

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
CENTRAL VALLEY REGION

ORDER R5-2015-0137

WASTE DISCHARGE REQUIREMENTS

FOR

UNIVERSITY OF CALIFORNIA, DAVIS  
USDA AQUATIC WEED CONTROL LABORATORY &  
J. AMOROCHO HYDRAULICS LABORATORY  
YOLO COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Central Valley Water Board) finds that:

1. In November 2013, the University of California, Davis (UCD) submitted a Report of Waste Discharge (RWD) that describes wastewater production and disposal at the USDA Aquatic Weed Control Laboratory (Aquatic Weed Lab), a University testing and research laboratory. A revised RWD was submitted on 29 May 2015. On 21 July 2015, UCD submitted a RWD amendment to include the wastewater production and disposal at the J. Amorocho Hydraulics Laboratory (Hydraulics Lab), another University testing and research laboratory.
2. UCD (hereafter "Discharger") owns both facilities that generate the waste and the land discharge areas. The Discharger operates the Hydraulics Lab and leases the Aquatic Weed Lab to the United States Department of Agriculture (USDA). The Discharger is responsible for compliance with these Waste Discharge Requirements (WDRs).
3. The Aquatic Weed Lab is at 2705 Levee Road in Davis. The Hydraulics Lab is at 2655 Brooks Road in Davis. Both facilities occupy Section 20, T8N, R2E, MDB&M and Assessor's Parcel Numbers (APN) 036-170-04 as shown on Attachment A, which is attached hereto and made part of this Order by reference.
4. WDRs Order R5-2008-0107 (NPDES Permit CA0083364), adopted by the Central Valley Water Board on 31 July 2008 and rescinded on 28 March 2014, prescribed requirements for the Aquatic Weed Lab's discharge to Putah Creek.
5. WDRs Order R5-2008-0131, adopted by the Central Valley Water Board on 31 July 2008, prescribe requirements for the Hydraulics Lab discharge to the South Basin of the Putah Creek North Fork Cutoff (South Basin), a leveed dry creek bed that contained an elevated culvert allowing one way flow to Putah Creek. The Hydraulics Lab was previously regulated under WDRs R5-2002-0026, which prescribed requirements for discharge to Putah Creek. WDRs Order R5-2008-0131 reclassified the discharge to the South Basin as a discharge to land.
6. The Putah Creek North Fork formerly flowed eastward toward the City of Davis. It has since been segmented into three hydraulically separate basins, informally named the

South, North, and East Basin. The culvert hydraulically connecting Putah Creek to the South Basin was capped and sealed in 2012.

7. Because the discharge point of the Aquatic Weed Lab is also to the South Basin, the Discharger proposes to combine the two facilities under one WDRs. The Discharger also proposes to expand the operations of the Hydraulics Lab to include a fish recirculation system and discharge to the North Basin of the North Fork Cutoff (North Basin). Therefore, Order R5-2008-0131 will be rescinded and replaced by this Order. The discharge areas are shown on Attachment A and a more detailed site plan is shown on Attachment B, which is attached hereto and made part of this Order by reference.

### **Existing Aquatic Weed Control Lab Facility and Discharge**

8. The Aquatic Weed Lab conducts research on the biology and ecology of invasive aquatic and riparian weed species, prevention of weed invasions, integrated management methods for management of invasive aquatic and riparian plant species, and ecological restoration of invaded aquatic and riparian ecosystems.
9. The facility consists of offices, a main laboratory, a laboratory annex, two greenhouses, a headhouse, an outdoor research area, two septic systems with leach fields, retention Ponds 1 and 2, and the South Basin.
10. Source water used by the facility is supplied by the UCD potable water supply system, which consist of six on-campus groundwater wells that have a screened depth between 800 and 1,400 feet below ground surface (ft bgs). The water is disinfected using chlorine to a residual level of 0.5 mg/L before being distributed. The May 2015 RWD provided quarterly sampling results from 2012. The following table shows the UCD Potable water supply quality from the six supply wells.

<b>Constituent</b>	<b>Units</b>	<b>UCD Potable Water Avg. (Min. – Max.)</b>
pH	pH units	8.4 (8.4 - 8.4)
EC	µmhos/cm	535 (520 - 560)
TDS	mg/L	305 (300 - 310)
NO <sub>3</sub> as N	mg/L	2.5 (1.5 - 5.0)
Bicarbonate	mg/L	198 (190 - 210)
Carbonate	mg/L	12.2 (8.8 - 15)
Calcium	mg/L	16 (15 - 19)
Chloride	mg/L	21 (16 - 23)
Magnesium	mg/L	18 (17 - 21)
Potassium	mg/L	1.9 (1.6 - 2.6)

<b>Constituent</b>	<b>Units</b>	<b>UCD Potable Water Avg. (Min. – Max.)</b>
Sodium	mg/L	73 (70 - 76)
Sulfate	mg/L	36 (36 - 36)
Boron	µg/L	0.64 (0.59 - 0.72)
Chromium VI	µg/L	6.7 (4.2 - 13.0)
Fluoride	µg/L	160 (130 - 180)
Iron	µg/L	0.04 (0.03 - 0.05)
Manganese	µg/L	0.01 (0.01 - 0.01)

11. Domestic wastewater from the office building is discharged to the west septic system and domestic wastewater from the headhouse is discharged to the south septic system. No other wastewater is generated at these buildings. The headhouse is used for sample processing (i.e., sorting), dish washing, and equipment storage.
12. The main laboratory is used to analyze soil and plant samples for total carbon and nitrogen. All wastewater from the main laboratory is conveyed to fiberglass evaporation vaults, which are located within concrete secondary containment and under a Plexiglas roof. The evaporation vaults are inspected monthly. The inspection includes evaluation of the secondary containment, roof integrity, tank integrity, piping integrity, and fill level. If any water is detected in the secondary containment, the evaporation tanks are emptied and inspected for leaks, which are fixed prior to putting the evaporation vaults back in service. If the evaporation vaults are at 80 percent capacity, the water is pumped out and hauled to the UC Davis wastewater treatment plant for disposal.
13. The laboratory annex is used to prepare plant, soil, and water samples, which are then transferred to the main laboratory for analysis. The laboratory annex has three sinks. Sink drainage is limited to handwashing with water and soap. Wastewater from the sinks is conveyed to holding tanks.
14. The greenhouses are used to conduct experiments on plant growth responses and grow plant cultures. The two greenhouses contain trench drains in the floors that collect overflow water from indoor plant culture experiments. Wastewater from the trench drains are conveyed to the two retention ponds.
15. The outdoor research area is used for growing plant cultures and experiments on plant response. Experiments on plant cultures are conducted in tanks or vaults on concrete pads. The outdoor research area also consists of two cement canals, which have not been used in over ten years. The number of tanks or canals in use depends on the experiments being conducted. Experiments typically evaluate plant responses to water depth, light regimes, or other environmental variables. Water is typically circulated through the tank, vault, or canal during experiments. The tanks and vaults

have bottom drains that connect to the collection system beneath the concrete pad. The collection system captures all wastewater generated from the tanks and vaults, and any storm water. Only one vault or tank is drained at a time to prevent flooding of the drain system. Wastewater from the concrete pads and canals is conveyed via gravity feed to Pond 1.

16. The outdoor research area currently has forty-eight 55-gallon plastic containers, which can be used for aquaculture experiments using herbicides. Only containers without bottom drains are used for experiments with herbicides. If experiments utilize herbicides, water is manually pumped from the containers to holding tanks. If no herbicides are used in the containers, the wastewater is pumped to the drains beneath the concrete pad and flows directly to Pond 1.
17. Wastewater from the outdoor research area experiments containing herbicides and wastewater from the laboratory annex is stored in two 2,000 gallon holding tanks. The Discharger states that wastewater from the holding tanks has only been disposed at the UCD wastewater treatment facility and not discharged to Pond 1. The facility's previous standard operations procedure stated that a wastewater sample was to be collected when the holding tanks reached 80 percent of the total capacity. The sample would be analyzed to determine if herbicides were present and whether granular activated carbon (GAC) would remove herbicides to non-detectable levels. If the GAC was able to remove herbicides, the stored wastewater would be pumped through an on-site GAC filter prior to being discharged to Pond 1. If the results showed that GAC was not effective at removing herbicides, the wastewater would be disposed off-site at the UC Davis wastewater treatment facility. This procedure has been revised and is described in the planned changes section below.
18. The facility contains two unlined retention ponds, Pond 1 and Pond 2. Each pond is approximately 20,000 square feet and has a maximum depth of 3 feet to the outlet points. Pond 1 typically contains water year-round from the greenhouse discharge. A culvert allows water from Pond 1 to overflow to Pond 2. Discharge from Pond 2 is to the South Basin via a manually operated valve.
19. Water from Pond 2 is conveyed to the South Basin via gravity feed. A valve, flow meter, and sampling port are located at the discharge point to the South Basin. The discharge area of the South Basin is bounded to the south by Levee Road, bounded to the north by an agriculture basin (a concrete holding pond previously used to hold irrigation water), and bounded to the east by Brooks Road. The North Basin has a surface area of 3.7 acres and hydraulic capacity of 4.6 million gallons (MG) at an elevation of 60 feet above mean sea level (AMSL), which maintains 4 feet of freeboard to the spillover point at an elevation of 64 feet AMSL. Overflow would flow into Putah Creek. A water level at 60 feet AMSL will inundate Ponds 1 and 2, which have a minimum berm elevation of 58.7 feet AMSL, but wastewater would remain on site. As described in the following section, wastewater from the Hydraulics Lab is also discharged to the South Basin.

20. Experiments and potted plant cultures are usually grown in aquatic mesocosms without adding any nutrients to the water since rooted aquatic plants acquire most of their nutrients from sediment. If nutrients are added, the experiments are designed to mimic high and low aqueous nutrient concentrations measured at field sites. For these experiments, a modified Hoagland's solution (a hydroponic nutrient solution) is used at full strength or diluted with deionized water to create the experimental conditions. The Hoagland's solution consists of the following concentrations of nutrients.

<b>Nutrient</b>	<b>Maximum Concentration</b>
Potassium nitrate	5 mg/L nitrogen
Sodium phosphate	2 mg/L phosphorus
Potassium bicarbonate	47 mg/L potassium
Calcium chloride	40 mg/L calcium
Magnesium sulfate	9.6 mg/L magnesium, 12.8 mg/L sulfur
Boric acid	0.27 mg/L boron
Manganese sulfate	0.27 mg/L manganese
Zinc sulfate	0.13 mg/L zinc
Copper sulfate	0.03 mg/L copper
Ammonium molybdate	0.01 mg/L molybdenum
Iron EDTA	0.04 g/L iron

21. Herbicides previously or potentially used at the lab are listed in the table below. Each herbicide is approved by the USEPA. All the herbicides are registered in California except "Stingray", which has an active ingredient of carfentrazone-ethyl and is pending approval for being a California registered herbicide. The Discharger proposes to only discharge herbicide wastewater when the active ingredients are non-detectable. However, the reporting limit that determines if a constituent is non-detectable can vary depending on the analysis procedure. Known reporting limits were obtained from a wastewater characterization study performed on 05 January 2006, which was submitted as part of the November 2013 RWD. The reporting limit for constituents that were not characterized is listed as to-be-determined (TBD). This Order sets the active ingredient's reporting limit as the effluent limit. For active ingredients with reporting limits listed as TBD, this Order requires the Discharger to determine the reporting limit and propose an associated effluent limit.

<b>Herbicide Trade Name</b>	<b>Active Ingredient</b>	<b>Maximum Concentration (µg/l)</b>	<b>Reporting Limit (µg/L)</b>
Weedar 64	2-4-Diethyl amine	4,000	5
Tradewind	Bispyribac-sodium	45	TBD
Stingray	Carfentrazone-ethyl	200	TBD
Cutrine Plus	Elemental copper	1,000	1

Herbicide Trade Name	Active Ingredient	Maximum Concentration (µg/l)	Reporting Limit (µg/L)
Reward	Diquat dibromide	380	4
Aquathol K	Endothall	5,000	45
Clipper	Flumioxazin	400	TBD
Sonar AS	Fluridone	150	TBD
Rodeo	Glyphosate	1,860	5
Clearcast	Imazamox	500	TBD
Habitat	Imazapyr	552	TBD
Galleon	Penoxsulam	150	TBD
Renovate 3	Triclopyr	2,500	TBD

22. The Discharger also proposes to utilize herbicides that are approved by the USEPA but have not been registered in California. For these herbicides, this Order requires the Discharger to evaluate the potential of the active ingredients to degrade groundwater, determine the reporting limit, and propose an effluent limit.
23. Under WDRs Order R5-2008-0107 (NPDES Permit CA0083364) effluent sampling was only performed for discharges to Putah Creek, not including the South Basin. The Discharger has not discharged to Putah Creek since 2000. The Discharger last characterized effluent from Pond 2 to the South Basin on 5 January 2006, prior to the 2008 NPDES permit renewal. On 2 April 2015, the Discharger took a single sample of the effluent from both greenhouses, a non-herbicide experiment being conducted at the outdoor research area, the holding tanks, and from the evaporation tank. The sampling results are provided in the following table.

