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MAY 2 0 2014
DIVISION OF WATER QUALITY

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# 7 13AP00001 C. ☐ Change of ownership or responsibility: WDID# _____

II. DISCHARGER INFORMATION

A. Name **IMPERIAL IRRIGATION DISTRICT**			
B. Mailing Address **P. O. Box 937**			
C. City **Imperial**	D. County **Imperial**	E. State **CA**	F. Zip **92251**
G. Contact Person **David Watson**	H. E-mail address **dwatson@iid.com**	I. Title Superintendent, PCA	J. Phone **760-562-9645**

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

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

IV. RECEIVING WATER INFORMATION

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

1. ☒ Canals, ditches, or other constructed conveyance facilities owned and controlled by Discharger.
   Name of the conveyance system: **All American, East Highline, Westside Main, Central Main**
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 **7**
(List all regions where algaecide and aquatic herbicide application is proposed.)

V. ALGAECIDE AND AQUATIC HERBICIDE APPLICATION INFORMATION

A. Target Organisms: _Phragmites australis, Scirpus spp.,_Typha spp.,_Arundo donax,____

C. Algaecide and Aquatic Herbicide Used: List Name and Active Ingredients

Main & Lateral Canals
1. AquaMaster – Glyphosate
2. Clearcast – Imazamox

Drains
1. AquaMaster – Glyphosate
2. Clearcast – Imazamox
3. Garlon 3A – Triclopyr
4. Habitat - Imazapyr

C. Period of Application: Start Date:___January 1, 2014_____ End Date___December 31, 2014____

D. Types of Adjuvants Used: Polytex A 311, Quest, Agri-Dex, and any other adjuvants registered for aquatic use.

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? ☒ **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:** Ismael Gomez

B. **Signature:** _____ **Date:** 05/15/14

C. **Title:** Interim Water Manager

XI. FOR STATE WATER BOARD STAFF USE ONLY

WDID:	**Date NOI Received:**	**Date NOI Processed:**
Case Handler's Initial:	**Fee Amount Received:** $	**Check #:**
☐ **Lyris List Notification of Posting of APAP**	**Date** _____	**Confirmation Sent** _____

IMPERIAL IRRIGATION DISTRICT

AQUATIC PESTICIDES APPLICATION PLAN

AQUATIC PESTICIDES GENERAL NPDES PERMIT
WATER QUALITY ORDER NO. 2013-0002-DWQ
GENERAL PERMIT NO. CAG990005
DECEMBER 2013

P.O. Box 931
333 E. Barioni Blvd.
Imperial, CA 92251

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GENERAL PERMIT NO. CAG990005
December 2013

1. BACKGROUND

On March 5, 2013, the State Water Resources Control Board (Water Board) adopted the 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 (permit). The permit requires that dischargers seeking permit coverage prepare and submit an Aquatic Pesticides Application Plan (APAP) with the permit application package to the Water Board (Reference: Section II.C.3. Permit Coverage and Application Requirements, General Permit Application). When the application package and the APAP are deemed complete, the Deputy Director of the Water Board will issue a Notice of Applicability allowing the discharger to apply aquatic pesticides in accordance with the requirements of the permit.

An APAP describes a discharger's methods and procedures to: determine the need for pesticide use; evaluate and use pesticide alternatives when practical; identify the appropriate pesticide, application method and formulation; assess treatment effectiveness; and monitor and document compliance with the permit requirements. Through these methods and procedures the APAP provides the discharger direction to ensure that pesticide applications to waters of the United States are in compliance with permit.

As methods and procedures change during the permit term so will the APAP accordingly. Major changes to the APAP (e.g., change in pesticide, change in pesticide amount, addition or deletion of Best Management Practices, etc.) will be submitted to the Deputy Director of the Water Board for review and approval as required by the permit. Following is the Imperial Irrigation District (IID) APAP.

2. DESCRIPTION OF THE WATER SYSTEM

IID is the largest irrigation district in the nation. As a public agency, IID strives to provide the highest level of service at the most economical price while still preserving the unique ecosystem associated with this working landscape.

IID diverts and delivers approximately 3.1 million acre-feet (MAF) of Colorado River water to nine cities and nearly 500,000 acres of agricultural land in Imperial Valley. As part of its operating system, the district maintains an extensive gravity flow drainage system and maintains 10 fully operational reservoirs. This irrigation water is conveyed into the Valley by way of the All-American Canal.

Three main canals, East Highline, Central Main and Westside Main, receive water from the All-American Canal and are used to deliver water to many canals that exist throughout Imperial Valley. Farmers then divert water directly from these canals to irrigate approximately 479,000 acres of farmland within IID's boundaries. Another important component of IID's distribution system is the seven regulating and three interceptor reservoirs that have a total storage capacity of more than 3,300 acre-feet of water.

IID serves water through approximately 5,600 delivery gates for irrigation purposes. It operates and maintains more than 1,438 miles of lateral canals, 230 miles of main canals and the 80-mile-long All American Canal. IID also maintains approximately 1,456 miles of drainage ditches used to collect surface runoff and subsurface drainage from 32,227 miles of tile drains underlying 462,202 acres of farmland. Most of these drainage ditches ultimately discharge water into either the Alamo River or New River.

IID has constructed 10 regulating reservoirs as part of its ongoing water conservation program. The reservoirs receive water that would normally be surplus and store the water for beneficial use when needed.

2.1.1. Kakoo Singh

The Kakoo Singh Reservoir, the first reservoir constructed by the district, regulates water from the East Highline Canal. The water is diverted into the Vail Supply Canal via gravity flow and back into the East Highline via pump flow.

2.1.2. J.M. Sheldon

The Sheldon Reservoir, located on the Westside Main Canal off Forrester Road, northwest of Imperial, takes surplus water from the Westside Main.

2.1.3. Oscar Fudge

The Fudge Reservoir is on the Central Main Canal located southwest of Brawley. It makes deliveries to several lateral canals.

2.1.4. H. "Red" Sperber

The Sperber Reservoir is located west of Holtville on Meloland Road. Water from the Rositas Canal is held and released when needed into the Rose and Rubber Canals.

2.1.5. Robert F. Carter

The Carter Reservoir is designed to conserve operational discharge from the end of the Westside Main Canal. Located adjacent to Highway 86, six miles north of Westmorland, the reservoir also features a computerized control system and a specially designed area for recreational fishing.

2.1.6. Bernard Galleano

The Bernard Galleano Reservoir is located at the terminus of the East Highline Canal just north of Niland. The location of the reservoir, and the fact that it is totally automated and self-controlled, allows the IID to balance water shortfalls and

overages in the East Highline Canal, thus providing more uniform water deliveries to all downstream users. The reservoir was designed with an enhanced fisheries habitat and test site for waterfowl habitat development.

2.1.7. Carl C. Bevins

The Carl C. Bevins Reservoir stores operational discharge from the eight lateral canals in the Plum-Oasis Lateral Interceptor system. Two 25-cfs pumps draw water out of the reservoir for downstream canal.

2.1.8. Young

The Mulberry-D Lateral Interceptor is approximately 8.25 miles long and receives operational discharge at the end of eleven (11) lateral canals serving 31,000 acres of farmland. The reservoir is located near Calipatria at the end of the interceptor canal to store water for downstream users.

2.1.9. Milas Russell, Sr.

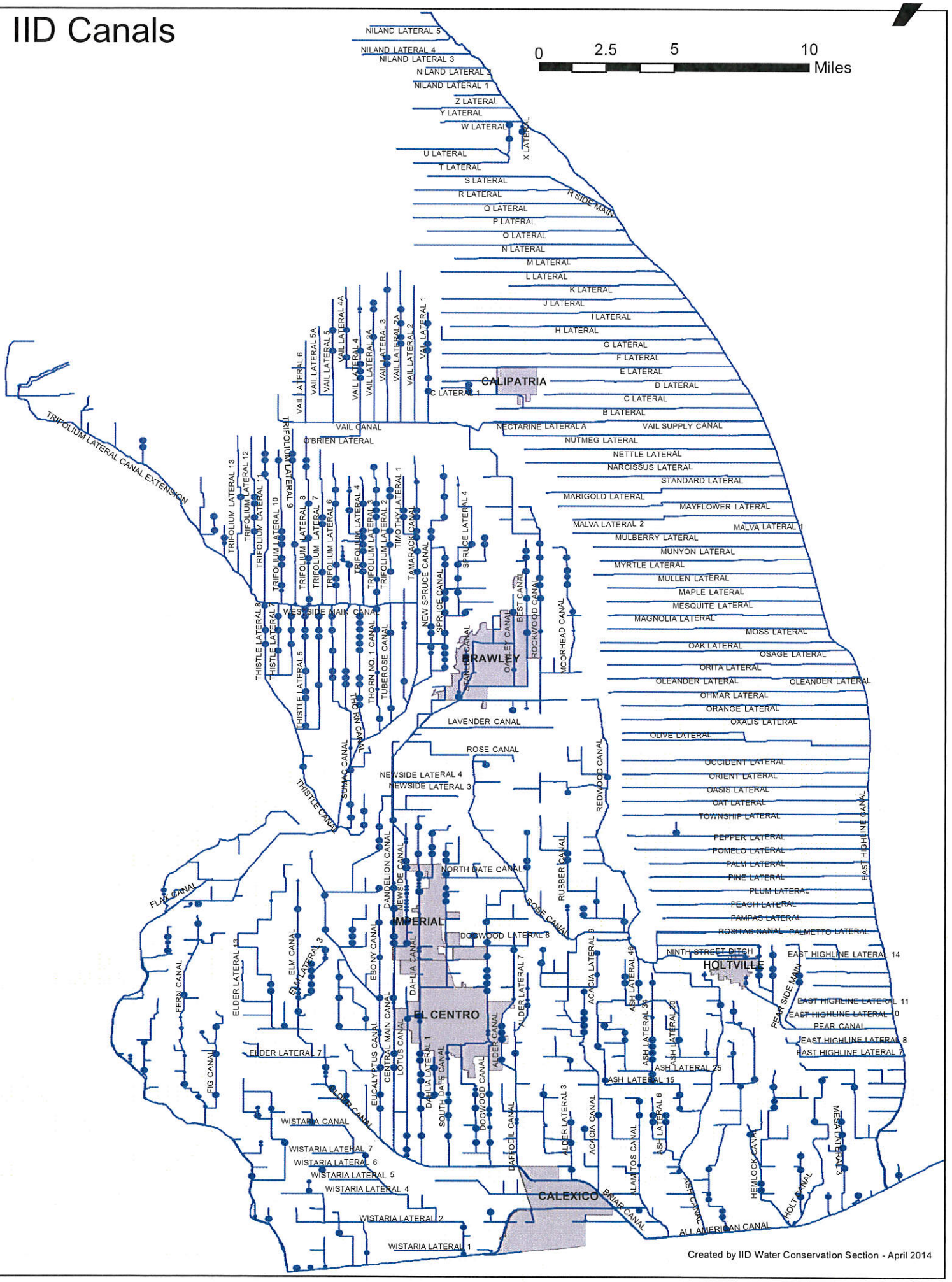
The Mulberry-D catches operational discharge at the ends of eleven (11) lateral canals that serve 31,000 acres of farmland near Calipatria. It is approximately 8.25 miles long. The Russell Reservoir stores water for downstream users and is located on the Vail Canal.

