

## **4.6 SURFACE WATER QUALITY**

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## 4.6 SURFACE WATER QUALITY

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This chapter provides information regarding surface water quality impacts resulting from the Seasonal Storage Project (SSP). Potential water quality impacts may include exceedences of numeric or narrative water quality criteria or objectives, degradation of surface water quality due to construction and facility operation activities, and non-attainment of established Total Maximum Daily Loads (TMDLs). To provide a basis for this evaluation, the setting section describes the existing surface water quality in the study area and recycled water quality.

### IMPACTS EVALUATED IN OTHER SECTIONS

The following subjects are related to the Surface Water Quality Section, but are evaluated in other sections of this document:

- Water Quality Related to Human Health. These issues are addressed in Section 4.7, Public Health and Safety.
- Water Quality Impacts on Aquatic Life. These issues are addressed in Section 4.8, Biological Resources.
- Erosion Due to Construction. Erosion caused by construction outside of the aquatic environment (i.e., not in or adjacent to waterways) is addressed in Section 4.3, Geology, Soils, and Seismicity.
- Streambed Erosion. Erosion to streambeds is addressed in Section 4.4 Surface Water Hydrology.
- Impacts on Groundwater Quality. These issues are addressed in Section 4.5, Groundwater.

### SETTING

This section describes water quality conditions and regulations in waterways that are potentially affected by the SSP alternatives. Water quality conditions in the Russian River, Laguna de Santa Rosa and Roseland Creek are described in subsections below.

#### Water Quality Conditions in the Study Area

The proposed storage ponds are situated near the Laguna de Santa Rosa (Laguna) and within the Laguna watershed. The Laguna empties into the Russian River approximately 6 to 9 miles north of the northernmost SSP site. Roseland Creek and a number of unnamed ephemeral drainages or creeks pass through or near the storage sites before flowing into the Laguna. This section describes existing water quality conditions in the Russian River, the Laguna and Roseland Creek

##### ***Russian River***

The Russian River from the confluence with the Laguna to the Pacific Ocean has several functions including habitat, aesthetics, and recreation. It is also a potable

water supply, although the main source of municipal water supply is above the confluence with the Laguna. The following are some of the main factors controlling water quality in the Russian River:

- Wastewater discharge. The Russian River below the confluence with the Laguna receives treated wastewater from the cities of Occidental, Forestville, Graton, Guerneville as well as recycled water from the Subregional System and Windsor (through the Laguna). The River also receives treated wastewater from the cities of Ukiah, Cloverdale, Geyserville, and Healdsburg.
- Warm Springs Dam. Water released from Warm Springs Dam on Dry Creek at times comprises a large portion of the Russian River below Dry Creek.
- Summer check dams. Several temporary dams are operated along the Russian River during the summer. The purpose of these dams is to provide recreational swimming areas. They result in a conversion of areas of the Russian River from a riverine habitat to a pond-like habitat.
- Watershed land uses. Uses of developed land in the lower Russian River are primarily low density residential, recreation, and agriculture.

The lower Russian River is currently on the 303(d) list as impaired for coliform bacteria, sedimentation/siltation, temperature, and pathogens. The pathogen listing is limited to the Monte Rio area of the River.

### ***Laguna de Santa Rosa***

The Laguna flows north across the Santa Rosa Plain to the Russian River. The dominant use in the watershed is agricultural. The lower portions of the Laguna serve as a migration corridor for steelhead and coho salmon to spawning grounds in the upper reaches of Santa Rosa Creek and Mark West Creek.

Laguna water quality is affected by a number of factors, including the flow and quality of waters in its tributaries, recycled water discharge from the Subregional System, runoff from urban and agricultural activities, and natural processes such as erosion, sedimentation, and algal growth. The Laguna is currently on the 303(d) list for the State as impaired for dissolved oxygen, mercury, nitrogen, phosphorus, sedimentation/siltation, and temperature.

### ***Roseland Creek***

Roseland Creek is an ephemeral stream that drains an area of 4.6 square miles. East of Llano Road the creek flows through private property until it reaches property owned by the Sonoma County Water Agency (SCWA). Through the SCWA property, the creek consists of a constructed earthen channel with access roads and lacks a natural riparian canopy. West of Llano Road, the creek flows just south of the AF pond, before joining the Laguna.

## Stored Recycled Water Quality

Stored recycled water quality in SSP ponds is expected to be similar to stored recycled water quality in existing Subregional System storage ponds. This section summarizes Subregional System storage pond water quality.