Constituent	Units	North Greenhouse <sup>1</sup>	South Greenhouse <sup>1</sup>	Outdoor Research Area <sup>1,2</sup>	Holding Tanks <sup>1</sup>	Pond 2 Effluent <sup>3</sup>	Evaporation Tank <sup>1,4</sup>
pH	pH units	8.96	8.33	8.78	8.44	8.12	8.76
EC	µmhos/cm	550	520	85	720	320	230
TDS	mg/L	370	280	74	420	250	1,400
COD	mg/L	9.3	7.2	<7.0	20	-	180
TKN as N	mg/L	0.62	<0.2	0.4	1.5	-	6.7
NO <sub>3</sub> as N	mg/L	<0.5	<0.5	<0.5	4.7	<0.23	<0.5
Bicarbonate	mg/L	200	90	34	210	-	190
Carbonate	mg/L	25	<5.0	<5.0	<5.0	-	19
Calcium	mg/L	17	22	12	19	-	13
Chloride	mg/L	18	75	0.59	45	13	260
Magnesium	mg/L	20	11	1.9	20	-	12

Constituent	Units	North Greenhouse <sup>1</sup>	South Greenhouse <sup>1</sup>	Outdoor Research Area <sup>1,2</sup>	Holding Tanks <sup>1</sup>	Pond 2 Effluent <sup>3</sup>	Evaporation Tank <sup>1,4</sup>
Potassium	mg/L	2.3	4.8	1.4	5.7	-	82
Sodium	mg/L	86	66	1.1	100	-	370
Sulfate	mg/L	33	34	2.2	42	4.1	220
Aluminum	µg/L	<50	<50	<50	50	220	76
Arsenic	µg/L	5	<2	<2	24	2.9	17
Chromium VI	µg/L	-	-	-	-	2.3	-
Total Chromium	µg/L	-	-	-	-	2.2	-
Copper	µg/L	<10	<10	<10	1,200	3.8	14
Fluoride	µg/L	240	220	<100	<100	<100	260
Iron	µg/L	<100	<100	<100	<100	<300	120
Lead	µg/L	<5	<5	<5	<5	0.15	<5
Mercury	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Manganese	µg/L	<20	<20	<20	<20	12	<20
Nickel	µg/L	-	-	-	-	1.8	-
Zinc	µg/L	<20	<20	<20	66	92	42

<sup>1</sup> Sample taken on 2 April 2015.

<sup>2</sup> The experiment conducted during the time of sampling used deionized source water.

<sup>3</sup> Effluent sample to the South Basin taken on 5 January 2006.

<sup>4</sup> Evaporation tanks have double containment and do not discharge to the retention ponds or the South Basin.

24. From 2010 through 2014, the average daily flow to the South Basin was approximately 2,400 gallons per day (gpd). The potential peak daily flow rate is 20,000 gpd, which includes filling and discharging the holding tanks and the outdoor research area tanks and vaults once per day. However, this is an unlikely scenario because experiments are typically run for several weeks or months.
25. The Discharger's water balance utilized conservative assumptions of no percolation or evaporation and determined that up to 1.7 MG of wastewater could be discharged annually to the South Basin without exceeding a water elevation of 60 feet AMSL (4.6 MG storage capacity) during a 100-year, 365-day precipitation event. The total annual storm water contribution was determined to be 2.9 MG.
26. Experimental plants are harvested and analyzed. After analysis, native plants are disposed of in campus dumpsters for composting as landscape material. Per protocols developed by the University and Yolo County Agricultural Commissioner for disposal of all invasive weeds and/or transgenic plant material, experimental plants

that are exotic and/or invasive weeds are autoclaved on site or steam injected for 24 hours at the University's Department of Plant Sciences autoclave. The autoclaved plant material is disposed at the Yolo County Landfill.

27. All hazardous chemical waste is collected in storage containers provided by the University Environmental Health and Safety (EH&S). Containers are labelled as chemical hazardous waste and removed from the facility by EH&S for disposal at a permitted facility.
28. Storm water runoff is maintained on-site and naturally flows to Pond 1, Pond 2, or the South Basin.

### **Existing Hydraulics Lab Facility and Discharge**

29. The Hydraulics Lab conducts experiments on hydraulics and fish swimming performance, behavior, and physiological response. The facility has both indoor and outdoor areas for engineering and fish experiments.
30. The main building houses the indoor area and currently contains two flumes, a fish treadmill, six 60-gallon tanks, two 95-gallon tanks, and a temperature controlled head tank for water recirculation. The number and size of tanks may vary depending on experimental needs. The current capacity of the indoor system is 80,000 gallons, and the water is typically replaced every two to four weeks.
31. The outdoor area is canopy-covered and currently contains a large flume and four 290-gallon holding tanks. The fish holding tanks are used to hold fish before and after experiments are conducted. Water used in the outdoor flume may be used for experiments involving fish, river bottom soils and/or riparian plants prior to discharge. The number and size of tanks may vary depending on experimental needs. Soil and plants are returned to their point of origin after experimentation. The current capacity of the outdoor system is 40,000 gallons, and depending on the type of experiment, may be replaced every two to four weeks.
32. Source water for the laboratory is either drawn from nearby Well C3C, previously used as an agricultural supply well and constructed in 1932 with a depth of 270 feet, or from UCD supplied potable water. The water quality of UCD supplied potable water is described in Finding 10. Water quality results of Well C3C from a 10 July 2015 sample are provided below. The well was last characterized on 28 June 2008 for preparation of WDRs R5-2008-0131. These results are also provided in the following table.

<b>Constituent</b>	<b>Units</b>	<b>Well C3C 2008 Sample</b>	<b>Well C3C 2015 Sample</b>
pH	pH units	--	7.7
EC	µmhos/cm	700	740

Constituent	Units	Well C3C 2008 Sample	Well C3C 2015 Sample
TDS	mg/L	430	430
TKN as N	mg/L	--	<0.2
Nitrate as N	mg/L	5.9	2.9
Ammonia as N	mg/L	0.14	--
Bicarbonate	mg/L	--	230
Carbonate	mg/L	--	<5.0
Calcium	mg/L	--	36
Chloride	mg/L	22	22
Magnesium	mg/L	--	51
Potassium	mg/L	--	1.4
Sodium	mg/L	--	34
Sulfate	mg/L	33	--
Arsenic	µg/L	1.5	2.5
Boron	µg/L	--	500
Total chromium	µg/L	25	19
Chromium VI	µg/L	24	--
Iron	µg/L	--	<100
Manganese	µg/L	--	10

33. The RWD states that no chemicals or toxins are added to water used for experimentation. Since a study was not performed to determine the effects of amendments on the receiving groundwater, chemical amendments are not permissible for experimentation.
34. Only well water is used for experiments involving fish due to their sensitivity to chlorine. Water used in fish experiments is air-equilibrated and temperature controlled in the indoor system and air-equilibrated at ambient temperature in the outdoor system.
35. Each flume includes a storage tank that is used as a settling tank for the effluent prior to discharge. Discharges occur intermittently and only during periods of experimentation. From July 2010 through July 2015, the facility had an annual average flow of 790,000 gallons.
36. Experimentation occurs when funding or a proposal has been awarded to the lab. For example, a previous project entitled The Roughness Study of the California Native Vegetation in Floodways was funded from 01 September 2008 to 30 June 2009. The project involved four experimental runs, each testing a different riparian plant with

sediment collected from the Sacramento River using the outdoor flume. Each experiment consisted of three replicate batches with eight trials in each batch. Water was discharged after each batch study and not reused between batches. Each experiment lasted for two or three months and required discharging three times. Typical volumes for each discharge were 20,000 to 30,000 gallons. Setup time between experiments was about two weeks.

37. The effluent is not biologically or physically treated prior to discharge. Order R5-2008-0131 required effluent monitoring of electrical conductivity (EC) and dissolved oxygen (DO). From July 2010 through July 2015, the EC concentration ranged from 387 to 701  $\mu\text{mhos/cm}$  with a flow weighted average of 594  $\mu\text{mhos/cm}$  and the DO concentration ranged from 6.7 to 11.5 mg/L.
38. Effluent is discharged to the South Basin, the same basin that the Aquatic Weed Lab discharges to, or to a retention basin (herein Retention Basin 1). Retention Basin 1 has a hydraulic ponding capacity of 126,000 gallons. The discharge specifications of Order R5-2008-0131 stated that discharge to Retention Basin 1 could not occur when ponding water was visible. The Discharger proposes to maintain this discharge specification.
39. Domestic wastewater generated from the facility is discharged to an on-site septic system that is permitted through Yolo County.
40. Storm water runoff is maintained on-site and naturally flows to Retention Basin 1 or the South Basin.

#### **Planned Changes in the Facility and Discharge**

41. Under the NPDES permit, the Aquatic Weed Lab previously stored herbicide wastewater in both 2,000-gallon storage tanks. When discharged to Pond 1, stored herbicide wastewater would then be treated by the GAC filter prior to discharge to Pond 1 without sampling. After a herbicide experiment, herbicide wastewater will now be stored in one of the 2,000-gallon storage tanks. After GAC treatment, treated wastewater will be stored in the second 2,000-gallon storage tank and tested prior to discharge into Pond 1. If the sample results exceed the effluent limits, wastewater will either be treated again or hauled to a locally permitted wastewater treatment system for disposal. The Aquatic Weed Lab's process flow diagram is shown in Attachment C, which is attached hereto and made part of this Order by reference.
42. The Hydraulics Lab proposes to increase the outdoor flumes volumetric capacity from 40,000 gallons to 96,000 gallons.
43. Under Order R5-2008-0131, the Hydraulics Lab transported fish to the facility for experimentation. The Discharger now proposes to construct a fish recirculation system to maintain fish on-site and perform joint research between the Civil and

Environmental Engineering Department and the Wildlife, Fish, and Conservation Biology Department.

44. The fish recirculation systems is planned to consist of a large head tank for well water aeration, four 2,000-gallon tanks, one 3,500-gallon tank, four 300-gallon tanks, and two 500-gallon tanks. The number and size of tanks may vary depending on experimental needs. The water supply will be from Well C3C on a demand basis. The tanks will be connected to a recirculating system designed to maintain the required levels of dissolved oxygen for fish survival. The tanks will be designed to discharge a cumulative 35 gallons per minute (GPM) continuously, but may discharge up to 125 GPM. The Hydraulic Lab’s process flow diagram is shown in Attachment D, which is attached hereto and made part of this Order by reference
45. The following amendments will be added to the fish recirculation system’s source water.

<b>Amendment</b>	<b>Use</b>
Commercial Fish Feed	Maintaining fish broods
10% iodine solution	Equipment disinfectant to prevent disease cross-contamination between fish species.
Bleach (5.25% sodium hypochlorite)	Equipment disinfectant to prevent disease cross-contamination between fish species.
Sodium chloride	Used occasionally to reduce fish stress.

46. The recirculated water will be treated through physical and biological means to maintain healthy water for the fish. Standard practices will be employed to maintain fish in captivity and will be consistent with the University’s Institutional Animal Care and Use Committee guidelines. Such practices may include physical treatment consisting of activated carbon, zeolite, ultraviolet light, or mechanical filters. Cultured natural anaerobic and aerobic bacteria may be used to reduce nitrogen ammonia to nitrogen gas. Wastewater is not treated prior to discharge.
47. The effluent character of the fish recirculation system is expected to be similar to the UCD Center for Aquatic Biology and Aquaculture’s (CABA, regulated under WDRs R5-2012-0053 (NPDES permit CA0083345)) fish recirculation system. The CABA Aquatic Center facility is located directly north of the Hydraulics Lab and utilizes groundwater from an on-site well as source water. Effluent data from the CABA Aquatic Center facility is provided in the table below. The concentration average and range for EC are from quarterly data collected from January 2012 through April 2015. The concentration average and range for TDS are from monthly data collected from August 2012 through June 2015. Data for the remaining constituents were obtained during the last NPDES permit revision, which consisted of three sampling events collected in 2007.