2.1.10. Louise K. Willey

The Trifolium Lateral Interceptor is approximately 10.9 miles long and receives operational discharge at the ends of fifteen (15) lateral canals serving 30,000 acres of farmland. The reservoir is located on the south side of the New River opposite the end of the Vail Canal. This reservoir stores the operational discharge from the interceptor and pumps the water through a 45-inch in diameter pipeline 3.5 miles

long upstream on the Vail Canal. The water is then discharged into the Vail Canal at the Vail Lateral No. 3 heading for downstream users.

IID Canals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MALVA LATERAL 2
MALVA LATERAL 1
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MUNYON LATERAL
MYRTLE LATERAL
MULLEN LATERAL
MAPLE LATERAL
MESQUITE LATERAL
MAGNOLIA LATERAL
MOSS LATERAL
OAK LATERAL
OSAGE LATERAL
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ORANGE LATERAL
OXALIS LATERAL
OLIVE LATERAL
OCCIDENT LATERAL
ORIENT LATERAL
OASIS LATERAL
OAT LATERAL
TOWNSHIP LATERAL
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THISTLE CANAL
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SANDERSON CANAL
OASIS CANAL
BEST CANAL
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MOORHEAD CANAL
LAVENDER CANAL
ROSE CANAL
NEWSIDE LATERAL 4
NEWSIDE LATERAL 3
REDWOOD CANAL
EAST HIGHLINE CANAL
NORTH DATE CANAL
DANDELION CANAL
NEWSIDE CANAL
RUBBER CANAL
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IMPERIAL
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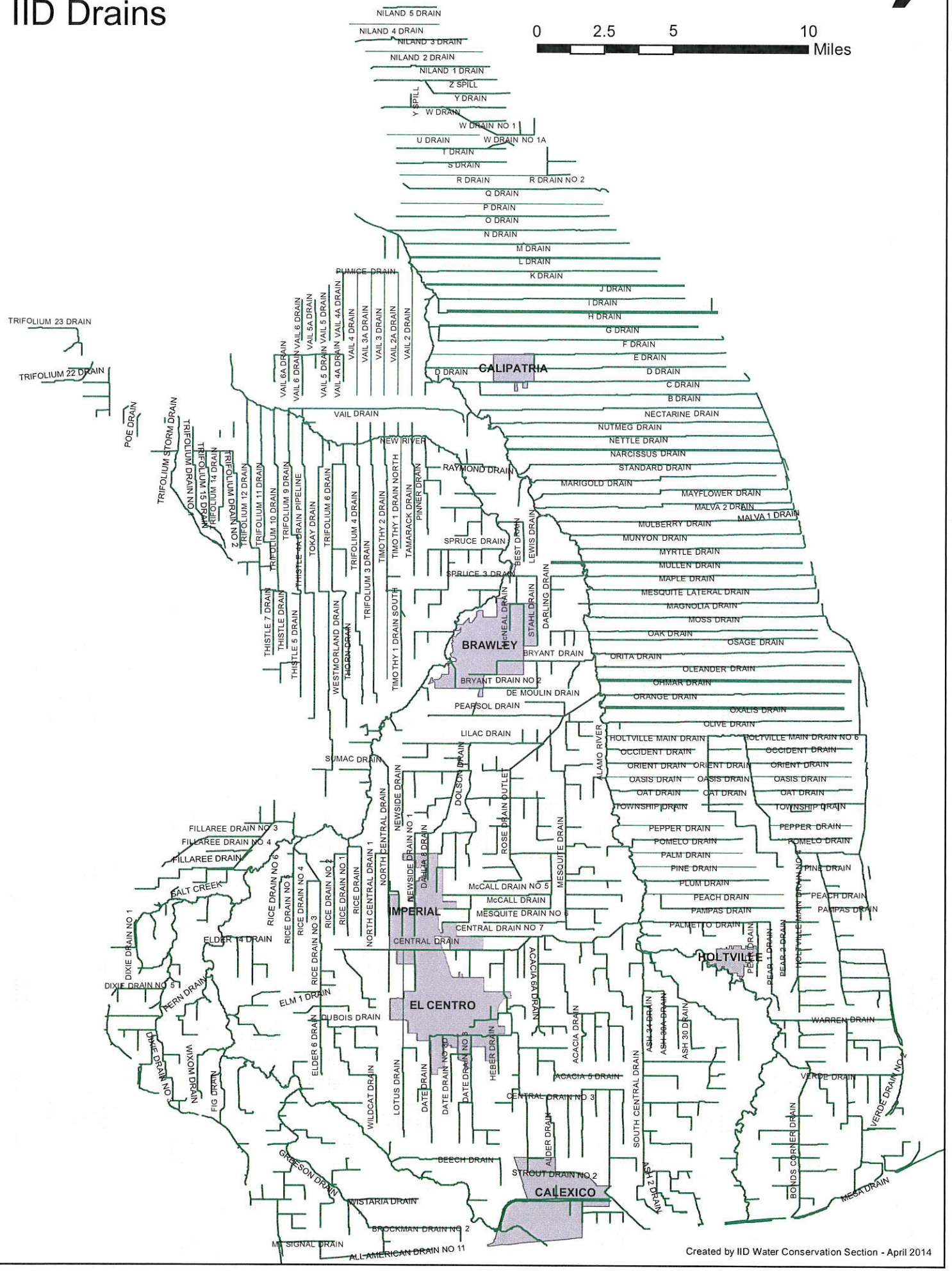
CALEXICO
BRIAR CANAL
ALL AMERICAN CANAL
Created by IID Water Conservation Section - April 2014

IID Drains



Created by IID Water Conservation Section - April 2014

3. DESCRIPTION OF TREATMENT AREA

The treatment area is defined as the area being treated by algaecide or aquatic herbicide for algae and aquatic weed controls and, therefore, the area being targeted to receive an appropriate rate of application consistent with product label requirements of algaecide or aquatic herbicide.

The District will maintain its unlined earthen canals being the All American Canal, East Highline, Central Main, Westside Main, Rositas, and numerous unlined lateral canals with aquatic herbicide application.

Basically, broadcast spraying will be the method of treatment with selective and aquatic herbicides. The District does not plan to use algaecide or aquatic herbicide direct application into its conveyance system or reservoirs. Mechanical and Biological controls are method of application.

Table 1 Description of Treatment Area

Description of Treatment Areas		
Water Body	**Target Organism**	**Treatment Area**
Unlined Canal	Typha spp. Phragmites spp.	Affected Area
Lined Canal	Pluchea Sericea	Affected Area
KaKoo Singh Reservoir	Myriophyllum spicatum Potamogeton pectinatus	Biological Control
J.M. Sheldon Reservoir	Myriophyllum spicatum Potamogeton pectinatus	Biological Control
Oscar Fudge Reservoir	Myriophyllum spicatum Potamogeton pectinatus	Biological Control
H. "Red" Sperber Reservoir	Myriophyllum spicatum Potamogeton pectinatus	Biological Control
Robert F. Carter Reservoir	Myriophyllum spicatum Potamogeton pectinatus	Biological Control

Bernard Galleano Reservoir	Myriophyllum spicatum Potamogeton pectinatus	Biological Control
Carl C. Bevins Reservoir	Myriophyllum spicatum Potamogeton pectinatus	Biological Control
Young Reservoir	Myriophyllum spicatum Potamogeton pectinatus	Biological Control
Milas Russell, Sr. Reservoir	Myriophyllum spicatum Potamogeton pectinatus	Biological Control
Louise K. Willey Reservoir	Myriophyllum spicatum Potamogeton pectinatus	Biological Control
Unlined Drain	Typha spp. Phragmites spp.	Affected Area
Unlined Drain	Typha latifolia L. Common Cattail	Affected Area

4. WEEDS AND ALGAE SUBJECT TO CONTROL

Bulrush, common reed, cattail, and giant reed are the four most troublesome aquatic weeds facing the IID the next several years. A brief description of each plant species are provided below:

4.1.1. **Bulrush (Scirpus spp.,)** belongs to the sedge family, is an annual or perennial plant species. Its habitats are marshes, lakes, ponds, stream banks, and other wet places. Bulrushes are characterized by tall triangular or round-shaped stems that may be leafy or may have no leaves at all. Brownish flowers are borne in clusters at the ends of the stems. River bulrush (S. fluviatilis), a perennial sedge, has three to five leaves just below the flower cluster and extensive rhizomes that produce tubers from which the plant reproduces vegetatively.

4.1.2. **Common reed (Phragmites australis)**, Grass family, is an perennial plant that grows in swamps, marshes, and along lake shores, pond margins, and canals, especially in areas with slow currents and muddy bottoms. Common reed has tall, erect stems that grow 6 to 15 feet high.

4.1.3. **Cattail (Typha spp.,)** Cattail family, could be found in marshes, swamps, irrigation and drainage ditches, rice fields, and shallow waters up to 4 feet deep. Cattail has a cylindrical flower spike that can be more than 1 foot long and that is densely packed with tiny flowers. Cattail leaves are long, narrow, and flat, and there are usually eight or more leaves per plant. Reproduction is by rhizomes and seed.

4.1.4. **Giant reed (Arundo donax)**, Grass family, is a perennial plant that grows in streams, ditches, levee banks, and other moist places; flourishes in all types of soils, including salty soils. Giant reed grows in clumps and is one of the tallest herbaceous perennial grasses, ranging between 12 and 25 feet in height. It has bamboo like hollow stems that are ¼ to 2 inches in diameter. A single clump of giant reed typically has hundreds of stems growing very close together. In spring and summer stems can grow as much as several inches per day. The blue-green leaves are 1 to 2 ½ inches wide and 12 inches long, and the plume like inflorescence is 12 to 24 inches long. Giant reed forms very large, densely matted, fibrous underground root masses to support its tall stems and can form dense floating mats in streams and rivers. It reproduces by stem fragments and rhizomes.