Stored recycled water quality data from storage ponds (Delta Pond and Meadowlane Pond D for most constituents; all ponds in current use for nutrients) are summarized in Table 4.6-1 and Table 4.6-2. Table 4.6-1 shows only those organic compounds that have been found in detectable concentrations in stored recycled water. All organic compounds, including those below detection, that were analyzed in stored recycled water are shown in a list following Table 4.6-2. Data from the storage ponds are collected only when discharging from that particular pond and only during the discharge season (October 1 through May 14). Table 4.6-1 summarizes grab sample data generally collected between January 2000 through the end of the discharge season in 2006 as part of the Self Monitoring Program.

Copper data summarized in Table 4.6-1 are those collected and analyzed using “clean” techniques which began in October 2005. An analysis of the pre- and post-clean techniques copper data indicated periodic contamination in the pre-clean technique data. Therefore, the post-clean technique data is thought to be more representative of actual recycled water copper concentrations (Merritt Smith 2007a). Copper data are summarized through March 2007. Other metals in recycled water were likely also subject to contamination prior to clean techniques. However, the number of data available to evaluate potential contamination is small. Therefore, as a conservative approach, all other recycled water metals data are summarized for January 2000 through July 2006, recognizing that actual metals concentrations may be lower.

Cyanide has found to be artificially created through the preservation step in the analytical methodology (Merritt Smith 2007b). However, the cyanide method can be run without preservation. The data in Table 4.6-1 reflect the cyanide data collected with the updated methodology collected from January 2007 through March 2007.

Generally the reporting limits for hexavalent chromium are higher than applicable criteria. However, the usual reporting limit for total chromium (of which hexavalent chromium is a subset) is lower than the hexavalent criteria. Therefore, total chromium concentrations are used in lieu of hexavalent chromium concentrations. However, a special study was conducted in June and July 2004 to assess the relative proportion of hexavalent to total chromium. These hexavalent chromium data are reported Table 4.6-1.

Some constituents in Table 4.6-1, primarily those of concern to drinking water, are not routinely collected but were collected as part of a special data collection conducted October 2005 through May 2006. Additional storage pond copper, lead, and nickel samples were collected February through May 2006 as part of a Biotic Ligand Model study.

Table 4.6-2 contains sonde data for temperature, dissolved oxygen, turbidity, pH, and conductivity recorded at 15 minute intervals in storage ponds. These data were also collected as part of the Self Monitoring Program. Temperature, dissolved oxygen, pH, and

conductivity data collected from January 2000 through the end of the discharge season 2006 are summarized. Turbidity data are summarized for Delta Pond only and from January 2006 through March 2007. This dataset was used because the Delta Pond discharge outfall was redesigned at the end of 2005. Data collected between 2006 through 2007 reflect this new design and are considered representative of what the turbidity would be in SSP ponds.

**TABLE 4.6-1**  
**Stored Recycled Water Summary**

Constituent	Units	Average <sup>a</sup>	Median <sup>a</sup>	Minimum <sup>b</sup>	Maximum Detected	Number of Samples
<b>Inorganic Constituents</b>						
Alkalinity - Total	mg/L	156	160	120	190	22
Aluminum - Total	mg/L	1.25	0.52	ND (0.5)	5.86	29
Aluminum - Dissolved	mg/L	0.23	0.17	0.02	1.33	29
Ammonia as N	mg/L	0.66	0.50	ND (0.2)	4.30	293
Antimony - Dissolved	µg/L	<1.8	<2.0	ND	ND	24
Antimony - Total	µg/L	<1.7	<2.0	ND	ND	26
Arsenic - Dissolved	µg/L	1.9	1	1	3.8	24
Arsenic - Total	µg/L	1.8	1.5	1	4.0	26
Asbestos	million fibers/L	<4.73	<2.1	ND	ND	3
Barium Total	mg/L	0.039	0.037	0.032	0.051	4
Beryllium - Dissolved	µg/L	<0.50	<0.50	ND	ND	24
Beryllium - Total	µg/L	<0.48	<0.50	ND	ND	26
Boron - Total	mg/L	0.32	0.30	0.17	0.50	23
Cadmium - Dissolved	µg/L	<0.50	<0.50	ND	ND	24
Cadmium - Total	µg/L	<0.54	<0.50	ND	ND	26
Calcium - Total	mg/L	29.73	30.60	2.91	48.00	106
Chlorate	mg/L	0.057	0.053	0.051	0.072	4
Chloride	mg/L	74	66	44	190	22
Chlorine Residual	mg/L	<0.1	<0.1	ND	ND	139
Chromium - Dissolved	µg/L	1.10	1	0.25	3.4	24
Chromium - Total	µg/L	4.07	2.05	0.43	21	26
Chromium - Total Hexavalent	µg/L	<0.96	<0.40	ND	ND	12
Copper - Dissolved	µg/L	2.8	2.6	1.2	4.9	18
Copper - Total	µg/L	3.5	3.6	1.7	4.9	32

