Chowchilla Water District

Aquatic Pesticides Application Plan

WATER QUALITY ORDER NO. 2013-0002-DWQ

General Permit #CAG990005

Statewide General National Discharge Pollutant Discharge Elimination System Permit for the Discharge of Aquatic Pesticides for Aquatic Weed Control in Waters of the United States

April 20, 2018

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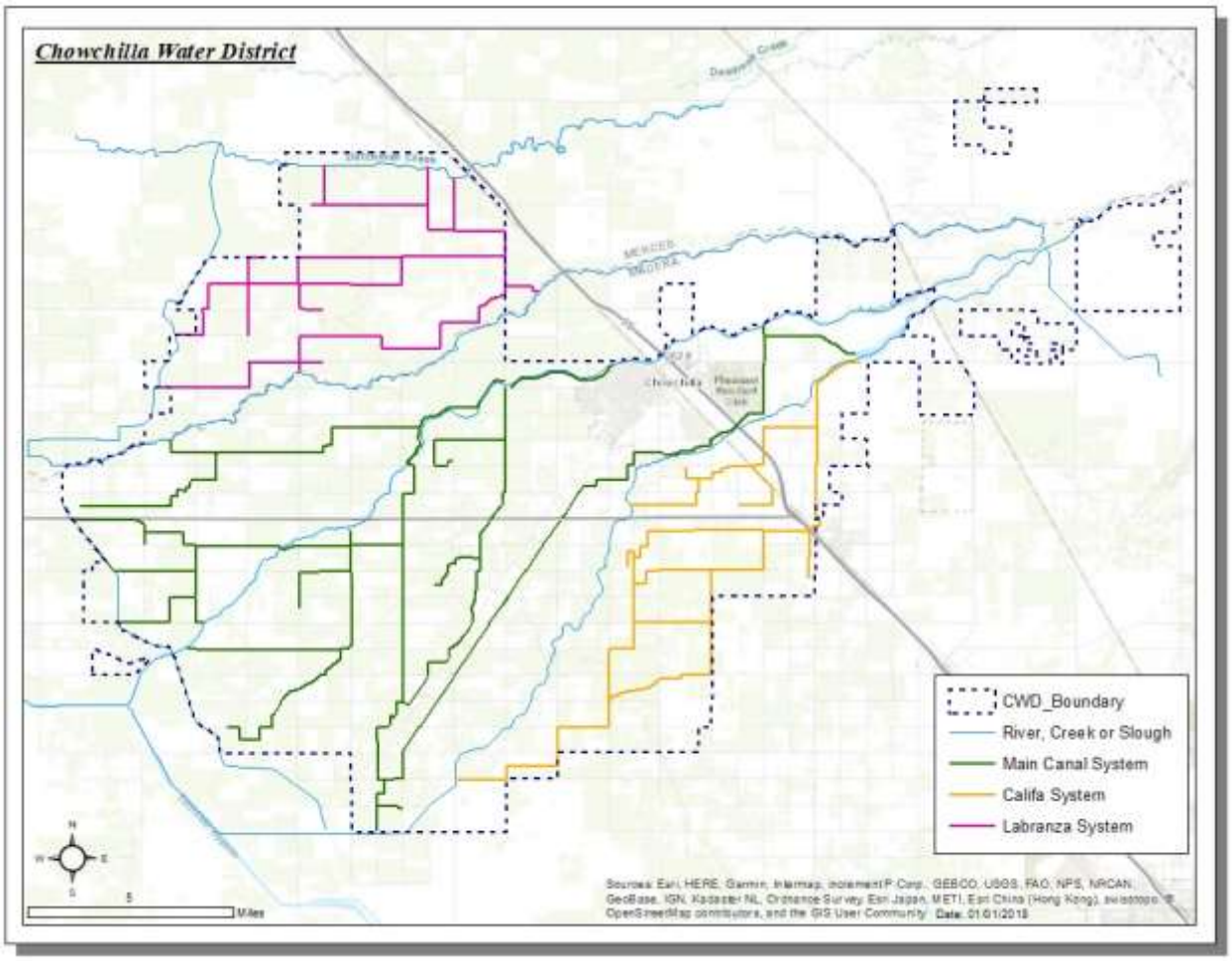
DESCRIBE THE WATER SYSTEM WHERE THE PESTICIDE WILL BE APPLIED.

The Chowchilla Water District is within the Chowchilla Sub basin of the San Juaquin Valley Basin, under the jurisdiction of the Regional Water Quality Control Boards: Region 5 Central Valley. The District was formed in 1949 for the purpose of furnishing a water supply alternative to groundwater for agriculture within its boundaries. Since its inception, the District has provided consistent and reliable surface water to its constituents, resulting in improvements to groundwater conditions. The District services over 400 landowners on 85,000 acres of land in southern Merced and northern Madera counties.

In 1950 the District signed its original water service contract for water delivery from the Friant Division of the Central Valley Project with the U.S. Bureau of Reclamation. In 1968 the District signed a second water service contract for water delivery from the Buchanan Unit of the Central Valley Project with the U.S. Bureau of Reclamation. In 1988, the LaBranza Water District and Chowchilla Water District consolidated into the current "Chowchilla Water District".

The District receives water from two sources; Madera Canal and Buchanan Dam. Portions of the irrigation water distribution system were built by Mutual Water Companies that were in place prior to formation of the District. The remainder of the irrigation distribution system was built by the District by way of contractors. The District utilizes 150 miles of unlined canals and 49 miles of pipeline. There are over 950 turnouts where irrigation water is delivered to waterusers.



DESCRIPTION OF THE TREATMENT AREA.

The District's irrigation distribution system consists of 3 main canal systems (environmental settings) further divided into seven subsystems that are operated by seven Ditchtenders. It is the responsibility of each Ditchtender to operate their subsystem to provide for adequate water to be present at the turnout during a waterusers' scheduled irrigation and at the same time to avoid spill from the canal.

The District utilizes various water management techniques and facilities to deliver water efficiently and accurately to its waterusers. These facilities include; measurement weirs, water meters, rated canal gates, regulating reservoirs and ponds, long-crested weirs, ITRC flap gates and the District's SCADA system. All water released to the District, delivered to waterusers is measured and recorded in the District's electronic database.

