



California Department of Parks and Recreation

Division of Boating and Waterways

Egeria Densa Control Program

Annual Report

2014 Application Season



***Egeria Densa* Control Program**

2014 Annual Report

Submitted Pursuant to:

NPDES General Permit CAG 990005

40 CFR 122.41 (k) and 40 CFR 122.21

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 information submitted. Based on my inquiry of Geoff Newman, Egeria densa Control Program, Senior Environmental Scientist and Edward Hard, Environmental Program Manager, 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 fines and imprisonment for knowing violations.

Christopher C. Conlin
Acting Deputy Director

Date

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Executive Summary

The Division of Boating and Waterways (DBW) received the Section 7, Biological Opinion from the United States Fish and Wildlife Service (USFWS) along with a letter of concurrence from the National Marine Fisheries Service (NMFS) on May 3, 2013. These two documents are valid until 2017. The National Pollutant Discharge Elimination System Permit is valid for one year and is renewable with the payment of all fees. The Division of Boating and Waterways started treatment on June 23, 2014.

DBW treated 2,170 acres in 17 sites located in various parts of the Delta. The sites treated were Bishop Cut, Honker Cut, Delta Yacht Club, Buckley Cove, Oxbow Marina, BW Resort and Marina, Perry's Yacht Harbor, Willow Berm Marina, Korth's Pirates Lair, Frank's Tract (3 sites), Cruiser Haven, Kings Island, Italian Slough, Village West Marina and the Sacramento Marina.

The Division conducted many water quality and residue samples before, during, and after the treatment season. These included 344 residue level samples (Fastest) and 74 water quality samples.

The Fastest samples are used for internal adjustment of herbicide application rates and to insure that all residues are within acceptable levels and in accordance with herbicide labels. The water quality samples are taken to ensure that all parameters of the National Pollutant Discharge Elimination System (NPDES) Permit are met.

All parameters set forth in both the USFWS Biological Opinion and the NMFS Concurrence Letter were met during the 2014 treatment season.

The *Egeria densa* plants are actively growing from early spring until late fall. The main growth spurt is during the early spring as the water temperatures are rising and the plants are taking in nutrients to recover from overwintering. This is optimum time to treat the plants to obtain control of the *Egeria densa*. Although the start date of treatment last year was a little late program staff did see a moderate reduction of biomass in the areas treated.

1 Introduction

1.1 *Egeria densa* Impact on the Delta

Egeria densa (Brazilian Elodea) is a fast growing, aquatic plant that is having a significant impact on the shallow water habitat in the Sacramento and San Joaquin Delta (Delta) ecosystem. Since *Egeria densa* was first introduced to the Delta, approximately 15,000 surface water acres or approximately 22% of the 67,000 surface water acres of the Delta have been infested. *Egeria densa* influences the Delta's biological diversity, recreation and agriculture. *Egeria densa* can crowd out native vegetation, slows water flows, entraps sediments, obstructs waterways, impedes anadromous fish migration patterns, and clogs agricultural and municipal water intakes.

1.2 Setting

The *Egeria densa* Control Program (EDCP) area of operation includes portions of six counties that encompass much of the Delta and its upland tributaries. Those six counties are Alameda, Contra Costa, Sacramento, San Joaquin, Solano and Yolo. The general boundaries of the treatment areas are:

- West to and including Sherman Island, at the confluence of the Sacramento and San Joaquin Rivers,
- North to the confluence of the Sacramento River and the Sacramento Deep Water Channel,
- East along the San Joaquin River to the City of Stockton, and
- South from Clifton Court along Old River to Mossdale.

1.3 Summary of Statutory Authority and Required Permits

In 1997, AB 2193 amended the California Harbors and Navigation Code to designate the Department of Boating and Waterways, now California State Parks, Division of Boating and Waterways (DBW), as the lead agency for controlling *Egeria densa* in the Sacramento and San Joaquin Delta, its tributaries and the Suisun Marsh. The United States Department of Agriculture-Agriculture Research Service (USDA-ARS) acts as the federal nexus agency for all federal regulatory processes. The USDA-ARS also provides research, technical expertise, and decision making input for the *Egeria densa* Control Program (EDCP) planning process. The DBW implemented the EDCP in 2001. In 2013, Assembly Bill 763 was passed designating DBW as the lead agency in cooperating with other agencies in identifying, detecting, controlling, and administering programs to manage invasive aquatic plants in the Sacramento-San Joaquin Delta, its tributaries, and the Suisun marsh. Of key importance, this bill requires DBW to consult with the California Department of Fish and Wildlife (DFW) to perform a Risk Assessment for any new invasive aquatic plants that have been identified by DBW as possible threats to economy, public health and the environment. Upon receipt of DFW's Risk Assessment(s), DBW will consult

with the applicable federal agencies to receive necessary permissions to treat the new invasive aquatic plants.

1.3.1 EDCP National Pollutant Discharge Elimination System Permit (No. CAG 990005)

The EDCP National Pollutant Discharge Elimination System (NPDES) General Permit for aquatic pesticide use requires the DBW to submit an annual report no later than March 1 following the EDCP treatment season. Reporting guidelines must include an executive summary discussing general permit compliance or violations of permit terms and conditions for discharging chemicals into the waters of the United States, the effectiveness of the EDCP Aquatic Pest Application Plan (APAP), the discharge of pollutants associated with the aquatic pest application, summary of monitoring data, including any changes in water quality, violations of compliance with water quality standards as outlined in the Central Valley Basin Plan. The Annual Report also includes a discussion of any violations and the actions taken, maps showing application areas, acreage and sampling locations, type and amounts of aquatic pesticides used during each application event, information on surface area, volume and rate of application, and sampling results for all monitoring as outlined in the General Permit's Monitoring and Reporting Program.

Terms and Conditions

Herbicide Residue Limits

The maximum limitations in receiving waters for fluridone, the main ingredient of Sonar[®], is 560 parts per billion (ppb) based on U.S EP Integrated Risk Information System, as stated in the NPDES. For diquat, it is 20 ppb. DBW did not apply any diquat during the 2014 treatment season. Receiving water limitations are stated in the NPDES General Permit which is derived from the U.S. Environmental Protection Agency's Maximum Contaminant Level and Integrated Risk Information System.

There are clear distinctions in the NPDES Permit about the application area and the receiving waters. An "application" area is defined as the area in which the aquatic herbicides are applied. The treatment area is the zone that is treated with aquatic herbicides. Receiving waters are defined as: 1) waters directly down flow of the treatment area and 2) water within the treatment area when herbicide levels fall below the minimum effective concentrations. In the EDCP, the herbicide can have an impact on the target species as long as residues are present in the water column. Residues found inside the treatment area are not considered receiving waters until seven days after an application ends.

