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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

NORTH COAST REGION

Interoffice Communication

TO: Bob Klant *[Signature]*

DATE: March 10, 1994

FROM: Cathy Goodwin *Cathy Goodwin*

SUBJECT: Russian River Monitoring

This memorandum serves as documentation for statements made regarding nutrients in the Laguna de Santa Rosa (Laguna) and Russian River in the February 22, 1994 Supplemental Public Report on Proposed Revisions to the Water Quality Control Plan for the North Coast Region, Section IV, Waste Discharge Prohibitions for the North Coastal Basin.

This memorandum describes water quality monitoring conducted in the Russian River and Laguna system in late December 1993 and January 1994. The objective of the monitoring was to determine if nitrate and phosphate concentrations increase measurably in the Laguna and lower Russian River (downstream of Wohler Bridge) at a time when the flow in the Russian River was low and the City of Santa Rosa was discharging at 5%.

Water column samples were collected by Regional Board staff on December 31, 1993 and January 3, 5, 7, 11 and 18, 1994. Monitoring stations sampled are identified on Figure 1 and included Santa Rosa Creek at Willowside Road (SRCWS), Delta Pond effluent (DPEFF), Santa Rosa Creek downstream of Delta Pond discharge (SRCDSTRM), Laguna de Santa Rosa upstream of Santa Rosa Creek (LUSR), Laguna at River Road (LRR), Mark West Creek at Trenton-Healdsburg Road (TH), Wohler Bridge (WB), Cook's Beach (CB), Oddfellows Bridge (OF), and Johnson's Beach (JB). Pace Incorporated laboratory analyzed all samples collected on December 31, 1993 as well as the phytoplankton samples collected on January 5, 1994. The City of Santa Rosa's environmental laboratory analyzed all other samples. Analytical results are summarized in Attachment 1.

Russian River flows as recorded at the Hacienda Bridge gaging station were all less than 500 cubic feet per second (range 363-446 cfs).

During the period of monitoring the City of Santa Rosa Laguna Wastewater Treatment Plan had discharges to the Laguna from three ponds: Delta Pond, Kelly Pond, and "D" Pond. These pond locations are identified on Figure 1. Windsor Water District was not discharging during the period monitored, although the District had discharged at one percent of the receiving water flow during the month of December, 1993 with that discharge ceasing on December 29, 1993 and not resuming again until January 24, 1994. Fulton Processors was not discharging during the period monitored. Numerous dairy discharges to the Laguna were documented during an aerial overflight of the Laguna on January 26, 1994.

There was no discharge from Delta Pond on January 18, 1994.

#### Data Evaluation

The analytical data was evaluated with the assistance of computer generated graphs.

The data was evaluated to answer the following questions:

1. Are there measurable increases in nitrate and phosphate downstream of Santa Rosa's discharge (in the Laguna and in the lower Russian River)?

Attachments 2 and 3 are box plot representations of nitrate and phosphate data respectively. The following observations can be made from the data.

In the Laguna system, nitrate and phosphate concentrations were the lowest at Santa Rosa Creek at Willowside Bridge (SRCWS) and the Laguna station upgradient of Santa Rosa Creek (LUSR), with nutrient concentrations being higher at LUSR. Both of these stations are upgradient of the City's Delta Pond discharge.

\* Nutrient concentrations increased at the two Laguna stations downgradient of the City's Delta Pond discharge: Laguna at River Road (LRR) and Mark West Creek at Trenton-Healdsburg Road (TH).

\* In the Russian River, nutrient concentrations increased at the two stations downgradient of the Laguna's confluence with the Russian River.

Historical Laguna monitoring data, dairy inspections by Regional Board staff, and data collected during this sampling period at LUSR (and SRCWS on January 18, 1994) demonstrates that there are also other sources contributing nutrients to the Laguna system.

2. Is there any correlation between nitrate and/or phosphate and phytoplankton density?

Samples were analyzed for phytoplankton identification and enumeration on December 31, 1993 and January 5, 1994. All phytoplankton density results were graphed in order of increasing concentration (regardless of sample collection date or sampling station) with corresponding nitrate concentrations (Attachment 4) and corresponding phosphate concentrations (Attachment 5). If phytoplankton density was correlated with nutrients (nitrate or phosphate), phytoplankton density should follow nutrient increases. These two graphs demonstrate that there is no correlation between nitrate or phosphate concentrations and phytoplankton density. This lack of correlation between nutrients and phytoplankton density is also demonstrated on Attachment 6 where one can observe increases in nitrate and phosphate between Wohler Bridge (WB) and Johnson's Beach (JB) as a result of TH's influence, but no such relationship for phytoplankton.

Attachments 7 and 8 represent the distribution of algae at Russian River stations. The distribution of algal phyla was consistent among stations, with blue-greens (Cyanophyta) predominant followed by diatoms (Crysophyta), greens (Chlorophyta), and euglenoids (Euglenophyta).

*Dumped together  
need to look  
at on an hour  
by hour basis*

*what happens  
in summer*