Each of the three canal systems has its own unique problems ranging from emergent plants, floating or submersed plants and/or algae. As a result, treatment areas may encompass any and all areas of any of these systems from shorelines and ditch-banks in the case of emergent vegetation, to surface water and subsurface applications for algae and submersed vegetation.

The area within the canal, drain or ditch system where the aquatic herbicide is effectively controlling weeds for any treatment event is considered the "Treatment Area". This area consists of the area downstream of the furthest upstream application area for a given treatment event to the furthest point where the treated water is able to flow to a control structure.

The "application area" is the specific location within a canal, drain or ditch where the aquatic herbicide is being applied. Depending on need, there may be multiple points (application areas) where aquatic herbicides are injected into a contiguous canal system within a Treatment Area, during a single treatment event. All treated water will be irrigated out to users, recirculated, or contained within the treatment area.

For the purposes of this permit, a "treatment event" starts upon initiation of the application of aquatic herbicide in a targeted canal, drain or ditch, pond or reservoir, or portion thereof, and proceeds until the concentration of the aquatic herbicide is below that which can kill the target pest in the facility.

TYPES OF WEEDS TO BE CONTROLLED AND WHY

Common Name	Scientific Name	Type	Purpose
Cattails & Bulrush	*Typha spp. & Schoenoplectus spp.*	Emergent	Impeded flow, Flood control
Sedges	*Carex spp.*	Emergent	Impeded flow, Flood control
Alligator Weed	*Alternathera spp.*	Emergent	Impeded flow, Flood control
Reeds	*Phragmites spp.*	Emergent	Impeded flow, Flood control
Giant Reed	*Arundo spp.*	Emergent	Impeded flow, Flood control
Rush	*Juncus spp.*	Emergent	Impeded flow, Flood control
Pennywort	*Hydrocotyl spp.*	Emergent	Impeded flow, Flood control
Water-Primrose	*Ludwigia spp.*	Emergent	Impeded flow, Flood control
Spike Rush	*Eleocharis spp.*		Impeded flow, Flood control
Duckweed	*Lemna spp.*	Floating	Clogging pumps or screens, Impeded flow
Mosquito Fern	*Azola spp.*	Floating	Clogging pumps or screens, Impeded flow
Watermeal	*Wolffia spp.*	Floating	Clogging pumps or screens, Impeded flow
Watermilfoil	*Myriophyllum spp.*	Submersed	Clogging pumps or screens, Impeded flow
Brazilian & Common Waterweed	*Egeria spp. & Elodea spp*	Submersed	Clogging pumps or screens, Impeded flow
Coontail	*Ceratophyllum spp.*	Submersed	Clogging pumps or screens, Impeded flow
Pondweeds	*Potamogeton spp.*	Submersed	Clogging pumps or screens, Impeded flow
Naiad	*Najas spp.*	Submersed	Clogging pumps or screens, Impeded flow
Widgeon Grass	*Ruppia spp.*	Submersed	Clogging pumps or screens, Impeded flow
Muskgrass & Nitella	*Chara spp.* *Nitella spp.*	Macro Algae	Clogging pumps or screens, Impeded flow
Planktonic & Filamentous Green Algae	*Lyngbya, Pithophora, Clydophora, etc.*	Floating and Submersed	Clogging pumps or screens, Impeded flow
Cyanobacteria Blue-Green Algae	*Anabaena, Aphanizomenon, Microcystis, Planktothrix, etc.*	Floating and Submersed	Clogging pumps or screens, Impeded flow

Table 1:Types of Weeds to be Controlled

Failure to adequately control weed growth in District facilities has detrimental effects. Weed growth significantly limits the amount of water that can be conveyed through District facilities. Substantial weed growth also clogs irrigation structures, increasing the risk of flooding and risks levy failure. Consistent and effective weed control will not only improve the District's ability to serve its customers. Weed growth also causes maintenance issues for farmers when it clogs pumps, filters, and other irrigation equipment which could discourage the use of surface water thereby putting further demand on groundwater supplies.

PESTICIDE PRODUCTS TO BE USED, DEGRADATION BYPRODUCTS OF PESTICIDES, METHOD OF APPLICATION, SURFACTANT AND ADJUVANTS TO BE USED.

Any of the active ingredients (AI) below may be selected by the District's PCA for use depending on the target pest and environmental setting where the application will occur. Any brand name product containing these AIs that has an approved aquatic label for use by the California Department of Pesticide Regulation may be used. Choice in brand name will be at the discretion of the District PCA and may vary depending on availability, changes in efficacy, financial considerations, or other factors.

Pesticide AI	Degradation and Byproducts	Methods of Application	Surfactants and Adjuvants
2,4-D	Parent acids, amine salts	Handgun and reel, boom sprayer, injection	various aquatic labeled non-ionic adjuvants.
Diquat Bromide	Ethylene dibromide	Handgun and reel, boom sprayer, injection	various aquatic labeled non-ionic adjuvants.
Endothall	Endothall acid, coco-alkylamine cation	Handgun and reel, boom sprayer, injection	various aquatic labeled non-ionic adjuvants.
Flumioxazin	APF, THPA, 482-HA	Handgun and reel, boom sprayer, injection	various aquatic labeled non-ionic adjuvants.
Fluridone	n-mythyl formamide and 3-trifluoromythul benzoic acid	Handgun and reel, boom sprayer, injection	various aquatic labeled non-ionic adjuvants.
Glyphosate	Aminomethyl phosphonic acid, carbon dioxide	Handgun and reel, boom sprayer	various aquatic labeled non-ionic adjuvants.
Imazamox	hydrogen chloride, nitrogen oxides	Handgun and reel, boom sprayer, injection	various aquatic labeled non-ionic adjuvants.
Imazapyr	Pyridine hydroy-dicarboxylic acid, pyridine dicarboxylic acid and nicotinic acid	Handgun and reel, boom sprayer, injection	various aquatic labeled non-ionic adjuvants.
Sodium Carbonate Peroxyhydrate	Oxygen, Water	Backpack spreader, spreader, injection (liquid formulations)	NA
Triclopyr	3,5,6-trichloro-2 pyridinol	Handgun and reel, boom sprayer, injection	various aquatic labeled non-ionic adjuvants.
Acrolein	acrylic acid, allyl alcohol, glycidol propanol, propionic acid, oxalic acid, and ultimately carbon dioxide.	Injection	NA
Copper	CO2, Carbon Monoxide, Nitrogen oxides, metal oxide(s)	Backpack sprayer, handgun and reel, boom sprayer, submersible boom, spreader	various aquatic labeled non-ionic adjuvants.

