INTERIM STAFF REPORT

regarding

RUSSIAN RIVER WATER QUALITY MONITORING

by

North Coast Regional Water Quality Control Board
5550 Skylane Boulevard
Santa Rosa, California 95403

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1992-93

During September and October, 1992 the sampling program was designed to satisfy the data needs of the water quality model by following up on areas in need of more focused sampling as suggested by model simulations. Field and laboratory analyses were performed for physico-chemical parameters and total and fecal coliform at selected upper and lower river mainstem monitoring stations.

Russian River monitoring for the remainder of FY 1992-93 will be geared to satisfying the needs of the water quality model. Field and laboratory analyses for standard nutrients and physico-chemical parameters are anticipated. Any remaining funds will be used to conduct bacteriological analyses and sampling to monitor conformance with water quality objectives in Tables 1 and 2 of the Inland Surface Waters Plan.

Regional Board sampling of six locations along the Russian River (Talmage, Cloverdale, Geyserville, Healdsburg Memorial Beach, Odd Fellows, and Johnson's Beach) in the time period of September 8 to October 13, 1992 indicated conformance to the Basin Plan objective for bacteria. However, results of sampling conducted in the lower Russian River by the Sonoma County Department of Environmental Health and subsequently provided to the Regional Board indicated higher bacteriological levels exceeding the Basin Plan objective for bacteria at Healdsburg Memorial Beach, Hilton Park, Midway Beach, Johnson's Beach, Monte Rio Beach, and Duncan's Mills during July and August.

IV. DATA EVALUATION

Following is a summary and evaluation of some indicators of water quality in the Russian River utilizing water quality data collected since 1973.

A. NUTRIENTS

The Basin Plan contains a narrative objective for nutrients that states, "Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses."

Nitrate and phosphate are readily used by algae and vascular plants as primary nutrients. High concentrations of nitrate and phosphate can cause nuisance algae blooms and excessive aquatic plant growth, leading to low concentrations of dissolved oxygen during night hours as the algae and plants respire. This low dissolved oxygen can result in adverse impacts to aquatic life. Additionally, swings in pH occur as the plants photosynthesize in the daytime and respire at night.

Nutrient cycling in a stream system is complex and tied to the various interrelationships of primary producers (algae and aquatic macrophytes), nutrient inflow from surface and ground water and waste discharges, sediment-water interactions, and nutrient outflow (residence time in the stream). At any given point in time the various nutrient forms are a result of the actions of all those factors. The primary relationships in

crient cycling are in plant productivity tying up the available utrients, settling of particulate matter containing those tied-up nutrients (organic nitrogen and phosphorus), and release of the nutrients via decomposition in the sediments. Phosphate generally tends to bind to particulates if they are available and fall out of the water column. Nitrate is more mobile and tends to dissolve in the water. Both nutrients are most readily available in dissolved form.

Since summertime discharges of waste containing elevated nutrients are not allowed in the basin, most inputs are from cycling within Lakes Mendocino and Sonoma, and within the stream system itself.

Concentrations of total nitrate and total phosphate are currently low in the mainstem of the Russian River. This has not always been the case. The trend in nitrate and phosphate concentrations indicates stepwise decreases in nutrient concentrations in response to increased levels in pollution control and the implementation of seasonal prohibitions over time.

In the mid-1970's the Regional Board, Sonoma County Board of Supervisors and the Soil Conservation Service focused attention on reclamation of dairy wastes. Ponds were constructed at dairies in the Russian River basin to contain dairy wastes and eliminate these agricultural discharges.

Seasonal prohibitions for discharges to the Russian River were phased in over a ten year period starting in 1967. Prior to that time, wastewater treatment plants had historically discharged to the river and it's tributaries year-round.

In 1967, the Regional Board began to modify waste discharge requirements for publically owned treatment works to include a prohibition against dry-weather discharge and limiting discharges to one percent of the river's flow between September 30 and May 15. Implementation of the prohibitions generally required construction of new facilities with State and federal Clean Water Grant Funds. By 1978, all municipal dischargers in the Russian River basin had facilities on line that were designed to meet the terms of the seasonal prohibitions.

Secondary treatment was implemented for all municipal dischargers by the early 1970's. Tertiary treatment was added at the Laguna WTP in 1988, and at the Windsor WTP and Russian River Sanitation District in the early 1990's.

1. Nitrate

Nitrate concentrations have dropped in the mainstem of the Russian River since 1973, as shown in Table 7 and Figure 2. The median values for 1973, 1975, and 1976 are based on summer monitoring data, while the median values for 1986 and 1992 are based on year-round monitoring data (primarily September through June, with some July and August data). The numbers are comparable since summer discharges were occurring in the 1970's, and much of the recent data (1985 to 1992) was collected during the winter discharge season.