**TABLE 4.6-1**  
**Stored Recycled Water Summary**

Constituent	Units	Average <sup>a</sup>	Median <sup>a</sup>	Minimum <sup>b</sup>	Maximum Detected	Number of Samples
Cyanide	µg/L	<3	<3	ND	ND	8
Dissolved Organic Carbon	mg/L	10.1	7.6	4.5	42	18
Fluoride	mg/L	0.2	0.2	0.2	0.2	4
Iron - Total	mg/L	1.7	0.91	0.06	8.9	21
Iron – Dissolved	mg/L	0.10	0.057	0.025	0.28	6
Lead - Dissolved	µg/L	0.69	1	0.044	0.6	32
Lead - Total	µg/L	0.80	1.0	ND (2)	2.5	34
Magnesium - Total	mg/L	19.3	20.0	1.8	33.0	106
Manganese - Total	mg/L	0.054	0.03	0.01	0.23	22
Mercury - Dissolved	µg/L	<0.060	<0.050	ND	ND	24
Mercury - Total	µg/L	0.04	0.025	ND (0.05)	0.0032	26
Nickel - Dissolved	µg/L	6.5	5.3	ND (2)	15.5	32
Nickel - Total	µg/L	9.4	6.7	3.3	32	34
Nitrate as N	mg/L	8.0	8.3	0.90	16.0	294
Nitrite as N	mg/L	0.18	0.17	ND (1)	0.50	22
Organic Nitrogen	mg/L	1.2	1.2	ND (0.2)	9.0	290
Orthophosphate as P	mg/L	1.6	1.3	0.20	2.7	22
Potassium	mg/L	10.7	11.10	5.6	15.6	20
Selenium - Dissolved	µg/L	<4.4	<5.0	ND	ND	24
Selenium - Total	µg/L	<4.6	<5.0	ND	ND	26
Silica - Total (as SiO <sub>2</sub> )	mg/L	36.8	31.0	1.1	81.0	19
Silver - Dissolved	µg/L	<0.46	<0.50	ND	ND	24
Silver - Total	µg/L	<0.52	<0.50	ND	ND	26
Sodium	mg/L	65	66.5	35	89	22
Sulfate	mg/L	34	32	26	67	22
Thallium - Dissolved	µg/L	<1.8	<2.0	ND	ND	24
Thallium - Total	µg/L	<1.6	<2.0	ND	ND	26
Total Kjeldahl Nitrogen	mg/L	1.54	1.50	ND (0.2)	4.80	63
Total Organic Carbon	mg/L	10.6	9.4	5.4	19	21
Total Phosphorus	mg/L	2.0	2.0	0.24	4.0	300
Vanadium Total	mg/L	<0.05	<0.05	ND	ND	4