Table 2: Pesticide Product Active Ingredients.

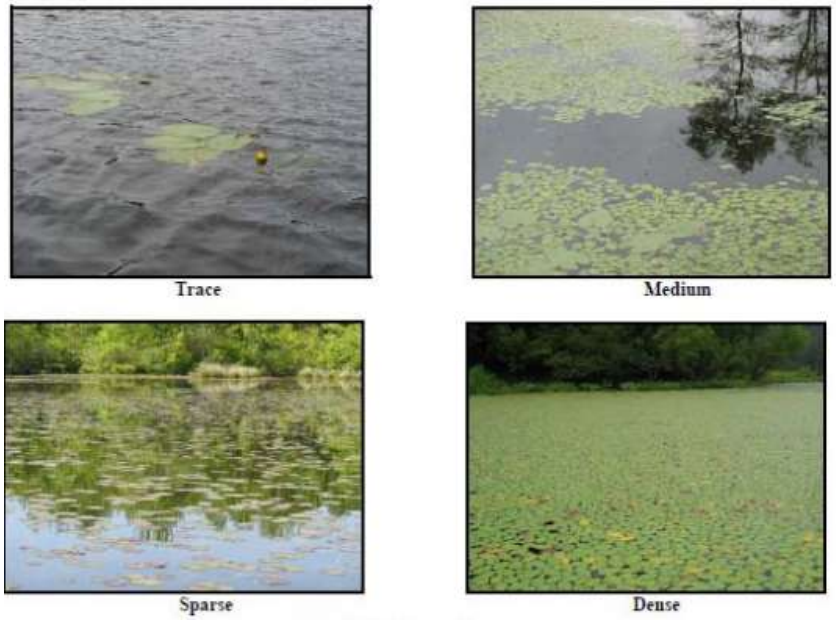
DISCUSS FACTORS INFLUENCING THE DECISION OF USING PESTICIDE FOR WEED CONTROL.

The action threshold level is the point at which action should be taken to control aquatic vegetation or algae before water quality becomes degraded, or intended uses of the water are impacted such as in the case of the District's conveyance system. Pesticide application locations and rates will be determined using Rake Toss Densities and Visual Density Assessment results based on standard criteria as shown in the figures below.

Figure 1: Rake toss vegetation density assessment

Trace = Fingerful (1-2 stems), Sparse = Handful (3-6 stems), Medium = Rakeful (no visible tines), Dense = Difficulty bringing weed mass to shore or boat)

Figure 2: Visual vegetation density assessment



LIST OF GATES OR CONTROL STRUCTURES TO BE USED IN RECEIVING WATER.

Gates and control structures are inspected frequently during the season and at least once in the irrigation off season when there is no running water in the distribution system. In urgent cases, the repair/replacement of gates and control structures can be done during the irrigation water season. When applicable, the District can close gates and/or structures to hold treated water and prevent discharges to receiving waters. The ephemeral flow of the creeks and sloughs listed below are typically dry during the irrigation season (May through October) in an average water year, however, in the event of off season rains or higher than average wet-years, the following gates will be inspected and closed.

1. Ash Slough
   Controls: Main Canal, Ash Slough

2. Dairyland Pond
   Controls: Berenda Slough

3. Justin Drop 18
   Controls: Chowchilla River/ Coehlo Pond.

4. Dutchman Creek at Lat 2
   Controls: Dutchman Creek

Inspection schedule of the gates and control structures

The District has invested a tremendous amount in improvements to the distribution system to allow the District to operate on a scheduled demand system and maintain water levels. The District has installed a number of long-crested weirs, broad-crested weirs and ITRC Flap Gates to stabilize water levels in the canal system and measure flows in critical sections of the system. The District has invested in a SCADA system that allows the District to monitor key locations in the system on in real-time. The District has also constructed numerous regulating reservoirs and continues to investigate locations that would improve the efficiency of the District and provide more flexible and consistent deliveries.

STATE IMPLEMENTATION POLICY (SIP) EXEMPTION

The State Implementation Policy Exception for Acrolein and Copper Section 5.3 of the State Water Board Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California or SIP allows exceptions to meeting priority pollutant criteria/objectives if the State Water Board or Regional Water Quality Control Boards determine the exception to be necessary to implement control measures either:

1. for resource or pest management (i.e., vector or weed control, pest eradication, or fishery management) conducted by public entities or mutual water companies;
2. for drinking water conducted to fulfill statutory requirements under the federal Safe Drinking Water Act or the California Health and Safety Code.

Dischargers do not need a SIP exception to get covered under State Water Board Order 2013-0002-DWQ. However, since the order allows an exception to receiving water limitations for acrolein and copper, which are the only two priority pollutants regulated by the order, dischargers may apply for an exception at their discretion.

CWD will not be applying for an exemption to the SIP as the system has sufficient gates and controls to hold water and prevent discharges to receiving waters. In the future, should the District choose to apply for the exemption, they will submit the following information to the Waterboard:

1. A detailed description of the proposed action, including the proposed method of completing the action;
2. A time schedule;
3. A discharge and receiving water quality monitoring plan (before project initiation, during the project, and after project completion, with the appropriate quality assurance and quality control procedures);
4. Documentation of compliance with the California Environmental Quality Act;
5. Contingency plans;
6. Identification of alternate water supply (if needed); and
7. Residual waste disposal plans.

MONITORING AND REPORTING PROGRAM

CWD has developed a water quality monitoring and reporting program (MRP) in accordance with the requirements of the Statewide General National Pollutant Discharge Elimination System Permit for the Discharge of Aquatic Pesticides for Aquatic Weed Control in Water of the United States General Permit No. CAG990005.

