

**Sonoma County Water Agency
 Temporary Urgency Change Order WR 2007-0015-DWR
 Water Quality Monitoring Plan
 Russian River
 May – October 2007**

Background

This Water Quality Monitoring Plan (Plan) is submitted in accordance with State Water Resources Control Board (State Board) Division of Water Rights Order WR 2007-0015-DWR (Order), approving a Temporary Urgency Change in Permits 12947A, 12949, 12950, and 16596 of Sonoma County Water Agency (SCWA). Provision 9 of this Order requires SCWA to prepare a Water Quality Monitoring Plan for the Russian River and submit it to the Chief of the Water Rights Division by May 24, 2007. In compliance with the Order, SCWA has consulted the North Coast Regional Water Quality Control Board, (NCRWQCB), and the Division of Water Rights in preparing this plan.

Although temperature monitoring is briefly discussed in this Plan, it is addressed specifically in the Temperature Monitoring Plan required by Provision 8 of Order WR 2007-0015-DWR.

Summary

There are four main components to the Plan, which are summarized in the following table:

Name of component	Number of sample locations	Reach monitored	Constituents monitored	Monitoring frequency
SCWA Permanent Sondes	5	Hopland to Hacienda	pH, temp, DO, spec. cond., turb, depth	Every 15 minutes via telemetry
NCRWQCB Seasonal Beach Bacteria and Water Quality	6	Healdsburg to Monte Rio	Total coliform, <i>E. coli</i> , pH, temp, DO, turb, spec. cond.	Once per week
SCWA Seasonal Sondes	6	Guerneville to the estuary	pH, temp, DO, spec. cond., salinity, depth	Once per hour, downloaded bi-weekly
USGS grab samples	10	Hopland to Monte Rio	Multitude of water quality parameters	Three times from June - September

The locations of the water quality samplers and locations of grab samples are shown in Attachment A. A more detailed summary of the sampling program is provided in Attachment B. The individual components are explained below.

SCWA Permanent Sondes – YSI 6600 Water Quality Samplers

The SCWA Operations Division has maintained five YSI 6600 multi-parameter water quality sondes on the Russian River for several years. They are located at Hopland, Diggers Bend in Healdsburg, SCWA's river diversion facility at Mirabel, Hacienda and Johnson's Beach. The sondes take readings of water pH, temperature, dissolved oxygen content (DO), specific conductivity, turbidity, and depth, every 15 minutes and transmit the raw data via telemetry to the SCWA operations center. This data has been made available to the public via an automated email. The SCWA will post a link to a "subscribe" button for those additional persons wishing to receive the data electronically. These five sondes are referred to as "permanent" as SCWA intends to maintain them indefinitely into the future.

Beach Pathogen and Water Quality Sampling

During previous summers, the NCRWQCB has conducted pathogen and general water quality sampling in conjunction with the Sonoma County Department of Environmental Health (DEH) and the SCWA at Russian River beaches which experience the greatest body contact recreation. On May 17, 2007 the SCWA began collecting samples for total coliform and *E. coli* so that bacteriological information will be available for this year prior to the start of the NCRWQCB program.

Both the NCRWQCB and SCWA samples will be collected at the same locations (from upstream to downstream): Camp Rose above Healdsburg, Memorial Beach in Healdsburg, Steelhead Beach near Forestville, Sunset Beach near Hacienda, Johnson's Beach in Guerneville, and Monte Rio. Samples will be collected by NCRWQCB staff and SCWA operations personnel trained in bacteriological and water quality sampling techniques.

SCWA will collect bacteriological samples twice per week, on Tuesdays and Thursdays through the end of June. Additionally, the SCWA measures temperature and DO during the sampling events. The NCRWQCB expects to implement the 2007 program by early June and continue through September 2007. The NCRWQCB also measures temperature, DO, pH, turbidity and conductivity during their weekly sampling events. SCWA sample results will be forwarded to the DEH for posting on the DEH website and to the NCRWQCB for review and coordination.

SCWA Seasonal Sondes – YSI 6600 Water Quality Samplers

SCWA expects to deploy a multitude of sondes in the lower river by the end of May 2007. The sondes will be installed near Freezeout Creek, Sheephouse Creek, Bridgehaven, Patty's Rock and at the mouth of the Russian River at Jenner. The sondes take a reading on water pH, temperature, DO, specific conductivity, turbidity, and depth,

every hour. Data are stored in the unit until it can be downloaded by field personnel. SCWA personnel download the data in the field every two to three weeks.

