

RECEIVED

JUN 25 2014

Attachment E – Notice of Intent

DIVISION OF WATER QUALITY

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

STATEWIDE GENERAL NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM  
 (NPDES) PERMIT FOR RESIDUAL AQUATIC PESTICIDE DISCHARGES TO WATERS OF  
 THE UNITED STATES FROM ALGAE AND AQUATIC WEED CONTROL APPLICATIONS

I. NOTICE OF INTENT STATUS (see Instructions)

Mark only one item	A. New Applicator	B. Change of Information: WDID#	5A57NP00022
	C. <input type="checkbox"/> Change of ownership or responsibility: WDID#		

II. DISCHARGER INFORMATION

A. Name California Department of Fish and Wildlife			
B. Mailing Address 1812 9th Street			
C. City Sacramento	D. County Sacramento	E. State CA	F. Zip 95811
G. Contact Person Joel Trumbo	H. E-mail address Joel.Trumbo@wildlife.ca.gov	I. Title Senior Environmental Scientist	J. Phone (916) 445-8544

III. BILLING ADDRESS (Enter Information only if different from Section II above)

A. Name N/A			
B. Mailing Address			
C. City	D. County	E. State	F. Zip
G. E-mail address	H. Title	I. Phone	

**IV. RECEIVING WATER INFORMATION**

A. Algaecide and aquatic herbicides are used to treat (check all that apply):

1.  Canals, ditches, or other constructed conveyance facilities owned and controlled by Discharger.  
Name of the conveyance system: CDFW has priorities statewide that may require treatment and that may occur in any or all of the listed types of bodies of water. \_\_\_\_\_

2.  Canals, ditches, or other constructed conveyance facilities owned and controlled by an entity other than the Discharger.  
Owner's name: \_\_\_\_\_  
Name of the conveyance system: \_\_\_\_\_

3. Directly to river, lake, creek, stream, bay, ocean, etc.  
Name of water body: \_\_\_\_\_

B. Regional Water Quality Control Board(s) where treatment areas are located  
(REGION 1, 2, 3, 4, 5, 6, 7, 8, or 9): Region Treatments could potentially occur in any or all listed regions \_\_\_\_\_  
(List all regions where algaecide and aquatic herbicide application is proposed.)

**V. ALGAECIDE AND AQUATIC HERBICIDE APPLICATION INFORMATION**

A. Target Organisms: \_\_\_\_\_  
**Various aquatic weed pests**

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

AquaMaster (Roundup Custom) : glyphosate  
Habitat or Polaris: imazapyr  
Renovate 3: triclopyr triethylamine  
Rodeo: Glyphosate  
Sonar: fluridone

C. Period of Application: Start Date Currently unknown \_\_\_\_\_ End Date Currently unknown \_\_\_\_\_

D. Types of Adjuvants Used:  
R-11 and Competitor

**VI. AQUATIC PESTICIDE APPLICATION PLAN**

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

If not, when will it be prepared? \_\_\_\_\_

**VII. NOTIFICATION**

Have potentially affected public and governmental agencies been notified?  
Notification to be done when treatment sites are determined  Yes  No

**VIII. FEE**

Have you included payment of the filing fee (for first-time enrollees only) with this submittal?  
 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: Eric Loft

B. Signature: 

Date: 6/23/14

C. Title: Wildlife Branch Chief

**XI. FOR STATE WATER BOARD STAFF USE ONLY**

WDID:	Date NOI Received:	Date NOI Processed:
Case Handler's Initial:	Fee Amount Received: \$	Check #:
<input type="checkbox"/> Lyris List Notification of Posting of APAP	Date _____	Confirmation Sent _____

# **Aquatic Pesticide Application Plan (APAP)**

**For the Statewide General NPDES Permit for Residual Aquatic Pesticide  
Discharges to the Waters of the United States  
from Aquatic Weed Control Applications  
Water Quality Order No. 2013-0002-DWQ  
General Permit # CAG990005**

Prepared by:  
California Department of Fish and Wildlife  
March 2014

Submitted to:  
State Water Resources Control Board  
1001 I Street  
Sacramento, CA 95814  
Attn: Russell Norman

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## **1. Description of the Water System**

The mission of California Department of Fish and Wildlife (CDFW) is to manage the state's diverse flora and fauna resources and the habitats on which they depend, for their ecological values and for their use and enjoyment by the public. Aquatic weed pests have the potential to cause serious environmental damage through native species displacement, degraded water quality and clogged waterways; which in turn diminishes the ecological value, as well as, the public's enjoyment of the land.