Herbicides applied to aquatic plants are not considered a pollutant until residues reach the receiving waters. This is because herbicides designed to treat aquatic plants and approved by

the EPA cannot be considered a pollutant under the Clean Water Act. This applies to chemicals approved under federal and state pesticide use regulations.

Herbicide label restrictions dictate maximum rates of application and maximum concentrations allowed in the water column. The application rate can be greater than the maximum water column concentration due to binding properties and dispersal rates in flowing waters.

Fluridone has no maximum application rate in flowing waters. The applicator is allowed to apply at an appropriate rate such that a target concentration in the water column does not exceed 40 ppb. However, most of the applications done by the EDCP are at or below 20 ppb with a residue level of 10 ppb or less in the water column.

Water Quality Parameters

The EDCP is required to monitor specific water quality parameters to ensure there are no significant impacts to beneficial use to waters of the United States. The physical and chemical water quality parameters monitored are temperature, salinity, electrical conductivity, turbidity, pH, and dissolved oxygen. The EDCP also conducts visual inspections before, during, and after applications have been made. All changes in water color, odor, and vegetative health are annotated.

Selection and Monitoring Frequency

The NPDES Permit requires representative monitoring for each water type found in the EDCP area of operation. The only water type for the EDCP is tidal. Per monitoring frequency requirements outlined in the NPDES and EDCP Aquatic Pesticide Application Plan, a minimum of two monitoring sites per water type per herbicides used if the total number of applications is below twenty. DBW records water quality parameters no earlier than twenty four hours prior to the first treatment and a minimum of two follow-up visits following the end of the treatment and continues monitoring until there are no detectable residues in the water column.

1.3.2 EDCP USFWS' Biological Opinion and NMFS Letter of Concurrence, Section 7 of the Endangered Species Act

Reporting Requirements

The USFWS' Biological Opinion and NMFS' Letter of Concurrence, pursuant to Section 7 of the Endangered Species Act, require DBW to submit an annual report no later than January 31 following the EDCP treatment season. Annual Reports must summarize compliance with the terms and conditions listed to include species and habitat protection, water quality monitoring, and any additional monitoring and studies that may have been conducted as part of the regulatory requirements for other participating state and federal agencies. Additional reporting requirements are on a case-by-case basis in the event a "take" should occur of any of the species discussed in the permit. Take reports begin with immediate notification of the USFWS

or NMFS Biologist in charge of administering the permit and require documentation of information such as where the take occurred, number of species involved, water quality condition, chain of custody and prescriptive action taken for preventing further occurrences.

USFWS Mitigation Requirements

The EDCP USFWS BO Section 7 Permit imposes several measures to avoid impacts to protected species in the Delta. Primarily DBW has been directed to implement species avoidance and habitat loss minimization. There are three main components to avoidance and habitat minimization mitigation. Components are seasonal timing of applications, species specific toxicity evaluations, and applicator education. All applicators received Worker Environmental Awareness Training before treatment began on June 23, 2014. Personnel were informed as to the presence of the Valley Longhorn Elderberry Beetle, Delta Smelt and the Giant Garter Snake and habitats associated with these species. The briefing also included the USFWS Biological Opinion as required by Section 7 of the ESA and concurrences from NMFS.

PROVISIONAL

Delta Smelt (*Hypomesus transpacificus*)



- Using Interagency Ecological Program (IEP Real-time Monitoring Program 20mm Survey's we determine the presence or absence of the Delta Smelt within or near the boundaries of our herbicide application areas. If Delta Smelt are found near the application areas applications are halted.
- There are no restrictions for the use of fluridone, however, if diquat is used it may only be applied between June 1 and July 31.
- DBW made no diquat applications during the 2014 treatment season.

Valley Longhorn Elderberry Beetle (*Desmoecerus californicus dimorphus*)



- Avoidance is the term USFWS included in their Biological Opinion. DBW has located most, if not all, of the Elderberry plants (*Sambucus ssp*) within our area of operation and are avoiding them during the treatment season.

Giant Garter Snake (*Thamnophis gigas*)



- Avoidance of the Giant Garter Snake habitat.
- The only restriction concerning the Giant Garter Snake applies to mechanical harvesting and land based operations occurring on unimproved Delta banks. The EDCP is not currently implementing mechanical harvesting nor is it operating near any unimproved areas. However, mitigation beyond the requirements of the USFWS permits has been implemented to avoid any impact. The entire EDCP project area has had a Giant Garter Snake habitat evaluation. Each application crew has been provided a set of maps delineating potential Giant Garter Snake habitat. This is to ensure that our crews avoid areas where Giant Garter Snakes are likely to be found.

NMFS Mitigation Requirements

Chinook Salmon (*Onorhynchus tshawytscha*), Spring and Winter run Steelhead Trout (*Onocorhynchus mykiss*)



- NMFS has specified start and stop dates for the EDCP operations. DBW can start treatments March 1st and must cease operations no later than October 15th.
- NMFS has also set forth specific sites that may be treated early. This is to preclude in and out migrating salmonids from passing through treated areas.
- In order to avoid impacts to aquatic species, particularly salmonids, which are reliant on dissolved oxygen levels (DO), crews monitor DO levels and water temperature prior to and after treatments. Crews are only permitted to make applications when DO levels are above 5mg/l or below 3 mg/l. During the 2014 season all DO levels were within the specific paramters¹.

¹ *The Central Valley Regional Water Quality Control Board (CVRWQCB), USFWS, and NMFS have slightly different dissolved oxygen limits. The CVRWQCB Basin Plan states that DO shall not be reduced below 5mg/l in all Delta waters except the Sacramento River below the I St Bridge (7mg/l) and all waters west of the Antioch Bridge, The San Joaquin River between Turner Cut and Stockton ((6 mg/l), and all other areas of the Delta (5mg/l). All EDCP sites are by definition waters of the Delta. The USFWS BO Take Permit directs no treatments in high flow areas where DO levels are below 5 mg/l. It also directs treatments be delayed in low flow areas if DO levels are between 4-6 mg/l. The Central Delta is all tidal and with no real distinctions between high and low flow waters. During the 2014 treatment season DBW recorded all reading above 5 mg/l.*

2 Personnel, Methods and Materials

2.1 EDCP Personnel, Accreditation, and Training

Each application crew consists of a specialist and a technician of which at least one is a certified applicator possessing a Qualified Applicator Certificate "F" (Aquatics). The certification is administered by the California Department of Pesticide Regulation (CDPR). All DBW crews have annual training on EDCP herbicide handling and environmental awareness.