USGS/SCWA Water Quality Sampling

SCWA has contracted the United States Geological Survey (USGS) to perform water quality monitoring on the lower Russian River since 2003. The proposed study presented in Attachment C would be the fifth year of an ongoing yet expanded program to establish baseline water quality in the Russian River during the summer months. Chemical, isotopic and microbiological data were collected from surface-water sites within the lower segment of the Russian River and Mark West Creek during 2004, 2005, and 2006, as well as from 10 tributaries during early, middle, and late summer, 2004.

The proposed study includes water quality sampling from 10 surface-water sites along the Russian River three times during the year: late spring, summer, and early fall. All samples will be analyzed for nutrients, major ions, trace metals, total and dissolved organic carbon, a broad suite of organic wastewater compounds (polyaromatic hydrocarbons, disinfection-by-products, human-health pharmaceuticals, hormones, pesticides and herbicides, personal care and household products such as fragrances and detergents), standard bacterial indicators (total coliform, E. coli, and enterococci), the stable isotopes of deuterium and oxygen and suspended sediments. These analyses will continue to establish a water-quality baseline for the Russian River between the city of Ukiah and Monte Rio beach. The baseline established with these analyses will enable SCWA to assess the water quality of the Russian River during summer flow.

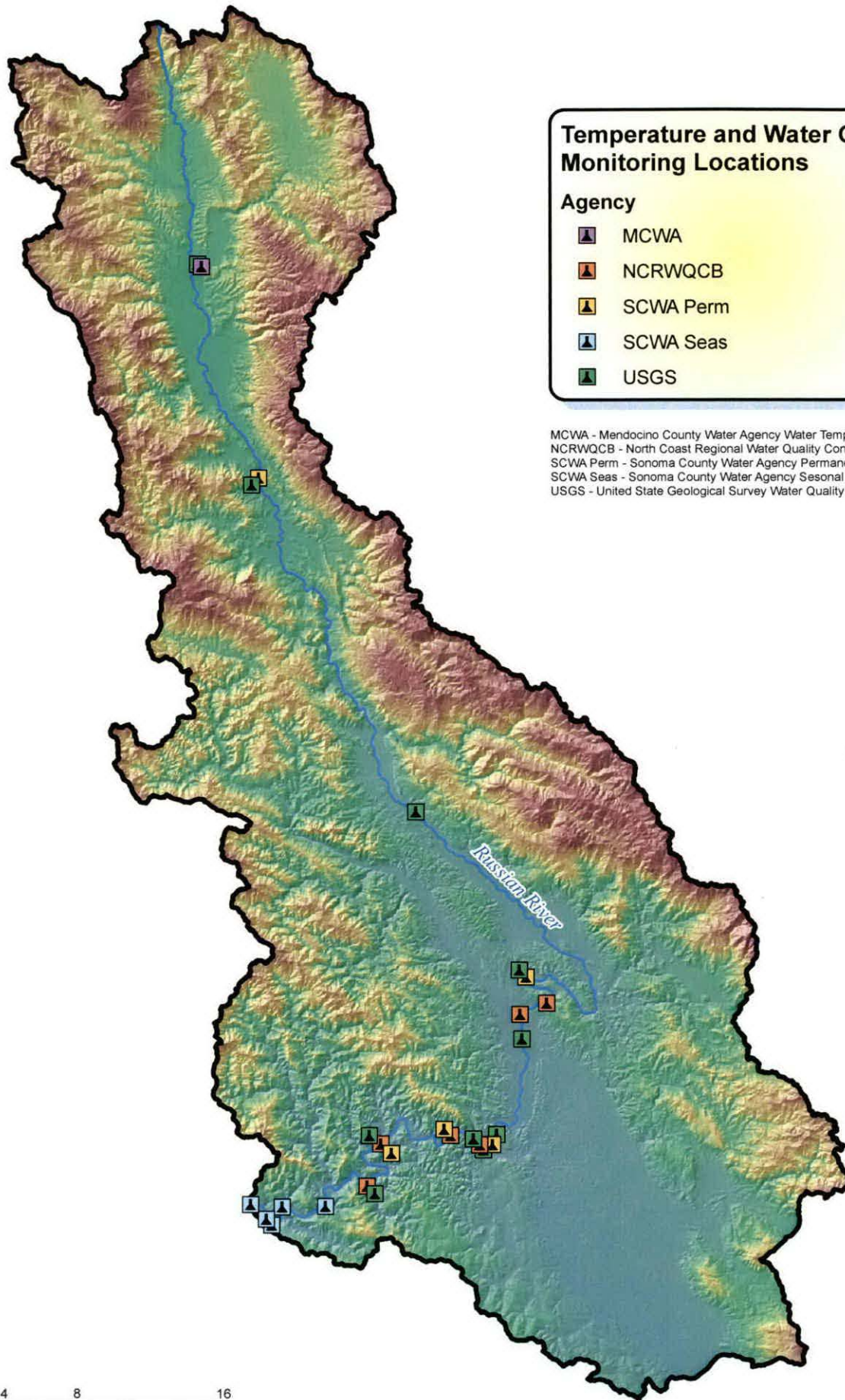
Due to USGS quality assurance/quality control (QA/QC) requirements, the data will not be available until early 2008.