ANNUAL TRAINING

All staff members that participate in water quality monitoring and water sample collection will have reviewed the monitoring plan prior to conducting sampling activities. Staff will have also been trained in water quality field monitoring (including instrument calibration, data recording procedures, and interpretation of collected data) and water sample collection (including quality assurance/quality control, completing laboratory chains of custody, ordering correct laboratory analysis, and proper handling of water samples). The training will include "dry-run" water quality monitoring and sample collection. The "dry-run" includes instrument calibration, water quality parameter measurement and recording, preparation of sample bottles, completing chains of custody, and sample collection.

RECORD KEEPING

In addition to the Districts standard record keeping practices for the application of aquatic herbicides and algaecides, records of monitoring information shall also be collected and will include the following:

1. The date, location (GPS coordinates), and time of sampling or measurements;
2. The individuals who performed the sampling or measurements;
3. Visual observations, physical parameters, and chemical measurements as noted in Table 3.
4. A signed statement confirming the monitoring was performed in conformance with the APAP.

Lab results will be appended to the monitoring reports and shall include:

1. The name of the laboratory certified for such analyses by the California Department of Public Health in accordance with California Water Code section 13176.
2. The date the samples were delivered and the dates the analyses were performed;
3. The individuals (and labs) who performed the analyses;
4. The analytical techniques or methods used; and
5. Results of analyses.

FIELD MEASUREMENTS

Visual and physical measurements will be collected in the field. Temperature, turbidity, electrical conductivity, pH, and dissolved oxygen may be collected using field multiparameter meters: these meters will be calibrated according to manufacturer's specifications prior to each use or as noted in the manual. All monitoring instruments and devices used to fulfill the prescribed monitoring program shall be properly maintained, cleaned after each use and calibrated as necessary to ensure their accuracy.

Sample Type	Constituent/Parameter	Units	Sample Method	Minimum Sampling Frequency	Sample Type Requirement	Required Analytical Test Method
Visual	1. Monitoring area description (pond, lake, open waterway, channel, etc.) 2. Appearance of waterway (sheen, color, clarity, etc.) 3. Weather conditions (fog, rain, wind, etc.)	Not applicable	Visual Observation	[1]	Background, Event and Post-event Monitoring	Not applicable
Physical	1. Temperature[2]	°F	Grab[4]	[5]	Background, Event and Post-event Monitoring	[6]
	2. pH[3]	Number				
	3. Turbidity[3]	NTU				
	4. Electric Conductivity[3] @ 25°C	µmhos/cm				
Chemical	1. Active Ingredient[7]	µg/L	Grab[4]	[5]	Background, Event and Post-event Monitoring	[6]
	2. Nonylphenol[8]	µg/L				
	3. Hardness (if copper is monitored)	mg/L				
	4. Dissolved Oxygen[2]	mg/L				

[1] All applications at all sites.
[2] Field testing.
[3] Field or laboratory testing.
[4] Samples shall be collected at three feet below the surface of the water body or at mid water column depth if the depth is less than three feet.
[5] Collect samples from a minimum of six application events for each active ingredient in each environmental setting (flowing water and non-flowing water) per year, except for glyphosate. If there are less than six application events in a year, collect samples during each application event for each active ingredient in each environmental setting (flowing water and non-flowing water). If the results of monitoring from six consecutive application events show concentrations that are less than the receiving water limitation/trigger for an active ingredient in an environmental setting, sampling shall be reduced to one application event per year for that active ingredient in that environmental setting. To support a reduction in monitoring frequency, the six sampling events showing concentrations that are less than the receiving water limitation/trigger for an active ingredient must be consecutive and can span more than one year or application season. The reduction in monitoring frequency under this provision applies to all listed active ingredients including SIP listed active ingredients If the yearly sampling event shows exceedance of the receiving water limitation/trigger for an active ingredient in an environmental setting, then sampling shall return to six application events for that active ingredient in each environmental setting. For glyphosate, collect samples from one application event from each environmental setting (flowing water and non-flowing water) per year.
[6] Pollutants shall be analyzed using the analytical methods described in 40 C.F.R. part 136.
[7] 2,4-D, acrolein, chlorine, dissolved copper, diquat, endothall, flumioxazin, fluridone, glyphosate, imazamox, imazapyr, penoxsulam, and triclopyr.
[8] It is required only when a surfactant is used.

Table 3: "Table C-.1 Monitoring Requirements"

SAMPLE COLLECTION

Frequency

Chemical samples shall be collected from a minimum of six application events for each active ingredient in each environmental setting (flowing water and non-flowing water, where applicable) per year, except for Sodium Carbonate Peroxyhydrate, which does not require sampling and for glyphosate, which only requires one sample per setting per year. In the event that there are less than six application events in a year, samples shall be collected during each application event for each active ingredient in each environmental setting (flowing water and non-flowing water, where applicable).

If the results from six consecutive sampling events show concentrations that are less than the applicable receiving water limitation/trigger in an environmental setting, then sampling frequency for that active ingredient will be reduced to one per year in that environmental setting. If the annual sampling shows exceedances of the applicable receiving water limitation/trigger, the District will be required to return to sampling six applications the next year, and until sampling may be reduced again. Regardless of the number of chemical sampling events required, the monitoring of visual and physical constituents/parameters is required for all application events.

Special requirements for collection of dissolved copper samples:

Because the applicable copper criterion is expressed as "dissolved copper", the analysis of the water sample must be for dissolved copper, not total copper. As such, the water sample will be filtered through a 0.45-micron filter within 15 minutes of collection. In addition, water hardness as $CaCO^3$ will be measured to calculate the maximum allowable dissolved copper concentration as seen below in Table 4. For freshwater aquatic life criteria, waters with a hardness 400 mg/L or less as calcium carbonate, the actual ambient hardness of surface water shall be used. For waters with a hardness of over 400 mg/L as calcium carbonate, a hardness of 400 mg/L as calcium carbonate shall be used with a default Water-Effect Ratio of 1.