Endangered Species Training

DBW perceives training as a major component necessary to ensure avoidance and minimization measures are met for both the USFWS BO Section 7 permits and the NMFS Letter of Concurrence. Application crews not only received refresher training on herbicide use and restrictions before the season began, they also received an annual environmental awareness refresher on threatened, endangered and species of concern known to be located within our area of operation. State and federal listed species covered included: Delta Smelt, Giant Garter Snake, Valley Longhorn Elderberry Beetle and its habitat, Central Valley Steelhead Trout, and both runs of Chinook Salmon including buffer zones, required surveys, fish passage protocols, and DO limits. Also included was a discussion of legal implications of the Endangered Species Act (ESA) and the California Environmental Quality Act (CEQA).

Monitoring Crews

Monitoring crews consist of a lead Environmental Scientist and one assistant. The scientist schedules and plans all field sampling events. A digital camera is used to document any unusual conditions noted at the sampling locations in vegetation or the condition of the surrounding area. Additional responsibilities included quality control field monitoring and laboratory analysis and reporting of findings in an Annual Report as outlined in the EDCP, NPDES Permit, USFWS Biological Opinion and NMFS Letter of Concurrence

2.2 Materials

Herbicides used during the 2014 treatment season include:

Fluridone: 1-methyl-3phenyl-5(trifluoromethyl-phenyl)-4(1H)-pyridone; under the commercial trade names of:

- Sonar One® - EPA Registration No. 67690-45 (Pellets)
- Sonar Q® - EPA Registration No. 67690-3 (Pellets)
- Sonar PR® - EPA Registration No. 67690-12 (Pellets)

Fluridone (Sonar®) is a selective systemic herbicide that inhibits the formation of carotene, an action that results in the degradation of sunlight exposed chlorophyll. Formation of carotene occurs primarily in new growth, thus fluridone is most effective in maximum growth periods of *Egeria densa*. Fluridone not absorbed by the plants is broken down into naturally occurring elements mostly through exposure to sunlight.

PROVISIONAL

Summary of Pesticide Use in 2014

	Sonar PR (lbs.)	Sonar Q (lbs.)	Sonar One (lbs.)
June			
Contra Costa	0	16,126	0
Sacramento	0	460	0
San Joaquin	0	796	0
July			
Contra Costa	0	140	24,440
Sacramento	0	460	1,916
San Joaquin	0	796	3,208.9
August			
Contra Costa	0	0	24,768
Sacramento	0	0	1,100
San Joaquin	1048	188	2,144
September			
Contra Costa	17,604	0	0
Sacramento	228	0	0
San Joaquin	3014	0	704
October			
Contra Costa	0	0	0
Sacramento	0	0	0
San Joaquin	0	0	188
Totals	21,894	18,966	58,468.9

Note: Net acreage treated was 2170 acres for the 2014 season.

Application Equipment

Crews use either a 19 or 21 foot aluminum boat powered by either an outboard engine or are air driven. At the start of each treatment the application crew takes dissolved oxygen and a temperature reading using a HACH® Dissolved Oxygen Meter within the treatment site. These readings must be within the parameters outlined in the NPDES Permit and the USFWS Biological Opinion and NMFS Letter of Concurrence before an application can be made. At the start of the application, the crew uses an Explore™1-104C Tablet PC with a GPS unit installed to record the beginning and ending spray lines, coordinates of the spray area and the time of treatment.

All boats are washed regularly to rid them of chemical residues and all application pumps, hoses, and nozzles are inspected and if found defective replaced on an as needed basis. Boat records are available upon request.

2.3 Environmental Monitoring

Using an herbicide free boat, powered by an outboard engine the Environmental Scientist conducts monitoring activities. A Hydrolab MS-5 water quality multi-probe Datasonde is used to collect water quality readings. A Hydrolab MS-5 reads water temperature, electrical conductivity, salinity, dissolved oxygen, pH, and turbidity. The data is stored together with GPS coordinates on an I-xplore 104C PC tablet. A digital camera is used to record visual records of sampling locations to denote noticeable changes in vegetation or the condition of the surrounding area.

Monitoring Protocols

Protocols

The DBW EDCP follows a water quality monitoring protocol as outlined in the December 2013 EDCP Aquatic Pesticide Control Application Plan (APAP). The monitoring team plans each sampling event in coordination with the field supervisor and the application crews. During the 2014 treatment season DBW sampled in Franks Tract Site 175, Delta Yacht Club Site 14, Cruisers Haven Site 91, and BW Resort Site 209. DBW treated a total of 17 sites in 2014.

Residue Sampling

For each application event DBW takes a pre-sample and as many weekly post samples as necessary until a non-detection of the herbicide residue is obtained. These samples are identified as A, B, and C. Sample A location is inside of the application area approximately 1/4 to 1/3 the distance from the downstream edge of the application polygon, sample location B is located on the downstream edge of the application polygon, and sample site C is located in an adjacent non-impacted area with similar hydrological conditions as the application area or receiving waters.

DBW also takes Fastest (immune assay) samples throughout the duration of the treatment season. These samples are sent to the herbicide manufacturer for analysis. The DBW took 344 fastest samples during the 2014 treatment season. To ensure accuracy of the sample analysis of these samples DBW also took and had analysis done on 12 split samples that were analyzed by another laboratory. All split samples received analysis that was within acceptable ranges with the analysis done by the manufacturer. The results of all samples were used to monitor and adjust the rate of application of the herbicide to ensure that the residues in the water column are conducive to attain the maximum efficacy to the vegetation treated.

Water Quality Parameters

Water quality sampling is done concurrent with the required NPDES residue sampling. Water quality monitoring samples are taken at a depth of 3 feet. The parameters measured are temperature, salinity, dissolved oxygen levels, electrical conductivity, pH, and turbidity. DBW also conducts physical inspections of the treated and surrounding areas to identify changes in water color and odor along with changes in vegetative health of the species within and around the treatment area.

2.4 Laboratory Analytical Methods and Validation

The DBW uses several methods to validate results found by the contracting laboratories. These include split samples field spikes, field blanks, and equipment blanks. During the 2014 treatment season DBW took 15 equipment blanks, 6 field blanks, 8 split samples, and 1 field spike. In addition, the DBW took an additional 7 split samples that were sent to another laboratory for analysis.

