

Regional Water Quality Control Board
North Coast Region

Executive Officer's Summary Report
Thursday, April 19, 2018
Weed City Council Chambers
550 Main Street
Weed, CA 96094

ITEM: 7

SUBJECT: Update on Smith River Monitoring Studies and Consideration of Next Steps; historical context, assessment summary, ongoing studies, follow up actions, and consideration of next steps (*Regional Water Board - Clayton Creager, Ben Zabinsky, and Rich Fadness, NOAA Fisheries - Justin Ly and Dan Free, and Tolowa Dee-ni' Nation - Megan Van Pelt*)

BOARD ACTION: This is an informational item. No action will be taken by the Regional Water Board.

INTRODUCTION: For this item, a panel including staff from the Regional Water Board, NOAA Fisheries, and the Natural Resources Director of the Tolowa Dee-ni' Nation will present the results of surface water quality monitoring studies in the Smith River Plain, and provide an overview of plans for additional water quality monitoring studies in the area. Regional Water Board staff will also provide historical context, including an overview of the Agricultural Lands Discharge Program (Program), discuss ongoing coordination efforts, and identify optional next steps for Regional Water Board consideration.

BACKGROUND: In 2013, the Regional Water Board initiated a study to assess water quality conditions in the Smith River Plain and to screen for the presence of agricultural chemicals and other constituents associated with lily bulb production in surface water and groundwater. At the time the Smith River Plain monitoring study was initiated to inform the development of a permit to address discharges associated with lily bulb cultivation. Staff last updated the Regional Water Board on the Agricultural Lands Discharge Program in March 2017. At that Board meeting, staff provided an update on each of the elements of the Region's Agricultural Lands Discharge Program, including permits under development or planned for development: 1) vineyards and orchards, 2) agricultural operations in the Tule Lake Watershed, and 3) lily bulb cultivation in Smith River Plain. Additional permits that are part of the Region's Agricultural Lands Discharge Program include the Scott and Shasta River TMDL Conditional Waivers, the Dairy Regulatory Program, Cannabis Regulatory Program, and the USFS Waiver, which includes discharges from grazing allotments in National Forests. At the March 2017 Board meeting, staff recommended, and the Regional Board concurred, with prioritizing the development of a permit addressing discharges from vineyards and orchards, while completing the Smith River Plain monitoring study. As stated at the March 2017 Board meeting, the intention was to assess next steps to address agricultural discharges from lily bulb cultivation following the completion of the study and based on staff resources.

The peer-reviewed *Smith River Plain 2015 Groundwater Monitoring Report* was released in November 2015. The peer-reviewed *Smith River Plain Surface Water and Sediment Monitoring Report* was released in January 2018. At the February 8, 2018 Regional Water Board meeting, the Board requested an information item on the results of the surface water monitoring study. Given on-going coordination associated with complimentary monitoring studies in the Smith River Plain, Regional Water Board staff invited NOAA Fisheries to present the ongoing copper

sampling they have been conducting in the Smith River Plain, and also invited the Tolowa Dee-ni' Nation to present their plans for a study in the Smith River Estuary.

DISCUSSION: Between 2013 and 2017, Regional Water Board staff sampled several tributaries to the lower Smith River as well as groundwater from residential and agricultural wells. The samples were analyzed for concentrations of agricultural chemicals and for chronic and acute toxicity responses in aquatic test species. The Regional Water Board's groundwater monitoring study analyzed 320 pesticides at seven groundwater wells and documented two low level detections of a legacy pesticide at concentrations that were below applicable standards. No other pesticides were detected in the groundwater samples. The results of the Regional Water Board's surface water monitoring study is the focus of this update and demonstrates that agricultural chemicals and dissolved copper (used as a fungicide in lily bulb cultivation) are present in low-level concentrations in surface waters of the Smith River Plain. The monitoring also documented both acute and chronic toxic responses in surface water samples from some tributaries to the Smith River. The results are summarized below.

Pesticides Results

Between 2013 and 2015, the lab analysis of surface water samples detected 17 pesticides in samples that were analyzed for over 200 pesticides. Out of the 17 pesticides detected, 4 exceeded USEPA aquatic life benchmark criteria: diuron (herbicide), imidacloprid (insecticide), permethrin (insecticide), and tebuconazole (fungicide). The majority of the exceedances were in Delilah Creek, in a roadside ditch that drains to Delilah Creek, and in Tilas Slough. No pesticides were detected above the benchmark levels in Morrison Creek or Rowdy Creek. Exceedance of the USEPA benchmark criteria does not in itself mean that toxicity is evident, but rather the criteria is designed to be protective of aquatic life and used as a tool to assist in understanding toxic events should they occur.

Metals Results

Surface water samples were analyzed for copper and zinc and the dissolved fractions of those metals were compared to the standards in the California Toxics Rule. Dissolved zinc was detected in 7 of 30 samples and in all cases the concentrations were below standards. Dissolved copper was detected in every surface water sample collected. Out of 30 samples collected between 2013 and 2017, 5 samples from Delilah Creek and 1 from Tilas Slough exceeded the California Toxics Rule standard for dissolved copper. As explained below, metals were indicated as a driver of the positive toxic response in some of the samples with positive toxicity.