Data Analysis

SCWA engineers and environmental scientists expect to be in frequent discussions with the NCRWQCB and the State Board during the course of the water quality monitoring program. If at any time the raw data indicate that water quality of the Russian River has significantly deviated from the expected norm the SCWA will consult and coordinate with the NCRWQCB and State Board on a preferred course of action.






ATTACHMENT A

**RUSSIAN RIVER
SAMPLING LOCATIONS**



Temperature and Water Quality Monitoring Locations

Agency

-  MCWA
-  NCRWQCB
-  SCWA Perm
-  SCWA Seas
-  USGS

MCWA - Mendocino County Water Agency Water Temp Location
 NCRWQCB - North Coast Regional Water Quality Control Board Seasonal Sampling Locations
 SCWA Perm - Sonoma County Water Agency Permanent Water Quality Locations
 SCWA Seas - Sonoma County Water Agency Seasonal Water Quality Locations
 USGS - United State Geological Survey Water Quality Locations



Temporary Urgency Change Order WR 2007-0015-DWR
 Russian River Watershed, CA



ATTACHMENT B

**WATER QUALITY AND
TEMPERATURE MONITORING
SUMMARY**

Summary of Water Quality and Temperature Monitoring for Temporary Urgency Change Order

Location	depth	temperature	DO	pH	turbidity	specific conductance	salinity	frequency	telemetry (y/n)	duration
SCWA Permanent Sonde YSI 6600 Water Quality Samplers										
Hopland	x	x	x	x	x	x		15 min	y	indefinite
Digger's Bend	x	x	x	x	x	x		15 min	y	indefinite
Mirabel	x	x	x	x	x	x		15 min	y	indefinite
Hacienda	x	x	x	x	x	x		15 min	y	indefinite
Johnson's Beach	x	x	x	x	x	x		15 min	y	indefinite
SCWA Seasonal Estuary Sonde YSI 6600 Water Quality Samplers										
Freezeout Creek	x	x	x	x		x	x	1 hour	n	June - Oct
Sheephouse Creek	x	x	x	x		x	x	1 hour	n	June - Oct
Bridgehaven	x	x	x	x		x	x	1 hour	n	June - Oct
Patty's Rock	x	x	x	x		x	x	1 hour	n	June - Oct
Mouth @ Jenner	x	x	x	x		x	x	1 hour	n	June - Oct

Location	total coliform	fecal coliform	frequency	flow	temperature	DO	pH	turbidity	TOC	DOC	suspended sediment	algae	specific conductance	Duration
NCRWQCB/SCWA* Seasonal Bacteria & Water Quality Sampling														
Camp Rose	x	x	1/week		x	x	x	x					x	May 17 - Oct
Memorial Beach	x	x	1/week		x	x	x	x					x	May 17 - Oct
Steelhead Beach	x	x	1/week		x	x	x	x					x	May 17 - Oct
Sunset Beach	x	x	1/week		x	x	x	x					x	May 17 - Oct
Johnson's Beach	x	x	1/week		x	x	x	x					x	May 17 - Oct
Monte Rio	x	x	1/week		x	x	x	x					x	May 17 - Oct