Constituent	Units	CABA Aquatic Center Effluent Quality NPDES Discharge Location D-001 Avg. (Min. – Max.)
pH	pH units	8.2 (8.0-8.4)
EC	µmhos/cm	786 (740-809)
TDS	mg/L	460 (353-550)
NO <sub>3</sub> as N	mg/L	3.0 (0.47-8.2)
Chloride	mg/L	18.3 (18-19)
Sulfate	mg/L	29.6 (29-30)
Aluminum	µg/L	<50
Arsenic	µg/L	2.7 (1.9-3.3)
Chromium (VI)	µg/L	21 (19-23)
Total chromium	µg/L	21.7 (21.2-22)
Copper	µg/L	1.49 (0.96-1.80)
Fluoride	µg/L	260 (230-280)
Iron	µg/L	19 (ND-35)
Lead	µg/L	<0.5
Mercury	µg/L	0.0020 (0.0012-0.0032)
Manganese	µg/L	<10
Nickel	µg/L	<5.0
Zinc	µg/L	2.3 (<1.0-4.3)

48. Wastewater from the fish recirculation system will be discharged to the North Basin.

The discharge area of the North Basin is bounded to the south by an access road to the Hydraulics Lab, bounded to east by Brooks Road, and bounded to the north by Garrod Road. The North Basin is not hydraulically linked to the South Basin or to Putah Creek. The North Basin has a surface area of 8 acres and hydraulic capacity of 23.8 MG at an elevation of 61 feet AMSL, which maintains 2 feet of freeboard to the spillover point at an elevation of 63 ft AMSL. Overflow would flow into the Agricultural Basin and into the East Basin of the North Fork Cutoff that is connected to UCD's Arboretum. As proposed by the Discharger, this Order requires the Discharger to install a valve, flow meter, and sampling port at the discharge point to the North Basin.

49. The Discharger's water balance utilized a conservative assumption of no percolation and determined that up to 15 MG of wastewater could be discharged annually to the North Basin without exceeding a water elevation of 63 feet AMSL (23.8 MG storage volume) during a 100-year, 365-day precipitation event. The total annual storm water

contribution was determined to be 16.3 MG and evaporation was calculated to be 7.5 MG per year.

50. Wastewater from the Hydraulic Lab's main building or outdoor flume may also be discharged to the North Basin.

### **Site-Specific Conditions**

51. The facilities are located west of Highway 113 and are part of the west campus of UCD located in the Putah Creek Plain of the Sacramento River Valley. The terrain at the site is predominately flat. Surface water from the surrounding area flows to the North Fork Cutoff basins or via surface runoff or a storm water collection system with an outfall to Putah Creek. The eastern portion of the Facility is located within the 100-year floodplain, as presented in Figure 8.
52. The RWD states that the eastern portion of the facility is located within the 100-year floodplain based on a 2002 FEMA map. However, a more recent FEMA flood map from 2010 shows that the facilities are not located within a 100 year flood zone. Putah Creek has a 100 year water level of 44.8 feet AMSL. The levee that separates the South Basin from Putah Creek is at an elevation of 64 feet AMSL.
53. Soils are characterized predominately as the Yolo Series, fine sandy loam found on alluvial fans, which have a moderate to high percolation rate. The Discharger states that rainfall percolates below ground surface within 24 hours after a precipitation event. However, infiltration rates for either discharge location have not been evaluated and thus are not considered herein.
54. Land use in the west campus is primarily agriculture field research lands. Crops change regularly based on research needs. West campus also contains various research facilities and an airport.

### **Groundwater Conditions**

55. Well C3C is used to supply source water for the Hydraulics Lab and located adjacent and upgradient of the South Basin. Three agricultural supply wells (Wells E2A, C2A, and C2F) are active within 3,000 feet downgradient of the Facility. These wells may influence the vertical groundwater gradient when they are actively pumping. Recharge to the shallow aquifer primarily occurs from Putah Creek, a losing stream, and from storm water and excess irrigation water infiltration.
56. Groundwater monitoring has not previously been required at either facility and the groundwater underlying the site has not been characterized.
57. The CABA Aquatic Center has three groundwater monitoring wells GW-003, GW-004, and GW-005 (formerly named P3, P4, and P5, respectively) to characterize groundwater at the site. These wells are located approximately 800 feet north of the Hydraulics Lab. From 2007 through 2014, the monitoring wells had an average

groundwater elevation of 19.5 feet AMSL, corresponding to a depth to groundwater of 32.8 feet bgs. The highest groundwater elevation in the groundwater monitoring wells was 29.4 feet AMSL, corresponding to a depth to groundwater of 22.9 feet bgs. The groundwater gradient flows northeast with a gradient of 0.001 to 0.005 feet/foot. The Discharger determined the groundwater depth below the discharge areas using the highest groundwater elevation. The results are summarized in the table below.

Discharge Area	Depth to Groundwater Below Base of Discharge Area
Aquatic Weed Lab Pond 1 and Pond 2	25.6 feet
Hydraulics Lab Retention Basin 1	31.6 feet
North Fork Cutoff South Basin	22.9 feet
North Fork Cutoff North Basin	13.7 feet

58. Of the three wells, groundwater monitoring well GW-003 is the most upgradient and was used to provide an indication of background groundwater quality at the Aquatic Weed Lab and Hydraulics Lab. Available data from January 2011 is provided in the table below.

Constituent	Units	CABA Aquatic Center Groundwater Quality NPDES Monitoring Location GW-003 Avg. (Min. – Max.)
pH <sup>1</sup>	pH units	7.54 (7.48 – 7.65)
EC <sup>2</sup>	µmhos/cm	784 (690 – 890)
TDS <sup>3</sup>	mg/L	445 (385 – 530)
NO <sub>3</sub> as N <sup>1</sup>	mg/L	4.7 (2.9 – 6.6)
Bicarbonate <sup>1</sup>	mg/L	395 (360 – 420)
Carbonate <sup>1</sup>	mg/L	<5.0
Calcium <sup>1</sup>	mg/L	41 (37 – 46)
Chloride <sup>1</sup>	mg/L	22 (20 – 24)
Magnesium <sup>1</sup>	mg/L	79 (70 – 88)
Potassium <sup>1</sup>	mg/L	<1
Sodium <sup>1</sup>	mg/L	44 (39 -51)
Sulfate <sup>1</sup>	mg/L	48 (33 – 71)
Arsenic <sup>1</sup>	µg/L	2.7 (2.3 – 3.0)
Boron <sup>1</sup>	µg/L	645 (540 – 720)
Chromium (VI) <sup>3</sup>	µg/L	17 (7 – 24)
Total chromium <sup>2</sup>	µg/L	23 (<10 – 81.6)

Constituent	Units	CABA Aquatic Center Groundwater Quality NPDES Monitoring Location GW-003 Avg. (Min. – Max.)
Copper <sup>1</sup>	µg/L	<10
Fluoride <sup>1</sup>	µg/L	340 (190 – 490)
Iron <sup>1</sup>	µg/L	<100
Lead <sup>1</sup>	µg/L	<5.0
Mercury <sup>1</sup>	µg/L	<0.20
Manganese <sup>1</sup>	µg/L	<20
Nickel <sup>1</sup>	µg/L	<20
Zinc <sup>1</sup>	µg/L	<20

<sup>1</sup> Average and range of quarterly data from first quarter of 2011 through second quarter of 2012.

<sup>2</sup> Average and range of quarterly data from first quarter of 2011 through fourth quarter of 2014.

<sup>3</sup> Average and range of quarterly data from third quarter of 2012 through fourth quarter of 2014.

59. Well C3C, used as source water at the Hydraulics lab, is located adjacent and upgradient of the South Basin, as indicated in Attachment B. This well was used to provide an indication of downgradient groundwater quality (data provided above).
60. Based on the provided effluent and groundwater data, the current effluent discharge and predicted effluent quality from the fish recirculation system are comparable to groundwater quality.

### **Basin Plan, Beneficial Uses, and Regulatory Considerations**

61. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins*, Fourth Edition (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Water Board. Pursuant to Water Code section 13263(a), waste discharge requirements must implement the Basin Plan.
62. Local drainage is to Putah Creek. The beneficial uses of surface water, as stated in the Basin Plan, are municipal and domestic supply; agricultural supply; industrial process supply; hydropower generation; water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater habitat; wildlife habitat; and spawning, reproduction, and/or early development.
63. The beneficial uses of underlying groundwater as set forth in the Basin Plan are municipal and domestic supply, agricultural supply, industrial service supply and industrial process supply.

64. The Basin Plan establishes narrative water quality objectives for chemical constituents, tastes and odors, and toxicity in groundwater. It also sets forth a numeric objective for total coliform organisms.
65. The Basin Plan's numeric water quality objective for bacteria requires that the most probable number (MPN) of coliform organisms over any seven-day period shall be less than 2.2 per 100 mL in MUN groundwater.
66. The Basin Plan's narrative water quality objectives for chemical constituents, at a minimum, require waters designated as domestic or municipal supply to meet the MCLs specified in Title 22 of the California Code of Regulations (hereafter Title 22). The Basin Plan recognizes that the Central Valley Water Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.
67. The narrative toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, animal, plant, or aquatic life associated with designated beneficial uses.
68. Quantifying a narrative water quality objective requires a site-specific evaluation of those constituents that have the potential to impact water quality and beneficial uses. The Basin Plan states that when compliance with a narrative objective is required to protect specific beneficial uses, the Central Valley Water Board will, on a case-by-case basis, adopt numerical limitations in order to implement the narrative objective.

In the absence of specific numerical water quality limits, the Basin Plan methodology is to consider any relevant published criteria. General salt tolerance guidelines, such as Water Quality for Agriculture by Ayers and Westcot and similar references indicate that yield reductions in nearly all crops are not evident when irrigation water has an EC less than 700  $\mu\text{mhos/cm}$ . There is, however, an eight- to ten-fold range in salt tolerance for agricultural crops and the appropriate salinity values to protect agriculture in the Central Valley are considered on a case-by-case basis. It is possible to achieve full yield potential with waters having EC up to 3,000  $\mu\text{mhos/cm}$  if the proper leaching fraction is provided to maintain soil salinity within the tolerance of the crop.

### **Antidegradation Analysis**

69. State Water Resources Control Board Resolution 68-16 ("Policy with Respect to Maintaining High Quality Waters of the State") (hereafter Resolution 68-16) prohibits degradation of groundwater unless it has been shown that:
  - a. The degradation is consistent with the maximum benefit to the people of the state.
  - b. The degradation will not unreasonably affect present and anticipated future beneficial uses.

- c. The degradation does not result in water quality less than that prescribed in state and regional policies, including violation of one or more water quality objectives, and
  - d. The discharger employs best practicable treatment or control (BPTC) to minimize degradation.
70. The Discharger has not monitored first encountered groundwater quality at the site and was not required to monitor groundwater under the previous WDRs. Therefore, it is not possible to determine pre-1968 groundwater quality or background groundwater conditions. However, groundwater monitoring well GW-003 from the nearby CABA Aquatic Center was used to estimate background groundwater quality. Therefore, determination of compliance with Resolution 68-16 for this facility must be based on background groundwater quality expected to be representative of groundwater quality upgradient of the Facility.
71. Based on the provided effluent and groundwater data, the current effluent discharge and predicted effluent quality from the fish recirculation system are not expected to cause degradation of groundwater. However, effective source control, treatment, and control measures are required to be implemented to maintain current effluent quality. Therefore, this Order establishes performance based effluent limits determined to be protective of groundwater but does not require groundwater monitoring at this time.
72. Constituents may concentrate during experimentation and holding prior to discharge due to evaporation. Implementing best management practices and appropriately scheduling experiments will require discharging effluent without excessive delay. This Order allows a reasonable salinity increase for effluent disposal of 100 mg/L TDS over source water. The TDS concentration of the UCD supply water is reported to have an average of 305 mg/L and Well C3C was reported to be 430 mg/L. Thus, this Order contains a performance based TDS monthly average effluent limitation of 530 mg/L, which shall be calculated based on all discharge flows
73. For nutrients such as nitrate, the potential for groundwater degradation depends on wastewater quality; crop uptake, and the ability of the vadose zone below the LAAs to support nitrification and denitrification to convert the nitrogen to nitrogen gas before it reaches the water table. Groundwater monitoring well GW-003 shows nitrate to range between 2.9 and 6.6 mg/L. Wastewater quality from the current discharge sources is less than the groundwater quality but sampling data is limited. Based on the provided wastewater quality data from the CABA fish recirculation system, the effluent nitrate concentration of the proposed fish recirculation is expected to remain below the Basin Plan groundwater quality objective of 10 mg/L but has the potential to exceed the groundwater quality. However, the Hydraulic Lab does not use nitrogen as a supplement during experiments. Wastewater quality from the Aquatic Weed Lab is limited and nitrate is used for plant nutrition during experiments. Therefore, to limit the potential for nitrate degradation this Order sets a total nitrogen effluent limit for

discharges from the Aquatic Weed Lab and the discharge from the Hydraulic Lab's fish recirculation system.