Surface aquatic weeds, such as sedges, rushes, tulles, cattails, water grasses, barnyard grass, giant reed, and phragmites thrive in distribution and drainage system. These aquatic pests can affect the operation and integrity of conveyance and drainage system by restricts water delivery; causes canal failure; banks erosion; clogs irrigation and drainage pipes; and frequently mechanical cleaning.

5. HERBICIDE PRODUCTS AND APPLICATION METHOD

The table listed below is the current herbicide products, active ingredient, degradation by-products, adjuvant or surfactant, and application method used by IID.

Every herbicide has its specific chemical, physical, and biological properties. Of primary concern is their movement and degradation in plants and soils. The herbicides that will be

a beneficial to the district's distribution system are Glyphosate and Imazamox. Imazapyr and Triclopyr will be used strictly for drainage ditches.

Table 2 Pesticide, Ingredients, and Degradation By-Products

	Pesticides, Ingredients, and Degradation By-Products			
Herbicide	**Active Ingredient**	**Degradation By-products**	**Adjuvant or Surfactant**	**Application Method**
AquaMaster	Glyphosate	Oxygen depletion decomposition of dead plants	Labeled for Aquatic Use	Boom Sprayer
Clearcast	Imazamox	None	Labeled for Aquatic Use	Boom Sprayer
Imazapyr	Imazapyr	Oxygen depletion decomposition of dead plants	Labeled for Aquatic Use	Boom Sprayer
Garlon	Triclopyr	Oxygen depletion decomposition of dead plants fish suffocation	Labeled for Aquatic Use	Boom Sprayer
Quest	Hydroxy carboxylic phosphoric acids ammonium salts	None	None	Water Conditioning
Polytex A 311	Polyacrylamide	None	None	Drift Retardant
Agri-Dex	Paraffinic Oil Polyol fatty acid Polyethoxylated derivatives	None	Labeled for Aquatic Use	Wetting Agent

5.1.1.1. AQUAMASTER®:

Aquamaster® is a post emergent, systemic herbicide with no soil residual activity. It gives broad-spectrum control of many annual weeds, perennial weeds, woody brush and trees. Aquamaster® moves through the plant from the point of foliage contact to and into the root system. Visible effects on most annual weeds occur within 2 to 4 days, but on most perennial weeds may not occur for 7 days or more.

Aquamaster® may be applied to submerged weeds in all bodies of fresh and brackish water which may be flowing, nonflowing or transient. This includes lakes, rivers, streams, ponds, estuaries, rice levees, seeps, irrigation and drainage ditches,

canals, reservoirs, wastewater treatment facilities, wildlife habitat restoration and management areas, and similar sites.

There is no restriction on the use of treated water for irrigation, recreation or domestic purposes.

Applications made to moving bodies of water must be made while traveling upstream to prevent concentration of this herbicide in water. When making any bankside applications, do not overlap more than 1 foot into open water. Do not spray in bodies of water where weeds do not exist. The maximum application rate of 7.5 pints per acre must not be exceeded in any single broadcast application that is being made over water. When emerged infestations require treatment of the total surface area of impounded water, treating the area in strips may avoid oxygen depletion due to decaying vegetation. Oxygen depletion may result in fish kill.

5.1.1.2. CLEARCAST®:

Clearcast® is an aqueous formulation that may be diluted in water and either applied directly to water for the control/suppression of certain submerged aquatic vegetation or applied as a broadcast or spot spray to floating and emergent vegetation. Aquatic sites that may be treated include estuarine and marine sites, ponds, lakes, reservoirs, wetlands marshes, swamps, bayous, arroyos, ditches, canals, streams, rivers, creeks and other slow-moving or quiescent bodies of water.

5.1.1.3. IMAZAPYR:

Imazapyr is an aqueous solution intended to be mixed in water and surfactants and applied as a post-emergent spray for control of most annual and perennial grasses, broadleaf weeds, vines, brambles, hardwood brush, trees for forestry site preparation and release of conifers from woody and herbaceous competition. Applications may only be made for the control of undesirable emergent and floating aquatic vegetation in and around standing and flowing water, including estuarine and marine sites. Applications may be made to control undesirable wetland, riparian and terrestrial vegetation growing in or around surface water.

5.1.1.4. Garlon® 3A:

Garlon® 3A herbicide use for the control of woody plants and broadleaf weeds in range and pasture, forests and non-crop areas including manufacturing and storage sites, rights-of-way such as electrical power lines, communication lines pipelines, roadsides, railroads, fence rows, non-irrigation ditch banks, and around farm buildings, and applications to grazed areas, and establishment and maintenance of wildlife openings, and in Christmas tree plantations and aquatic sites.

It is permissible to treat non-irrigation ditch banks, seasonally dry wetlands (such as flood plains, deltas, marshes, swamps, or bogs), and transitional areas between upland and lowland sites. Water treated with Garlon 3A may not be used for irrigation purposes for 120 days after application or until residue levels of Garlon 3A are determined by laboratory analysis, or other appropriate means of analysis, to be 1 ppb or less.

6. FACTORS INFLUENCING WEED CONTROL

Aquatic pests block screens and intake on pumps, interfere with hydroelectric production, increase sedimentation, decrease channel flow, degrade recreation uses, and reduce water quality and wildlife habitat value, and crop damage due to dense vegetation growth in our waterways and drainage system.

7. LIST OF GATES AND CONTROL STRUCTURES AND INSPECTION SCHEDULE

There is no inspection of gates or control structures since no algaecides or aquatic herbicide being treated directly into our distribution system only mechanical and biological controls are being used.

8. EXCEPTION PERIOD

Of the aquatic pesticides used by IID, there are no copper based aquatic pesticides being used within the receiving water.

9. MONITORING AND SAMPLING PROGRAM

Section 122.48 of title 40 of the Code of Federal Regulations (40 C.F.R. §122.48) requires that all NPDES permits specify monitoring and reporting requirements. California Water Code sections 13267 and 13383 also authorize the State Water Resources Control Board (the State Water Board) and the Regional Water Quality Control Board (Regional Water Board) to require technical and monitoring reports. This Monitoring and Reporting Program (MRP) establishes monitoring and reporting requirements which implement federal and California State laws and regulations.

This MRP is designed to address the two key questions shown below.

Question No. 1: Does the residual algaecides and aquatic herbicides discharge cause an exceedance of receiving water limitations?

Question No. 2: Does the discharge of residual algaecides and aquatic herbicides, including active ingredients, inert ingredients, and degradation byproducts, in any combination cause or contribute to an exceedance of the "no toxics in toxic amount" narrative toxicity objective?

A review of the receiving water limitations is appropriate to establish MRP guidelines.

The instantaneous maximum receiving water limitations are based on promulgated water quality criteria such as those provided in the California Toxics Rule (CTR), water quality objectives adopted by the State and Regional Water Boards in their Basin Plans, water quality criteria adopted by the California Department of Fish and Wildlife, water quality standards such as drinking water standards adopted by U.S. EPA or the California Department of Public Health (CDPH), or U.S. EPA National Recommended Ambient Water Quality Criteria.

This General Permit provides receiving water limitations based on the lowest water quality criteria/objectives to protect all designated beneficial uses of the receiving water.

In algaecide or aquatic herbicide applications, it is reasonable to conclude that some residual algaecides or aquatic herbicides will remain in the receiving waters. These residual algaecides or aquatic herbicides may cause toxicity to aquatic life. However, information regarding the specific amount of algaecide or aquatic herbicide residues (described below) in the receiving water as a result of direct applications for weed control is not adequate to develop receiving water limitations for these algaecides and aquatic herbicides. The monitoring triggers and monitoring data will be used to assess whether the discharges of these algaecide or aquatic herbicide residues have the reasonable potential to cause or contribute to an excursion of a water quality standard, including numeric and narrative objectives within a standard.

In the absence of adopted criteria, objectives, or standards, the State Water Board used U.S. EPA's Ambient Criteria for the Protection of Freshwater Aquatic Life (Ambient Water Quality Criteria) which are directly applicable as a regulatory level to implement narrative toxicity limitations included in all Regional Water Board Basin Plans. Where adopted criteria, objectives, standards, or Ambient Water Quality Criteria are unavailable, the State Water Board used data from U.S. EPA's Ecotoxicity Database to develop the Receiving Water Monitoring Triggers to protect all beneficial uses of the receiving water.

For constituents that do not have Ambient Water Quality Criteria, the Instantaneous Maximum Receiving Water Monitoring Trigger is based on one-tenth of the lowest 50 Percent Lethal Concentration (LC50) from U.S. EPA's Ecotoxicity Database. Using one-tenth of the lowest LC50 as the receiving water monitoring trigger is consistent with the Central Valley Regional Water Board's Basin Plan approach when developing the Daily Maximum Limitation for algaecides or aquatic herbicides that do not have water quality criteria.

This General Permit may be re-opened to add receiving water limitations to the algaecides or aquatic herbicides listed below if the monitoring triggers are exceeded or the monitoring data indicate re-opening of the permit is appropriate. The following is a detailed discussion of toxicity data, applicable water quality criteria, and Receiving Water Monitoring Triggers, if applicable, for these algaecide or aquatic herbicide:

9.1.1. Imazamox

Imazamox is a derivative of the active ingredient, ammonium salt of imazamox for the aquatic herbicide Clearcast, which DPR registered for use in California in October 2012. It is labeled for application to water for the control of submerged aquatic plants species and some emergent and floating species.

Imazamox is an herbicide that inhibits an enzyme in aquatic plants that is essential for the synthesis of three-branched chain amino acids.

The State obtained toxicity data for imazamox from U.S. EPA's *Ecotoxicity Database* to assess its toxicity to freshwater aquatic life. However, U.S. EPA's *Ecotoxicity Database* contains toxicity data only for imazamox, but not for its salt. Table 3 summarizes the toxicity data for imazamox below.

Table 3 Toxicity Data Summary for Imazamox (CAS# 114311-32-9)

Type of Organism	Study Length	Study Date	LC50 (mg/L)
Mysid	96 h	1998 1998	>100 >94.3
Bluegill sunfish	96 h	1994	> 119
Rainbow trout	96 h	1994	> 122
Sheephead mino	96 h	1998 1998	>94.2 >94.2
Lowest LC50/10 > 9.4 mg/L			

Ambient Water Quality Criteria are unavailable for imazamox and imazamox salt. Table 3 shows that one-tenth of the lowest LC50 to protect the most sensitive freshwater aquatic life for imazamox is greater than 9.4 mg/l.