The Integrated Pest Management (IPM) program of CDFW works in partnership with other cooperating governmental agencies, private landowners, and NGOs (non-government organizations) to control, if not eradicate invasive species infestations.

CDFW has identified the following properties as having the potential need for aquatic herbicide use: Cosumnes River Ecological Reserve (Sacramento County), Gray Lodge Wildlife Area (Butte and Sutter Counties), Los Banos Wildlife Area (Merced County), Mendota Wildlife Area (Fresno County), North Grasslands Wildlife Area (Merced County), Oroville Wildlife Area (Butte County), and Upper Butte Basin Wildlife Area (Colusa and Glenn Counties). Water bodies that may be present at these properties include ponds, and irrigation ditches or canals. Those water bodies that have the greatest potential to become infested and cause significant environmental and or recreational damage with aquatic weeds are described below.

### **1.1 Still Bodies of Water- (ponds)**

Ponds often receive and discharge water from similar sources; streams, either permanent or intermittent, or irrigation canals or flumes. During peak flow, there is the potential for infested ponds to become part of a larger body of water such as a lake or river. All ponds that are found to have populations of invasive aquatic weeds will be evaluated by the IPM unit and a determination of whether a threshold has been met will be made prior to treatment. In the development of a treatment plan, alternative methods will be considered and implemented if deemed appropriate. If it is determined that there will be any direct application of herbicides to the body of water, CDFW will identify and describe the body of water along with the treatment and application areas and any site specific BMPs.

### **1.2 Moving Bodies of Water-(canals and ditches)**

In early spring or during other periods of heavy water flow, canals and ditches can carry large water volumes that can move aquatic weeds downstream into uninfested areas. Canals and ditches have the potential to move aquatic weeds throughout their system affecting water conveyance ability, and ultimately wildlife habitat conditions, recreational opportunities and agricultural production. Canals and ditches that are found to have

populations of invasive aquatic weeds will be evaluated by the IPM unit and a determination of whether a threshold has been met will be made prior to treatment. In the development of a treatment plan, alternative methods will be considered and implemented if deemed appropriate. If it is determined that there will be any direct application of herbicides to the body of water, CDFW will identify and describe the body of water along with the treatment and application areas and any site specific BMPs.

## **2. Description of the Treatment Area**

CDFW may apply aquatic herbicides to any of the above mentioned water bodies if aquatic weed treatment thresholds are met.

## **3. Description of Weeds to be Controlled**

The CDFW's water delivery system consisting of irrigation channels and associated natural waterways, as well as standing bodies of water such as ponds are prone to infestations by emergent, submerged and floating aquatic weeds such as water primrose (*Ludwigia spp.*), parrotfeather ( *Myriophyllum aquaticum*), water hyacinth (*Eichhornia crassipes*), South American spongeplant (*Limnobium laevigatum*), and horned pondweed (*Zannichellia palustris*).

The presence of these weeds in the various bodies of water can cause obstruction of the water delivery control structures such as gates and pumps and displace more desirable aquatic flora; thus impacting the habitat quality, and reducing water quality.

#### 4. Aquatic Herbicides to be Used, Known Degradation Byproducts, Application Methods and Surfactants

The various herbicides and surfactants that may be employed by CDFW are summarized in Table 1.