**TABLE 4.6-1  
Stored Recycled Water Summary**

Constituent	Units	Average <sup>a</sup>	Median <sup>a</sup>	Minimum <sup>b</sup>	Maximum Detected	Number of Samples
Zinc - Dissolved	µg/L	17.5	17.5	0.5	28	24
Zinc - Total	µg/L	23.3	23.0	10	38	26
<b>Organic Constituents Detected in Recycled Water or Stored Recycled Water</b>						
b-BHC	µg/L	0.050	0.04	ND (0.1)	0.07	27
Endosulfan Sulfate	µg/L	0.10	0.05	ND (0.1)	0.08	27
Bromodichloromethane	µg/L	0.27	0.25	ND (0.5)	0.6	29
Chloroform	µg/L	0.43	0.25	0.23	1.5	29
1,4-Dichlorobenzene	µg/L	0.28	0.25	ND (0.5)	0.62	29
Methyl-tertButyl Ether	µg/L	0.43	0.25	ND (0.5)	1.2	28
Di-n-Butyl Phthalate	µg/L	4.4	2.65	ND (5)	5.7	31
Methomyl	µg/L	1.4	1	ND (2)	2.2	3
1,4-Dioxane	µg/L	0.34	0.24	ND (0.5)	0.53	3
<b>Radionuclides</b>						
Gross Alpha	pCi/L	<3	<3	ND	ND	4
Gross Beta	pCi/L	8.2	8.3	7.6	8.7	4
Sum Radium 226 & 228	pCi/L	1.8	1.8	ND (0.7)	2.8	4
Strontium 90	pCi/L	<0.87	<0.92	ND	ND	4
Uranium	pCi/L	<2	<2	ND	ND	4
Tritium	pCi/L	<361	<361	ND	ND	4
<b>Physical Parameters</b>						
Color	CU	35	35	30	40	4
Electrical Conductivity	µmhos/cm	582	561	430	754	22
Hardness	mg CaCO <sub>3</sub> /L	157	158	69.7	256	105
Odor	T.O.N.	2	1	<1	5.5	4
Turbidity	NTU	16.6	5.5	0.60	410.00	297
Settleable Solids	mL/L	<0.1	<0.1	ND	ND	22
Total Dissolved Solids	mg/L	382	395	260	456	21
Total Suspended Solids	mg/L	22.3	7.0	ND (1)	530	205
pH	pH	7.8	7.9	7.2	8.7	22
Surfactants	mg/L	<0.1	<0.1	ND	ND	4

**TABLE 4.6-1**  
**Stored Recycled Water Summary**

Constituent	Units	Average <sup>a</sup>	Median <sup>a</sup>	Minimum <sup>b</sup>	Maximum Detected	Number of Samples
Volatile Suspended Solids	mg/L	Not Available	Not Available	Not Available	Not Available	0
<b>Biological Constituents</b>						
Bioassay 96 hour	% Survival	99.7	100	95	100	86
Chronic Lethal Toxicity (Fathead Minnow) <sup>c</sup>	NOEC	100	100	100	100	24
BOD 5 Day	mg/L	2.6	2.0	ND (2)	13.0	299
Chlorophyll a	mg/m <sup>3</sup>	13.2	5.5	ND (0.3)	45.4	14
Pheophytin	mg/m <sup>3</sup>	14.2	6.4	ND (2)	41.0	18

Notes:

- a. When values were below detection, half the reporting limit was used to calculate averages and medians except when all values were below detection. If all values were below detection the values shown are the average and median of the reporting limits.
- b. When some of the values are below detection the minimum is designated as ND with the most common reporting limit in parentheses after the ND. Analyses for a particular constituent may have two or more different reporting limits for values below detection and, in some cases, some detected concentrations may be lower than reporting limits. Therefore, in some cases the average and/or median values may be lower than the reporting limit shown in the minimum column.
- c. For chronic lethal toxicity, the minimum No Observable Effects Concentration was 100 percent stored recycled water which occurred in all 24 toxicity tests. One toxicity test showed extreme bacterial/fungal coverage of the fish and extreme variability in mortality between replicates (no dose response curve). Therefore, these data are not included here.

**TABLE 4.6-2**  
**Stored Recycled Water Temperature, Dissolved Oxygen, Turbidity, Conductivity, and pH**

	Average	Maximum	Minimum	Number of Samples
<b>Temperature (°F)</b>				
October	No data	No data	No data	No data
November	59.4	63.6	56.1	1102
December	55.3	57.9	52.2	3995
January	54.3	68.7 <sup>a</sup>	45.8	13965
February	55.1	61.0	48.4	7815
March	58.7	71.5	50.2	10855
April	62.6	68.7	57.4	5377
May	65.5	69.2	59.5	1682
<b>Dissolved Oxygen (mg/L)</b>				
October	No data	No data	No data	No data
November	7.8	13.0	2.2	1102
December	7.8	17.6	4.2	3995
January	8.1	26.3	4.2	13965
February	9.4	18.9	3.5	7815
March	11.0	30.6	3.3	10855
April	8.0	16.4	1.9	5377
May	6.6	10.5	0.9	1682
<b>Turbidity (NTU)</b>				
October	No data	No data	No data	No data
November	No data	No data	No data	No data
December	No data	No data	No data	No data
January	19.5	337	3.6	2,687
February	15.3	211	7.3	768
March	7.1	84	0.1	2,685
April	5.2	16.3	2.1	2,016
May	2.5	12.8	0.6	336
<b>pH</b>				
October	No data	No data	No data	No data
November	7.8	8.0	7.4	1102
December	7.8	8.2	7.4	3995
January	7.7	8.8	6.5	13965

