

Introduction

This water quality monitoring fact sheet was prepared by the Irrigated Agriculture Program of the Central Coast Regional Water Quality Control Board (Water Board) and made available on November 30, 2008. The data were delivered by Central Coast Water Quality Preservation, Inc. (CCWQP) to the Water Board as part of the monitoring and reporting requirements for all dischargers enrolled under *Conditional Waiver of Waste Discharge Requirements for Discharge from Irrigated Lands, Order No. R3-2004-0117*. Monitoring stations were selected to represent water quality in predominantly agricultural areas, but in some cases reflect mixed land uses upstream of the sites.

309BLA Blanco Drain below Pump

The Cooperative Monitoring Program sampled Blanco Drain 37 times (one sample per month) between January 2005 and December 2007, with an additional sample in February 2005.

Summary of Water Quality Data

Notable Measured Analytes for Water Quality Monitoring

Analyte/Parameter	Average	Range	Water Quality Criteria (WQC) or Guideline ¹	Percent Outside WQC or Guideline
Ammonia as N, Unionized	0.007 mg/L	0.001–0.023 mg/L	<0.025 mg/L ⁺	0%
Nitrate/Nitrite as N	64.0 mg/L	1.0–130 mg/L	<10.0 mg/L*	96%
Orthophosphate as P	0.38 mg/L	0.00–1.08 mg/L	<0.12 mg/L*	94%
Turbidity (NTU)	81 NTU	0.05–530 NTU	<25 NTU*	89%
Conductivity	2.96 mmho/cm	2.28–3.46 mmho/cm	Ranges: * <0.75 No Problem 0.75–3.0 Increasing >3.0 Severe	% in Range: 0% 51% 49%
pH	8.1	7.6–8.4	7.0–8.3 ⁺	5%
Annual Median Dissolved Oxygen (% Saturation)	2005: 85% 2006: 70% 2007: 81%	47–115%	>85% annual median ⁺	Std met Std not met Std not met
Dissolved Oxygen	8.0 mg/L	4.5–12.6 mg/L	>5.0 mg/L (GEN/WARM) ⁺ >7.0 mg/L (COLD/SPWN)*	5% 24%
Chlorophyll a	2.8 µg/L	0.3–28 µg/L	<40 µg/L*	0%
Water Temperature	15.9°C	10.1–23.6°C	Water Basin Specific	--

+ Indicates standard defined in the Water Quality Control Plan, Central Coast Basin (Basin Plan)

* Indicates guideline not described in the Basin Plan or not specifically stated as applicable to the beneficial uses of the site. Origin of the guideline is described in the individual discussion of the analyte/parameter.

The present and potential beneficial uses for **Blanco Drain** as defined in the Basin Plan include Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Wildlife Habitat (WILD), Warm Fresh Water Habitat (WARM), and Commercial and Sport Fishing (COMM).

Unionized Ammonia (as N)

Unionized ammonia (as N) is a calculated value based on water temperature, pH, and total ammonium concentration. Ammonia can be toxic in water. With high water temperature and/or high pH, ammonia becomes unionized and is toxic at

¹ Water Quality Criteria (WQC) are defined in the Water Quality Control Plan, Central Coast Basin (also referred to as the “Basin Plan”) to protect beneficial uses such as drinking water, fish habitat, irrigation water, etc. WQC include general water quality standards for some analytes as well as specific criteria based on the defined beneficial uses. Other water quality guidelines were compiled to provide a standard in order to compare sites. Bold indicates beneficial uses that apply to this watershed.

much lower levels. The Basin Plan general water quality objectives state that unionized ammonia shall not exceed 0.025 mg/L. Over time, ammonia should reduce to nitrate, so long-lasting levels of ammonia may indicate continuous discharges of waste. **No unionized ammonia samples exceeded the standard. The two highest levels of ammonia occurred in September and October, which may indicate an increase during the fall. The average unionized ammonia concentration was 0.007 mg/L**