**Table 1. Aquatic herbicides and surfactants that may be used by CDFW.**

<b>Herbicide (active ingredient)</b>	<b>Degradation Byproducts</b>	<b>Application Method(s)</b>	<b>Surfactant</b>
Glyphosate	Aminomethyl phosphonic acid, carbon dioxide	Backpack sprayer, handgun or boom sprayer	Various aquatic-labeled surfactants
Imazapyr	Pyridine hydroxy-dicarboxylic acid, pyridine dicarboxylic acid and nicotinic acid	Backpack sprayer, handgun or boom sprayer	Various aquatic-labeled surfactants
Triclopyr amine	3,5,6-trichloro-2 pyridinol	Backpack sprayer, handgun or boom sprayer	Various aquatic-labeled surfactants
Fluridone	n-methyl formamide and 3-trifluoromethyl benzoic acid	Backpack sprayer, handgun, submersed boom, spreader or boom sprayer	None

All herbicide applications are made according to product label specifications. When applicable to enhance the efficacy of an herbicide, surfactants labeled for aquatic use are utilized. All applications are performed using Best Management Practices (BMP's) by qualified personnel.

#### 5. Factors Influencing the Decision to Use Aquatic Herbicides

CDFW utilizes an Integrated Pest Management (IPM) Program approach in the treatment of aquatic vegetation on its properties. One of the goals of this program is to establish a reasonable set of control measures that aid in the management of aquatic vegetation infestations. An action threshold level is the point at which action should be taken to control aquatic vegetation before any or all of the following occurs: the water conveyance system is appreciably impacted, the native species becomes displaced, and/or water quality is degraded. One of the main functions of an IPM program is to determine when a control action is necessary, for the mere presence of some aquatic vegetation species may be an indicator of a flourishing ecosystem in a state of equilibrium. If the aquatic vegetation is present in quantities sufficient to meet or exceed the action threshold, a control method is implemented. Control methods may include, mechanical, cultural, biological and/or chemical and the choice of options will be based on the feasibility, biological efficacy, environmental impacts, minimal public intrusiveness and availability of fiscal resources. An integrated pest management approach will be utilized whenever possible. Occasionally herbicide applications may be made

prior to threshold exceedance based on predicted aquatic vegetation growth rate and density, historical growth trends, weather, and water flow. Some aquatic weeds may be treated shortly after emergence or when appropriate based on the herbicide to be used; especially since younger plants are more susceptible and less plant mass to target means a reduction in herbicide needed.

Part of CDFW's IPM approach is the evaluation of alternative control methods and these may be implemented as part of a test program.

Alternative control methods tend to be more expensive, labor intensive, not as effective, spread aquatic weeds and can cause temporary water quality degradation and therefore will be evaluated based on site and weed characteristics.

## **6. Gates and Control Structures**

CDFW operates and maintains numerous water control structures on many of its properties. When appropriate, staff will close any control structures within or adjacent to the application or treatment areas during herbicide applications, if there is a concern that receiving waters may be affected by herbicide residues.

Control structures within the treatment area will be inspected prior to and during the herbicide application to evaluate for leaks. Should a leak develop on closed control structures, the application will be stopped as soon as practicable and repairs made before resuming treatment.

## **7. State Implementation Policy (Section 5.3) Exceptions**

The proposed herbicides and surfactant are not priority pollutants, and therefore do not require an exception from Section 5.3.

## **8. Monitoring Program**

Water monitoring studies are performed in compliance with the Monitoring and Reporting Program (MRP) for Water Quality Order NO 2013-0002-DWQ. Samples will be collected and analyzed per MRP guidelines as stated in the table below (Table 2).