**TABLE 4.6-2**  
**Stored Recycled Water Temperature, Dissolved Oxygen, Turbidity, Conductivity, and pH**

	Average	Maximum	Minimum	Number of Samples
February	7.9	8.9	7.4	7815
March	8.3	9.4	7.5	10855
April	8.0	9.0	7.5	5377
May	7.9	8.6	7.6	1682
<b>Conductivity (µmhos/cm)</b>				
January	564	737	11	13949
February	632	718	350	7814
March	612	756	377	10853
April	652	743	557	5377
May	658	772	594	1673
October	No data	No data	No data	No data
November	693	717	657	1102
December	649	773	573	3995

Notes:

- a. January maximum water temperature occurred in January 2006 and was impacted by the extreme flood conditions at the plant (1/12/06 11:45). A short duration spike was recorded at 68.7F. Except for this spike, the maximum was 64.5F. Note, without the 2006 January data, the maximum recorded January temperature for 2000-2005 was 53.9F.

The following is a list that contains all organic compounds and radionuclides that have been analyzed in stored recycled water. Constituents that have been detected in stored recycled water are shown in bold.

1, 2, 4- Trichlorobenzene	alpha-BHC	Fluoranthene
1,1,1,2-Tetrachloroethane	Ametryn	Fluorene
1,1,1-Trichlorethane	Anthracene	Formaldehyde
1,1,2,2-Tetrachloroethane	Asbestos	Freon-113
1,1,2-Trichloroethane	Atrazine	gamma-BHC
1,1-Dichloroethane	b-Endosulfan	Glyphosate
1,1-Dichloroethene	Bentazon	Gross Alpha radionuclides
1,1-Dichloropropene	Benz(a)anthracene	<b>Gross Beta Radionuclides</b>
1,2 Benzanthracene	Benzene	Heptachlor
1,2 Dichlorobenzene	Benzidine	Heptachlor Epoxide
1,2- Diphenylhydrazine	Benzo (A) anthracene	Hexachlorobenzene
1,2,3-Trichlorobenzene	Benzo (A) pyrene	Hexachlorobenzene
1,2,3-Trichloropropane	Benzo (B) fluoranthene	Hexachlorobutadiene
1,2,4 Trichlorobenzene	Benzo (G, H, I) perylene	Hexachlorobutadiene
1,2,4-Trimethylbenzene	Benzo (K) fluoranthene	Hexachlorocyclopentadiene