Toxicity Testing Results

Acute toxicity is indicated by a lab test result where the survival rate of the test species in the sample water is significantly lower than the survival rate in the laboratory control water. Out of the 30 samples taken between 2013 and 2017, 2 samples tested positive for acute toxicity - one taken from lower Rowdy Creek in August 2013 during the dry season, and one taken from Delilah Creek in March 2015 after a wet weather runoff event. Chronic toxicity is indicated by a test result where the test species show either reduced growth rates or reduced reproduction rates in the sample compared to a laboratory control. The test species used for the majority of reproductive toxicity tests, *Ceriodaphnia dubia*, can have its reproductivity impaired by low conductivity and low hardness water, which should be accounted for in the lab testing methods. However, the chronic toxicity test results from 2013 did not include an additional lab control to account for this effect. Therefore, we were unable to determine if the positive chronic toxicity responses documented in 4 out of the 12 samples taken in 2013 were directly

related to the naturally low hardness and conductivity of the water in the Smith River Basin or to some other contaminant.

The lab adjusted their methods in 2015 and 2017 to include a low hardness/conductivity control in addition to the standard control, making the chronic toxicity test results from those years more relevant to local conditions. Of the 2015 and 2017 samples, 7 out of 18 samples tested positive for chronic toxicity - 3 from Delilah Creek (including the March 2015 sample that was also acutely toxic) and 2 each from upper and lower Rowdy Creek. The samples from Rowdy Creek exhibited a positive chronic toxic response both upstream and downstream of lily bulb cultivation.

To further assess the causes of the positive chronic toxicity in the samples from June 2015 in upper Rowdy Creek and Delilah Creek, the samples were run through another series of tests called a Toxicity Identification Evaluation, or TIE. A TIE is stepwise laboratory procedure that involves the application of a suite of physical/chemical manipulations intended to guide the isolation and identification of the type of toxicant(s) driving the toxic response in the water sample. The TIE's performed on the June 2015 samples determined that low water hardness and conductivity may have had a role in the toxicity exhibited; no other toxicants were determined to contribute to the toxic effect. Another TIE was performed on the Delilah Creek sample from March 2015 that exhibited both chronic and acute toxicity. That TIE strongly suggested that metals were the primary driver causing a toxic response, and to a lesser extent, a pesticide may have also contributed. In 2017, we initiated the use of two additional test species that are not affected by low conductivity and hardness in sample water in order to eliminate the influence of low conductivity/hardness on the toxicity test results. One of those test species, the green algae *Selenastrum capricornutum*, showed a reduced growth rate compared to the laboratory control, indicating a positive chronic toxic response in the water sample collected from Delilah Creek in June 2017. A follow up TIE identified that a pesticide and a metal were responsible for the toxicity in the June 2017 sample, similar to the results from the TIE for the March 2015 Delilah Creek sample, which exhibited acute toxicity.

Summary and Next Steps

The study design was intended as a preliminary screening for agriculture chemicals and toxicity in the Smith River Plain to inform the need to develop a permit to control discharges from lily bulb cultivation. The monitoring plan was not designed to explicitly link sources with the presence of contaminants in the waterbodies. While the results of the monitoring study documented some chronic and acute toxic responses and the presence of some pesticides and metals at levels above thresholds, the results were not uniform at all sample locations and were variable throughout the sample period. The positive toxicity, pesticide detections, and elevated copper concentrations were found primarily in the samples from Delilah Creek, with some copper and pesticide detections in Tilas Slough, the receiving water for Delilah Creek drainage. Toxicity was exhibited in samples taken in both the wet and dry seasons.

Though the results of the study provided meaningful information about the spatial and temporal extent of water quality impacts at the monitoring sites sampled, further assessment would be helpful in characterizing the severity and timing of risks to water quality associated with the use of agricultural chemicals in the Smith River Plain. A monitoring study by NOAA Fisheries and the California Department of Fish and Wildlife, with support from the Regional Water Board, is now under way to further investigate some of these additional questions. This monitoring study is designed to better understand the spatial extent of dissolved copper

in key salmonid habitats occurring above and below lily bulb cultivation areas in the Smith River Plain during periods of copper fungicide applications and high runoff events. This monitoring will better characterize the conditions contributing to toxicity to aquatic organisms and the potential impacts of copper on threatened Coho salmon, other salmonids, and their critical habitat. In addition, the Tolowa Dee-ni' Nation is planning to conduct bioassay assessments, collect water samples to be analyzed for basic water quality parameters, and collect benthic macroinvertebrate samples in the Smith River Estuary. The intent of this study is to determine the degree to which pesticides, metals, or other contaminants may be bioaccumulating in native sculpin fish or affecting the benthic macroinvertebrate communities found in the Smith River Plain in comparison to control points upstream. At the April Regional Water Board meeting, representatives from NOAA Fisheries and the Tolowa Dee-ni' Nation will provide an overview of their respective studies.

While these additional assessments are taking place, Regional Water Board staff have renewed discussions with the lily bulb growers and technical assistance agencies with the goal of identifying changes that can be made to management practices to better control agricultural chemicals in runoff. Potential actions moving forward include:

- Continued coordination and support of additional monitoring and assessment efforts;
- Continued collaboration with lily bulb growers and technical assistance agencies to identify changes to management practices to control discharges;
- Enforcement actions and/or issuing an investigative order; and/or
- Initiating development of a regulatory permit to control discharges from lily bulb cultivation operations.

At this April 2018 Board meeting, Regional Water Board staff will seek direction on these optional next steps from the Regional Water Board.

RECOMMENDATIONS: N/A

SUPPORTING DOCUMENTS:

1. The peer-reviewed January 2018 *Final Smith River Plain Surface Water and Sediment Monitoring Report 2013 - 2015* is available at:
https://www.waterboards.ca.gov/northcoast/water_issues/programs/agricultural_lands/lily/
2. The peer-reviewed November 2015 *Smith River Plain 2015 Groundwater Monitoring Report* is available at:
https://www.waterboards.ca.gov/water_issues/programs/swamp/docs/reglrpts/smith_riv_plain_grdwater_data_rep.pdf