**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 <sup>2</sup>	°F	Grab <sup>4</sup>	5	Background, Event and Post-event monitoring	6
	2. pH <sup>3</sup>	Number				
	3. Turbidity <sup>3</sup>	NTU				
	4. Electric Conductivity <sup>3</sup> @ 25°C	µmhos/cm				
Chemical	1. Active Ingredient <sup>7</sup>	µg/L	Grab <sup>4</sup>	5	Background, Event and Post-event monitoring	6
	2. Nonylphenol <sup>8</sup>	µg/L				
	3. Hardness (if copper is monitored)	mg/L				
	4. Dissolved Oxygen <sup>2</sup>	mg/L				

<sup>1</sup> All applications at all sites.  
<sup>2</sup> Field testing.  
<sup>3</sup> Field or laboratory testing.  
<sup>4</sup> 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.  
<sup>5</sup> Collect samples from a minimum of six application events for each active ingredient in each environmental setting (flowing 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 and non-flowing water). If the results from six consecutive sampling events show concentrations that are less than the receiving water limitations/trigger for an active ingredient in an environmental setting, sampling shall be reduced to one application event per year for that active ingredient in that environmental setting. If the yearly sampling event shows exceedance of the receiving water limitation/trigger for an active ingredient in an environmental setting, then sampling shall return to six application events for that active ingredient in each environmental setting. For glyphosate, collect samples from one application event from each environmental setting (flowing and non-flowing water) per year.  
<sup>6</sup> Pollutants shall be analyzed using the analytical methods described in 40 C.F.R. part 136.  
<sup>7</sup> 2,4-D, acrolein, dissolved copper, diquat, endothall, fluridone, glyphosate, imazamox, imazapyr, penoxsulam, and triclopyr.  
<sup>8</sup> It is required only when a surfactant is used.

## **8.1 Monitoring Frequency and Locations**

Monitoring locations will be selected to represent the variations in treatment that occur, which may include: environmental setting, impoundment or conveyance type, hydrology, aquatic herbicide use, seasonal and regional variations.

Monitoring frequency will follow the schedule set forth by the NPDES general permit and is summarized below:

### **8.1.1 Background Monitoring**

Background monitoring samples shall be collected upstream at the time of the application event, or in the application area just prior to (up to 24-hours in advance of) the application event.

### **8.1.2 Event Monitoring**

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

### **8.1.3 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 CDFW properties.

## **8.2 Sample Collection**

For water depths of 6 feet or greater, the sample will be collected at a depth of three feet. If the water depth is less than six feet, the sample will be collected at the approximate mid-depth. A long handled sampling pole may be used for locations that are difficult to access.

## **8.3 Field Measurements**

In addition to the collection of water samples, visual parameters (water body description, appearance of waterway and weather conditions) and physical readings (with the exception of turbidity, which will be analyzed by a lab) will be done at the sampling sites and recorded on the field data form shown below (Figure 1). All field meters will be

calibrated according to the manufacturer's specifications at the recommended frequency and checked with a standard prior to the start of the sampling season.

Figure 1. NPDES Monitoring Data Sheet

## NPDES Monitoring Data Sheet

Site Name:	Collector:	Target Veg:	Herbicide/Surfactant:
------------	------------	-------------	-----------------------

**Background Monitoring :** Upstream at time of the application event or in application area just prior to (up to 24 hours in advance of) the application event.

Date:	GPS/Waypt:	H <sub>2</sub> O Spd (ft/sec)	%Veg	Photo
Time:	Altitude:			<input type="checkbox"/>
<b>OBSERVATIONS – Circle and provide description, if applicable</b>				
Weather: Clear / Partly Cloudy / Cloudy / Overcast / Other:			Wind:	
Water Clarity: Clear / Cloudy / Milky / Muddy / Other:				
Water Color: Clear / Brown / Red/ Green / Other:				
Visible: Films / Sheens / Coatings		Bottom Deposits: Yes / No		Fungi / Slimes / Objectionable Growth:
Floating/ Suspended Material (algae, trash, etc.):				
Aquatic Life: Yes / No				
Potential Nuisance Conditions: Yes / No				
<b>WATER TESTING</b>				
Temp(°C):	DO(mg/L):	EC(µs/cm):	Sal (ppt):	pH:

**Event Monitoring:** Immediately downstream of treatment area in flowing waters or immediately outside of treatment area in non-flowing waters.