* SCWA samples twice weekly for total/fecal coliform & measures DO & Temp May 17 thru June, NCRWQCB samples all parameters noted from May 29 to October

USGS Water Quality Sampling**														
RR near Ukiah	x	x	3/yr	x	x	x	x	x	x	x	x	x		summer/early fall 2007
RR near Hopland	x	x	3/yr	x	x	x	x	x	x	x	x	x		summer/early fall 2007
RR near Asti	x	x	3/yr	x	x	x	x	x	x	x	x	x		summer/early fall 2007
Digger's Bend	x	x	3/yr	x	x	x	x	x	x	x	x	x		summer/early fall 2007
Wohler Bridge	x	x	3/yr	x	x	x	x	x	x	x	x	x		summer/early fall 2007
Mark West nr Mirabel Hts	x	x	3/yr	x	x	x	x	x	x	x	x	x		summer/early fall 2007
Johnson's Beach	x	x	3/yr	x	x	x	x	x	x	x	x	x		summer/early fall 2007
Monte Rio	x	x	3/yr	x	x	x	x	x	x	x	x	x		summer/early fall 2007
Steelhead Beach	x	x	3/yr	x	x	x	x	x	x	x	x	x		summer/early fall 2007
RR below Dry Creek	x	x	3/yr	x	x	x	x	x	x	x	x	x		summer/early fall 2007

**The USGS water quality sampling program includes many constituents: nutrients, major ions, trace metals, total and dissolved organic carbon, a broad suite of organic wastewater compounds (polyaromatic hydrocarbons, disinfection-by-products, human-health pharmaceuticals, hormones, pesticides and herbicides, personal care and household products such as fragrances and detergents), standard bacterial indicators (total coliform, E. coli, and enterococci), the stable isotopes of deuterium and oxygen and suspended sediments.

ATTACHMENT C

**U.S. GEOLOGICAL SURVEY – SONOMA COUNTY
WATER AGENCY COOPERATIVE STUDY**

**WATER-QUALITY IN THE
LOWER RUSSIAN RIVER BASIN**

**U.S. GEOLOGICAL SURVEY – SONOMA COUNTY WATER AGENCY
COOPERATIVE STUDY**

**WATER-QUALITY IN THE LOWER RUSSIAN RIVER BASIN,
SONOMA COUNTY, CALIFORNIA**

Robert Anders, USGS, San Diego, CA

Donald M. Stoeckel, USGS, Columbus, OH

Karl L. Davidek, USGS, Ukiah, CA

Summary of Work to Date

Chemical, microbiological, and isotopic data were collected from 7 sites along the lower Russian River and Mark West Creek in northern California between 2003 and 2006 to establish a water-quality baseline during summer flows. Discharge measurements indicated that flow in the lower segment of the Russian River ranged from 94.3 to 494 cfs during monitoring events. Standard bacterial indicators (total coliforms, *E. coli*, and enterococci) were detected in all Russian River samples, although no *E. coli* concentrations exceeded the 235 cfu/100 mL single-sample maximum allowable density for recreational waters. A narrow range of stable isotope values in samples (~ 1 per mil $\delta^{18}\text{O}$) from the Russian River indicates that tributary discharge is not a significant source of inflow within this section of the river during the study period.

To better understand how tributary discharges might influence water quality during the summer months, water samples were collected from 11 tributary sites during 2004 and 7 tributary sites during 2006: in early, middle and late summer to represent the range in conditions during summer flow. Discharge measurements and sampling techniques were modified to accommodate the very low flows at most of the tributaries. All samples were analyzed for the same constituents that were monitored for along the Russian River. In addition, enrichment of enterococci was performed on all water samples for detection of the human-associated enterococcal surface protein (*esp*) in *Enterococcus faecium*. The human-associated *esp* gene was

detected in 3 out of 51 tributary samples (Fife Creek, Green Valley Creek, and Mark West Creek) and in the sewage treatment plant effluent. This indicates that human fecal contamination was not present in the lower Russian River during the study period; however, tributary discharges are a potential source of human fecal contamination during summer flow.