3 ENVIRONMENTAL COMPLIANCE

3.1 Herbicide Application Data and Permit Compliance

The 2014 *Egeria densa* Control Program season began on June 23, 2014 and ended on September 12, 2014. The Division of Boating and Waterways treated a total of 2170 acres in 18 sites located in three counties, Contra Costa, San Joaquin, and Sacramento. In Contra Costa County the sites treated were Franks Tract (three sites), Cruisers Haven, Italian Slough, and Kings Island, Sacramento County sites were Sacramento Marina, Oxbow Marina, Willow Berm Marina, Korth's Marina, B and W Resort, and Perry's Yacht Club, and San Joaquin County sites were Bishop Cut, Honker Cut, Delta Yacht Club, Buckley Cove and Village West Marina.

Compliance

The *Egeria densa* Control Program treatment operations were in full compliance with all parameters outlined in the US Fish and Wildlife Section 7 Biological Opinion and the National Marine Fisheries Service Letter of Concurrence.

The National Pollutant Discharge Elimination System Permit encompasses the discharge of herbicides into the waters of the Sacramento/San Joaquin Delta. All limitations outlined in the Regional Water Quality Control Board's Basin Plan were not exceeded during the 2014 season.

4 CONCLUSIONS

4.1 Discussion

DBW treated 2,170 acres in 18 sites located in various parts of the Delta. The sites treated were Bishop Cut, Honker Cut, Delta Yacht Club, Buckley Cove, Oxbow Marina, BW Resort and Marina, Perry's Yacht Harbor, Willow Berm Marina, Korth's Pirates Lair, Frank's Tract (3 sites), Cruiser Haven, Kings Island, Italian Slough, Village West Marina and the Sacramento Marina.

The Division conducted many water quality and residue samples before, during, and after the treatment season. These included 344 residue level samples (Fastest) and 74 water quality samples.

The *Egeria densa* plants are actively growing during the springtime when water temperatures are rising. This is when the plants are recovering from overwintering and are taking in as many nutrients as possible to stimulate growth. It is the optimum time to apply herbicides to control its growth.

Using visual observations, physical rake sampling method and sonar mapping it is estimated that the DBW had achieved a reduction of approximately 25% *Egeria densa* in all sites treated. This compares to the 20% reduction in 2012 and the 30% reduction in 2013.

DBW plans on starting treatment in early March 2015. The early start should increase efficacy in all treatment areas.

APPENDIX A

1 - Delta Yacht Club Site 14 - Sampling Results and Map of Site

2 - Cruiser Haven Marina Site 91 - Sampling Results and Map of Site

3 - B & W Resort Site 209 – Sampling Results and Map of Site

4 - Franks Track Sites 173, 174, and 175 – Sampling Results and Map of Site

PROVISIONAL

**Egeria
Treatment Sites
for 2014**

Delta Yacht Club

11m

3 Acres

Site # 14

	2014 Egeria Treatment Sites	California Department of Parks and Recreation Division of Boating and Waterways	
	DBW Sites		
	Waterways		
	Counties		
	Other Major Roadways		
	Major Highways		

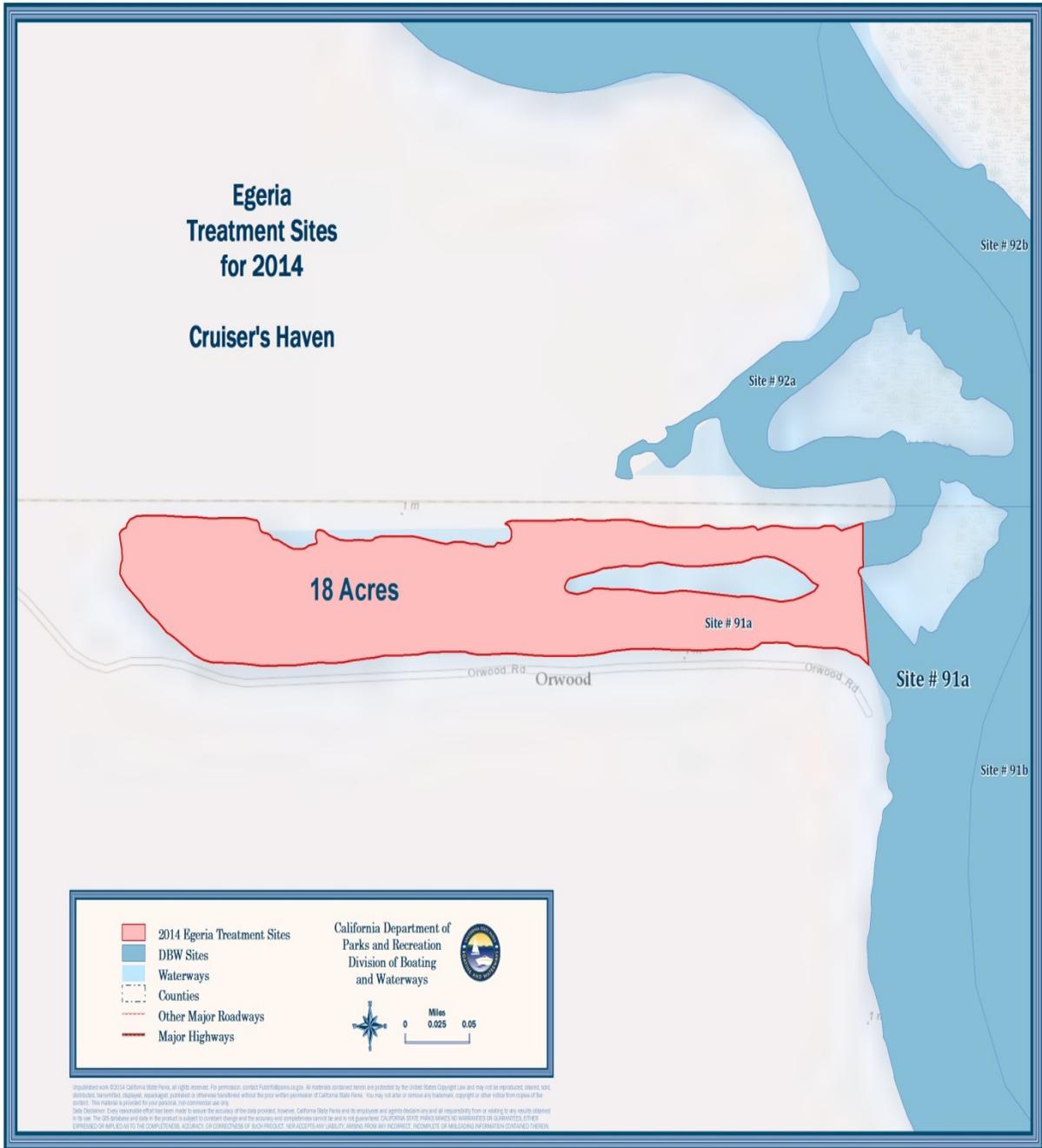
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Delta Yacht Club Site # 14