Due to the absence of water quality criteria for imazamox and its low toxicity to aquatic life as indicated in U.S. EPA's *Ecotoxicity Database*, this General Permit does not have a receiving water monitoring trigger for imazamox. However, this General Permit requires receiving water monitoring for imazamox to collect data, which will provide information on whether the use of imazamox has water quality impacts.

9.1.2. Imazapyr

The active ingredient imazapyr is marketed by the trade names Arsenal, Chopper, and Assault. Upon contact, imazapyr can interfere with DNA synthesis and cell growth of the plants. The target weed species are grasses, broad-leaves, vines, brambles, shrubs and trees, and riparian and emerged aquatics. The result of exposure is death of new leaves. It was first registered in the United States in 1984.

Imazapyr is a slow-acting amino acid synthesis inhibitor. It has an average water half-life* of four days with photo degradation as the primary form of degradation in water. Imazapyr acts more quickly and is less toxic than other low-volume herbicides. According to the San Francisco Estuary* Invasive Spartina Project's May 4, 2005 report titled *Use of Imazapyr Herbicide to Control Invasive Cordgrass (Spartina spp.) in the San Francisco Estuary*, imazapyr in water rapidly degrades via photolysis. The report further states that a number of field studies demonstrated that imazapyr rapidly dissipated from water within several days, and no detectable residues of imazapyr were found in either water or sediment within two months; in estuarine systems, dilution of imazapyr with the incoming tides contributes to its rapid dissipation, suggesting that imazapyr is not environmentally persistent in the estuarine environment and does not result in significant impacts to water quality. The report concludes that imazapyr herbicides can be a safe, highly effective treatment for control and eradication of non-native *Spartina* species in the San

Francisco Estuary and offers an improved risk scenario over the existing treatment regime with glyphosate herbicides. On August 30, 2005, DPR registered imazapyr for aquatic application as an aquatic herbicide.

Toxicity data for imazapyr were obtained from U.S. EPA's *Ecotoxicity Database* to assess the toxicity of imazapyr to freshwater aquatic life. Tables 4 and 5 summarize the toxicity data for imazapyr and imazapyr salt.

Table 4 Toxicity Data Summary for Imazapyr (CAS#81334-34-1)

Type of Organism	Study Length	Study Date	LC50 (mg/L)
Pink Shrimp	96 h	1988	>189
Atlantic Silverside	96 h	1988	> 184
Bluegill sunfish	96 h	1983 1983	>100 >100
Channel catfish	96 h	1983	>100
Rainbow trout	96 h	1983 1985	>100 >110
Lowest LC50/10 > 10			

Table 5 Toxicity Data Summary for Imazapyr Isopropylamine Salt (CAS#81510-83-0

Type of Organism	Study Length	Study Date	LC50 (mg/L)
Water flea	48 h	1984	350
Rainbow trout	96 h	1984	112
Bluegill sunfish	96 h	1984	>1000
Lowest LC50/10 = 11.2			

Ambient Water Quality Criteria are unavailable for imazapyr and imazapyr salt. Tables 4 and 5 show that the lowest one-tenth of LC50 to protect the most sensitive freshwater aquatic life for imazapyr is 11.2 mg/l.

Due to its safe use in the environment and low toxicity to aquatic life as indicated in U.S. EPA's *Ecotoxicity Database*, this General Permit does not have a receiving water limitation for imazapyr. However, this General Permit contains a monitoring trigger of 11.2 mg/l based on one-tenth of the lowest LC50 from U.S. EPA's *Ecotoxicity Database* and requires receiving water monitoring to collect data, which will provide information on whether imazapyr has water quality impacts.

9.1.3. Triclopyr Triethylamine (TEA) Salt

Triclopyr TEA is a systemic herbicide used to control broad-leaf weeds and woody plants.

U.S. EPA concluded in its re-registration document that triclopyr TEA is practically non-toxic to freshwater fish and aquatic invertebrates on an acute basis and triclopyr TEA is slightly toxic to practically non-toxic to estuarine/marine fish and invertebrates on an acute basis.

Triclopyr produces the metabolite or degradate 3,5,6-trichloro-2-pyridinol (TCP). Based on its analysis, U.S. EPA concludes that the existing uses of triclopyr are unlikely to result in acute or chronic dietary risks from TCP. Based on limited available data and modeling estimates, with less certainty, the U.S. EPA concluded that existing uses of triclopyr are unlikely to result in acute or chronic drinking water risks from TCP.

Toxicity data for triclopyr TEA were obtained from U.S. EPA's *Ecotoxicity Database* to assess the toxicity of triclopyr TEA to freshwater aquatic life. Table 6 summarizes the toxicity data for Triclopyr TEA.

Table 6 Toxicity Data Summary for Triclopyr TEA Salt (CAS#57213-69-1)

Type of Organism	Study Length	Study Date	LC50 (mg/L)
Bluegill sunfish	96 h 96 h	1978 1973	891 471
Fathead minnow	96 h 96 h 96 h	1978 1983 1983	947 546 279
Grass shrimp	96 h	1992	326
Inland Silverside fish	96 h	1989	130
Pink shrimp	96 h	1975	895
Rainbow trout	96 h 96 h	1973 1978	240 552
Lowest LC50/10 = 13.0			

Ambient Water Quality Criteria are unavailable for triclopyr TEA. Table 6 shows that the lowest one-tenth of LC50 to protect the most sensitive freshwater aquatic life for triclopyr TEA is 13 mg/l.

Due to its safe use in the environment and low toxicity to aquatic life as indicated in U.S. EPA's *Ecotoxicity Database*, this General Permit does not have a receiving water limitation for triclopyr TEA. However, this General Permit contains a monitoring trigger of 13.0 mg/l based on one-tenth of the lowest LC50 from U.S. EPA's *Ecotoxicity Database* and requires receiving water monitoring to collect data, which will provide information on whether triclopyr TEA has water quality impacts.

The monitoring triggers and monitoring data will be used to assess whether the discharges of these aquatic herbicide residues have the reasonable potential to cause or contribute to an excursion of a water quality standard, including numeric and narrative objectives within a standard.

The District's herbicide program consists of imazapyr, imazamox, triclopyr, and glyphosate for its weed control applications. Therefore, it is reasonable to conclude that some residual aquatic herbicides will remain in the receiving waters. These

residual aquatic herbicides may cause low toxicity to aquatic life, monitoring several identifiable sites to determine the residual effects are essential.

9.2. Monitoring Locations

To establish monitoring locations it must be similar in hydrology, algaecides and aquatic herbicides use, and other factors that affect the discharge of algaecides and aquatic herbicides and their residues to surface waters as a result of applications to the areas being represented in that environmental setting.

Monitoring location information shall include a description of the treatment area, GPS coordinates if feasible, and algaecides and aquatic herbicides being applied (Figure 1 AQUATIC HERBICIDE APPLICATION LOG). Listed below are monitoring locations:

Canals

1. All American
2. East Highline
3. Central Main
4. Westside Main
5. Rositas

Drains

1. Bonds Corner
2. Rice No. 3
3. Trifolium 10
4. Vail 2
5. Mayflower
6. "G" drain

10. SAMPLE PROCEDURAL

The District does not expect to use algaecides herbicides into its receiving water. Aquatic herbicides of use will be applied according to the label for bankside and some broadcast

application along shoreline using precision equipment to apply herbicides. Broadcast spraying over the District's drainage ditches to control emerged aquatic plants such as cattail, will be performed.

The Receiving Water Monitoring Triggers shown in Table 7 below will be used to assess compliance with the narrative receiving water toxicity limitation. Nevertheless, exceeding the monitoring trigger does not establish a violation of this General Permit as long as the District performs the follow actions:

1. Initiates additional investigations for the cause of the exceedance
2. Implements additional BMPs to reduce the algaecide and aquatic herbicide residue concentration to be below the monitoring triggers in future applications
3. Evaluates the appropriateness of using alternative products.

Table 7 Receiving Water Monitoring Triggers

Ingredient	Unit	Instantaneous Maximum Monitoring Trigger	Basis
Imazapyr	mg/l	11.2	U.S. EPA Office of Pesticides Ecotoxicity Batabase
Imazamox	mg/l	9.4	U.S. EPA Office of Pesticides Ecotoxicity Batabase
Triclopyr Triethylamine	mg/l	13.0	U.S. EPA Office of Pesticides Ecotoxicity Batabase

Sampling would illustrate the impacts of the residual pesticide discharge from pesticide applications. Six samples are required per year for each active ingredient in each environmental setting to characterize the effects of residual pesticide discharge from pesticide applications. After applications have provided results from six consecutive sampling events showing concentrations that are less than the receiving water limitation/trigger for an active ingredient in a specific environmental setting, sampling shall be reduced to one application event per year for that active ingredient. Exception would be glyphosate application which this General Permit reduces the monitoring frequency of once per year (instead of six) at each environmental setting.

The District will investigate all aquatic herbicide applications that exceeded the monitoring triggers to explore if written recommendations were according to the manufacturers' labels and application of each aquatic herbicide was applied according to the labels and written recommendations. Therefore, if aquatic herbicide applications were applied according to the label and the monitoring trigger has exceeded its limitations then future application of that active ingredient will be applied to one-half of the treatment area and second application in several weeks after follow sampling protocols as described below under Sample Types.

10.1.1. Sample Types

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

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.

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

10.1.2. Visual, Physical, and Chemical Monitoring Requirements

The following data will be collected and analyzed during treatment events. The field measurements for temperature, dissolved oxygen, turbidity, electrical conductivity, and pH will be collected in the field using the appropriate instruments.

Table 8 Required Sample Analysis

Analyte	EPA Method	Reporting Limit	Hold Time (Days)	Container	Chemical Preservative
Temperature	N/A	N/A	N/A	**N/A**	**None**
Dissolved Oxygen	360.1 or 360.2	0.0 mg/L	1	**1L Amber Glass**	**None**
Turbidity	180.1	0.00 NTU	2	**100 mL HDPE**	**None**
Electrical Conductivity	120.1	0 µS/cm	28	**100 mL HDPE**	**None**
pH	150.1 or 150.2	1-14	Immediately	**100 mL HDPE**	**None**
Glyphosate	547	0.5 µg/L	14	**2 x 40 mL VOA**	**None**
Imazapyr	532m	100 µg/L	14	**2 x 40 mL VOA**	**None**
Imazamox	HPLC	50 µg/L	14	**1L Amber Glass**	**None**
Triclopyr	8151, 8150A, 615	0.5 µg/L	7	**1L Amber Glass**	**None**

After analysis, the laboratory will report the results using a standard format. Each report will be accompanied by the following information:

- The date, place, and time of the sample taken by District staff
- The date the analysis was performed
- The analytical techniques and methods used by the laboratory
- The results of the analysis by the laboratory
- Chain-of-custody record

10.1.3. Sampling Sites

1. All samples shall be taken at the anticipated monitoring locations
2. Laboratories performing sample analyses shall be done by Certified Laboratory approved by the State of California.
3. The District shall institute a Quality Assurance-Quality Control Program for any onsite field measurements such as electric conductivity, PH, turbidity, and temperature.