Hardness	Dissolved Cu µg/L (ppb)
100	8.96
150	12.66
200	16.19
250	19.59
300	22.90
350	26.12
400	29.28

Table 4: Maximum allowable concentration of dissolved Cu by hardness as $CaCO_3$

SAMPLE TYPE AND LOCATION

Samples and measurements taken as required herein shall be representative of the nature of the monitored discharge. All samples shall be taken at the anticipated monitoring locations specified in the Discharger's APAP.

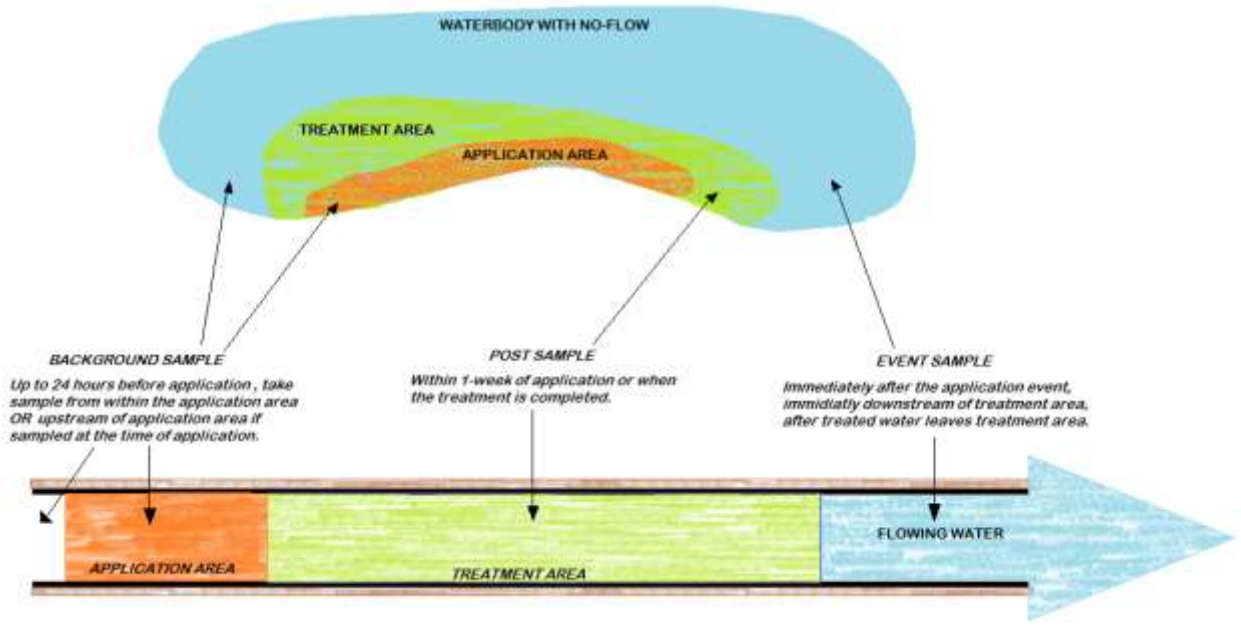


Figure 3: Sample location diagram

Grab samples shall be collected 3 feet below the surface of the water or at mid-water column depth if the water depth is less than 6 feet. In flowing systems, samples should be collected near mid-channel or where the water column is most evenly mixed to provide a representative sample.

Background Sample

Samples will be taken, as required, at the most appropriate location upstream of the furthest upstream application area during a particular application event. In most cases, this will likely be the drop upstream of the furthest upstream injection point for a particular application event. Alternatively, samples may be collected at the application area, up to 24 hours in advance of the application.

Event Sample

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. In some cases, water is not allowed to leave the treatment area via a control structure. In this circumstance, if water is present downstream of the control structure, a grab sample will be collected, if no water is present, evidence will be recorded in the form of the District's sensor readings and/or photographic evidence.

Post Sample

Post-event monitoring samples shall be collected within the treatment area within one week after treatment or when the treatment is completed.

SAMPLE PRESERVATION AND TRANSPORTATION

All samples shall be labeled with the appropriate site name or number, the sample collection time and date, the active ingredient being collected and placed in a cooler with ice to keep samples cool until delivered to the laboratory for analysis. Sample bottles will be provided directly from the lab performing the analysis to safeguard that the proper preservatives and volumes of sample water. A chain of custody form will be filled out and kept with the samples during transport to the lab. Samples will be delivered to the lab either the day of collection or the following day via next day freight delivery to ensure hold times are not exceeded.

EXCEEDANCE OF RECEIVING WATER LIMITATIONS OR MONITORING TRIGGERS

If a Receiving Water Limitation in Table 5 or a Monitoring Trigger in Table 6 is exceeded in the Event or Post-Event sample, the Discharger shall perform the following actions: (1) initiate additional investigations for the cause of the exceedance, (2) implement appropriate BMPs to reduce the algaecide and aquatic herbicide concentration to be below the applicable receiving water limitation or monitoring triggers in future application.

Adverse Incident to Threatened or Endangered Species or Critical Habitat If the Discharger becomes aware of an adverse incident* to a federally-listed threatened or endangered species or its federally-designated critical habitat, that may have resulted from the Discharger's algaecides and aquatic herbicides application, the Discharger must immediately notify the National Marine Fisheries Service (NMFS) Santa Rosa office by phone at (707) 575-6050 in the case of an anadromous or marine species, or the U.S. Fish and Wildlife Service (FWS) at (916) 414-6600 in the case of a terrestrial or freshwater species. This notification must be made by telephone immediately when the Discharger becomes aware of the adverse incident and must include at least the following information:

1. The caller's name, telephone number, and e-mail address;
2. Applicator name and mailing address;
3. The name of the affected species;
4. How and when the Discharger became aware of the adverse incident;
5. Description of the location of the adverse incident;
6. Description of the adverse incident, including the U.S. EPA pesticide registration number for each product applied in the area of the adverse incident; and
7. Description of any steps that have been taken or will be taken to alleviate the adverse impact to the species.

Additional information on federally-listed threatened or endangered species and federally-designated critical habitat is available from NMFS (www.nmfs.noaa.gov) for anadromous or marine species or FWS (www.fws.gov) for terrestrial or freshwater species.