Sample Location	Sample Number	UTM Coordinates	Date	Time	Temp (°C)	Conductivity (mS/cm)	Salinity (ppt)	DO (mg/l)	Depth (ft)	pH	Turbidity (NTU)	Residue Levels (ppb)
A	E014-062314-015	E 633658 N4210013	6/23	1220	24.4	.463	0.23	9.59	3	8.33	0.8	ND
B	E014-062314-016	E633671 N4209874	6/23	1215	23.93	.465	0.23	8.44	3	8.20	0.8	ND
C	E014-062314-017	E633910 N4209931	6/23	1210	24.03	.470	0.24	8.67	3	7.99	2.7	ND
A	E014-091814-030	E 633658 N4210013	09/18	0900	23.06	.372	0.18	7.93	3	7.98	4.6	ND
B	E014-091814-031	E633671 N4209874	09/18	0850	23.22	.405	0.20	7.87	3	7.89	3.2	ND
C	E014-091814-032	E633910 N4209931	09/18	0840	23.39	.436	0.22	7.84	3	7.91	3.5	ND
A	E014-092914-044	E 633658 N4210013	09/29	0835	21.82	.426	0.31	7.35	3	7.86	4.0	ND
B	E014-092914-045	E633671 N4209874	09/29	0825	21.75	.416	0.21	7.07	3	7.86	7.0	ND
C	E014-092914-046	E633910 N4209931	09/29	0825	21.91	.398	0.20	7.33	3	7.94	3.5	ND

**Egeria
Treatment Sites
for 2014**

Cruiser's Haven



Cruiser's Haven Site #91

Sample Location	Sample Number	UTM Coordinates	Date	Time	Temp (°C)	Conductivity (mS/cm)	Salinity (ppt)	DO (mg/l)	Depth (ft)	pH	Turbidity (NTU)	Residue Levels (ppb)
A	E091A-062314-006	E625888 N4200027	06/23	0905	23.52	.813	0.42	7.30	3	8.33	2.1	ND
B	E091A-062314-007	E626405 N4200056	06/23	0855	23.53	.816	0.42	7.32	3	8.13	3.5	ND
C	E091A-062314-008	E626210 N4200412	06/23	0850	23.23	.873	0.45	6.86	3	8.17	6.9	ND
A	E091A-091814-035	E625888 N4200027	09/18	0950	23.02	.644	0.33	5.77	3	7.43	14.7	3.36
B	E091A-091814-036	E626405 N4200056	09/18	0940	23.25	.625	0.32	7.84	3	7.96	4.4	ND
C	E091A-091814-037	E626210 N4200412	09/18	0935	23.02	.638	0.33	7.38	3	7.87	7.87	ND
A	E091A-092914-054	E625888 N4200027	09/29	0915	21.50	.683	0.35	6.48	3	7.78	3.7	1.18
B	E091A092914-055	E626405 N4200056	09/29	0910	21.71	.709	0.37	7.29	3	7.95	5.5	1.23
C	E091A-092914-056	E626210 N4200412	09/29	0905	21.71	.720	0.37	7.47	3	8.03	5.4	1.30
A	E091A-100614-064	E625888 N4200027	10/06	0855	21.51	.688	0.35	6.08	3	7.65	3.6	ND
B	E091A-100614-065	E626405 N4200056	10/06	0850	21.75	.690	0.36	7.75	3	7.88	6.2	1.01
C	E091A-100614-066	E626210 N4200412	10/06	0845	21.71	.692	0.36	7.92	3	8.02	2.0	ND
A	E091-101614-068	E625888 N4200027	10/16	1200	20.79	.744	0.38	7.55	3	8.61	2.1	ND
B	E091-101614-069	E626405 N4200056	10/16	1150	20.71	.747	0.39	7.55	3	8.84	1.8	ND
C	E091-101614-070	E626210 N4200412	10/16	1145	20.66	.759	0.39	7.49	3	9.04	2.0	ND

B and W Resort Site # 209a

Sample Location	Sample Number	UTM Coordinates	Date	Time	Temp (°C)	Conductivity (mS/cm)	Salinity (ppt)	DO (mg/l)	Depth (ft)	pH	Turbidity (NTU)	Residue Levels (ppb)
A	E209-062314-011	E624491 N4220960	6/23	1120	23.04	.157	0.07	8.78	3	8.13	6.1	ND
B	E209-062314-012	E624435 N4220699	6/23	1115	23.15	.153	0.07	8.22	3	7.95	5.4	ND
C	E209-062314-013	E624517 N4220535	6/23	1110	23.30	.151	0.07	8.92	3	8.29	4.9	ND
A	E209-091814-025	E624491 N4220960	9/1/	1120	22.98	.220	0.10	7.63	3	7.80	.6	1.49
B	E209-091814-026	E624435 N4220699	9/18	1110	23.48	.220	0.10	7.73	3	7.79	1.7	ND
C	E209-091814-027	E624517 N4220535	9/18	1105	23.54	.222	0.10	7.40	3	7.83	3.5	ND
A	E209-092914-040	E624491 N4220960	9/29	1025	21.07	.183	0.08	5.52	3	7.66	5.53	ND
B	E209-092914-041	E624435 N4220699	9/29	1020	21.58	.186	0.08	6.57	3	7.70	14.1	ND
C	E209-092914-042	E624517 N4220535	9/29	1015	21.56	.185	0.08	6.27	3	7.84	2.3	ND