4. A manual containing the steps followed in this program must be kept in the laboratory and shall be available for inspection by the SWB and the appropriate Regional Water Board staff.
5. All analyses shall be conducted in accordance with the latest edition of "Guidelines Establishing Test Procedures for Analysis of Pollutants," promulgated by the U.S. EPA in title 40 Code Federal Regulation (40 C.F.R.) 136 or equivalent methods

10.1.4. Maintenance and Calibration

A periodic maintenance and calibration schedule will be done to all monitoring instruments and devices to confirm their accuracy.

10.1.5. Sample Collection

If the water depth is 6 feet or greater the sample will be collected at a depth of 3 feet. If the water depth is less than 6 feet the sample will be collected at the approximate mid-depth. As necessary, an intermediary sampling device (e.g., Van-Dorn style sampler or long-handled sampling pole) will be used for locations that are difficult to access. Long-handled sampling poles with attached sampling container will be inverted before being lowered into the water to the desired sample depth, where it will be turned upright to collect the sample. Appropriate cleaning technique will be discussed later.

10.1.6. Field Measurements

In conjunction with sample collection, temperature will be measured in the field. Turbidity, electrical conductivity, pH, and dissolved oxygen may be measured in the field using field meters as available, or analyzed in the laboratory. Turbidity, pH, and dissolved oxygen meters are calibrated according to manufacturer's

specifications at the recommended frequency, and checked with a standard prior to each use. Conductivity meters are calibrated by the manufacturer and will be checked according to manufacturer's specifications with standards throughout the year (typically once per month) to evaluate instrument performance. If the calibration is outside the manufacturer's specifications, the conductivity probe will be recalibrated. Calibration logs are maintained for all instruments to document calibration.

10.1.7. Sample Preservation and Transportation

Sample may be collected directed into preserved containers, or collected in unpreserved containers, and preserved at the laboratory upon receipt if the analytical method requires preservation. Once a sample is collected and labeled it will immediately be placed in a dark, cold (~4° C) environment, typically a cooler with ice. Delivery to the laboratory should occur as soon as practicable after sample collection.

10.1.8. Sample Analysis

Table 8 shows the constituents that each sample must be analyzed for.

Table 9 Required Sample Analysis

Analyte	EPA Method	Reporting Limit	Hold Time (Days)	Container	Chemical Preservative
Temperature	N/A	N/A	N/A	**N/A**	**None**
Dissolved Oxygen	360.1 or 360.2	0.0 mg/L	1	**1L Amber Glass**	**None**
Turbidity	180.1	0.00 NTU	2	**100 mL HDPE**	**None**
Electrical Conductivity	120.1	0 µS/cm	28	**100 mL HDPE**	**None**
pH	150.1 or 150.2	1-14	Immediately	**100 mL HDPE**	**None**
Glyphosate	547	0.5 µg/L	14	**2 x 40 mL VOA**	**None**

Imazapyr	532m	100 µg/L	14	**2 x 40 mL VOA**	**None**
Imazamox	HPLC	50 µg/L	14	**1L Amber Glass**	**None**
Triclopyr	8151, 8150A, 615	0.5 µg/L	7	**1L Amber Glass**	**None**

10.1.9. Reporting Requirements

An annual report for each reporting period, from January 1 to December 31 will be prepared by March 1 of the following year and will be submitted to the appropriate Regional Water Board. The annual report will included the following information as described in Attachment C of the Permit:

1. An Executive Summary discussing compliance or violation of this Order and the effectiveness of the APAP to reduce or prevent the discharge of pollutants associated with herbicide applications;
2. A summary of monitoring data
3. Identification of BMPs currently in use and a discussion of their effectiveness in obtaining the Permit requirements
4. A discussion of BMP modifications addressing the violations
5. A map showing the location of each treatment area
6. Types and amounts of aquatic herbicides used at each application event during each application
7. Information on surface area and/or volume of treatment area and any other information used to calculate dosage, concentration, and quantity of each aquatic herbicide used
8. Sampling results shall indicate the name of the sampling agency or organization, detailed sampling location information (including latitude and longitude or township/range/section if available), detailed map or description of each sampling area (address, cross roads, etc.), collection date, name of constituent/parameter and its concentration detected, minimum levels, method detection limits for each constituent analysis, name or description of water body sampled, and a comparison with

applicable water quality standards, description of analytical QA/quality control plan. Sampling results shall be tabulated so that they are readily discernible

9. Summary of algaecide and aquatic herbicide application logs

The District will report to the State Water Board and appropriate Regional Water Board any noncompliance, including any unexpected or unintended effect of an algaecide or aquatic herbicide that may endanger health or the environment. A Twenty-Four Hour Report will be provided orally, by way of a phone call, from the time the District becomes aware of the circumstances and must include the following information:

1. The caller's name and telephone number
2. Applicator name and mailing address
3. Waste Discharge Identification (WDID) number
4. The name and telephone number of a contact person
5. How and when the District became aware of the noncompliance
6. Description of the location of the noncompliance
7. Description of the noncompliance identified and the U.S. EPA pesticide registration number for each product the District applied in the area of the noncompliance
8. Description of any steps that the District has taken or will take to correct, repair, remedy, cleanup, or otherwise address any adverse effects

If the District is unable to notify the State and the appropriate Regional Water Board within 24 hours, the District must do so as soon as possible and also provide the rationale for why the District was unable to provide such notification with 24 hours.

The District shall also provide a written submission within five (5) days of the time the District becomes aware of the noncompliance. The written submission shall contain the following information:

1. Date and time the District contacted the State Water Board and the appropriate Regional Water Board notifying of the noncompliance and any instructions received from the State and/or Regional Water Board; information required to be provided in Section D.1 (24-Hour Reporting)
2. A description of the noncompliance and its cause, including exact date and time and species affected, estimated number of individual and approximate size of dead or distressed organisms (other than the pests to be eliminated)
3. Location of incident, including the names of any waters affected and appearance of those waters (sheen, color, clarity, etc.)
4. Magnitude and scope of the affected area (e.g. aquatic square area or total stream distance affected)
5. Algaecide and aquatic herbicide application rate, intended use site (e.g., banks, above, or direct to water), method of application, and name of algaecide and herbicide product, description of algaecide and herbicide ingredients, and U.S. EPA registration number
6. Description of the habitat and the circumstances under which the noncompliance activity occurred (including any available ambient water data for aquatic algaecides and aquatic herbicides applied)
7. Laboratory tests performed, if any, and timing of tests. Provide a summary of the test results within five days after they become available
8. If applicable, explain why the District believes the noncompliance could not have been caused by exposure to the algaecides or aquatic herbicides from the District's application
9. Actions to be taken to prevent recurrence of adverse incidents

The State Water Board staff or Regional Water Board staff may waive the above required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours.

10.2. Sampling Methods and Guidelines

10.2.1. Surface Water Sampling Techniques

As mentioned before, if the water depth is 6 feet or greater the sample will be collected at a depth of 3 feet. If the water depth is less than 6 feet the sample will be collected at the approximate mid-depth. As necessary, an intermediary sampling device (e.g., Van-Dorn style sampler or long-handled sampling pole) will be used for locations that are difficult to access. Long-handled sampling poles with attached sampling container will be inverted before being lowered into the water to the desired sample depth, where it will be turned upright to collect the sample. Appropriate cleaning technique will be discussed later.

During collection, the samples will be collected in a manner that minimizes the amount of suspended sediment and debris in the sample. Surface water grab samples will be collected directly by the sample container or by an intermediary container in the event that the sample container cannot be adequately or safely used. Intermediary samplers will be poly (plastic/HDPE), stainless steel or glass. Any container that will be reused between sites will be washed thoroughly and triple rinsed before collection of the next sample. Alternatively, disposable poly or glass intermediary sample containers can be used.

10.2.2. Sample Containers

Clean, empty sample containers with caps will be supplied in protective cardboard cartons or ice chests by the primary laboratory. The containers will be certified clean by either the laboratory or the container as specified by the laboratory for each sample type. Sample container type, holding time, and appropriate preservative are listed above in Table 8. Each container will be affixed with a label indicating the date and time of sampling and the sampler's name.

10.2.3. Sample Preservation and Filtering

Samples may either be collected with bottles containing the correct preservative(s), or collected in unpreserved bottles and preserved upon receipt at the analytical lab. If filtration is required, it must be done prior to simple preservation. After collection, samples will be refrigerated at approximately four (4) degrees Celsius (C), stored in a dark place, and transported to the analytical laboratory.

10.2.4. Sample Equipment Cleaning

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

10.2.5. Sample Packing and Shipping

All samples are to be packed and transported the day the samples are collected to provide ample time for samples to be analyzed within the required holding time.
Ice will be included in coolers containing samples that require temperature control.
Samples will be packaged in the following matter:

1. Sample container stickers will be checked for secure attachment to each sample container.
2. The sample containers will be placed in the lined cooler. Bubble-wrap, suitable foam padding, or newspaper will be placed between sample containers to protect the sample containers from breakage during shipment and handling.
3. The Chain of Custody (COC) will be placed inside a plastic bag and placed inside the cooler. The COC will indicate each unique sample identification name, time and place of sample collection, the sampler collector, the required analysis, turn-around-time, and location to which data will be reported.

4. The cooler will then be readied for pick-up by a courier or delivered directly to the laboratory.

10.3. Field Sampling Operations

10.3.1. Field Logbook

A 3-ring binder or bound logbook will be maintained by members of the sampling team to provide a record of sample location, significant events, observations, and measurements taken during sampling. Observations and measurements should be supplemented with pictures of site conditions at the time of sampling if possible. Field logbooks are intended to provide sufficient data and observations to enable project team members to reconstruct events that occurred during the sampling. The field logbook entries will be legible, factual, detailed, and objective.

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

1. Floating or suspended matter;
2. Discoloration;
3. Bottom deposits;
4. Aquatic life;
5. Visible films, sheens, or coatings;
6. Fungi, slimes, or objectionable growths; and
7. Potential nuisance conditions.

See Figures 2, 3, and 4 below for the forms to be used to record relevant field data when sampling.