Constituent/ Parameter	BENEFICIAL USE[1]				Basis
	MUN, µg/L	WARM or COLD, µg/L	Other than MUN, WARM, or COLD, µg/L	All Designations	
2,4-D	70				U.S. EPA MCL
Acrolein[2]	320	21	780		U.S. EPA Water Quality Criteria, 1986.
Copper[2]				Dissolved Freshwater[3] Copper Chronic = 0.960exp{0.8545 [ln(hardness[4])] – 1.702}[5, 6] Dissolved saltwater[3] Copper Chronic = 0.83exp{0.8545 [ln(hardness[4])] – 1.702}[5,6]	California Toxics Rule
Diquat	20				U.S. EPA MCL
Endothall	100				U.S. EPA MCL
Fluridone	560				U.S. EPA Integrated Risk Information System
Glyphosate	700				U.S. EPA MCL
Nonylphenol				Freshwater Chronic Criterion = 6.6 µg/L Saltwater Chronic Criterion = 1.7 µg/L	U.S. EPA National Recommended Ambient Water Quality Criteria
Toxicity	Algaecide and aquatic herbicide applications shall not cause or contribute to toxicity in receiving water(s).				Regional Water Boards' Basin Plans

Notes:
1. See Regional Water Boards' Water Quality Control Plans (Basin Plans) for beneficial use definitions.
2. Public entities and mutual water companies* listed in Attachment G are not required to meet these limitations in receiving waters during the exception period described in the APAP and Section VIII.C.10 below.
3. For waters in which the salinity is equal to or less than 1 part per thousand 95% or more of the time, the freshwater criteria apply. For waters in which the salinity is equal to or greater than 10 parts per thousand 95% or more of the time, saltwater criteria apply. For waters in which the salinity is between 1 and 10 parts per thousand, the applicable criteria are the more stringent of the freshwater or saltwater criteria.
4. For freshwater aquatic life criteria, waters with a hardness 400 mg/L or less as calcium carbonate, the actual ambient hardness of surface water shall be used. For waters with a hardness of over 400 mg/L as calcium carbonate, a hardness of 400 mg/L as calcium carbonate shall be used with a default Water-Effect Ratio of 1.
5. Values should be rounded to two significant figures.
6. This limitation does not apply to the Sacramento River and its tributaries above the State Highway 32 Bridge at Hamilton City. See Table III-1 of the Basin Plan for the Sacramento and San Joaquin River Basins for copper limitation.

Table 5: Receiving water limitations

B. Dissolved Oxygen. Dissolved oxygen to be below the Regional Water Board Basin Plans' dissolved oxygen objectives for the receiving water.
C. Floating Material. Floating material to be present in the amounts that cause nuisance or adversely affect beneficial uses.
D. Settleable Substances. Settleable substances to be present in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.
E. Suspended Material. Suspended material to be present in concentrations that cause nuisance or adversely affect beneficial uses.
F. Taste and Odors. Taste- or odor-producing substances to be present in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses or domestic or municipal water supplies.
G. Toxic Pollutants. Toxic pollutants to be present in the water column, sediments, or biota in concentrations that adversely affect beneficial uses; that produce detrimental response in human, plant, animal, or aquatic life; or that bioaccumulate in aquatic resources at levels which are harmful to human health.
H. Color. Esthetically undesirable discoloration.

l. Aquatic Communities. Aquatic communities and populations, including vertebrates, invertebrates, and non-target plant species to be degraded.

Ingredient	Unit	Instantaneous Maximum Monitoring Trigger	Basis
Imazapyr	mg/L	11.2	U.S. EPA Office of Pesticides *Ecotoxicity Database*
Triclopyr Triethylamine	mg/L	13.0	U.S. EPA Office of Pesticides *Ecotoxicity Database*
Flumioxazin	mg/l	0.23	U.S. EPA Office of Pesticides *Ecotoxicity Database*

Table 6: Receiving water monitoring triggers

HOW TO PREVENT SAMPLE CONTAMINATION

The most common causes of sample contamination during sample collection include poor sample-handling techniques, atmospheric input, inadequately cleaned equipment, and use of equipment constructed of materials inappropriate for the analytes targeted for study. Contamination of samples from these sources can be prevented or minimized by adhering to good field practices.

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

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

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

MINIMUM CONTENT OF BMPS

HOW TO PREVENT PESTICIDE SPILL AND SPILL CONTAMINATION

All herbicide applications will be supervised by a California Department of Pesticide Regulation certified applicator who has received training specific to the herbicide and surfactant/adjuvant products to be used. Label language will be followed to ensure safe handling and loading of herbicides. Application equipment will be routinely maintained and checked to identify and/or minimize the possibility of leak development or failure that might lead to a spill. Tank mixing and filling will be done well away from all surface waters. In the unlikely event of an aquatic herbicide spill, the material will be prevented from entering any water bodies to the extent practicable. Label instructions will be followed and reporting as required by local, state and federal laws will be done for all spills.

1. Train personnel in proper procedures for handling pesticides during receipt, storage, formulation, loading, application and disposal.
2. Advise and train pest control personnel in proper spill prevention, emergency response and containment procedures.

ENSURE ONLY MINIMUM AND CONSISTENT AMOUNT OF PESTICIDE USED FOR TARGETED WEEDS

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

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

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

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

- CWD takes a preventative maintenance approach to weed control, targeting weeds when they are small, thereby requiring lower concentrations of herbicide to be applied.
- CWD also endeavors to treat the ditches and canals on a routine basis to prevent heavy weed growth that would require higher herbicide concentrations.

- CWD Facilities and Pest Control staff are licensed pesticide applicators who receive regular training on correctly calculating application rates, setup and use of application equipment and record keeping.
- CWD Facilities and Pest Control staff utilize the recommended label rates as displayed for aquatic injections, and for surface spraying.
- Prior to each application, CWD Facilities and Pest Control staff fill out a Pesticide Field Application Log which documents all of the calculations used to determine the herbicide concentration to be used for that application. The log sheet shows the maximum allowable concentration for each herbicide to serve as a double check for the applicator.