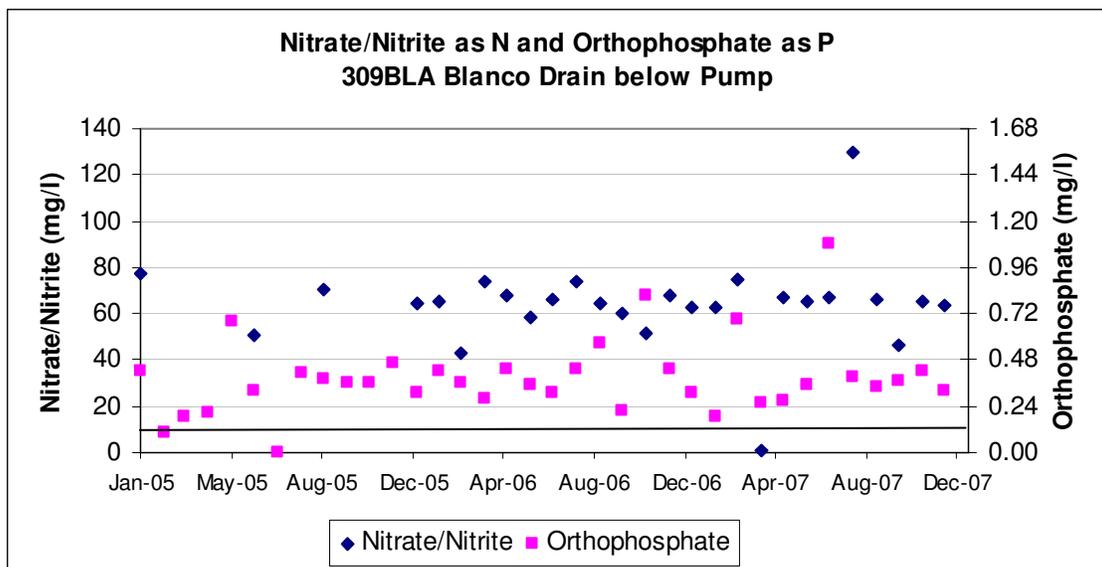
Nitrate/Nitrite as N

The Municipal and Domestic Supply (MUN) objective states in Table 3-2 of the Basin Plan that nitrate as NO₃ shall not exceed 45 mg/L. This value is equivalent to 10 mg/L of nitrate as N. Nitrite accounts for a small percent of total nitrate/nitrite, and therefore, nitrate as N criterion was used as a guideline for nitrate/nitrite. **Twenty-six of 27 nitrate/nitrite samples (96%) exceeded the guideline with no apparent cycles. The average concentration was 64.0 mg/L (more than six times the guideline).**

Orthophosphate as P

The Basin Plan does not contain orthophosphate standards. The Central Coast Ambient Monitoring program (CCAMP) non-regulatory guideline for general water quality objectives states that orthophosphate concentrations shall not exceed 0.12 mg/L. **Orthophosphate concentrations exceeded the guideline in 34 of 36 samples (94%). Five samples exceeded the guideline by five or more times, and one sample exceeding by nine times. All samples exceeding by five or more times occurred between March and August. The average concentration was 0.38 mg/L.**

The chart below shows the nitrate/nitrite and orthophosphate concentrations throughout the sampling period. The guidelines for nitrate/nitrite as N and orthophosphate as P state that their concentrations shall not exceed 10 mg/L and 0.12 mg/L, respectively, shown by the black horizontal line on the graph.



Turbidity

The Basin Plan states: “Water shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses.” Sigler et al.² shows that turbidity levels of 25 NTU or greater caused reduction in juvenile salmonid growth due to interference with their ability to find food. Turbidity is often affected by suspended material in runoff. **Thirty-three of 37 turbidity readings (89%) exceeded the guideline. Turbidity levels in Blanco Drain averaged 81 NTU and ranged from 0.05 to 530 NTU. Five of six readings exceeding 100 NTU occurred between October and February, with one readings exceeding 100 NTU in June 2006. There are no apparent trends between flow and turbidity.**

² Sigler, J.W., T.C. Bjornn, & F.H. Everst. (1984). *Effects of chronic turbidity on density and growth of steelhead and coho salmon*. Transactions of the American Fisheries Society. 113:142-150.

Conductivity

Conductivity is measured from a water sample. Based on Table 3-3 of the Basin Plan showing Guidelines for Interpretation of Quality of Water for Irrigation, conductivity below 0.75 mmho/cm causes no problems to irrigation, between 0.75 and 3 mmho/cm causes increasing problems, and conductivity above 3 mmho/cm causes severe problems. The conductivity level can be greatly affected by geologic and biological influences and is not necessarily related to agricultural activities. **Measuring conductivity in Blanco Drain would misrepresent its health. Conductivity and salinity fluctuate daily based on the tides; Blanco Drain is greatly influenced by the ocean and therefore shows greater salinity than a similar water body uninfluenced by the ocean. However, 19 of 37 samples (51%) indicated increasing problems; and 18 samples (49%) indicated severe problems.**