74. The Discharger proposes to only discharge herbicide experimental wastewater when the active ingredients are not detectable. However, the reporting limit used to determine whether the constituent is detectable can vary depending on the media matrix and detection method. Therefore, this Order requires the Discharger to submit an *Analytical Methods and Proposed Effluent Report* that establishes the reporting limits yet to be determined for active ingredients in currently used herbicides. Upon the Executive Officer's approval, the determined reporting limit will be set as the effluent limit.
75. Herbicide concentrations will be further reduced when discharged to Pond 1 where dilution with wastewater not containing herbicides will occur. The Discharger also maintains vegetative growth in Ponds 1 and Ponds 2 and prevents breeding of mosquitoes through methods such as mosquitofish. The final concentrations of herbicides discharged to the South Basin are expected to be considerably less than if herbicides were used to control vegetation in the ponds.
76. Prior to using new herbicides not registered in California or not used in accordance with label specifications, the Discharger must obtain the Executive Officer's permission by submitting an *Herbicide Evaluation Report* that evaluates the active ingredient's potential to degrade groundwater. The report shall propose the effluent limit based on the determined reporting limit of the active ingredient(s). Upon approval by the Executive Officer, this Order allows use of the herbicide and sets the effluent limit at the established reporting limit.
77. This Order establishes effluent and groundwater limitations for the facility that will not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that exceeds water quality objectives set forth in the Basin Plan. The nature of the waste, site-specific conditions and available groundwater monitoring data indicate that the discharge does not pose a threat of degradation. The requirements of this Order do not allow any degradation to occur.
78. The Discharger provides treatment and control of the Aquatic Weed Lab discharge that incorporates:
  - a. Using plastic storage tanks to store wastewater containing herbicides prior to treatment and disposal;
  - b. Granular activated carbon treatment to remove herbicides from the wastewater;
  - c. Herbicides are not used to stop vegetative growth in Pond 1 or Pond 2. This prevents additional herbicides from being added to the wastewater and maintaining vegetative growth has the potential to provide further herbicide removal; and

- d. Using deionized source water in experiments performed at the outdoor research area. While all experiments may not require the use of deionized water, the occasional use provides potential for constituent dilution when wastewater is commingled in Pond 1.
79. The Discharger provides treatment and control of the Hydraulics Lab discharge that incorporates:
- a. No chemical amendments to the source water used for hydraulic experiments without fish;
  - b. Treatment of the fish recirculation water to maintain a healthy environment for the fish; and
  - c. Adding minimal chemical amendments to the source water during fish experiments to maintain a healthy environment.
80. The Board finds that the treatment and control measures described above may be considered "BPTC" for this discharge. This Order also establishes operational requirements, limitations, and prohibitions that will ensure that the discharge will not unreasonably affect present and anticipated beneficial uses of groundwater or result in groundwater quality less than that prescribed in state and regional policies.

### **Other Regulatory Considerations**

81. In compliance with Water Code section 106.3, it is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. This order promotes that policy by requiring discharges to meet maximum contaminant levels designed to protect human health and ensure that water is safe for domestic use.
82. Based on the threat and complexity of the discharge, the facility is determined to be classified as 3C as defined below:
- a. Category 3 threat to water quality: "Those discharges of waste that could degrade water quality without violating water quality objectives, or could cause a minor impairment of designated beneficial uses as compared with Category 1 and Category 2."
  - b. Category C complexity, defined as: "Any discharger for which waste discharge requirements have been prescribed pursuant to Section 13263 of the Water Code not included in Category A or Category B as described above. Included are dischargers having no waste treatment systems or that must comply with best management practices, dischargers having passive treatment and disposal systems, or dischargers having waste storage systems with land disposal."
83. Title 27 of the California Code of Regulations (hereafter Title 27) contains regulatory requirements for the treatment, storage, processing, and disposal of solid waste.

However, Title 27 exempts certain activities from its provisions. Discharges regulated by this Order are exempt from Title 27 pursuant to provisions that exempt domestic sewage, wastewater, and reuse. Title 27, section 20090 states in part:

The following activities shall be exempt from the SWRCB-promulgated provisions of this subdivision, so long as the activity meets, and continues to meet, all preconditions listed:

(a) Sewage - Discharges of domestic sewage or treated effluent which are regulated by WDRs issued pursuant to Chapter 9, Division 3, Title 23 of this code, or for which WDRs have been waived, and which are consistent with applicable water quality objectives, and treatment or storage facilities associated with municipal wastewater treatment plants, provided that residual sludges or solid waste from wastewater treatment facilities shall be discharged only in accordance with the applicable SWRCB-promulgated provisions of this division.

(b) Wastewater - Discharges of wastewater to land, including but not limited to evaporation ponds, percolation ponds, or subsurface leachfields if the following conditions are met:

- (1) the applicable RWQCB has issued WDRs, reclamation requirements, or waived such issuance;
- (2) the discharge is in compliance with the applicable water quality control plan; and
- (3) the wastewater does not need to be managed according to Chapter 11, Division 4.5, Title 22 of this code as a hazardous waste.

84. The discharge authorized herein, and the treatment and storage facilities associated with the discharge, are exempt from the requirements of Title 27 as follows:

- a. Discharges to Ponds 1 and 2, the Hydraulics Lab Retention Basin 1, and the North and South Basin of the North Fork Cutoff are exempt pursuant to Title 27, section 20090(b) because they are discharge of wastewater to land and:
  - i. The Central Valley Water Board is issuing WDRs.
  - ii. The discharge is in compliance with the Basin Plan, and;
  - iii. The treated effluent discharged to the ponds does not need to be managed as hazardous waste.

85. Water Code section 13267(b)(1) states:

In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region ... shall furnish, under penalty of perjury, technical or monitoring program reports which the board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

The technical reports required by this Order and the attached Monitoring and Reporting Program <order number> are necessary to ensure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

86. The California Department of Water Resources sets standards for the construction and destruction of groundwater wells (hereafter DWR Well Standards), as described in *California Well Standards Bulletin 74-90* (June 1991) and *Water Well Standards: State of California Bulletin 94-81* (December 1981). These standards, and any more stringent standards adopted by the state or county pursuant to Water Code section 13801, apply to all monitoring wells used to monitor the impacts of wastewater storage or disposal governed by this Order.
87. The Discharger evaluated the potentially significant environmental effects due to the construction and operation of the new fish recirculation system in accordance with the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.). On 7 December 2015, the Discharger certified a Notice of Exemption that found the project to be categorically exempt under class 3 for new construction of small structures.
88. Aside from the new fish recirculation system, all components of the facilities were existing at the time the Board undertook its environmental review of these WDRs. The action of prescribing these WDRs, which impose regulatory requirements on the existing discharge in order to ensure the protection of groundwater resources, is therefore exempt from the provisions of CEQA in accordance with California Code of Regulations, title 14, section 15301, which exempts the “operation, repair, maintenance, [and] permitting ... of existing public or private structures, facilities, mechanical equipment, or topographical features” from environmental review.
89. Pursuant to Water Code section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.

### **Public Notice**

90. All the above and the supplemental information and details in the attached Information Sheet, which is incorporated by reference herein, were considered in establishing the following conditions of discharge.
91. The Discharger and interested agencies and persons have been notified of the Central Valley Water Board's intent to prescribe waste discharge requirements for this discharge, and they have been provided an opportunity to submit written comments and an opportunity for a public hearing.
92. All comments pertaining to the discharge were heard and considered in a public hearing.

**IT IS HEREBY ORDERED** that Order R5-2008-0131 is rescinded and, pursuant to Water Code sections 13263 and 13267, the Discharger, its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the Water Code and regulations adopted hereunder, shall comply with the following:

#### **A. Discharge Prohibitions**

1. Discharge of wastes to surface waters or surface water drainage courses is prohibited.
2. Discharge of waste classified as 'hazardous', as defined in the California Code of Regulations, title 23, section 2510 et seq., is prohibited.
3. Discharge of waste classified as 'designated', as defined in Water Code section 13173, in a manner that causes violation of groundwater limitations, is prohibited.
4. Discharge of waste at a location or in a manner different from that described in the Findings is prohibited.
5. The discharge of toxic substances into the wastewater ponds or basins is prohibited.
6. Discharge of wastewater containing experimental waste into the septic systems is prohibited.
7. Discharge of domestic waste to anything other than septic system or regularly serviced portable toilets is prohibited.
8. Discharge of anything other than domestic wastewater to the septic tank and leach field system is prohibited.

**B. Flow Limitations**

1. **Effectively immediately**, wastewater discharge to the following discharge areas shall not exceed the specified flow limits:

Discharge Area	Total Annual Flow Limit <sup>1</sup>
South Basin	1.7 MG
North Basin	15.0 MG

<sup>1</sup> As determined by the total flow for the calendar year.

2. **Effectively immediately**, wastewater discharge to the Hydraulic Lab Retention Basin 1 shall comply with the following limitations:
  - a. Not exceed 126,000 gallons during a single discharge event,
  - b. Not occur 24-hours prior to a forecasted storm event, and
  - c. Not occur when ponding water is visible.

**C. Effluent Limitations**

1. Wastewater discharged to each the Aquatic Weed Lab Ponds 1 and 2, the Hydraulics Lab Retention Basin 1, or the North and South Basin of the North Fork Cutoff shall not exceed the following effluent limits. The Hydraulic Lab does not use nitrogen as a supplement during experiments and, therefore, the total nitrogen effluent limit does not apply to batch flows from the Hydraulic Lab.

Constituent	Units	Monthly Maximum	Monthly Average
Average TDS Concentration <sup>1</sup>	mg/L	--	530
Total Nitrogen Concentration <sup>2</sup>	mg/L	12	--

<sup>1</sup> Flow-weighted average based on total flow and concentration for each source of water discharged.

<sup>2</sup> The total nitrogen effluent limit does not apply to batch flows from the Hydraulic Lab.

2. Wastewater discharged from the Aquatic Weed Lab storage tanks shall not exceed the following effluent limits:

Herbicide Trade Name	Active Ingredient	Effluent Limit <sup>1</sup> (µg/L)
Weedar 64	2,4-Dichlorophenoxyacetic acid	5

Tradewind	Bispyribac-sodium	TBD
Stingray	Carfentrazone-ethyl	TBD
Cutrine Plus	Elemental copper	1
Reward	Diquat dibromide	4
Aquathol K	Endothall	45
Clipper	Flumioxazin	TBD
Sonar AS	Fluridone	TBD
Rodeo	Glyphosate	5
Clearcast	Imazamox	TBD
Habitat	Imazapyr	TBD
Galleon	Penoxsulam	TBD
Renovate 3	Triclopyr	TBD

<sup>1</sup> Effluent limits are set based on known reporting limits obtained from a wastewater characterization study performed on 05 January 2006. Effluent limits listed as TBD (to-be-determined) were not characterized in the study. For TBD constituent effluent limits and for future herbicides not yet listed, this Order requires the Discharger to submit an *Analytical Methods and Proposed Effluent Report* that establishes the active ingredient's reporting limit. Once approved by the Executive Officer the reporting limit will be set as effluent limit.

3. Compliance with the above requirements shall be determined as specified in the Monitoring and Reporting Program.

#### D. Discharge Specifications

1. No waste constituent shall be released, discharged, or placed where it will cause a violation of the Groundwater Limitations of this Order.
2. Wastewater treatment, storage, and disposal shall not cause pollution or a nuisance as defined by Water Code section 13050.
3. The discharge shall remain within the permitted wastewater treatment and containment structures at all times.
4. The Discharger shall operate all systems and equipment to optimize the quality of the discharge.
5. All conveyance, treatment, storage, and disposal systems shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.
6. The Discharger shall operate and maintain all ponds sufficiently to protect the integrity of containment dams and berms and prevent overtopping and/or structural failure. Unless a California-registered civil engineer certifies (based on

design, construction, and conditions of operation and maintenance) that less freeboard is adequate, the operating freeboard in any pond shall never be less than two feet (measured vertically from the lowest possible point of overflow). As a means of management and to discern compliance with this requirement, the Discharger shall install and maintain in each pond a permanent staff gauge with calibration marks that clearly show the water level at design capacity and enable determination of available operational freeboard.