PLAN FOR EDUCATING APPLICATORS ON AVOIDING ADVERSE EFFECT FROM PESTICIDE APPLICATION

- Licensed QACs and QALs complete 20 hours and PCAs complete 40 hours of continuing education every 2 years to remain licensed, thus ensuring that all applicators are up-to-date on the latest pest control techniques, laws and regulations.
- Applicators wear appropriate personal protective equipment (PPE) for the specific herbicide being applied as stated on the herbicide label.
- Prior to the start of each aquatic herbicide application season, CWD Ditchtenders receive additional safety training on the proper handling of treated water within their canals.

PLAN ON INFORMING THE FARMERS AND AGENCIES WHO HAVE WATER RIGHTS ON THE RECEIVING WATER

Each calendar year, the District shall notify potentially affected farmers and agencies prior to the first application of aquatic pesticides.
The notifications shall contain a minimum of the following information:

1. Statement of intent to apply aquatic pesticide(s);
2. Name of algaecide and aquatic herbicide (s);
3. Purpose of use;
4. Approximate time period and expected locations of use;
5. Applicable water use restrictions and precautions during treatment; and
6. Contact information for interested persons to obtain additional information.

- There are no agencies with water diversions from treated CWD canals. Prior to each treatment the Ditchtenders make arrangements with the downstream growers to irrigate out the treated water to appropriate sites. Additionally, waterusers are allowed or advised to refuse irrigation water that contains aquatic herbicide if the label has restrictions or the user grows organic crops.
- There are no active potable water intakes downstream of any of the ditches or canals that CWD will be treating.

FISH KILLS

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

CWD canals are drained on an annual basis after water deliveries are completed. The canals typically remain dry for at least four months a year. As a result, the canals are not suitable habitat for fish, and fish kills within the canals are unlikely. To prevent fish kills in the downstream adjacent water bodies, aquatic pesticide applications will be made as far as possible upstream of the discharge location.

CWD canals do not provide suitable habitat for fish, in addition, receiving waters are either the episodic Chowchilla River and ultimately, the Eastside Bypass which connects to the San Juaquin River. They are drained every year for approximately 5 months; therefore, fish kills within the canal system are unlikely. To prevent fish kills in downstream receiving waters, CWD follows the following practices.

- Verify that gates at all potential release points downstream of the point of application are closed and not leaking prior to treatment and are kept closed until herbicide is no longer in the system (when applicable).
- When possible, empty out the last few drops in a canal, upstream of the gate at the end of the canal, to provide a type of 'storage reservoir' for unscheduled fluctuations in canal flows.

EVALUATION OF ALTERNATIVES

No action
Not controlling the weed and algae population within CWD canals is not a feasible alternative. The District's ability to deliver agricultural water to farmers will be severely diminished and impacts would be manifested in reducing agricultural production in Madera County. The increased presence of algae in the distribution system will reduce the volume of water that can be delivered and decrease the ability to accurately control water deliveries. Without the ability to control algae growth in CWD canals and pipelines, the implementation of highly water efficient irrigation methods employed by farmers within CWD will not be possible.

Prevention
CWD regularly maintains its canal system when dry through sloping and dipping the bottom and sides of the channels, which includes sediment removal. As a result, some aquatic weeds will generally take longer to return due to the soil disturbance and the removal of sandy deposits. CWD is also testing pre-emergent aquatic pesticides in dry canals before the start of the water delivery season. These aquatic pesticides are designed to inhibit the growth of aquatic weeds during the water delivery season. Pre-emergent pesticides will continue to be used in canals when found to be effective.

Mechanical method
The District utilizes mechanical means, including an excavator and grader/sloper, to remove weeds. However, various areas of the distribution system are not easily accessible or do not provide adequate room for safe equipment operation. The excavator and grader/sloper are necessary equipment for other District maintenance operations and pipeline construction projects. As a result, the equipment is frequently unavailable for daily weed removal. The growth of emergent or shoreline weeds can also be controlled utilizing a tractor with a mower attachment. Mowing is done 3-4 days per week and is limited to locations that are accessible by tractor. At control structures, trash screens, and road crossings, manual removal of weeds is employed. Manual removal of weeds along canal banks and along the water surface is inefficient and very expensive. In the past, the District also made an effort to utilize chaining as a method of weed removal, but this method is not effective within many of the District's canals due to obstructions and debris within the canals and along the banks.

Cultural method
Ditchtenders monitor weed and algae populations to determine optimum application periods. By making applications during specific weed and algae growth stages, a reduced application rate is required to maintain the population below the desired threshold. Due to the nature of the on-demand water distribution system, it is typically not feasible to manage canal water levels as a method of weed or algae control.

Biological control
Biological control methods such as fish, goats, and sheep are not feasible for widespread use in or around District canals. Given that the canal system is typically drained for at least four months per year, it does not provide suitable habitat for fish. Goat and sheep grazing for emergent and terrestrial weeds is limited by the lack of fencing limits, vehicle traffic, and high maintenance costs.

Pesticide control
Due to the very limited feasible alternatives mentioned in the previous sections, CWD has decided to continue to use aquatic pesticides as a necessary method of treating weed and algae populations.

Use least intrusive method of weed control
The district applies aquatic pesticides based on manufacturer recommendations. These methods are typically unobtrusive and require only one or two applicators in a single vehicle along a canal bank. Table 2 includes the application methods used for each aquatic pesticide.

APPLY DECISION MATRIX CONCEPT FOR CHOOSING THE MOST APPROPRIATE FORMULATION

The rigid nature of decision matrix in choosing the appropriate formulation of aquatic herbicide is not compatible with the vast array of scenarios present along the District's canal systems. Further, it does not lend itself to the fluid nature of an integrated pest management (IPM) approach that CWD utilizes. CWD's IPM is based on making changes to its weed control activities based on weed species present, water temperature, seasonal variabilities in canal operations, water chemistry, length of canal to be treated and the need for short or long term weed control. It is not feasible to consider all these factors in a matrix that can be applied to each stretch of canal and its seasonal variations.