10.3.2. Alteration of Sampling Techniques

It is possible that actual field conditions may require a modification of the procedures outlined herein. Specifically, water levels, weather, other

environmental parameters and hazards including stream flow, rainfall, and irrigating water use may pose access and/or sampling problems. In such instances, variations from standard procedures and planned sampling locations and frequencies will be documented by means of appropriate entry into the field logbook.

10.3.3. Chain-of-Custody

The COC record will be employed as physical evidence of sample custody. The sampler will complete a COC record to accompany each sample shipment from the field to the laboratory. The COC will specify: time, date, location of sample collection, specific and unique sample number, requested analysis, sampler name, required turn-around-time, time and date of sample transaction between field and laboratory staff, preservative, if any, and name of receiving party at the laboratory.

Corrections to the COC will be made by drawing a line through, initialing, and dating the error, and entering the correct information. Erasures are not permitted.

Upon receipt of the samples, laboratory personnel will check to insure that the contents of the ice chest(s) are accurately described by the COC. Upon verification of the number and type of samples and the requested analysis, a laboratory representative will sign the COC, indicating receipt of the samples.

The COC record form will be completed in duplicate. Upon sample delivery, the original copy will be left with the laboratory and a copy will be kept by the sampler, three-hole punched, and placed in the field logbook.

10.3.4. Sample Label

The label will contain information on the specific project (i.e. Imperial Irrigation District), the unique individual sample ID (i.e. EHL Canal), the date and time the sample was collected, and the name of the sampler (i.e. D. Watson).

Prior to sampling, a water resistant label will be completed with waterproof ink and be affixed to the appropriate container.

10.3.5. Correction to Documentation

Documents will not be destroyed or thrown away, even if they are illegible or contain inaccuracies that require a replacement or correction. If an error is made on a document used by an individual, that individual will make corrections by making a line through the error and entering the correct information. The erroneous information will not be obliterated. Corrections will be initialed and dated.

10.3.6. Document Control

A central file location will be established and used to store documentation such as the filed logbook and laboratory data.

10.3.7. Sample Kit

Prior to departing to the field to collect samples, the following equipment will be prepared for use:

- Laboratory-supplied sampling bottles (one set for each sample to be collected plus spares, plus QA/QC samples)
- Sample labels (one for each sample to be collected plus spares)
- Sharpie® Pen or other permanent, water-proof ink marker
- Chain of Custody forms
- Field data logbook
- Flow meter (optional – for moving water applications)
- Zip lock style bags for paperwork
- Non-phosphate cleaner (i.e. Liqui-Nox®)
- Deionized or distilled water
- Ice or blue ice packs

- Clear Mailing Tape
- Cooler for samples
- Grab pole or Van-Dorn style sampler
- Gloves
- Rubber boots or waders
- Stop or wrist watch
- Camera

10.4. Quality Assurance and Quality Control

10.4.1. Precision

Precision is a measurement of the reproducibility of measurements under a given set of conditions. It is a quantitative measure of the variability of a group of measurements compared to the average value of the group and is expressed as the relative percent difference (RPD). Sources of error in precision (imprecision) can be related to both laboratory and field techniques. Specifically, lack of precision is caused by inconsistencies in instrument setting, measurement and sampling techniques, and record keeping.

Laboratory precision is estimated by generating analytical laboratory matrix spike (MS) and matrix spike duplicate (MSD) sample results and calculating RPD. In general, laboratory RPD values of less than 25% will be considered acceptable.

Field precision is estimated by collecting field duplicates (FDs) in the field and calculating RPD. In general, field RPD values of less than 35% will be considered acceptable.

10.4.2. Accuracy

Accuracy is a measure of how close data are to their true values and is expressed as percent recovery (%R), which is the difference between the mean and the true

value expressed as a percentage of the true value. Sources of error (inaccuracy) are the sampling process, field contamination, preservation, handling, sample matrix effects, sample preparation, analytical techniques, and instrument error.

Laboratory accuracy is estimated using reference standards, matrix spike (MS) and matrix spike duplicates (MSD) samples. Acceptable accuracy is generally between 75 and 125%.

10.4.3. Completeness

Completeness is defined as the percentage of measurements made which are judged to be valid measurements. The completeness objective is that the sufficiently valid data is generated to allow for submittal to the SWRCB and RWQCB. Completeness will be assessed by comparing the number of valid sample results to the number of sample collected. The objective for completeness is ≥80%.

10.4.4. Representativeness

Representativeness refers to a sample or group of sample that reflects the predominant characteristics of the media at the sampling point. The objective in addressing representativeness is to assess whether the information obtained during the sampling and analysis represents the actual site conditions. Permit requirements of sampling each application at 10% of all sites treated is assumed to meet the representativeness criteria.

10.4.5. Field Duplicate

The purpose of a field duplicate (FD) is to quantify the precision, or reproducibility, of the field sampling technique. It involves the duplication of the techniques use for a particular field sample collection method and the subsequent comparison of the initial and duplicate values. The comparison is measured as the relative percent difference (RPD). RPD is calculated as follows:

RPD = [(Sample1 – Sample2) / (Average of Samples 1 and 2)] X 100

An acceptable field RPD value is ≤ 35%.

The FD is collected at the same time as the actual field sample and one FD per year will be collected.

10.4.6. Field Blank

The purpose of the field blank (FB) is to assure that the field sampling technique, equipment, or equipment cleaning technique or materials do not impart a false positive or negative result during the collection of the sample. A FB will be prepared with distilled water and allowed to come into contact with the sampling device in a manner identical to the actual sample. The only acceptable values for analytes in the FB is less than the detection limit for the compounds of interest, or an expected, previously determined, background value.

10.4.7. Laboratory Quality Assurance and Quality Control

Laboratory precision and accuracy will be monitored by a series of laboratory-generated quality control samples. As long as sufficient sample volume is collected and submitted to the laboratory, no additional effort is required by field activities to generate laboratory quality control samples. Each set of field samples will have associated with it one each from the following set of laboratory quality control samples.

10.4.7.1.1. Method Blank

The purpose of the method blank (MB) is to assure that the analytical technique does not impart a false positive result during the preparation or analysis of the sample. A method blank will be prepared by the laboratory from high purity distilled or deionized water. The only acceptable values for analytes in the MB are zero or an expected, previously determined, background values.

10.4.7.1.2. Matrix Spike

The purpose of a matrix spike (MS) is to quantify accuracy and to assure that the analytical technique does not impart a false negative or positive result during the preparation or analysis of the sample. It involves the introduction of the analyte (or an analyte surrogate) of interest into the actual simple matrix and then quantitating it.

The amount detected divided by the amount added to the matrix is expressed as a percent recovery (%R). Acceptable values of %R range from 75% to 125%. Percent recovery is calculated as follows:

%R = [(Spike Amount Detected – Sample Value) / Amount Spiked] X 100

10.4.7.1.3. Matrix Spike Duplicate

The purpose of a matrix spike duplicate (MSD) is to quantify laboratory precision. An acceptable RPD is less than or equal to 25%. The MDS involves duplication of the MS resulting in two data points from which relative percent difference (RPD) is calculated as follow:

RPD = [(MS – MDS) / (Average of MS and MSD)] X 100

10.4.8. Data Validation

Data validation will use data generated from the analytical laboratory and the field. References that can be used to assist in data validation include USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (USEPA 1994) and USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (USEPA 1999).

The purpose of data validation is to ensure that data collected are of sufficient quality for inclusion in reports to the Regional Water Board. In order to serve this

purpose, the following information must be available in order to evaluate data validity:

1. Date of sample collection – required to uniquely identify sample and holding time.
2. Location of samples – required to identify sample.
3. Laboratory QA/QC procedures – required to assess analytical accuracy, precision, and sample integrity. A laboratory QA/QC sample set consists of a MS, a MSD, and a MB. A laboratory QA/QC sample set will be analyzed by the laboratory for each field sample batch. Sufficient sample volume and number will be supplied to the laboratory in order to prepare and evaluate the laboratory QA/QC sample set.
4. Analytical methods – required to assess appropriateness and acceptability of analytical method used.
5. Detection limits – required to assess lower limit of parameter identification.
6. Holding times, preservation, and dates of extraction and analysis – required to assess if a sample was extracted and analyzed within the specified time limits and if a sample was stored at the appropriate temperature.
7. Field QA/QC procedures – required to assess field precision and sample integrity. A field QA/QC sample set consists of FB and FD samples. A field QA/QC sample set will be analyzed by the laboratory for one sampling event per year. Sufficient sample volume and number will be collected in the field and supplied to each laboratory in order to prepare and evaluate the field QA/QC sample set.

10.4.9. Data Qualification

Data collected for compliance with the Permit will be qualified through the Analytical Lab Validation process as described in the Laboratory Quality Assurance and Quality Control. This process will ensure all data has been thoroughly reviewed

and qualified as valid. During the data validation process, data qualifiers will be used to classify sample data. The following qualifiers will be used:

A - Acceptable. The data have satisfied each of the requirements and are quantitatively acceptable (i.e., valid) and will be used in reports.

R- Reject. Data not valid. This qualifier will be used for samples that cannot be uniquely identified by date of collection or sample location or that fail holding time or detection limit requirements. Invalid data will not be presented in reports submitted to the Regional Water Board.

10.4.10. Corrective Action

If previously described criteria for valid data are not met, then corrective action as follows will be taken:

1. The laboratory will be asked to check their quality assurance/quality control data and calculations associated with the sample in question. If the error is not found and resolved, then:

    a. The extracts or the actual samples, which will be saved until the data are validated, will be reanalyzed by the laboratory if they are within holding time limitations. These new results will be compared with the previous results. If the error is not found and resolved, then:
    b. If field analytical equipment is used, then calibration records will be reviewed. If the error is not found, then:
    c. The sampling procedure and sample preparation will be re-checked and verified. If the procedures appear to be in order and the error is not resolved, then:
    d. The data will be deemed invalid and not used.

2. Upon discovery of the source of an error, every attempt will be made to address the cause of the error and remedy the problem.

10.4.11. Data Reporting

The results of sampling and analysis will be summarized in the Annual Report. The data will be tabulated so that they are readily discernible.

11. Procedures to Prevent Sample Contamination

11.1.1. Contamination Prevention

Sample collection will not be done in close proximity to application equipment and preferably upwind. Sampling will be done in a manner that prevents contact with algaecide or aquatic herbicide application equipment, containers or personal protective equipment (PPE). Care will be taken by samplers to minimize into contact with any treated water or vegetation. In the event that sampling equipment will be used in more than one location, the equipment will be thoroughly cleaned with non-phosphate cleaner, triple-rinsed uncontaminated water, and then rinsed once with the water being sampled prior to its first use at a new sample collection location. Gloves will be changed between sites.