7. Wastewater treatment, storage, and disposal ponds or structures shall have sufficient capacity to accommodate allowable wastewater flow, design seasonal precipitation, and ancillary inflow and infiltration during the winter while ensuring continuous compliance with all requirements of this Order. Design seasonal precipitation shall be based on total annual precipitation using a return period of 100 years, distributed monthly in accordance with historical rainfall patterns.
8. On or about **1 October** of each year, available capacity shall at least equal the volume necessary to comply with Discharge Specifications D.6 and D.7.
9. All ponds and open containment structures shall be managed to prevent breeding of mosquitoes. Specifically:
  - a. An erosion control program shall be implemented to ensure that small coves and irregularities are not created around the perimeter of the water surface.
  - b. Dead algae, vegetation, and debris shall not accumulate on the water surface.
  - c. The Discharger shall consult and coordinate with the local Mosquito Abatement District to minimize the potential for mosquito breeding as needed to supplement the above measures.
10. Newly constructed or rehabilitated berms or levees (excluding internal berms that separate ponds or control the flow of water within a pond) shall be designed and constructed under the supervision of a California Registered Civil Engineer.
11. Wastewater contained in any unlined pond shall not have a pH less than 6.0 or greater than 9.0.
12. If wastewater is present in the Aquatic Weed Lab evaporation tank's secondary containment structure, the evaporation tanks shall be emptied and inspected for leaks. All leaks shall be fixed prior to putting the evaporation tanks back in service. All wastewater collected while the evaporation tanks are out of service shall be stored in an impermeable container or disposed of at a permitted wastewater disposal facility capable of treating the waste.

## E. Groundwater Limitations

Release of waste constituents from any portion of the Facility shall not cause groundwater to:

1. Exhibit a pH of less than 6.5 or greater than 8.4 pH units.
2. Contain taste or odor-producing constituents, toxic substances, or any other constituents in concentrations that cause nuisance or adversely affect beneficial uses.

## F. Provisions

1. The following reports shall be submitted pursuant to Water Code section 13267 and shall be prepared as described in Provision F.3:
  - a. By **1 May 2016**, the Discharger shall submit an *Analytical Methods and Proposed Effluent Report* for the herbicide active ingredients identified as “to-be-determined” in Effluent Limitations C.2. Additionally, **90 days prior** to using herbicides not listed in Effluent Limitations C.2 but registered by the California Department of Pesticide Regulation, the Discharger shall submit an *Analytical Methods and Proposed Effluent Report* for the new herbicides. The report shall propose a reporting limit and effluent limit using the most sensitive calibration standard. The proposed effluent limit shall be based on the proper application of method-based analytical procedures for sample preparation and the absence of any matrix interferences. Other factors may be applied to determine the effluent limit depending on the specific sample preparation steps employed. For example, the treatment typically applied in cases where there are matrix-effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied to compute the effluent limit from the reporting limit. Proposed effluent limits will be established as part of the WDRs upon the Executive Officer’s written approval.
  - b. At least **90 days** prior to discharging wastewater containing herbicides not regulated by the California Department of Pesticide Regulation, the Discharger shall submit an *Herbicide Evaluation Report* that evaluates if the active ingredients have the potential to impact surface water or groundwater quality. The report shall provide the evaluation protocol used for the determination, provide evidence of consultation with the Solano County Agricultural Commissioner, and state how the herbicide use will comply with UCD safety and experimental procedures. The report shall also determine the reporting limit and associated effluent limit using the most sensitive calibration standard as described in Provision F.1.a. Upon the Executive Officer’s written approval, discharge of the herbicide containing wastewater may occur.

- c. At least **90 days** prior to discharging to the North Basin of the North Fork, the Discharger shall submit a *Flow Meter and Sampling Port Installation Report*. The report shall certify that a flow meter and sample port were installed, describe the type of flow meter, indicate the installation location on a scaled map, and describe which wastewater streams are plumbed to be discharged through the flow meter.
2. A discharger whose waste flow has been increasing, or is projected to increase, shall estimate when flows will reach hydraulic and treatment capacities of its treatment, collection, and disposal facilities. The projections shall be made in January, based on the last three years' average dry weather flows, peak wet weather flows and total annual flows, as appropriate. When any projection shows that capacity of any part of the facilities may be exceeded in four years, the discharger shall notify the Central Valley Water Board by **31 January**.
3. In accordance with California Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. All technical reports specified herein that contain workplans for investigations and studies, that describe the conduct of investigations and studies, or that contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall bear the professional's signature and stamp.
4. The Discharger shall submit the technical reports and work plans required by this Order for consideration by the Executive Officer, and incorporate comments the Executive Officer may have in a timely manner, as appropriate. Unless expressly stated otherwise in this Order, the Discharger shall proceed with all work required by the foregoing provisions by the due dates specified.
5. The Discharger shall comply with Monitoring and Reporting Program **<order number>**, which is part of this Order, and any revisions thereto as ordered by the Executive Officer. The submittal dates of Discharger self-monitoring reports shall be no later than the submittal date specified in the MRP.
6. The Discharger shall comply with the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements", dated 1 March 1991, which are attached hereto and made part of this Order by reference. This attachment and its individual paragraphs are commonly referenced as "Standard Provision(s)."
7. The Discharger shall comply with all conditions of this Order, including timely submittal of technical and monitoring reports. On or before each report due date, the Discharger shall submit the specified document to the Central Valley Water

Board or, if appropriate, a written report detailing compliance or noncompliance with the specific schedule date and task. If noncompliance is being reported, then the Discharger shall state the reasons for such noncompliance and provide an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Central Valley Water Board in writing when it returns to compliance with the time schedule. Violations may result in enforcement action, including Central Valley Water Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.

8. The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the Discharger when the operation is necessary to achieve compliance with the conditions of this Order.
9. The Discharger shall use the best practicable cost-effective control technique(s) including proper operation and maintenance, to comply with this Order.
10. As described in the Standard Provisions, the Discharger shall report promptly to the Central Valley Water Board any material change or proposed change in the character, location, or volume of the discharge.
11. The Discharger shall not allow pollutant-free wastewater to be discharged into the wastewater collection, treatment, and disposal systems in amounts that significantly diminish the system's capability to comply with this Order. Pollutant-free wastewater means rainfall, groundwater, cooling waters, and condensates that are essentially free of pollutants.
12. At least **90 days** prior to termination or expiration of any lease, contract, or agreement involving disposal or recycling areas or off-site reuse of effluent, used to justify the capacity authorized herein and assure compliance with this Order, the Discharger shall notify the Central Valley Water Board in writing of the situation and of what measures have been taken or are being taken to assure full compliance with this Order.
13. In the event of any change in control or ownership of the facility, the Discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Central Valley Water Board.
14. To assume operation as Discharger under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the

Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Central Valley Water Board, and a statement. The statement shall comply with the signatory paragraph of Standard Provision B.3 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the Water Code. If approved by the Executive Officer, the transfer request will be submitted to the Central Valley Water Board for its consideration of transferring the ownership of this Order at one of its regularly scheduled meetings.

15. A copy of this Order including the MRP, Information Sheet, Attachments, and Standard Provisions, shall be kept at the discharge facility for reference by operating personnel. Key operating personnel shall be familiar with its contents.
16. The Central Valley Water Board will review this Order periodically and will revise requirements when necessary.

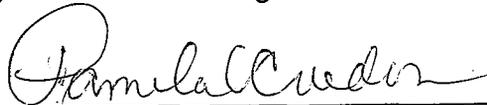
If, in the opinion of the Executive Officer, the Discharger fails to comply with the provisions of this Order, the Executive Officer may refer this matter to the Attorney General for judicial enforcement, may issue a complaint for administrative civil liability, or may take other enforcement actions. Failure to comply with this Order may result in the assessment of Administrative Civil Liability of up to \$10,000 per violation, per day, depending on the violation, pursuant to the Water Code, including sections 13268, 13350 and 13385. The Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

[http://www.waterboards.ca.gov/public\\_notices/petitions/water\\_quality](http://www.waterboards.ca.gov/public_notices/petitions/water_quality)

or will be provided upon request.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify that the foregoing is a full true, and correct copy of an Order adopted by the California Regional Water Quality Control Board on 11 December 2015.



PAMELA C. CREEDON, Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM R5-2015-0137

FOR

UNIVERSITY OF CALIFORNIA, DAVIS  
USDA AQUATIC WEED CONTROL LABORATORY &  
J. AMOROCHO HYDRAULICS LABORATORY  
YOLO COUNTY

The Monitoring and Reporting Program (MRP) describes requirements for monitoring influent source water, effluent wastewater, and the disposal areas. This MRP is issued pursuant to Water Code Section 13267. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer.

All samples shall be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each sample shall be recorded on the sample chain of custody form. Field test instruments (such as those used to measure pH and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are calibrated prior to each monitoring event;
3. The instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in the "Reporting" section of the MRP.

Laboratory analytical procedures shall comply with the methods and holding times specified in the following (as applicable to the medium to be analyzed):

- *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater* (EPA);
- *Test Methods for Evaluating Solid Waste* (EPA);
- *Methods for Chemical Analysis of Water and Wastes* (EPA);
- *Methods for Determination of Inorganic Substances in Environmental Samples* (EPA);
- *Standard Methods for the Examination of Water and Wastewater* (APHA/AWWA/WEF); and
- *Soil, Plant and Water Reference Methods for the Western Region* (WREP 125).

Approved editions shall be those that are approved for use by the United States Environmental Protection Agency or the California Department of Public Health's Environmental Laboratory Accreditation Program (ELAP). The Discharger may propose alternative methods for approval by the Executive Officer. Where technically feasible, laboratory reporting limits shall be lower than the applicable water quality objectives for the constituents to be analyzed.

If monitoring consistently shows no significant variation in a constituent concentration or parameter after at least eight consecutive monitoring events, the Discharger may request this MRP be revised to reduce monitoring frequency. The proposal must include adequate technical justification for reduction in monitoring frequency.

A glossary of terms used in this MRP is included on the last page.

### INFLUENT MONITORING

Influent monitoring for the Aquatic Weed Lab and Hydraulics Lab shall be performed on UCD potable water and groundwater source Well C3C. Monitoring shall include at least the following:

Parameter	Units	Type of Sample	Monitoring Frequency	Reporting Frequency
Total Dissolved Solids	mg/L	Grab	Quarterly	Quarterly

### EFFLUENT MONITORING

#### Monitoring of Effluent without Herbicides

Effluent samples shall be collected upstream of the point of discharge to Pond 1, Hydraulics Lab Retention Basin 1, and the North and South Basins of the North Fork Cutoff as indicated in Attachment C and Attachment D. Effluent from Pond 2 into the South Basin does not need to be monitored. At a minimum, effluent shall be monitored as specified below:

Parameter	Units	Type of Sample	Monitoring Frequency	Reporting Frequency
Continuous Flows <sup>1</sup>				
Volume	GPD	Meter reading	Daily	Quarterly
Total Dissolved Solids	mg/L	Grab	Monthly	Quarterly
Total Nitrogen	mg/L	Grab	Monthly	Quarterly

Parameter	Units	Type of Sample	Monitoring Frequency	Reporting Frequency
<b>Aquatic Weed Batch Flows</b>				
Volume	Gallons	Calculation	Per batch	Quarterly
Total Dissolved Solids	mg/L	Grab	Per batch	Quarterly
Total Nitrogen	mg/L	Grab	Per batch	Quarterly
<b>Hydraulic Lab Batch Flows</b>				
Volume	Gallons	Calculation	Per batch	Quarterly
Total Dissolved Solids	mg/L	Grab	Per batch	Quarterly

<sup>1</sup> Continuous is considered to be effluent flow for 28 consecutive days or more.

### Monitoring of Effluent Containing Herbicides

Effluent samples shall be collected after granular activated carbon filtration and prior to discharge into Pond 1. Herbicide active ingredient monitoring shall account for all herbicides added to the holding tanks and any remaining herbicides since the last discharge. At a minimum, effluent shall be monitored as specified below:

Parameter	Units	Type of Sample	Monitoring Frequency	Reporting Frequency
Discharge Volume	Gallons	Calculation	Per discharge	Quarterly
Total Dissolved Solids	mg/L	Grab	Per discharge	Quarterly
Total Nitrogen	mg/L	Grab	Per discharge	Quarterly
Herbicide Active Ingredients	µg/L	Grab	Per discharge	Quarterly

### WASTEWATER POND AND BASIN MONITORING

The North Basin, South Basin, Hydraulics Lab Retention Basin 1, and Aquatic Weed Lab Ponds 1 and 2 shall be monitored as follows:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Freeboard <sup>1</sup>	0.1 feet	Staff Gage	Weekly	Quarterly
Levee Condition	--	Observation	Weekly	Quarterly
Odors	--	Observation	Weekly	Quarterly
pH <sup>2</sup>	pH Units	Grab	Monthly <sup>3</sup>	Quarterly
Dissolved Oxygen <sup>2</sup>	mg/L	Grab	Monthly <sup>3</sup>	Quarterly

<sup>1</sup> Freeboard shall be measured vertically from the surface of the pond water to the lowest elevation of the surrounding berm and shall be measured to the nearest 0.1 feet.

<sup>2</sup> Samples shall be collected opposite the pond inlet at a depth of one foot.

- <sup>3</sup> Sampling is only necessary in the event that the pond or basin contains 2 feet or more of water.