Date:	GPS/Waypt:	H <sub>2</sub> O Spd (ft/sec)	%Veg	Photo
Time:	Altitude:			<input type="checkbox"/>
<b>OBSERVATIONS – Circle and provide description, if applicable</b>				
Weather: Clear / Partly Cloudy / Cloudy / Overcast / Other:			Wind:	
Water Clarity: Clear / Cloudy / Milky / Muddy / Other:				
Water Color: Clear / Brown / Red/ Green / Other:				
Visible: Films / Sheens / Coatings		Bottom Deposits: Yes / No		Fungi / Slimes / Objectionable Growth:
Floating/ Suspended Material (algae, trash, etc.):				
Aquatic Life: Yes / No				
Potential Nuisance Conditions: Yes / No				
<b>WATER TESTING</b>				
Temp(°C):	DO(mg/L):	EC(µs/cm):	Sal (ppt):	pH:

**Post-Event Monitoring :** Within the treatment area within one week after application

Date:	GPS/Waypt:	H <sub>2</sub> O Spd (ft/sec)	%Veg	Photo
Time:	Altitude:			<input type="checkbox"/>
<b>OBSERVATIONS – Circle and provide description, if applicable</b>				
Weather: Clear / Partly Cloudy / Cloudy / Overcast / Other:			Wind:	
Water Clarity: Clear / Cloudy / Milky / Muddy / Other:				
Water Color: Clear / Brown / Red/ Green / Other:				
Visible: Films / Sheens / Coatings		Bottom Deposits: Yes / No		Fungi / Slimes / Objectionable Growth:
Floating/ Suspended Material (algae, trash, etc.):				
Aquatic Life: Yes / No				
Potential Nuisance Conditions: Yes / No				
<b>WATER TESTING</b>				
Temp(°C):	DO(mg/L):	EC(µs/cm):	Sal (ppt):	pH:

#### **8.4 Sample Preservation and Delivery**

Samples will be collected in unpreserved containers. Should an analytical method require preservation, it will occur at the laboratory by the appropriate lab personnel. Once collected and labeled, samples will be immediately placed in a dark, cold (~4°C) environment, typically a cooler with ice. Delivery of samples to the laboratory needs to occur as soon as possible.

#### **8.5 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 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.

### **9. How to Prevent Sample Contamination**

Samples shall be, if possible, collected upwind and not in close proximity to application equipment. There shall not be any contact with aquatic herbicide application equipment, containers or personal protective equipment.

When done sampling in a given location, the equipment will be cleaned with a non-phosphate cleaner and triple-rinsed with distilled water. Once at a new sampling location, the equipment will be rinsed once with the water being sampled prior to collection. Gloves will be changed between collection sites.

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

### **10. Description of BMPs to be Implemented**

CDFW has identified several best management practices (BMPs) to be implemented in conjunction with the planned herbicide applications.

#### **10.1 Aquatic Herbicide Spill Prevention and Containment**

All herbicide applications will be supervised by a California Department of Pesticide Regulation-certified applicator who has received training specific to the herbicide and surfactant/adjuvant products to be used. Label language is followed to ensure safe handling and loading of herbicides. Application equipment is routinely maintained and checked to identify and/or minimize the possibility of leak development or failure that might lead to a spill. Tank mixing and filling will be done well away from all surface

waters. In the unlikely event of an aquatic herbicide spill, the material will be prevented from entering any water bodies to the extent practicable. CDFW staff is trained to contain spilled herbicide products, apply absorbent material, and remove products to a landfill. Label instructions will be followed and reporting as required by local, state and federal laws will be done for all spills.

## **10.2 Appropriate Application Rate**

### **10.2.1 Site Evaluation**

CDFW's Pest Control Adviser (PCA) and/or qualified staff will evaluate sites that have aquatic weed populations to determine if thresholds have or likely will be exceeded. Thresholds relate to the ability of the water conveyance system to move water, the native species being negatively impacted, and the degradation of water quality. If it is determined that a threshold has or likely will be exceeded, an aquatic herbicide application is considered; and barring any concerns of water quality degradation, an application plan will be initiated.

