

# Progress Report

## Tembladero Slough Pesticide and Toxicity Reduction Project

Agreement Number DPR 16-C0102  
April – September 2017  
UC Davis – Granite Canyon Lab

The project will assess treatment practice effectiveness monitoring of the Molera Experimental Treatment Wetland. Monitoring will include evaluations of contaminant reductions at four stations as Tembladero Slough water progresses through the treatment channel and wetland. Monitoring will include evaluation of the treatment processes through chemical analysis of pesticides, nutrients, suspended particles (as turbidity) and associated toxicity.

### **Task 1) Project Management** (March 2017 – June 2019)

UC Davis faculty researchers, along with the Project Manager from the Department of Pesticide Regulation and scientists from the Central Coast Wetlands Group (CCWG) at Moss Landing have coordinated all aspects of the project. USGS is conducting the chemical analyses.

*Level of Completion* – We are six months into the 27-month project. All arrangements have been made for wetland modification and sample analysis. Additional modifications will be made to the carbon installation based on the results of the first sampling event.

### **Task 2) Management Practice Implementation** (July 2017 – August 2017)

The Molera Experimental Treatment Wetland consists of a 285 meter long, 6.5 meter wide, and 0.3 meter deep sinuous channel that drains onto a non-channelized wetland shelf before flows are returned to Tembladero Slough. The treatment system receives water from a pump intake in Tembladero Slough. The existing system will be modified to optimize treatment of current-use pesticides, nutrients and turbidity. Modifications include the addition of pennywort to approximately 20% of the distal end of the treatment channel, and a treatment installation containing granulated activated carbon (GAC) at the outflow of the channel. The GAC installation consists of a flow-through trough containing approximately 400 liters of GAC in mesh Filtrexx® socks (Phillips et al., 2017).

*Level of Completion* – Pennywort transplanting is complete. The pennywort currently has the desired coverage on the surface of the wetland, but has not completely rooted out on the bottom of the channel. GAC treatment was installed as part of the outflow from the channel. This installation will be modified and made more efficient before next year's sampling events.

### **Task 3) Monitoring Performance** (September 2017 – June 2019)

During sampling events, Tembladero Slough water is pumped through the wetland at a rate of approximately 360 L/m for 12 hours per day and 4 hours per day during maintenance periods. The composite samplers are installed at the inflow, upstream and downstream of the vegetation,

and at the outflow of the GAC installation for sampling events. Samplers collect 24-hour composites in a staggered fashion to account for wetland residence time. One set of samples was collected in the fall of 2017, and the remaining four will be collected starting in the spring of 2018. All samples are tested for toxicity with *Ceriodaphnia dubia* (96 hour acute test), *Chironomus dilutus* (10 day chronic test), and *Hyalella azteca* (96 hour acute test), as well as analyzed for a suite of neonicotinoid, organophosphate, and pyrethroid pesticides. Water samples are also analyzed for nitrate, phosphate and turbidity.

*Level of Completion* – The first sampling event has taken place. Preliminary results show reduction of input toxicity by the wetland. Analytical samples are being processed.

Task 4) Education and Outreach (January 2019 – June 2019). Conduct project demonstrations and outreach to educate growers, landowners, and other stakeholders on project outcomes through field tours or other communications.

*Level of Completion* – None at this time.

#### Project Timeline and Percent Completion

Task	Start Date	End Date	Percent Completed
Task 1: Project Management	3/1/17	6/30/19	20
Task 2: Management Practice Implementation	7/1/17	8/31/17	80
Task 3: Monitoring Performance	9/1/17	9/30/19	20
Task 4: Education and Outreach	1/1/19	6/30/19	0

#### Reference

Phillips, B.M., Anderson, B.A., Cahn, M., Rego, J.L., Voorhees, J.P., Siegler, C., Zhang, X., Budd, R., Goh, K., Tjeerdema, R.S., 2017. An Integrated Vegetated Ditch System Reduces Chlorpyrifos Loading in Agricultural Runoff Integrated Environmental Assessment and Management 13, 423-430.