

INFORMATION SHEET

ORDER R5-2015-__
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.