The evaluation of pest management alternatives is conducted jointly by the department's pest control advisor (Joel Trumbo, Senior Environmental Scientist, [joel.trumbo@wildlife.ca.gov](mailto:joel.trumbo@wildlife.ca.gov)) and one of the following onsite managers:

Cosumnes River Ecological Reserve: Eric Kleinfelter, 209-744-1598

Gray Lodge Wildlife Area: Dave Van Buren, 530-846-7500

Los Banos Wildlife Area: Sean Allen, 209-826-0463

Mendota Wildlife Area: Rick Knoernschild, 559-655-4645

North Grasslands Wildlife Area: Steve Miyamoto, 559-970-2810

Oroville Wildlife Area: Byron Stone, 530-538-2236

Upper Butte Basin Wildlife Area: Laura Cockrell, 530-982-2169

Each of these on-site managers has obtained their pesticide applicator certification from the California Department of Pesticide Regulation and receives annual training on pesticide safety, invasive weed biology and control. The evaluations are conducted annually on a site-specific basis, but may be revised more frequently if conditions change dramatically during the treatment year. The evaluation process includes the consideration of both chemical and non-chemical methods with the most effective and efficient method being selected. Many times, the selected control strategy involves an integrated approach that uses both chemical and non-chemical methods.

### **10.2.2 Applications Made According to Label and PCA Recommendation**

All aquatic herbicide applications are to be made according to the product label in accordance with regulations of the U.S. EPA, CalEPA, Cal OSHA, DPR and the local Agricultural Commissioner. Prior to application, the PCA will prepare a written recommendation that specifies rates of application and any warnings or conditions that limit the application so that non-target flora and fauna are not negatively affected.

### **10.2.3 Applications Made By Qualified Personnel**

Aquatic herbicide applications will be made by CDFW personnel holding a valid Qualified Applicator Certificate (QAC) or Qualified Applicator License (QAL), or staff under the supervision of QACs or QALs. These applicators will have the training necessary to utilize proper equipment loading, nozzle selection, calibration, and operation to ensure that spills are minimized, only target vegetation is treated, and precise application rates are made according to the label.

### **10.3 Plan for Educating Applicators on Avoiding Adverse Effect from Pesticide Applications**

Licensed QACs and QALs must complete 20 hours and PCAs must complete 40 hours of continuing education every 2 years to remain licensed, thus ensuring that all applicators are up-to-date on the latest pest control techniques.

### **10.4 Plan on Informing Landowners and Agencies Who Have Water Rights on the Receiving Waters**

Appropriate gates, weirs, etc. will be closed to prevent discharge of residual aquatic herbicide into receiving waters of adjacent landowners (private or public). Additionally, water users potentially affected by any water use restrictions will be notified prior to an application being made, per the aquatic herbicide label.

### **10.5 Preventing Fish Kills**

All herbicide applications will be supervised by a California Department of Pesticide Regulation-certified 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. Additionally, all aquatic applications will be made from the downstream end of a project to the upstream end to avoid a buildup of product in the flowing water. It is important to note that even with proper application and

the use of precautions; in rare circumstances aquatic herbicide use may result in impacts to non-target aquatic fauna.

## **11. Evaluation of Alternative Control Methods**

### **11.1 Other Management Options**

CDFW utilizes an Integrated Pest Management (IPM) Program approach in the treatment of aquatic weeds on its properties. One of the goals of this program is to establish a reasonable set of control measures that aid in the management of aquatic weed infestations. An action threshold level is the point at which action should be taken to control aquatic weeds before any or all of the following occurs: the water conveyance system is appreciably impacted, the native species becomes displaced, or water quality is degraded. One of the main functions of an IPM program is to determine when a control action is necessary, for the mere presence of some aquatic vegetation species may be an indicator of a flourishing ecosystem in a state of equilibrium. If the aquatic vegetation is present in quantities sufficient to meet or exceed the action threshold, a control method is implemented. Control methods may include, mechanical, cultural, biological and/or chemical and the choice of options will be based on the feasibility, biological efficacy, environmental impacts, minimal public intrusiveness and availability of fiscal resources. An integrated pest management approach will be utilized whenever possible. Occasionally herbicide applications may be made prior to threshold exceedance based on predicted aquatic vegetation growth rate and density, historical growth trends, weather, and water flow. Some aquatic weeds may be treated shortly after emergence or when appropriate based on the herbicide to be used; especially since younger plants are more susceptible and less plant mass to target means a reduction in herbicide needed.