Franks Tract Site #175

Sample Location	Sample Number	UTM Coordinates	Date	Time	Temp (°C)	Conductivity (mS/cm)	Salinity (ppt)	DO (mg/l)	Depth (ft)	pH	Turbidity (NTU)	Residue Levels (ppb)
A	E175-062314-001	E 623889 N 4213126	6/23	0825	22.3	.751	0.40	8.56	3	8.88	6.1	ND
B	E175-062314-002	E624124 N4213491	6/23	0820	22.5	.723	0.37	8.34	3	8.85	4.4	ND
C	E175-062314-003	E624840 N4214706	6/23	0815	22.9	.792	0.41	8.42	3	8.91	7.5	ND
A	E175-091814-019	E 623889 N 4213126	9/18	1045	22.58	.628	0.32	8.96	3	8.43	1.6	1.41
B	E175-091814-020	E624124 N4213491	9/18	1040	22.53	.673	0.35	8.17	3	8.32	2.7	1.36
C	E175-091814-021	E624840 N4214706	9/18	1025	22.50	.666	0.34	8.60	3	8.34	3.4	1.38
A	E175-092914-049	E 623889 N 4213126	9/29	1000	21.10	.750	0.39	8.06	3	8.24	2.6	1.16
B	E175-092914-050	E624124 N4213491	9/29	0955	21.23	.851	0.44	7.70	3	8.02	6.0	ND
C	E175-092914-051	E624840 N4214706	9/29	0950	21.62	.502	0.25	7.90	3	8.08	6.1	ND
A	E175-100614-058	E 623889 N 4213126	10/06	0940	21.78	.658	0.34	8.32	3	8.00	2.2	ND
B	E175-100614-059	E624124 N4213491	10/06	0930	21.89	.684	0.34	8.17	3	7.99	13.6	ND
C	E175-100614-060	E624840 N4214706	10/06	0925	21.90	.679	0.35	8.21	3	8.03	6.5	ND

APPENDIX B

- 1 – CA Agriculture Pest Control Recommendation
- 2 - Fastest Results
- 3 - CDFA Chemical Residue Analysis

PROVISIONAL



California Agriculture Pest Control Recommendation

Aquatic Herbicide Application

Pest Control Advisor: David C. Blodget
3300 Nord Avenue
Bakersfield, CA 93314
Phone: 916-955-2464, 661-381-8384
daveb@sepro.com

License Number: PCA 75633

NOTE: All products recommended below are general use herbicides.

- 1) **Owner of Treatment Site:** Sacramento-San Joaquin Delta, California Department of Parks and Recreation, Division of Boating and Waterways, as lead management agency.
- 2) **Product Names:** SonarOne (Pellet), Sonar PR (Precision Release pellet), Sonar Q (Quick Release pellet).
- 3) **Application Rate:** SonarOne at 5-20 ppb per application, Sonar Q at 5-20 ppb per application and Sonar PR at 5-20 ppb per application. Treatment protocol is designed to maintain a range of 1-10 ppb of Fluridone in the water column during the treatment period.
- 4) **Water Use Restrictions:** Always read and follow label recommendations. Water from Sonar treated areas can be immediately used for swimming, fishing, livestock watering and potable uses at recommended treatment levels.

Water users are not expected to be impacted by the treatments scheduled under this Fluridone program. The use of FastEST assay will be used for monitoring Fluridone concentrations in waters surrounding the treatment areas. FastEST data will also be used to make the necessary adjustments to treatment frequency and rates (within label specifications) to achieve optimum control and monitor concentrations at irrigation intakes. The following guidelines (as specified on the product label) will be implemented should water from these treatment sites be needed for irrigation purposes.

Water from Sonar treated areas should not be used to irrigate established turf, row crops and tree crops if Fluridone concentrations are greater than 10 ppb. Water from the Sonar treated areas should not be used to irrigate newly seeded grasses, tobacco, tomatoes, peppers and other plants in the Solanaceae family until Fluridone concentrations are 5 ppb or lower. Do not use Fluridone treated water for irrigation of greenhouse or nursery plants until Fluridone concentrations are <1 ppb.

- 5) Targeted Aquatic Weed:
Brazilian elodea, *Egeria densa*.
- 6) Criteria Used For Determining Need for Pest Control:
History, Field Observation and monitoring of *Egeria densa* density and locations.
- 7) Non-Pesticide Control, Warnings and other Remarks:
Applicators must follow NPDES Permit, Fish & Wildlife Service & National Marine Fisheries Service Biological Opinions. Follow all label guidelines for Personal Protective Equipment.
- 8) Recommended Treatment Protocol:
- a) Time/Schedule Treatment Window: April 1st – October 15th, 2014.
 - b) Scheduled Locations: Site #173- Franks Tract- 354.6 acres, #174-Franks Tract- 1169.4 acres, #175, Franks Tract 348.9 acres, Honker Cut- 48.0 acres, Bishop Cut North- 56.0 acres, Cruisers Haven- 18.0 acres, Sacramento Marina- 20.0 acres, Buckley Cove- 34.0 acres, Oxbow Marina- 16.0 acres, Korth's Marina- 14.0 acres, Willow Berm Marina- 19.0 acres, Perry's Harbor- 8.7 acres, Italian Slough- 4.4 acres, BW Marina- 3.4 acres, Kings Island- 2.2 acres and Delta Yacht Club- 3.0 acres.
 - c) Concentration (ppb): The Sonar products will be used as needed to maintain approximately 1-10 ppb of Fluridone in the water column during the treatment program. Applications will occur as needed per label guidelines.
- 9) Criteria Used Determining the Need for the Treatment (alternative assessment): CA Dept. of Boating & Waterways has been designated the lead agency to develop and implement a control program for the aquatic weed *Egeria densa* in the Sacramento – San Joaquin Delta, *Egeria Densa* Control Program (EDCP). The primary objective of this program is to improve navigation in currently infested areas of the Delta by reducing the growth and spread of *Egeria densa*. An Environmental Impact Report (EIR) was completed in 2000 and updated in 2006 to address potential impacts of the EDCP. The proposed Sonar treatment program for 2014 follows the treatment protocols outlined in the EIR, as well as the specific treatment guidelines established by state and federal agencies; State Water Resources Control Board, CA Department of Fish & Game, US Fish & Wildlife and the National Oceanic and Atmospheric Administration.