Control tolerances are defined, as the amount of growth that can occur before action is necessary. The control tolerances may vary, depending on:

- The time of year (more growth may be allowed at the end of the season, when canal flows are lower and growth is less likely to impact the ability to supply irrigation water to growers);
- Irrigation demands along a specific reach of the canal;
- Canal capacity or the ability to transport the necessary flows through the canal system;
- Maturity of plant, and the effectiveness of treatment when the weed becomes more mature.

Decision Factors for Aquatic Herbicide Treatment in the Canal System

The weed and algae control methods (cultural, biological, physical, chemical) used by CWD on its canal facilities are selected based on many factors, including the following:

- Access
- Potential environmental impacts
- Extent of the weed growth
- Effectiveness in controlling the targeted pests
- Cost-effectiveness
- Practicality of implementation

Prior to treatment, an evaluation is conducted by the Pest Control/Facilities Manager, in conjunction with other Operations and Water Distribution staff, to determine the best means of addressing an existing aquatic weed infestation. In some instances, alternative means other than aquatic herbicide treatment, such as mechanical removal, is recommended. This determination is made on a case-by-case basis, given the information available to the PCA and other District Staff at the time.

APPENDIX A

Pesticide Application Log

Application information	Weather Information
Date: City, County: Location: Applicators: Method of Application: Vessel Used: Sample code, if applicable:	Wind Speed: Cloud cover %: Air Temp (C): Water Temp (C): DO (mg/L): Start Time: End Time:

Type and Amount of Product used

Sub location	Surface Acres	Depth	Product	Quantity

Overall Conditions

Describe the target organism

	Algae ID		Plant ID	
Surface		Surface		
Bottom		Bottom		

0 = No Growth, 1 = Minimal, 2 = Moderate, 3 = High

Other Monitoring Notes

Treatment Notes

I certify that I have reviewed the contents of the APAP and have followed the APAP

Signature: _____

Background Monitoring

(u/s of treatment area at time of application, or within the treatmetn areaup to 24 hours prior)

Date:		**Time:**		**Weather Conditions:**		**CFS/Acres:**	
Sampled By:		**Location Name:**		**GPS Waypoint:**			
Monitoring Area Description:							

Visible Monitoring	**Absent**	**Present (comments)**		**Absent**	**Present (comments)**	**Physical Monitoring**	
Floating or suspended matter:			Visible films, sheens, or coatings			Temp°C	
Discoloration:			Fungi, slimes, objectionable growths:			pH	
Bottom deposits:			Potential nuisance conditions:			DO mg/L	
Aquatic life:						DO %	
Chemical Sampling	**Chemical Name**		**Sample ID**	**Hardness** (*if copper is applied*)		SPC µs/cm	
Active Ingredient 1						Turbidity NTU	
Active Ingredient 2				Sample ID nomenclature: PR/EV/PO.month.day.SITEID			
Surfactant			N/A	examples: PR620Brenda, EV620Brenda, PO627Brenda			

Event Monitoring

(immediately after the application event, immidiately downstream or outside of treated area, after treated water leaves treatment area)

Date:		**Time:**		**Weather Conditions:**		**CFS/Acres:**	
Sampled By:		**Location Name:**		**GPS Waypoint:**			
Monitoring Area Description:							

Visible Monitoring	**Absent**	**Present (comments)**		**Absent**	**Present (comments)**	**Physical Monitoring**	
Floating or suspended matter:			Visible films, sheens, or coatings			Temp°C	
Discoloration:			Fungi, slimes, objectionable growths:			pH	
Bottom deposits:			Potential nuisance conditions:			DO mg/L	
Aquatic life:						DO %	
Chemical Sampling	**Chemical Name**		**Sample ID**			SPC µs/cm	
Active Ingredient 1						Turbidity NTU	
Active Ingredient 2							

Post Monitoring

(within 1-week of application or when the treatmetn is completed, collect from within the treatment area)

Date:		**Time:**		**Weather Conditions:**		**CFS/Acres:**	
Sampled By:		**Location Name:**		**GPS Waypoint:**			
Monitoring Area Description:							

Visible Monitoring	**Absent**	**Present (comments)**		**Present**	**Absent**	**Comments**	**Physical Monitoring**	
Floating or suspended matter:			Visible films, sheens, or coatings				Temp°C	
Discoloration:			Fungi, slimes, objectionable growths:				pH	
Bottom deposits:			Potential nuisance conditions:				DO mg/L	
Aquatic life:							DO %	
Chemical Sampling	**Chemical Name**		**Sample ID**				SPC µs/cm	
Active Ingredient 1							Turbidity NTU	
Active Ingredient 2								

APPENDIX B

APPENDIX C

Water Quality Parameter	Recommended Device	Units	Resolution	Instrument Accuracy Specs	Points per Calibration	Pre-Sampling Calibration Check Frequency[2]	Post-Sampling Calibration Check Frequency[2]	Allowable Drift[3]
Dissolved Oxygen	Polarographic or luminescence quenching probe	mg/L	0.01	±0.2	1	Before every monitoring day on-site	After every monitoring day (within 24 hours)	±0.5 or 10%
pH	Electrode	pH	0.01	±0.2	2	Per manufacturer	Per manufacturer	±0.2 units
Salinity	Refractometer or conductivity cell	ppt	0.01	±2%	Per manufacturer	Per manufacturer	Per manufacturer	Per manufacturer
Specific Conductance	Conductivity cell	µS/cm*	1	±0.5%	Per manufacturer	Per manufacturer	Per manufacturer	±10%
Temperature	Thermistor or bulb	°C	0.1	±0.15	Per manufacturer	Per manufacturer	Per manufacturer	±0.5
Turbidity	Portable turbidimeter or optical probe	NTU	0.1	±1% up to 100 NTU; ±3% from 100-400 NTU; and ±5% from 400-3000 NTU	2	Per manufacturer	Per manufacturer	±0.2 or 10%

[1] Unless manufacturer specifies more stringent requirements

[2] SWAMP requires daily pre- and post-sampling calibration checks when the manufacturer or documented procedure (e.g., standard operating procedure) do not provide calibration instructions

* mS/cm for marine water

[3] Unit or percentage, whichever is greater

[4] Water column only

[5] Electromagnetic meters should undergo periodic maintenance according to manufacturer instructions