### **AQUATIC WEED LAB EVAPORATION VAULT MONITORING**

The evaporation vaults shall be inspected monthly and the following items shall be documented:

- a. Integrity evaluation of the fiberglass tanks, concrete secondary containment, roofing, and piping;
- b. Fill level of the fiberglass tanks;
- c. Presence of water in the secondary containment structure. If water is present, document how wastewater was stored, how much wastewater was stored, how any leaks were fixed, and how much wastewater was disposed at a permitted disposal facility prior to putting the evaporation tanks back in service. The monitoring report shall also make evaluation of whether further improvements are necessary to maintain the evaporation vault structure.

### **REPORTING**

All monitoring reports should be converted to a searchable Portable Document Format (PDF) and submitted electronically. Documents that are less than 50MB should be emailed to: [centralvalleysacramento@waterboards.ca.gov](mailto:centralvalleysacramento@waterboards.ca.gov).

To ensure that your submittal is routed to the appropriate staff person, the following information should be included in the body of the email:

Attention: Compliance/Enforcement Section  
University of California, Davis  
USDA Aquatic Weed Control Lab & J. Amorocho Hydraulics Lab  
Yolo County  
Place ID: 268934

Documents that are 50 MB or larger should be transferred to a CD, DVD, or flash drive and mailed to the following address:

Central Valley Regional Water Quality Control Board  
ECM Mailroom  
11020 Sun Center Drive, Suite 200  
Rancho Cordova, California 95670

Please include a transmittal sheet that includes the following:

Attention: Compliance/Enforcement Section  
University of California, Davis  
USDA Aquatic Weed Control Lab & J. Amorocho Hydraulics Lab  
Yolo County  
Place ID: 268934

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type (e.g., wastewater, groundwater, etc.), and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall be reported in the next scheduled monitoring report.

Laboratory analysis reports do not need to be included in the monitoring reports; however, all laboratory reports must be retained for a minimum of three years in accordance with Standard Provision C.3.

In addition to the requirements of Standard Provision C.3, monitoring information shall include the method detection limit (MDL) and the Reporting limit (RL) or practical quantitation limit (PQL). If the regulatory limit for a given constituent is less than the RL (or PQL), then any analytical results for that constituent that are below the RL (or PQL) but above the MDL shall be reported and flagged as estimated. For a Discharger conducting any of its own analyses, reports must also be signed and certified by the chief of the laboratory.

All monitoring reports that involve planning, investigation, evaluation or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code sections 6735, 7835, and 7835.1.

#### **A. Quarterly Monitoring Reports**

Quarterly monitoring reports shall be submitted to the Central Valley Water Board on the **1<sup>st</sup> day of the second month after the quarter** (i.e. the January-March quarterly report is due by **May 1<sup>st</sup>**). Each Quarterly Monitoring Report shall include the following:

1. Results of wastewater influent, effluent, wastewater pond and basin, and Aquatic Weed evaporation vault monitoring. Data shall be separated by facility and presented in a tabular format.
2. The cumulative volume of wastewater generated at the facility during the year to date;
3. A comparison of monitoring data to the requirements of the WDRs and an explanation of any violation of those requirements.
4. The flow-weighted average monthly TDS concentration shall be calculated using the following formula:

$$C_a = \frac{\sum_1^n (C_i \times V_i)}{\sum_1^n V_i}$$

Where:

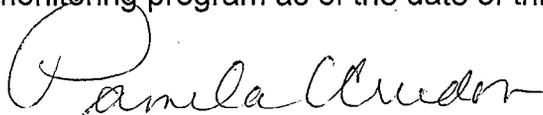
$C_a$	=	Flow-weighted average monthly TDS concentration in mg/L
$i$	=	Designated number of the discharge source (e.g., Weed Control Lab holding tanks to Pond 1 = 1, Hydraulics Lab discharge to South Basin = 2, etc.)
$C_i$	=	TDS concentration for each discharge $i$ in mg/L (monthly average TDS concentration for continuous flows or grab sample TDS concentration for batch flows)
$V_i$	=	Total volume of each discharge $i$ in gallons (total monthly volume for continuous flows or individual batch flow volume)

5. Results of the Aquatic Weed Lab holding tanks shall include a tabulated list of all approved herbicides, their active ingredient(s), the reporting limit(s), effluent limit(s), and sampling results for the quarter.
6. If requested by staff, copies of laboratory analytical report(s).
7. A copy of inspection log page(s) documenting inspections completed during the quarter.
8. A copy of calibration log page(s) verifying calibration of all hand-held monitoring instruments performed during the quarter.

A letter transmitting the self-monitoring reports shall accompany each report. The letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain a statement by the Discharger, or the Discharger's authorized agent, under penalty of perjury, that to the best of the signer's knowledge the report is true, accurate and complete, as described in the Standard Provisions General Reporting Requirements Section B.3.

The Discharger shall implement the above monitoring program as of the date of this Order.

Ordered by:



PAMELA C. CREEDON, Executive Officer

12-11-15

(Date)

## GLOSSARY

BOD <sub>5</sub>	Five-day biochemical oxygen demand
CaCO <sub>3</sub>	Calcium carbonate
DO	Dissolved oxygen
EC	Electrical conductivity at 25° C
FDS	Fixed dissolved solids
NTU	Nephelometric turbidity unit
TKN	Total Kjeldahl nitrogen
TDS	Total dissolved solids
TSS	Total suspended solids
Continuous	The specified parameter shall be measured by a meter continuously.
24-hr Composite	Samples shall be a flow-proportioned composite consisting of at least eight aliquots over a 24-hour period.
Daily	Every day except weekends or holidays.
Twice Weekly	Twice per week on non-consecutive days.
Weekly	Once per week.
Twice Monthly	Twice per month during non-consecutive weeks.
Monthly	Once per calendar month.
Bimonthly	Once every two calendar months (i.e., six times per year) during non-consecutive months.
Quarterly	Once per calendar quarter.
Semiannually	Once every six calendar months (i.e., two times per year) during non-consecutive quarters.
Annually	Once per year.
mg/L	Milligrams per liter
mL/L	Milliliters [of solids] per liter
µg/L	Micrograms per liter
µmhos/cm	Micromhos per centimeter
gpd	Gallons per day
mgd	Million gallons per day
MPN/100 mL	Most probable number [of organisms] per 100 milliliters
MTF	Multiple tube fermentation

## INFORMATION SHEET

ORDER R5-2015-0137  
UNIVERSITY OF CALIFORNIA, DAVIS  
USDA AQUATIC WEED CONTROL LABORATORY &  
J. AMOROCHO HYDRAULICS LABORATORY  
YOLO COUNTY

### **Facility Description**

The University of California, Davis (UCD) owns and operates the J. Amorocho Hydraulics Laboratory (Hydraulics Lab) and leases the Aquatic Weed Control Laboratory (Aquatic Weed Lab) to the United States Department of Agriculture (USDA). Both laboratories discharge wastewater to the South Basin of the Putah Creek North Fork Cutoff (South Basin). The Putah Creek North Fork formerly flowed eastward toward the City of Davis. It has since been segmented into three hydraulically separate basins, informally named the South, North, and East Basins. The culvert hydraulically connecting Putah Creek to the South Basin was capped and sealed in 2012. Because both laboratories discharge to the South Basin this Order regulates both discharges under the same WDRs. The Hydraulics Lab proposes to expand by constructing a fish recirculation system, which will discharge to the North Basin of the North Fork Cutoff (North Basin).

The Aquatic Weed Lab conducts research on the biology and ecology of invasive aquatic and riparian weed species, prevention of weed invasions, integrated management methods for management of invasive aquatic and riparian plant species, and ecological restoration of invaded aquatic and riparian ecosystems. The facility consists of offices, a main laboratory, a laboratory annex, two greenhouses, a headhouse, an outdoor research area, two septic systems with leach fields, retention Ponds 1 and 2, and the South Basin.

The overflow water from the two greenhouses and wastewater from the outdoor research area not containing herbicides is conveyed to Retention Pond 1. Wastewater from the outdoor research area containing herbicides is pumped to a storage tank. Wastewater from the laboratory annex consists of sink drainage of soap water, which is also conveyed to the holding tank. Wastewater from the holding tank is filtered using granular activated carbon (GAC) prior to discharge into Pond 1. Wastewater from Pond 1 to overflows to Pond 2, which discharges to the South Basin via a manually operated valve.

The office building and headhouse generate domestic wastewater, which is discharged to the west septic system and south septic system, respectively. All wastewater from the main laboratory is conveyed to fiberglass evaporation vaults, which are located within concrete secondary containment and under a Plexiglas roof.

The Hydraulics Lab conducts experiments on hydraulics and fish swimming performance, behavior, and physiological response. The facility has both indoor and outdoor areas for engineering and fish experiments. No chemicals or toxins are added to water used for experimentation. Discharges occur intermittently and only during periods of experimentation. From July 2010 through July 2015, the facility had an annual average flow of 790,000 gallons. The effluent is not biologically or physically treated prior to discharge to Retention Basin 1 or the South Basin.

### **Planned Changes**

Herbicide wastewater will be stored in one of the 2,000-gallon storage tanks. GAC treated wastewater will be stored in the second 2,000-gallon storage tank and tested prior to discharge into Pond 1. If the sample results exceed the effluent limits, wastewater will either be treated again or hauled to a locally permitted wastewater treatment system for disposal.

The Hydraulics Lab proposes to increase the outdoor flumes volumetric capacity from 40,000 gallons to 96,000 gallons and construct a fish recirculation system to maintain fish on-site. The fish recirculation system will consist of a large head tank for well water aeration, four 2,000-gallon tanks, one 3,500-gallon tank, four 300-gallon tanks, and two 500-gallon tanks. The system will be designed to discharge a cumulative 35 gallons per minute (GPM) continuously, but may discharge up to 125 GPM.

Wastewater from the fish recirculation system will be discharged to the North Basin. The North Basin is not hydraulically linked to the South Basin or to Putah Creek. The North Basin has a surface area of 8 acres and hydraulic capacity of 23.8 MG. The Discharger determined that up to 15 MG of wastewater could be discharged annually to the North Basin while accounting for a 100-year, 365-day precipitation event.

### **Site-Specific Conditions**

The facilities are located west of Highway 113 and are part of the west campus of UCD located in the Putah Creek Plain of the Sacramento River Valley. The terrain at the site is predominately flat. Surface water from the surrounding area flows to the North Fork Cutoff basins or via surface runoff or a storm water collection system with an outfall to Putah Creek. Soils are characterized predominately as the Yolo Series, fine sandy loam found on alluvial fans, which have a moderate to high percolation rate.

Land use in the west campus is primarily agriculture field research lands. Crops change regularly based on research needs. West campus also contains various research facilities and an airport.

### **Groundwater Conditions**

Well C3C is used to supply source water for the Hydraulics Lab and located adjacent and upgradient of the South Basin. Three agricultural supply wells (Wells E2A, C2A, and C2F) are active within 3,000 feet downgradient of the Facility. These wells may influence the groundwater gradient when they are actively pumping. Recharge to the shallow aquifer primarily occurs from Putah Creek, a losing stream, and from storm water and excess irrigation water infiltration.

Groundwater monitoring has not previously been required at either facility and the groundwater underlying the site has not been fully characterized. Three groundwater monitoring wells (GW-003, GW-004, and GW-005) were used to characterize groundwater at the site. These wells are located approximately 800 feet north of the Hydraulics Lab. From 2007 through 2014, the monitoring wells had an average depth to groundwater of

32.8 feet bgs with groundwater being as shallow as 22.9 feet bgs. The groundwater gradient flows towards the northeast with a gradient of 0.001 to 0.005 feet/feet.

Groundwater monitoring well GW-003 is the most upgradient and was used to provide an indication of background groundwater quality underlying the laboratories. In general, groundwater quality is of good quality with respect to salinity constituents (EC, TDS, sodium, and chloride), nitrate as nitrogen, and other mineral and metal constituents that are monitored. Background groundwater occasionally exceeds the total chromium water quality objective for groundwater.

Well C3C, used as source water at the Hydraulics lab, is located adjacent and upgradient of the South Basin. The well was used to provide an indication of downgradient groundwater quality. Based on the provided effluent and groundwater data, the current effluent discharge and predicted fish recirculation system effluent are comparable to groundwater quality and are not expected to cause groundwater degradation.

### **Basin Plan, Beneficial Uses, and Regulatory Considerations**

Local drainage is to Putah Creek. The beneficial uses of surface water, as stated in the Basin Plan, are municipal and domestic supply; agricultural supply; industrial process supply; hydropower generation; water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater habitat; wildlife habitat; and spawning, reproduction, and/or early development.

### **Antidegradation Analysis**

Based on the provided effluent and groundwater data, the current effluent discharge and predicted effluent quality from the fish recirculation system are not expected to cause degradation of groundwater. However, effective source control, treatment, and other control measures are required to be implemented to maintain current effluent quality. Therefore, this Order establishes performance based effluent limits determined to be protective of groundwater but does not require groundwater monitoring at this time.