Besides the human-associated *esp* marker, all water samples were analyzed for a board suite of organic wastewater compounds (OWCs) during 2006 to assess the influence of sewage effluent in the lower Russian River. This suite includes polyaromatic hydrocarbons, disinfection-by-products, human-health pharmaceuticals, hormones, pesticides and herbicides, as well as personal care and household products such as fragrances and detergents. Although 22 OWCs were detected in the sewage effluent sample at concentrations equal to or slightly greater than their published method detection limit, only the herbicide 3, 4-dichloroaniline, the fragrance benzophenone, the pharmaceutical compound cabamazepine, the insecticides DEET and fipronil (along with their corresponding desulfinyl derivatives), the disinfectant triclosan, and the plasticizer triphenyl phosphate were detected in both the sewage effluent and in at least one river sample. In contrast, combustion byproducts, the flavorant camphor, and the herbicide simazine were detected in several Russian River and tributary samples but not detected in the sewage effluent. Combustion byproducts also were found in the bed sediment at three Russian River sites and one tributary site at concentrations ranging from 10 to 450 $\mu\text{g}/\text{kg}$ of soil. These results suggest that human activities in and adjacent to the lower Russian River are the predominant source of OWCs within this reach of the river.

Objective

The overall objective of the continuation of the water-quality study is to establish a water-quality baseline within the Lower Russian River Basin between the city of Ukiah and Monte Rio beach during summer flow.

Approach

Water samples will be collected from 10 surface-water sites along the Russian River three times during the year: late spring, summer, and early fall. Russian River sites include: Russian River near Ukiah, which is located downstream from Lake Mendocino; Russian River near Hopland and Russian River at Asti, which are within the agricultural area around Cloverdale;

Russian River at Digger Bend near Healdsburg, which is within the city of Healdsburg and upstream from any hydrologic influence from Healdsburg Veterans Memorial beach; Russian River below Dry Creek near Healdsburg, which is downstream from the confluence with Dry Creek and proximal to the city of Healdsburg's wastewater treatment plant; Russian River at Wohler Bridge which is within the SCWA's water supply facility; Russian River at Steelhead Beach which is downstream from the confluence with Mark West; Russian River at Johnsons Beach which is within the resort area of Guerneville; and Russian River at Monte Rio which is the furthest downstream site, located downstream from the Dutch Bill Creek confluence. The other surface-water site will be Mark West Creek, a small creek which originates in the Mayacama Mountains to the east of the Santa Rosa Plain and empties into the Russian River at Mirabel Heights between the SCWA's riverbank filtration facility and Steelhead Beach. It should be noted that Mark West Creek drains the Laguna de Santa Rosa, which receives seasonal discharge from Santa Rosa's Regional Wastewater Treatment Plant.

All samples will be analyzed for nutrients, major ions, trace metals, total and dissolved organic carbon, a broad suite of organic wastewater compounds (polyaromatic hydrocarbons, disinfection-by-products, human-health pharmaceuticals, hormones, pesticides and herbicides, personal care and household products such as fragrances and detergents), standard bacterial indicators (total coliform, *E. coli*, and enterococci), the stable isotopes of deuterium and oxygen and suspended sediments. These analyses will establish a water-quality baseline for the Russian River between the city of Ukiah and Monte Rio beach. The baseline established with these analyses will enable SCWA to assess the influence of human activities and sewage effluent in the Russian River during summer flow. It should be noted that enrichment of enterococci for detection of the human-associated *esp* biomarker will not be performed, owing to the absence of the *esp* biomarker in previously analyzed Russian River samples.

Reports

A USGS Data Report and (or) peer-reviewed journal article describing the water quality of the Lower Russian River Basin during summer flow will be prepared at the completion of the study.

Budget

The budget to collect water-quality data in the Russian River between the city of Ukiah and Monte Rio beach during late spring through early fall is as follows:

Categories	FFY2007
Labor-Salaries	138,300
Travel and Per Diem	21,200
Supplies and Equipment	6,000
Laboratory	97,200
Total Expenses	262,700
Coop Funding	217,700
FMFs Requested	45,000
Total Funding	262,700

The cost to SCWA for the continuation of the water-quality study through FFY2007 is \$217,700. The amount of federal matching funds for FFY2007 is \$45,000. The amount of federal matching funds for FFY2008 is not yet known.

If you have any questions, please call me at (619) 225-6155.

Robert Anders, Ph.D.
Research Hydrologist