the most widespread non-native species of concern in Suisun Marsh and increased by 325.2% over the entire marsh, between 1999 and 2015. No action would likely result in significant negative effects on native fish and wildlife species, including some that are state and federally listed.
   ii. Prevention;
   There is no known method for effectively preventing Phragmites from invading tidally restored wetlands when there is disturbance and a local propagule source, however, we are simultaneously conducting an experiment at an adjacent restoration site testing how actively planting native species may help to deter invasive species like Phragmites, through competition.
   Mowed waste (clippings) from this study will be collected in large trash bags and disposed of properly at an off-site landfill to prevent them from spreading further.
   iii. Mechanical or physical methods;
   Previous studies evaluating Phragmites control strategies indicate that mowing alone has the opposite of the desired effect and stimulates rather than inhibits Phragmites growth. Regardless, this study will evaluate the effectiveness of mowing alone, without the use of herbicides.
iv. Cultural methods;
There are no cultural control methods to remove *Phragmites*.

v. Biological control agents; and
At this time, there are no known biological agents that are effective at controlling *Phragmites*.

vi. 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.*

The proposed study will employ established *Phragmites* control methods individually and as integrated approaches, including mowing and application of two herbicides, glyphosate (Rodeo) and imazapyr (Habitat). Herbicides will be mixed with water and adjuvants, per label instructions. All herbicide applications will occur by an authorized and certified aquatic pest control applicator with experience in the Bay-Delta. An amphibious mower, mounted with an herbicide applicator, will be used to apply herbicides to the designated 10-meter x 10-meter treatment plots. The amphibious vehicle will navigate around the perimeter of the plot in order to access all sides for even pesticide treatment. A total of 18 plots will be treated with herbicides once per year during the late Summer and Fall, between August and December. Herbicide applications will occur first when the plants are mature and beginning to reallocate resources from aboveground to belowground tissues, between August and October, and mowing will occur more than two weeks later, to allow the herbicide time to take effect. All herbicide applications will occur during low tide to maximize plant coverage and minimize water contamination (Figure 3).

b. Using the least intrusive method of algaecide and aquatic herbicide application.
To prevent over application and excess herbicide runoff downstream, herbicides will be applied using precision methods by foliar spray with a backpack sprayer or small boom sprayer, mounted to the amphibious vehicle.

Several measures will be taken to limit the impact of the herbicides in water. Aquatic herbicides will never be applied directly to flowing water. Aquatic herbicides will not be applied during any wet weather or 12 hours before or after a rain event. Aquatic herbicides will not be applied when wind speeds are greater than 10 mph.

It is our hope that this study will help to elucidate which method is least intrusive, while still being effective.

c. Applying a decision matrix concept to the choice of the most appropriate formulation.
It is our hope that results from this study will inform a decision matrix for future *Phragmites* control efforts within Suisun Marsh.