The Discharger proposes to only discharge herbicide experimental wastewater when the active ingredients are not detectable in the effluent. However, the reporting limit used to determine whether the constituent is detectable can vary depending on the media matrix and laboratory detection method. Therefore, this Order requires the Discharger to submit an *Analytical Methods and Proposed Effluent Report* that establishes the reporting limits yet to be determined for active ingredients in currently used herbicides. Upon the Executive Officer's approval, the determined reporting limit will be set as the effluent limit.

The Discharger provides treatment and control of the Aquatic Weed Lab discharge that incorporates:

- a. Using plastic storage tanks to store wastewater containing herbicides prior to treatment and disposal;
- b. Granular activated carbon treatment to remove herbicides from the wastewater;

- c. Herbicides are not used to stop vegetative growth in Pond 1 or Pond 2. This prevents additional herbicides from being added to the wastewater and maintaining vegetative growth has the potential to provide further herbicide removal; and
- d. Using deionized source water in experiments performed at the outdoor research area. While all experiments may not require the use of deionized water, the occasional use provides potential for constituent dilution when wastewater is commingled in Pond 1.

The Discharger provides treatment and control of the Hydraulics Lab discharge that incorporates:

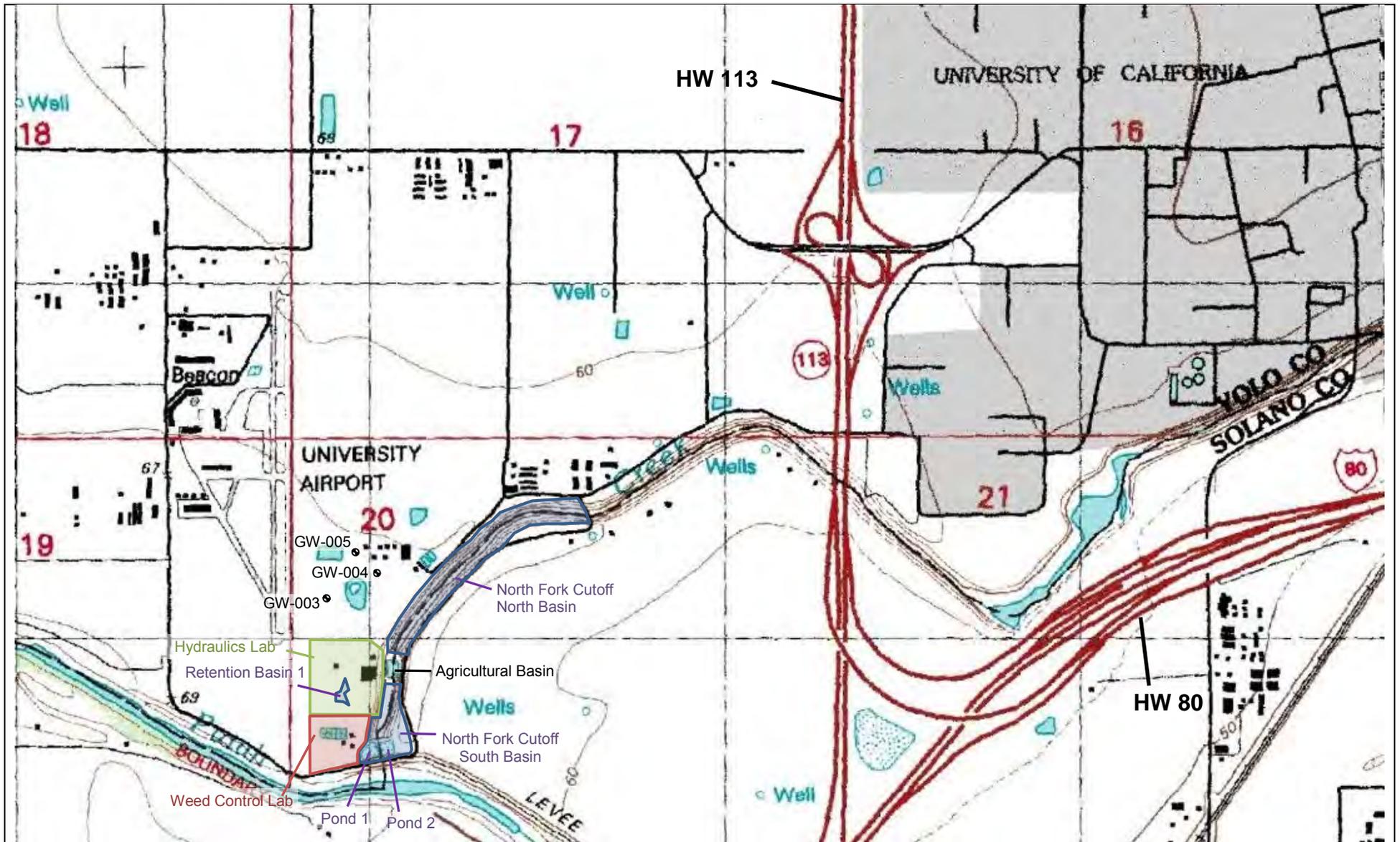
- a. No chemical amendments to the source water used for hydraulic experiments without fish;
- b. Treatment of the fish recirculation water to maintain a healthy environment for the fish; and
- c. Adding minimal chemical amendments to the source water during fish experiments to maintain a healthy environment.

#### **Discharge Prohibitions, Specifications, Limitations and Provisions**

This Order Discharge establishes annual flow limits to the North and South Basins. The Discharger shall operate and maintain all basins and ponds sufficiently to protect the integrity of containment dams and berms and prevent overtopping and/or structural failure. This Order specifies freeboard limits for all basins and ponds.

This Order establishes performance based effluent limits for TDS, total nitrogen, and herbicides that will prevent groundwater degradation. This Order also sets groundwater limitations that will ensure compliance with the Basin Plan.

The Provisions section of this Order requires submittal of technical and monitoring reports by the specified dates. The Monitoring and Reporting Program is designed to ensure and verify compliance with the limitations and requirements in this Order.



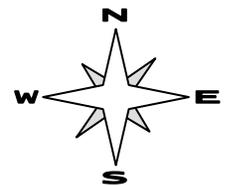
**DRAWING REFERENCE:**

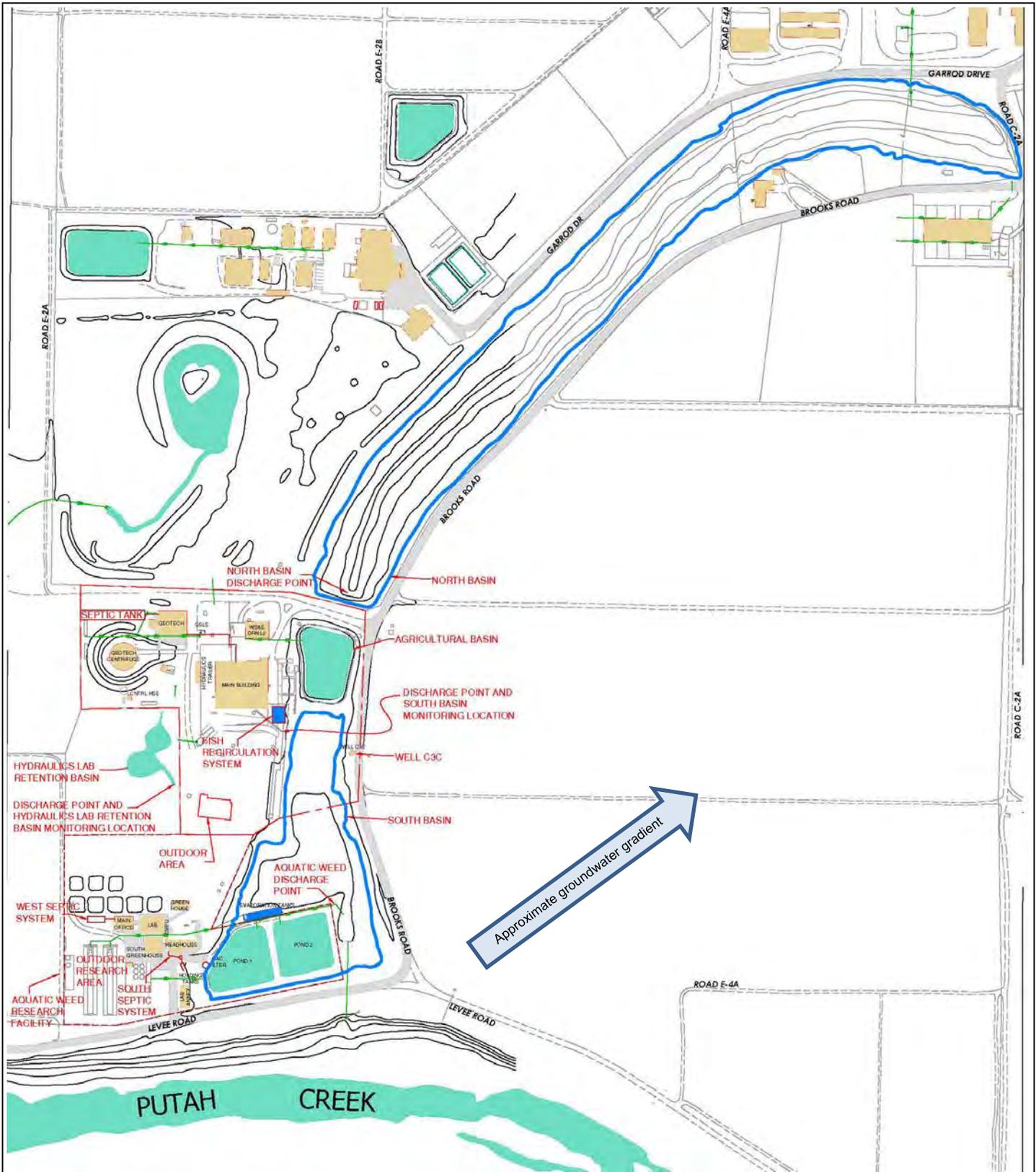
U.S.G.S. Topographic Map 7.5  
Minute Quadrangle

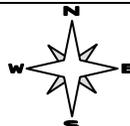
**SITE LOCATION**

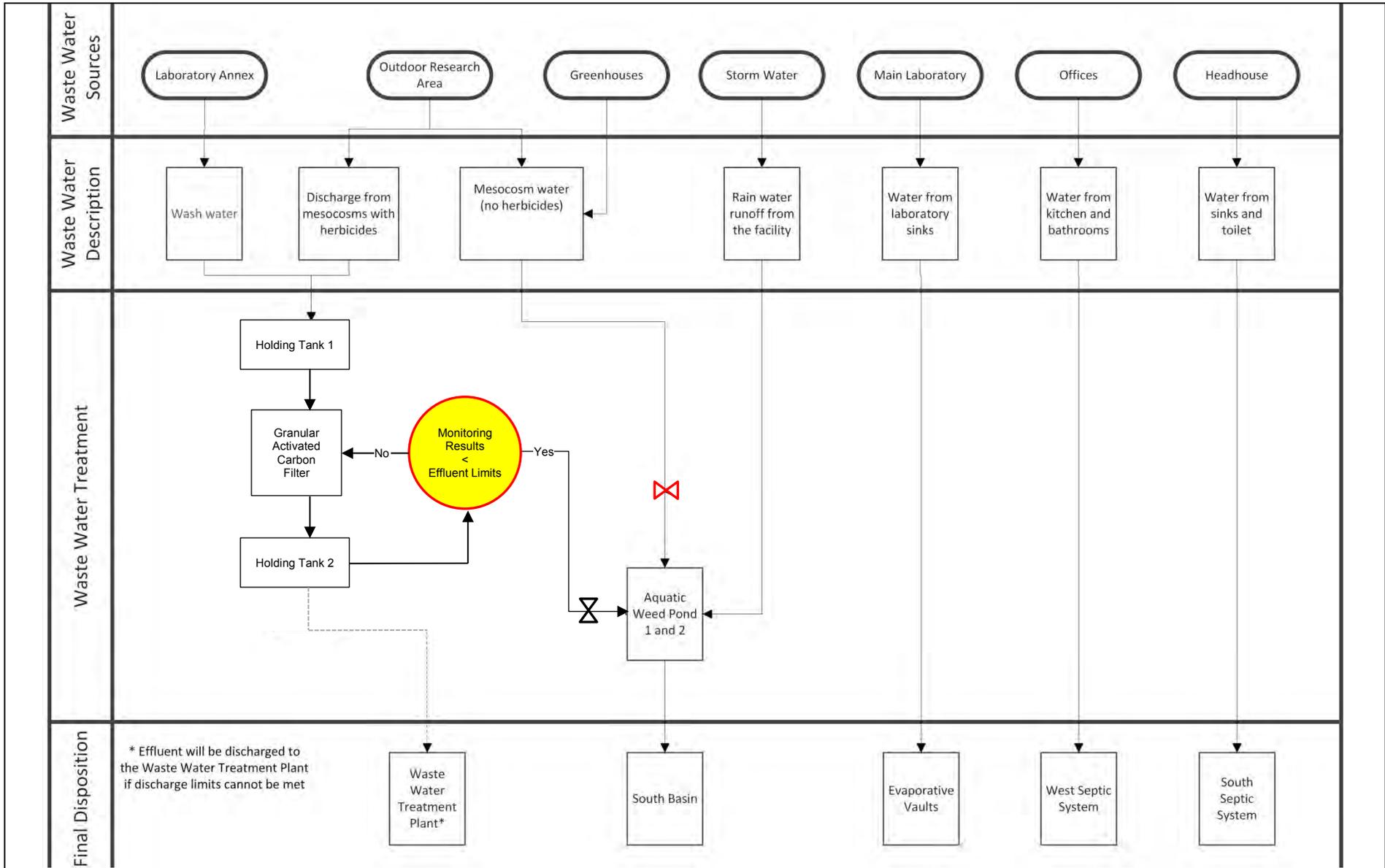
UNIVERSITY OF CALIFORNIA, DAVIS  
USDA AQUATIC WEED CONTROL LAB &  
J. AMOROCHO HYDRAULICS LAB  
YOLO COUNTY