I certify that alternative and mitigation measures that would substantially lessen any significant adverse impact on the environment have been considered, and if feasible, adopted

Dave Blodget
Pest Control Advisor
SePRO Corporation

Date: June 5, 2014

Expiration Date of Recommendation: December 31, 2014

FASTEST RESULTS

Site	Treatment Area	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11
1	Franks Tract	2.3	2.7	<1	1.6	<1		1.3	<1	1.9	
2	"		1.2		1.6			<1	1.3	2.3	
3	"	2.1	1.4	<1	1.5	<1		1	6.6	2.5	
4	"		2.6		1.2				<1	2.6	
5	"	3.3	2.4	1.3	1.6	1.9		1.1	3.7	2.8	1.9
6	"		1.7		1.2				4.3	1.9	
7	"	4.6	1.8	<1	1.2	2.3	1.5	1.4	3.6	2	
8	"		2.2		<1				1.7	2.4	
9	"	1.7	1.3	<1	1.4	1.8		1	1.8	3	
10	"		2		<1				1.4	3.5	
11	"	2.3	2.9	2.7	<1	<1	1.8	1	<1	2.1	
12	"		<1		<1				2.5	1.7	
13	"	<1	1.1	1.3	3	1.6		<1	2.5	1.7	1.1
14	"		1		1.1				3.7	1.1	
15	"	1.5	1.9	1.1	2	1.4	1.7	<1	3	<1	
16	"		4.9		2.7		3.5		6	2	
17	"	2.2	3.8	1.5	1.8	2.6	3.3	2.1	1	2	
18	"		2.4		2.7		2.2		<1	2.6	
19	"	2.6	3.2	2	1.8	1.7	2.4	1.6	1.5	3.3	2.6
20	Bishop Cut	<1	1.3	2.4		2.8	1.4	3.4	1.1	2.2	
21	"		1.6			3.9	4.4		1.1	2.1	
22	"	3.1	2.6	2.2		2.4	3.9	<1	1.2	7.5	6
23	Honker Cut		<1				<1		<1	1	
24	"	2.9	<1	<1		<1	<1	<1	2.1	<1	<1
25	"		<1				<1		1.7	1.3	
26	Cruiser Haven		3.1		2.7	2.7	5.9	3.3	<1		
27	"		<1	4.5	4.6	2.2	1.9	2.3	1.7		
28	Buckley Cove	1.9	2.3	1.5	4.2	2.5	4.1	2.6	1.9	2.2	
29	"		5.7		5.6		8.7		<1	6.3	
30	"	4.6	1.9	<1	1	<1	<1	<1	<1	1	
31	Kings Island		12.7	1.5	2.7	4.1		2.2	2.3		4.2
32	Italian Slough		3.4		1.5	<1	3	1	2.1		1.4
33	"		8.6	<1	3.6	1.4	2.9	1.5	2.1		1.4
34	"		4.7	2.3	5.2	<1	1.2	2.1	2.6		1.6
35	Delta YC	2.9	2.8	4.5	1.9	2.4	2.8	1.4	2.4	1.9	
36	Korth's		<1					3.7	1.9	1.8	4.5
37	"	<1	<1	<1		<1		<1	3.3	<1	
38	"		<1				3.2		4.5	<1	
39	Willow Berm	<1	<1	<1		<1		<1	<1	3.9	
40	"		<1				2.8		<1	<1	3.7

41	"	<1	2.3	2.4		2.2		1.5	<1	4.1	
42	OxBow	2.3	1.7	6.2	1.4	<1	1.6	2.7	4.9	3.7	
43	B&W		5.7		2		2.5	3.5	<1	3	1.8
44	"	11.1	1.6	2.6	4.6	2.2		<1	5.7	3	2
45	"		5		1.5			4.2	5.4	5.2	
46	Perry's		<1		<1	1.1	3.4	<1	<1	1.9	9.9
47	"	2.6	<1	3	<1	<1	5.8	<1	3.4	2.2	1.9
48	Sac Marina	1.8	1.9	5.6		7.4	7.9	3.2	1.4	5.2	
49	"		6.9			6.1	8.4	4.2	1.8	2.7	
50	Village West								<1	9.7	6.8
51	"								<1	10.7	9.6

All results reported in parts per billion (ppb)

PROVISIONAL

**California Department of Food and Agriculture
Chemical Residue Analysis**

Date: 6/24/2014
 Chemical: Fluridone
 LOQ: 1.0 ppb
 Lab: CDFA-CAC
 Analytical Method: WHS-SM-FL1

Chemical Analytical Results

Reported by: California Department of Food and Agriculture
 Center for Analytical Chemistry
 3292 Meadowview Rd. Sacramento, CA 95832

Lab Sample ID	DBW ID	Date sample taken	Date sample received	Date sample extracted	Date sample analyzed	Conc. (ppb)	Surrogate recovery(%)	QC Batch	Sample Type
2013-3734	E175 062314-001	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3735	E175 062314-002	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3736	E175 062314-003	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3737	E175 062314-004	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3738	E175 062314-005	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3739	E209A 062314-011	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3740	E209A 062314-012	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3741	E209A 062314-013	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3742	E209A 062314-014	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3743	E014 062314-15	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3744	E014 062314-16	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3745	E014 062314-17	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3746	E014 062314-18	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3747	E91A 062314-006	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3748	E91A 062314-007	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3749	E91A 062314-008	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3750	E91A 062314-009	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample
2013-3751	E91A 062314-0010	6/23/2014	6/23/2014	NA	6/24/2014	ND	NA	1	Sample

Chemical Analytical Results
Reported

by: California Department of Food and Agriculture
Center for Analytical Chemistry
3292 Meadowview Rd. Sacramento, CA 95832

Date: 9/23/2014
Chemical: Fluridone
LOQ: 1.0 ppb
Lab: CDFA-CAC
Analytical Method: WHS-SM-FL1