pH

Multiple beneficial uses have objectives for pH. The Basin Plan general water quality objective for pH is between 7.0 and 8.5; MUN, AGR, REC-1, and REC-2 pH objectives are between 6.5 and 8.3. The standard, therefore, is 7.0-8.3 if one or more of MUN, AGR, REC-1, and REC-2 is defined as a beneficial use. pH above 9 can cause skin irritation to humans and makes water inhospitable to many species. **Two of 37 pH samples (5%) exceeded the standard. There may be a trend showing an annual peak between September and December; however, September 2007 had the lowest pH in 2007. Because Blanco Drain is tidally influenced, high pH levels are expected. The pH levels at this site ranged from 7.6 to 8.4.**

Dissolved Oxygen Concentration and Dissolved Oxygen Saturation

The Basin Plan general water quality objectives state annual median dissolved oxygen shall remain above 85% saturation. General and WARM objectives state that the dissolved oxygen concentration must remain above 5.0 mg/L at all times, and SPWN and COLD objectives state that the dissolved oxygen concentration must remain above 7.0 mg/L at all times. **Two of 37 samples (5%) did not meet the general and WARM concentration standard. Dissolved oxygen did not meet the saturation standard during 2006 or 2007, with median annual values of 70% and 81% saturation, respectively. The median annual value for 2005 (85%) met the standard for dissolved oxygen saturation. Dissolved oxygen dropped significantly during the second half of 2006 and into 2007, but increased in the later part of 2007.**

Chlorophyll a

Healthy and appropriate Chlorophyll a levels are not defined in the Basin Plan. Chlorophyll a indicates phytoplankton growth, a necessary component of healthy water bodies. Because turbidity causes interference for the Chlorophyll a probe, measurements of Chlorophyll a may not be accurate when turbidity is above 1000 NTU. Chlorophyll a levels over 40 µg/L are considered problematic by North Carolina Administrative Code (NCAC). **No readings exceeded the guideline. The Chlorophyll a readings averaged 2.8 µg/L.**

Temperature

Sullivan et al.³ state that the maximum weekly average temperatures for protection of steelhead or rainbow trout, and coho salmon are 19.6 and 19.7°C, respectively. **The temperature averaged 15.9°C and ranged from 10.1 to 23.6°C. Though weekly averages were not taken, and Blanco Drain is designated as a warm-water body, the temperatures taken at this site indicate that it may be capable of supporting a cold-water fish habitat.**

³ Sullivan, K., D.J. Martin, R.D. Cardwell, T.E. Toll, & S. Duke. (2000). *An analysis of the effects of temperature on salmonids of the Pacific Northwest with implications for selecting temperature criteria*. Portland, OR: Sustainable Ecosystems Institute.

Summary of Toxicity Data

Species with Significant Mortality

	Feb-05	Mar-05	Apr-05	Jul-05	Sep-05	Feb-06	May-06	Aug-06	Sep-06	Feb-07	Mar-07	Apr-07	Oct-07
Invertebrate (Water Column)	No	Yes ⁺		No*	No*	No*		No*	No*	No	No*		No
Invertebrate (Sediment)			Yes				No*					Yes	
Fish (Water Column)	No	Yes				No*		No	No	No	No		No*
Algae (Water Column)	No	Yes				No		No	No	Yes	Yes		No

⁺Indicates complete mortality within 24 hours of test initiation

*Indicates significant effect on growth or reproduction (even though mortality did not have a significant effect)

Significant effect is determined by statistically significant rates of mortality, growth, or reproduction compared to a control sample and provides an indication that something is affecting plant or animal life in the stream. Invertebrates show significant sensitivity to organophosphates and pesticides. Significant effect to algae often indicates the presence of herbicides and metals such as copper. Fish are less sensitive to organophosphates but can be impacted by other pollutants such as ammonia and pyrethroid pesticides.

Photos of Site



July 2006



February 2006

QAQC

The data in this water quality monitoring fact sheets meet the quality assurance and quality control requirements of the Water Board's Surface Water Ambient Monitoring Program (SWAMP). Additional surface water monitoring data are available at the Water Board's Central Coast Ambient Monitoring Program website <http://www.ccamp.org>. Any questions regarding the data or analysis should be directed to either **Peter Meertens** at pmeertens@waterboards.ca.gov (805) 549-3869 or **Amanda Bern** at abern@waterboards.ca.gov (805) 594-6197.

Attachment: Monitoring Data