#### **11.1.1 No Action**

When feasible, this option is utilized. Once a threshold is reached however, consideration of other control methods needs to be initiated. This alternative would allow the continued spread of the pest species resulting in increased difficulties managing water conveyance and ultimately degrading the environment.

#### **11.1.2 Prevention**

Many aquatic weed infestations within the natural waterways on CDFW lands are the result of infestations further upstream on private or public properties. Informing the upstream owners as to the presence of aquatic weed infestations on their properties and presenting eradication and/or control methods would help prevent future infestations. In addition, opportunities for coordinated and cooperative eradication efforts could be implemented in these situations.

In the case of hunting and fishing activities on CDFW lands, educational material could be presented and closure of those bodies of water (or portions of them) could prevent the inadvertent spread of target weeds.

Utilization of foreign materials such as plastic liners or concrete within drainage or irrigation channels has the potential to keep submersed weeds under control for a short period of time. However, sediment build-up within these channels will occur over time and will require manual removal. This technique is very costly to implement and maintain and will most likely will cause increased sediment loads downstream, degrade water quality over time and destroy wildlife habitat.

#### **11.1.3 Mechanical Method**

This alternative may provide some control of the target species, but it generally does not provide the desired long-term reduction of target species biomass, and therefore cannot accomplish the desired management goals. Further, this alternative will produce a large number of plant fragments that can rapidly spread infestations. Harvesting in dense stands also presents the risk of significant by-catch of non-target animals including fish, amphibians and reptiles.

#### **11.1.4 Cultural Methods**

Cultural management relies heavily on altering environmental factors related to pest population size. Common methods include burying (or filling in), lining (with plastic, cement or asphalt) drawing down or draining the water body. These methods can be effective in controlling invasive aquatic weed populations, but each of these carries the risk of damaging other native populations and wildlife habitat.

#### **11.1.5 Biological Control**

This method uses biological organisms to reduce the number or density of pests within a given pest population. Although goats, sheep and cattle are frequently used in terrestrial settings they would not be effective in controlling submerged vegetation; and the potential for degrading the water quality, makes this a poor option. The use of exotic biocontrol agents for aquatic weed control is not often an option, but when these agents are approved/available they will be considered as alternative control methods.

#### **11.1.6 Pesticide Control**

The decision to use an aquatic herbicide is based on the recommendation of CDFW's PCA. The selection of an appropriate aquatic herbicide, in addition to the

inclusion of other control methods (mechanical, cultural, biological) will be based on feasibility, biological efficacy, environmental impacts and availability of fiscal resources.

### **11.2 Using the Least Intrusive Method of Weed Control**

CDFW evaluates each treatment area to determine the least intrusive method of treatment. The decision as to which delivery system (backpack sprayers, trucks, all-terrain vehicles trailers, etc.) will be based on terrain; the ability to hold, safely transport and properly apply herbicide, and lowest impact to the environment.

### **11.3 Applying a Decision Matrix Concept for Choosing the Most Appropriate Formulation**

CDFW's PCA or designee will evaluate the area(s) to be treated prior to herbicide application to verify the presence and the extent of the target aquatic weeds. Aquatic herbicide product labels will be checked for control efficacy, proper dosage and the required amount necessary for application. A written recommendation which will include the rate of application and any warnings or conditions that will limit the application will be rendered by the PCA. A recommendation to include an adjuvant/surfactant to enhance the efficacy of the aquatic herbicide may also be made by the PCA.