Approximate Scale:  
1 inch = 1,300 feet





<p><b>DRAWING REFERENCE:</b>                  RWD                  UC Davis                  July 2015</p>	<p><b>FACILITY PLAN</b>                  UNIVERSITY OF CALIFORNIA, DAVIS                  USDA AQUATIC WEED CONTROL LAB &amp;                  J. AMOROCHO HYDRAULICS LAB                  YOLO COUNTY</p>	<p>Approximate Scale:                  1 inch = 370 feet</p> 
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**DRAWING REFERENCE:**

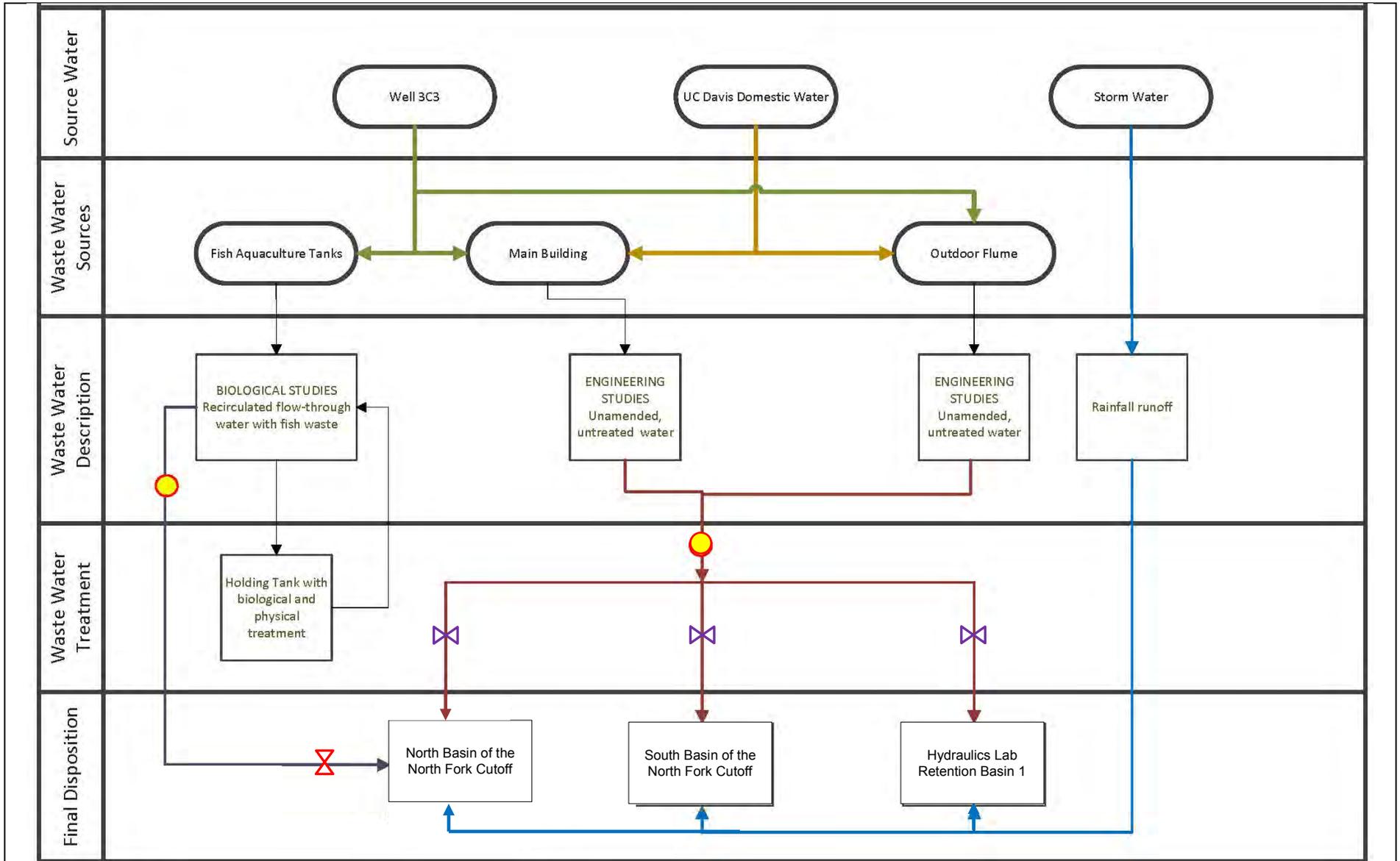
RWD  
UC Davis  
July 2015

**AQUATIC WEED LAB FLOW DIAGRAM**

UNIVERSITY OF CALIFORNIA, DAVIS  
USDA AQUATIC WEED CONTROL LAB &  
J. AMOROCHO HYDRAULICS LAB  
YOLO COUNTY

**LEGEND**

- Effluent limit monitoring
- Flow limit monitoring
- Flow and effluent limit monitoring



**DRAWING REFERENCE:**

RWD  
UC Davis  
July 2015

**HYDRAULIC LAB FLOW DIAGRAM**

UNIVERSITY OF CALIFORNIA, DAVIS  
USDA AQUATIC WEED CONTROL LAB &  
J. AMOROCHO HYDRAULICS LAB  
YOLO COUNTY

**LEGEND**

- Effluent limit monitoring
- ✕ Continuous flow limit monitoring
- ✕ Batch flow limit monitoring

**Monitoring Report Submittal Transmittal Form**

Attn: Brendan Kenny (916) 464-4635  
Central Valley Regional Water Quality Control Board  
11020 Sun Center Drive #200  
Rancho Cordova, CA 95670-6114

Discharger: University of California, Davis  
Name of Facility: USDA Aquatic Weed Control Laboratory &  
J. Amorocho Hydraulics Laboratory  
WDRs Order Number: R5-2015-0137  
WDID: 5A570800005  
County: Yolo

I am hereby submitting to the Central Valley Water Board the following information:

**Check all that apply:**

- Monthly Monitoring Report for the month of \_\_\_\_\_
- 1st / 2nd / 3rd / 4th (**circle one**) Quarterly Monitoring Report for the year of \_\_\_\_\_
- 1st / 2nd (**circle one**) Semi-annual Monitoring Report for the year \_\_\_\_\_
- Annual Monitoring Report for the year \_\_\_\_\_

**Violation Notification**

During the monitoring period, there were / were not (circle one) any violations of the WDRs.

1. The violations were:
  
2. Have the violations been corrected? Yes / No. If no, what will be done to correct the violations:

**Certification Statement**

*"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."*

Signature: \_\_\_\_\_ Phone: \_\_\_\_\_

Printed Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Central Valley Regional Water Quality Control Board**

21 December 2015

Sue Fields, Environmental Manager  
 University of California, Davis  
 122 Hoagland Hall, One Shields Avenue  
 Davis, CA 95616

**CERTIFIED MAIL**  
**7014 3490 0001 3008 2954**

**NOTICE OF ADOPTION  
 OF  
 ORDER R5-2015-0137  
 WASTE DISCHARGE REQUIREMENTS  
 FOR  
 UNIVERSITY OF CALIFORNIA, DAVIS  
 USDA AQUATIC WEED CONTROL LABORATORY &  
 J. AMOROCHO HYDRAULICS LABORATORY  
 YOLO COUNTY**

Waste Discharge Requirements (WDRs) Order R5-2015-0137 for the University of California, Davis (UCD) USDA Aquatic Weed Control Laboratory and J. Amorocho Hydraulics Laboratory was adopted by the Central Valley Regional Water Quality Control Board on 11 December 2015.

Although the WDRs allow wastewater discharge to land, the discharge is a privilege not a right and may be revoked at any time. A copy of the Order must be maintained at the facility and must be accessible to anyone operating the wastewater system. Please note that the Provisions section of the WDRs requires submittal of certain technical reports by the dates provided in the Order. The required submittals include the items listed in the following table.

Required Reports	Due Date
Analytical Methods and Proposed Effluent Report	<b>1 May 2016</b>
Herbicide Evaluation Report <sup>1</sup>	<b>At least 90 days prior to the period specified<sup>1</sup></b>
Flow Meter and Sampling Port Installation Report <sup>2</sup>	<b>At least 90 days prior to the period specified<sup>2</sup></b>

<sup>1</sup>Prior to discharging wastewater containing herbicides not regulated by the California Department of Pesticide Regulation.

<sup>2</sup>Prior to discharging to the North Basin of the North Fork.

In addition to technical reports required by the WDRs, the WDRs include a Monitoring and Reporting Program (MRP), which specifies monitoring and reporting requirements for you to implement. Please

review the MRP closely so that you may establish appropriate sampling schedules and reporting protocols. The required monitoring report submittal dates are in the table below.

Required Monitoring Report	Due Date
<i>Monthly Monitoring Reports</i>	<b>1<sup>st</sup> day of second month following the sampling (the December Report is due by 1 February)</b>

Please be advised that the monitoring reports must be submitted on time and complete. Monitoring reports must include all of the items described in the Reporting Section of the MRP. **The first monitoring report is due on 1 February 2016 and is to cover the month of December 2015 monitoring.** All monitoring and reporting under Order R5-2008-0131 must continue up to 11 December 2015, the adoption date of Order R5-2015-0137.

### Report Submittals

All monitoring and technical reports should be converted to searchable Portable Document Format (PDF) and submitted electronically. Documents that are less than 50 MB should be emailed to: *centralvalleysacramento@waterboards.ca.gov*.

To ensure that your submittal is routed to the appropriate staff person, the following information should be included in the body of the email or any documentation submitted to the mailing address for this office:

Facility Name: UCD USDA Aquatic Weed Control Lab and J. Amorocho Hydraulics Lab		
Program: Non-15 Compliance	Order: R5-2015-0137	CIWQS Place ID: 268934

Documents that are 50 MB or larger should be transferred to a CD, DVD, or flash drive and mailed to:

Central Valley Regional Water Quality Control Board  
ECM Mailroom  
11020 Sun Center Drive, Suite 200  
Rancho Cordova, CA 95670

To conserve paper and reduce mailing costs, a paper copy of the Order has been sent only to the Discharger. Interested parties are advised that the full text of this Order is available at: [http://www.waterboards.ca.gov/centralvalley/board\\_decisions/adopted\\_orders/](http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/). Anyone without access to the Internet who needs a paper copy of the Order can obtain one by contacting Central Valley Water Board staff.

Now that the permit has been adopted, the Board's Compliance and Enforcement Section will take over management of your case. Brendan Kenny is your new point of contact for any questions about the Order. If you find it necessary to make a change to your permitted operations, Brendan will direct you to the appropriate Permitting staff. You may contact Guy at (916) 464-4635 or at [Brendan.Kenny@waterboards.ca.gov](mailto:Brendan.Kenny@waterboards.ca.gov).



SCOTT ARMSTRONG, P.G., C.HG.  
Senior Engineering Geologist  
Waste Discharge to Land Permitting Unit

Enclosures : Order No. R5-2015-0137  
Standard Provisions and Reporting Requirements for Waste Discharge Requirements,  
1 March 1991  
Monitoring Report Transmittal Sheet

cc w/o enc.: Patrick Pulupa, Office of Chief Counsel, State Water Board, Sacramento  
Annalisa Kihara, State Water Resources Control Board, Sacramento  
Yolo County Environmental Health Department, Woodland