Figure 1

AQUATIC HERBICIDE APPLICATION LOG

1. Information

Date _____ Applicator Name _____

Location _____Type of Weed(s) being Treated_____

2. Pesticide & Adjuvant Information

Herbicide _____Rate/Concentration _____Amount Applied _____

Herbicide _____Rate/Concentration _____Amount Applied _____

Herbicide _____Rate/Concentration _____Amount Applied _____

Adjuvant _____Rate/Concentration _____Amount Applied _____

Adjuvant _____Rate/Concentration _____Amount Applied _____

Application made with water flow _____ Against water flow _____ Not applicable _____

3. Treatment Area

Type of waterway _____ Water flow (cfs) _____ Water Depth (ft)_____
(lined canal, unlined canal, drain, reservoir)

Water Depth (ft) _____ Water Temperature (F) _____ Percent weed cover _____Sheen (yes/no)_____

Color: none ____ brown ____ green ____ Other _____ Clarity (poor, fair, good) _____

Other Information _____

4. Gates, Weirs, Checks or Other Control Structures

A. Are there any gates or control structures in the treatment area that may discharge to streams, rivers, lakes, or other natural waterways? Yes_____ No_____

B. Have flow control structures been closed & sealed to prevent aquatic pesticide from discharging to natural waterways? Yes_____No_____

C. Have necessary flow control structure been inspected for leaks? Yes _____No_____

D. If leaks were found, were they sealed or otherwise prevented from allowing water to discharge to natural waterways prior to application? Yes_____No_____

E. Were necessary flow control structures inspected for leaks during Application? Yes ____No _____

F. If leaks developed, was the application stopped until the leak could be sealed or prevented from allowing water to discharge to natural waterways? Yes ____No _____

If the answer to any of the B-F questions is No, explain: _____

Gate _____ Time Closed _____ Time Opened _____ Explain:_____

5. CERTIFICATION

I _____(print name) certify that the APAP has been followed (sign here): _____

Figure 2 **Aquatic Herbicide Field Monitoring & Sampling Form**

Moving Water

Background -Collect upstream of, or in Treatment area within 24 hours of the treatment starting

Site Name: _____ Organization _____

Sampler Name: _____ Date: _____

Time: _____ Herbicide Applied: _____Surfactants Applied:_____

Water Speed (ft/sec): _____

Sample Waypoint or GPS Coordinates: _____

Target Vegetation: _____

Site Description: _____

DO (mg/L): _____ EC (µs/cm) _____ pH: _____ Temp (*C): _____

Turbidity (NTU): _____

Presence of	Yes	No	Unknown	Describe Your Observations
Floating Material				
Suspended Matter				
Discoloration				
Bottom Deposits				
Aquatic life				
Visible films, sheens, or coatings				
Fungi, slimes, or Objectionable Growths				
Potential Nuisance Conditions				

Description of each sampling area (address, cross roads, etc.):

Figure 3 **Aquatic Herbicide Field Monitoring & Sampling Form**

Moving Water

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

Site Name: _____ Organization _____

Sampler Name: _____ Date: _____Time: _____

Sample Waypoint or GPS Coordinates: _____

Water Speed (ft/sec): _____ Length of Treated Area (ft) _____

Application Start Date: _____ Start Time: _____

Application End Date: _____ End Time: _____

Application made with or against water flow? _____

DO (mg/L): _____ EC (µs/cm) _____ pH: _____ Temp (*C): _____

Turbidity (NTU): _____

Presence of	Yes	No	Unknown	Describe Your Observations
Floating Material				
Suspended Matter				
Discoloration				
Bottom Deposits				
Aquatic life				
Visible films, sheens, or coatings				
Fungi, slimes, or Objectionable Growths				
Potential Nuisance Conditions				

Date Field Blank (FB) Collected: _____Date Field Duplicate (FD) Collected: _____

Description of each sampling area (address, cross roads, act.):

Figure 4 **Aquatic Herbicide Field Monitoring & Sampling Form**

Moving Water

Post-Event Monitoring – Collect in treatment area within 7 days of application, or when treatment is deemed complete.

Site Name: _____ Organization _____

Sampler Name: _____ Date: _____Time: _____

Sample Waypoint or GPS Coordinates: _____

Water Speed (ft/sec): _____

DO (mg/L): _____ EC (µs/cm) _____ pH: _____ Temp (*C): _____

Turbidity (NTU): _____

Presence of	Yes	No	Unknown	Describe Your Observations
Floating Material				
Suspended Matter				
Discoloration				
Bottom Deposits				
Aquatic life				
Visible films, sheens, or coatings				
Fungi, slimes, or Objectionable Growths				
Potential Nuisance Conditions				

Description of each sampling area (address, cross roads, ect.):

12. BEST MANAGEMENT PRACTICES

The development and implementation of an Integrated Weed Management (IWM) strategy within the Imperial Irrigation District which shall involve the development of long term planning goals and the implementation of various weed management practices to control and eradicate noxious weeds in Imperial Irrigation District waterways. Through the use of sound vegetation management practices, including education, prevention, physical and mechanical control methods, biological control, herbicide application, and adaptive management in the propagation of beneficial plants to help stabilize canal and drain banks from erosion and to prevent invasive or noxious weeds from becoming established in selected areas. These goals can be achieved with minimal disruption to the environment.

12.1.1. Utilization of Vegetation Control Practices

12.1.1.1.1. Education

The Vegetation Manager shall ensure that all employees performing vegetation control work are properly educated and licensed where required by law.

The Vegetation Management Unit shall endeavor to stay abreast of new laws and regulations pertaining to worker safety, groundwater protection, endangered species protection, and restricted-use materials including crop related restrictions. Moreover, the Vegetation Control Unit shall develop educational programs to keep Imperial Irrigation District employees, water users, and the public informed of these important issues.

12.1.1.1.2. Prevention

Preventative control measures shall be adopted wherever practical to control or eradicate noxious or invasive weeds. This includes the cleaning of all equipment and their attachments when operating in weed infested areas prior their relocating. The Vegetation Manager shall provide a list of infested areas to the appropriate offices for distribution.

The Vegetation Control Unit shall further endeavor to induce competition that favors desirable and beneficial plants, helping to prevent noxious and invasive plant species from becoming established.

The Vegetation Control Unit shall consider various viable best management practices to reduce the spread of undesirable or noxious weeds.

12.1.1.1.3. Physical and Mechanical Control Methods

Physical and mechanical control methods shall be employed when necessary to keep Imperial Irrigation District canals and drains operating efficiently and to meet or exceed designed flow capacities. The removal of sedimentation and vegetation from Imperial Irrigation District's waterways will help to maintain the structural integrity of Imperial Irrigation District's canals and drains and will facilitate the control of invasive, non-native, or noxious plant species within Imperial Irrigation District's service area.

12.1.1.1.4. Biological Control

Biological control involves introducing natural enemies from the part of the world where the pest plant originated. Importing and introducing natural enemies requires special permits and involves lengthy host-specific testing and quarantine periods to ensure that the imported organisms will not become pests. State laws ban the use of nonsterile (diploid) grass carp, but do allow certain strict and limited uses of sterile (triploid) grass carp with appropriate authorization by the California Department of Fish and Wildlife.

The Imperial Irrigation District (IID) has introduced the (triploid) grass carp into its schedule maintenance plan to eradicate hydrilla from the canal system. In 1981, the IID research team began a three-year study in the mechanical, chemical and biological methods of controlling hydrilla found in 400 miles of IID waterways. Findings concluded that mechanical methods were temporary and expensive, and chemical methods were incompatible with agricultural and fishery use. The biological research method paid handsome rewards and today IID's program is the only successful hydrilla

eradication program utilizing biological methods. Research conducted in cooperation with the Coachella Valley Water District demonstrated the economy and effectiveness of using triploid sterile grass carp to consume aquatic vegetation. IID utilizes the sterile variety to avoid adverse impacts to the balance of the environment. In addition to hydrilla, the grass carp also consume other aquatic weeds such as Sago Pondweed and Eurasian Watermilfoil. In June 1989, the U.S. Department of Agriculture awarded the IID a distinguished service award for outstanding accomplishment in pioneering biological control of hydrilla.

12.1.1.1.5. Herbicides

The Vegetation Manager/Pest Control Adviser shall be responsible for selecting and instituting the use of the safest and effective herbicides registered for controlling terrestrial and aquatic plants. In selecting any herbicide, the Vegetation Manager/Pest Control Adviser shall give due consideration to any known hazards and risks associated with use of the material to humans, non-target plant species including production agriculture, animals and the environment. Before the application of any herbicide the Vegetation Manager/Pest Control Adviser shall determine how the material will affect the target plant, non-target organisms, the environment, and management practices. The Vegetation Manager/Pest Control Adviser shall review the possible use of registered growth regulators for controlling terrestrial and emerged aquatic plants.

The Vegetation Manager/Pest Control Adviser shall confer with the appropriate federal, state, and/or local agencies before employing any mechanical, chemical, or biological control method that may potentially have a negative impact any endangered and protected species, or wildlife habitat. The Vegetation Manager/Pest Control Adviser shall follow the appropriate label instructions when chemical control is used.

12.1.2. Integrated Weed Management Strategy & Mandates

1. The Vegetation Control Unit shall develop a comprehensive written plan for implementing Imperial Irrigation District's IWM strategy.
2. The Vegetation Manager/Pest Control Adviser determines the appropriate control method.
3. The Vegetation Control Unit shall make information accessible to the public and employees regarding Imperial Irrigation District's utilization of all cultural, mechanical, and chemical control methods.
4. The Vegetation Control Unit shall endeavor to educate Imperial Irrigation District employees, water users, and the public about the vegetation management problems facing Imperial Irrigation District, as well as the solutions developed to deal with these problems.
5. The Vegetation Control Unit shall develop and utilize a monitoring program and establish evaluation criteria to measure the success of Imperial Irrigation District's vegetation control-related activities.
6. The Vegetation Manager/Pest Control Adviser shall ensure that safe vegetation management practices are employed.
7. Any employee who uses a pesticide must first be trained and obtained an applicator certificate.
8. Prior to the use of any pesticide, the Vegetation Manager/Pest Control Adviser shall ensure that the pesticide is registered in California and that all laws regarding its use are followed.
9. Before the utilization of any pesticide, the Vegetation Manager/Pest Control Adviser shall ensure that a written recommendation for the pesticide has been issued by a licensed pest control adviser employed by the Imperial Irrigation District and has registered with the Imperial County Agriculture Commissioner's office.
10. The Vegetation Control Unit shall be responsible for obtaining and maintaining a copy of the Safety Data Sheet (SDS) from the

manufacturer for every herbicide used by the Imperial Irrigation District and is posted in the appropriate places.