Lab Sample ID	DBW ID	Date sample taken	Date sample received	Date sample extracted	Date sample analyzed	Conc. (ppb)	Surrogate recovery(%)	QC Batch	Sample Type
2014-1195	E175-091814-019	9/18/2014	9/18/2014	NA	9/22/2014	1.41	NA	5	Sample
2014-1196	E175-091814-020	9/18/2014	9/18/2014	NA	9/22/2014	1.36	NA	5	Sample
2014-1197	E175-091814-021	9/18/2014	9/18/2014	NA	9/22/2014	1.38	NA	5	Sample
2014-1198	E175-091814-022	9/18/2014	9/18/2014	NA	9/22/2014	ND	NA	5	Sample
2014-1199	E175-091814-023	9/18/2014	9/18/2014	NA	9/22/2014	1.64	NA	5	Sample
2014-1200	E175-091814-024	9/18/2014	9/18/2014	NA	9/22/2014	1.69	NA	5	Sample
2014-1201	E209A-091814-025	9/18/2014	9/18/2014	NA	9/22/2014	1.49	NA	5	Sample
2014-1202	E209A-091814-026	9/18/2014	9/18/2014	NA	9/22/2014	ND	NA	5	Sample
2014-1203	E209A-091814-027	9/18/2014	9/18/2014	NA	9/22/2014	ND	NA	5	Sample
2014-1204	E209A-091814-028	9/18/2014	9/18/2014	NA	9/23/2014	ND	NA	6	Sample
2014-1205	E209A-091814-029	9/18/2014	9/18/2014	NA	9/23/2014	1.28	NA	6	Sample
2014-1206	E014-091814-030	9/18/2014	9/18/2014	NA	9/23/2014	ND	NA	6	Sample
2014-1207	E014-091814-031	9/18/2014	9/18/2014	NA	9/23/2014	ND	NA	6	Sample
2014-1208	E014-091814-032	9/18/2014	9/18/2014	NA	9/23/2014	ND	NA	6	Sample
2014-1209	E014-091814-033	9/18/2014	9/18/2014	NA	9/23/2014	2.61	NA	6	Sample
2014-1210	E014-091814-034	9/18/2014	9/18/2014	NA	9/23/2014	ND	NA	6	Sample
2014-1211	E091A-091814-035	9/18/2014	9/18/2014	NA	9/23/2014	3.36	NA	6	Sample
2014-1212	E091A-091814-036	9/18/2014	9/18/2014	NA	9/23/2014	ND	NA	6	Sample
2014-1213	E091A-091814-037	9/18/2014	9/18/2014	NA	9/23/2014	ND	NA	6	Sample
2014-1214	E091A-091814-038	9/18/2014	9/18/2014	NA	9/23/2014	ND	NA	6	Sample
2014-1215	E091A-091814-039	9/18/2014	9/18/2014	NA	9/23/2014	2.35	NA	6	Sample

Chemical Analytical Results
Reported

by: California Department of Food and Agriculture
Center for Analytical Chemistry
3292 Meadowview Rd. Sacramento, CA 95832

Date: 10/1/2014
Chemical: Fluridone
LOQ: 1.0 ppb
Lab: CDFA-
CAC
Analytical Method: WHS-SM-FL1

Lab Sample ID	DBW ID	Date sample taken	Date sample received	Date sample extracted	Date sample analyzed	Conc. (ppb)	Surrogate recovery(%)	QC Batch	Sample Type
2014-1394	E209A-092914-040	9/29/2014	9/29/2014	NA	10/1/2014	ND	NA	7	Sample
2014-1395	E209A-092914-041	9/29/2014	9/29/2014	NA	10/1/2014	ND	NA	7	Sample
2014-1396	E209A-092914-042	9/29/2014	9/29/2014	NA	10/1/2014	ND	NA	7	Sample
2014-1397	E209A-092914-043	9/29/2014	9/29/2014	NA	10/1/2014	ND	NA	7	Sample
2014-1398	E014-092914-044	9/29/2014	9/29/2014	NA	10/1/2014	ND	NA	7	Sample
2014-1399	E014-092914-045	9/29/2014	9/29/2014	NA	10/1/2014	ND	NA	7	Sample
2014-1400	E014-092914-046	9/29/2014	9/29/2014	NA	10/1/2014	ND	NA	7	Sample
2014-1401	E014-092914-047	9/29/2014	9/29/2014	NA	10/1/2014	ND	NA	7	Sample
2014-1402	E014-092914-048	9/29/2014	9/29/2014	NA	10/1/2014	ND	NA	7	Sample
2014-1403	E175-092914-049	9/29/2014	9/29/2014	NA	10/1/2014	1.16	NA	7	Sample
2014-1404	E175-092914-050	9/29/2014	9/29/2014	NA	10/1/2014	ND	NA	7	Sample
2014-1405	E175-092914-051	9/29/2014	9/29/2014	NA	10/1/2014	ND	NA	7	Sample
2014-1406	E175-092914-052	9/29/2014	9/29/2014	NA	10/1/2014	ND	NA	7	Sample
2014-1407	E175-092914-053	9/29/2014	9/29/2014	NA	10/1/2014	1.26	NA	7	Sample
2014-1408	E91A-092914-054	9/29/2014	9/29/2014	NA	10/1/2014	1.18	NA	7	Sample
2014-1409	E91A-092914-055	9/29/2014	9/29/2014	NA	10/1/2014	1.23	NA	7	Sample
2014-1410	E91A-092914-056	9/29/2014	9/29/2014	NA	10/1/2014	1.30	NA	7	Sample
2014-1411	E91A-092914-057	9/29/2014	9/29/2014	NA	10/1/2014	1.16	NA	7	Sample
2014-1464	E091A-100614-63	10/6/2014	10/6/2014	NA	10/8/2014	ND	NA	8	Sample
2014-1465	E091A-100614-64	10/6/2014	10/6/2014	NA	10/8/2014	ND	NA	8	Sample
2014-1466	E091A-100614-65	10/6/2014	10/6/2014	NA	10/8/2014	1.01	NA	8	Sample
2014-1467	E091A-100614-66	10/6/2014	10/6/2014	NA	10/8/2014	ND	NA	8	Sample
2014-1468	E091A-100614-67	10/6/2014	10/6/2014	NA	10/8/2014	ND	NA	8	Sample
2014-1469	E175-100614-58	10/6/2014	10/6/2014	NA	10/8/2014	ND	NA	8	Sample
2014-1470	E175-100614-59	10/6/2014	10/6/2014	NA	10/8/2014	ND	NA	8	Sample
2014-1471	E175-100614-60	10/6/2014	10/6/2014	NA	10/8/2014	ND	NA	8	Sample
2014-1472	E175-100614-61	10/6/2014	10/6/2014	NA	10/8/2014	ND	NA	8	Sample
2014-1473	E175-100614-62	10/6/2014	10/6/2014	NA	10/8/2014	ND	NA	8	Sample
2014-1601	E091-101614-068	10/16/2014	10/17/2014	NA	10/21/2014	ND	NA	9	Sample
2014-1602	E091-101614-069	10/16/2014	10/17/2014	NA	10/21/2014	ND	NA	9	Sample
2014-1603	E091-101614-070	10/16/2014	10/17/2014	NA	10/21/2014	ND	NA	9	Sample
2014-1604	E091-101614-071	10/16/2014	10/17/2014	NA	10/21/2014	ND	NA	9	Sample
2014-1605	E091-101614-072	10/16/2014	10/17/2014	NA	10/21/2014	ND	NA	9	Sample
2014-1606	E091-101614-073	10/16/2014	10/17/2014	NA	10/21/2014	ND	NA	9	Sample
2014-1607	E091-101614-074	10/16/2014	10/17/2014	NA	10/21/2014	ND	NA	9	Sample