11. The Vegetation Control Unit shall monitor treated areas to determine if the control methods employed are effective.
12. The Vegetation Manager/Pest Control Adviser shall ensure that outside contractors involved in vegetation management activities are:
    a) Employing properly trained, certified and legally qualified applicators to handle all equipment and materials;
    b) Familiar with the pesticide to be used, including the manufacturer's instructions and precautions and any legal requirements pertaining to use as established by local and state regulations;
    c) Using all required safety equipment and clothing;
    d) Keeping written records of chemical name(s), area(s) sprayed, date and time of completion, and quantities of chemical used for each treated area;
    e) In possession of the SDS;
    f) In possession of a written recommendation for pesticide use from a registered licensed pest control adviser employed by the Imperial Irrigation District;
    g) Utilizing the appropriate application equipment for the job at hand, and using equipment that is properly calibrated;
    h) Prepared for emergencies and have in place interim measures which can be taken before help arrives;
    i) Informed that it is not permissible to spray or inject pesticides directly into water, except as authorized by the Vegetation Manager/Pest Control Adviser's written recommendation; and
    j) Informed that the application of pesticides shall not occur during a temperature inversion, windy conditions or where drift may fall on production agriculture.

12.1.3. Preventable Measures to Contain Herbicide Spill

The Imperial Irrigation District as stewards of community resources carries the responsibility to protect the environment that it serves to the extent possible as dictated by service expectations. To address these responsibilities, the IID will strive to meet or exceed all regulatory requirements of Federal, State, and local government agencies. The District will inform and educate employees regarding proper techniques to manage hazardous substances in the work environment, work cooperatively with regulatory agencies to develop plans/strategies to ensure the health and safety of our community, and mitigate any emergency incidents that may occur.

There is a certified Hazardous Materials Specialist assigned day-to-day administration of the District's Hazardous Materials Program; includes coordinating IID Hazmat Incident First Response activities.

The following are general guidelines to be followed for a chemical spill. More detailed procedures may be available in IID's Hazardous Materials/Waste Compliance Program.

1. Immediately alert area occupants and supervisor, and evacuate the area, if necessary.
2. If there is a fire or medical attention is needed, contact 911.
3. Attend to any people who may be contaminated. Contaminated clothing must be removed immediately and the skin flushed with water for no less than fifteen minutes. Seek medical attention as soon as possible. Clothing must be laundered before reuse.
4. If a volatile, flammable material is spilled, immediately warn everyone, control sources of ignition and ventilate the area.
5. Don personal protective equipment, as appropriate to the hazards. Refer to the Safety Data Sheet or other references for information.

6. Consider the need for respiratory protection. The use of a respirator or self-contained breathing apparatus requires specialized training and medical surveillance. Never enter a contaminated atmosphere without protection or use a respirator without training. If respiratory protection is used, be sure there is another person outside the spill area in communication, in case of an emergency. If no one is available, contact IID Hazardous Materials and Waste Section for assistance.
7. Protect outlet drains or other means for environmental release. Spill socks and absorbents may be placed around spill areas, as needed.
8. When spilled materials have been absorbed, use appropriate equipment to place materials in an appropriate container. Polyethylene bags may be used for small spills. Five gallon pails or 20 gallon drums with polyethylene liners may be appropriate for larger quantities.
9. Complete a hazardous waste sticker, identifying the material as Spill Debris involving XYZ Chemical, and affix onto the container. Spill control materials will probably need to be disposed of as hazardous waste.
10. Decontaminate the surface where the spill occurred using a mild detergent and water, when appropriate.
11. Report all spills to IID Hazardous Materials and Waste Section.

12.1.4. Measures to Ensure Appropriate Rate of Application

IID will assure that the appropriate application equipment is utilized for the job, and using equipment that is properly calibrated. And always follow the manufacturers' labels for proper application rate.

12.1.4.1. Educational Program Targeting Staff and Herbicide Applicators

12.1.4.1.1. Education and Awareness

It is important to keep management and the public up to date, through discussion, reports and literature, and to educate and reassure them that District staff is implementing the best pest management strategies. District staff will be trained in plant identification and information. An awareness of what constitutes noxious weeds and the problems they cause will help the general public to understand why a long-term weed management program is important. Invasive plants pose a serious threat to desirable and beneficial vegetation. Plants have invasive and competitive natures. Defining noxious weeds makes it imperative for personnel to be familiar with the most important noxious weed species types and know the damage they can cause.

The Vegetation Manager/Pest Control Adviser, District public outreach/education staff, or other appropriate District management must take the leading role in educating the public and staff about integrated weed management.

Develop general public awareness programs outlining problems caused by noxious weeds, including:

- Damage to wildlife habitat and crop and forage production.
- Health problems associated with weeds.
- Impacts on scenic and recreational values.
- Spreading of noxious and invasive weed seed onto agricultural lands.
- Management techniques used to control herbicide drift when controlling noxious and invasive weeds in District's drains and canals.

12.1.4.2. Understand the Aquatic Environment

Many plants are adapted to life in or near water. Many aquatic plants are beneficial because they:

- provide food for organisms, including fish, birds, and mammals

- produce oxygen for fish and other aquatic animals
- provide habitat for numerous invertebrates and cover for fish
- stabilize shorelines by reducing erosion
- absorb water pollutants
- trap silt particles to assist with treatment of polluted water
- provide nesting sites for birds
- improve the appearance of a body of water

There are fewer than 20 of the known 700 aquatic plants classified as noxious weeds. Some of the problems caused by aquatic weeds are:

- impede water flow, resulting in floods, increase seepage and evapotranspiration, and damage canals
- clog pipes, culverts, and water intakes
- hinder navigation
- interfere with aquatic recreation
- increase health hazards by providing shelter for disease-carrying mosquitoes
- provide escape cover for non-native fish species
- kill fish when decaying weeds reduce oxygen levels in the water or when overabundant submersed weeds consume excessive oxygen at night
- prevent the oxygenation of water bodies by covering the water's surface
- create pollution when decaying masses of weeds contaminate drinking water
- displace desirable native and beneficial plants, depriving native animals of their natural habitats and food supplies
- provide avenues for weed seed introduction into agricultural fields when immersed weeds along banks are left uncontrolled

12.1.5. Planning and Coordination with Local Agencies and Farmers

Currently, IID published its drain cleaning programs and special projects on the website. The District shall establish an Herbicide Oversight Committee as a communication tools to alert the farming community and general public about the herbicide applications being applied in their environment.

12.1.6. Measures to Prevent Fish Kill

The district has ten reservoirs, four main canals, and hundreds of mile of lateral canals that fish can populate. The applicator should apply herbicide treatment to half of the treatment area and remove dead vegetation to restore any oxygen loss before treating the second half after a specified time period. Do not exceed the annual maximum use rate for combined total of all treatments and maximum application rate per acre in a single broadcast application over water.

13. Examination of Possible Alternatives

The District utilized three types of control methods to eradicate or control varies type of plant species within the Imperial Irrigation District's boundaries. These methods are mechanical, chemical, and biological. A method or combination of methods is chosen for each site depending on the maintenance requirements of the facility. Efficiency, economics, and the protection of public health and environmental resources are all considered in the selection of methods.

13.1.1. Mechanical:

The process of mechanical removing vegetation from the district's canals and drains has been excavating, mechanical scraper device that scrapes the sides and bottom to remove sediment and vegetation, mowing vegetation growth to reduce the height and lessen the dense of the plants, and chaining the channel with anchor chain to dislodge vegetation growth.

13.1.1.1. **Excavation** – Removal of sediment and dense vegetation an excavator has to dredge below the root system of the vegetation to gain control. Significant drawbacks in the use of an excavator for aquatic weed control in canals include damage to the canal profile and bottom seal and production of abundant plant fragments and turbidity.

13.1.1.2. **Scraper Device** – The District has for years used a scraper type mechanical device to scrape the sides and dislodge the vegetation from the bottom of concrete-lined canals. The sediment and vegetation is displaced and removed from the canal increases the capacity of the canal for several weeks.

13.1.1.3. **Chaining** – This device can displace sediment and plant fragments rather quickly than any other mechanical devices. The problem with chaining is increase turbidity and suspended sediment in the water, which may impact the amount of sediment through deliver gates, buildup at the end of the lateral, and/or may damage concrete-lined canal.

13.1.1.4. **Mowing** – A mowing program is essential to reduce the dense vegetation growth on IID's canals and drains and rights of way. Mowing consists of operating fail style mowers to eliminate or reduce broad leaf plants and woody plants that would cause problems for channels to function as surface and subsurface drainage facilities and canals to transport water. Mowing is conducted on the inside slope of canal and drain banks and outside banks on dense vegetation area.

Mowing is an effective weed management tool, particular when used in combination with chemical weed control. It is the most common method of nonchemical weed control used along rights-of-way.

Mowing should be completed before weeds set seed or before seeds mature. Follow-up mowing is necessary, depending on the growth and flowering pattern of the weed species present.

13.1.2. Chemical:

Herbicides can often be a more effective vegetation control method when compared to mechanical or hand removal. This is because of their ability to spread into and damage the roots of the target plants, thus preventing resprouting. When treated with mechanical methods, some woody plants, such as salt cedars, will resprout with multiple stems. The multiple sprouts result in a greater flood protection problem and require annual control. With herbicides, annual retreatment is often necessary; however, the treatment area is greatly reduced, as only a small percentage of regrowth will occur. As a result, this program includes herbicides as the primary method by which vegetation is controlled in channels and on maintenance roads.

13.1.3. Biological Control:

The Imperial Irrigation District (IID) has introduced the (triploid) grass carp into its schedule maintenance plan to eradicate aquatic plants from the canal system. Findings concluded that mechanical methods were temporary and expensive, and chemical methods were incompatible with agricultural and fishery use. IID utilizes the sterile variety to avoid adverse impacts to the balance of the environment. To manage aquatic weeds, it is crucial to understand the conditions that promote their growth. The important factors are light, water clarity, nutrients, temperature, and water chemistry. Prolific growth and reproduction characterize most aquatic weeds. Through competition they often displace native plants or other more desirable plant species. The reproduction is an important factor in determining whether an aquatic plant is a weed. Weeds must have the capacity to invade a habitat successfully, reinfest the area despite control efforts, and spread rapidly. The aquatic weed has the superior ability to compete for available nutrients and light and their propensity to crowd out other plants. They do this through early emergence and rapid growth, which allows them to dominate space and gain access to nutrients before other plants emerge.