1,2-Dibromo-3-chloropropane	Benzo(a)pyrene	Hexachloroethane
1,2-Dibromoethane	Benzo(a)pyrene(3,4 Benzopyrene)	HMX
1,2-Dichlorobenzene	Benzo(b)fluoranthene	Indeno(1,2,3-cd)pyrene
1,2-Dichloroethane	Benzo(g,h,i)perylene	Iodomethane
1,2-Dichloroethane	Benzo(k)fluoranthene	Isophorone
1,2-Dichloropropane	Benzo(k)fluoranthene	Isopropylbenzene
1,2-Dichloropropane	<b>beta-BHC</b>	Lindane (gamma-BHC)
1,3-5-Trimethylbenzene	b-Hexachlorocyclohexane	m,p-Xylene
1,3-Dichlorobenzene	Bis (2- chloroisopropyl) ether	<b>Methomyl</b>
1,3-Dichloropropane	Bis (2- ethylhexyl) phthalate	Methoxychlor
<b>1,4 Dioxane</b>	Bis (2-chloroethoxy) methane	<b>Methyl tert-butyl ether</b>
<b>1,4-Dichlorobenzene</b>	Bis (2-chloroethyl) ether	Methylene chloride
2- Chloronaphthalene	bis (2-Chloroisopropyl) ether	Metolachlor
2- Chlorophenol	bis (2-Ethylhexyl) phthalate	Metribuzin
2- Nitrophenol	bis 2-(1-Chloroethoxy) methane	Molinate
2, 4- Dimethylphenol	Bromobenzene	Napropamide
2, 4- Dinitrotoluene	Bromochloromethane	Naphthalene
2, 4, 6- Trichlorophenol	<b>Bromodichloromethane</b>	Nitrobenzene
2, 6- Dinitrotoluene	Bromoform	N-Butylbenzene
2,2,3,3,4,4,6-Heptachlorobiphenyl	Bromoform	N- Nitrosodi-n-propylamine
2,2,3,3,4,4,6-Octachlorobiphenyl	Bromomethane	N-Nitrosodimethylamine
2,2,3,4,6-Pentachlorobiphenyl	Butachlor	N-Nitrosodiphenylamine
2,2,4,4,5,6-Hexachlorobiphenyl	Butyl benzyl phthalate	N-Propylbenzene
2,2,4,4-Tetrachlorobiphenyl	Butylate	Oxamy
2,2-Dichloropropane	Carbaryl	o-Xylene
2,3,7,8-TCDD	Carbofuran	Paraquat
2,3-Dichlorobiphenyl	Carbon Disulfide	PCB 1016
2,4 Dimethylphenol	Carbon tetrachloride	PCB 1221
2,4 Dinitrotoluene	Chlorate	PCB 1232
2,4,5-TP (Silvex)	Chlordane	PCB 1242
2,4,5-Trichlorobiphenyl	Chlorobenzene	PCB 1248
2,4,6 Trichlorophenol	Chloroethane	PCB 1254
2,4,6-Trinitrotoluene (TNT)	<b>Chloroform</b>	PCB 1260
2,4-D	Chloromethane	Pebulate
2,6 Dinitrotoluene	Chloroneb	Pentachlorophenol
2-Butanone	Chloropropham	Perchlorate
2-Chlorobiphenyl	Chlorpyrifos	Permethrins (mixed isomers, total)
2-Chloroethyl vinyl ether	Chrysene	Phenanthrene
2-Chloronaphthalene	cis-1,2-Dichloroethene	Phenol
2-Chlorophenol	cis-1,3-Dichloropropene	Picloram
2-Chlorotoluene	Cycloate	Prometryn
2-Hexanone	Dacthal acid metabolites	Propachlor
2-Nitrophenol	Dalapon	Propazine
3,3 Dichlorobenzidine	delta-BHC	Pyrene

3,4 Benzofluoranthene	d-Hexachlorocyclohexane	<b>Radium 226</b>
3-Hydroxycarbofuran	Di(2-ethylhexyl)adipate	<b>Radium 228</b>
4- Chloro-3-methylphenol	Di(2-ethylhexyl)phthalate	RDX
4- Chlorophenyl phenyl ether	Diazinon	sec-Butylbenzene
4- Nitrophenol	Dibenzo (a, h) anthracene	Simazine
4, 6- Dinitro-2-methylphenol	Dibromochloromethane	Simetryn
4,4-DDD	Dibromomethane	Strontium 90
4,4'-DDE	Dicamba	Styrene
4,4'-DDT	Dichlorodifluoromethane	Surfactants
4,6 Dinitro-2-methylphenol	Dieldrin	Terbutryn (e)
4-Bromophenyl phenyl ether	Diethyl phthalate	Tert-amyl methyl ether
4-Chlorophenyl phenyl ether	Di-isopropyl ether	Tert-butyl Alcohol
4-Chlorotoluene	Dimethyl phthalate	tert-Butylbenzene
4-Isopropyltoluene	<b>Di-n-butyl phthalate</b>	Tetrachloroethylene
4-Methyl-2-pentanone	di-n-Octyl phthalate	Thiobencarb
4-Nitrophenol	Dinoseb	Toluene
Acenaphthene	Diocetyl phthalate	Toxaphene
Acenaphthylene	Diphenamid	trans-1,2-Dichloroethene
Acetone	Diquat	trans-1,3-Dichloropropene
Acrolein	Endosulfan I	Triadimefon
Acrylonitrile	Endosulfan II	Trichloroethene
a-Endosulfan	<b>Endosulfan Sulfate</b>	Trichlorofluoromethane
a-Hexachlorocyclohexane	Endothall	Trifluralin
Alachlor	Endrin	Tritium
Aldicarb	Endrin Aldehyde	Uranium
Aldicarb Sulfone	Ethanol	Vernolate
Aldicarb Sulfoxide	Ethyl tert-butyl ether	Vinyl Acetate
Aldrin	Ethylbenzene	Vinyl chloride

## Regulatory Framework

Surface water quality is regulated to protect aquatic life and human health according to the provisions of the Federal Clean Water Act (and associated federal regulations) and the California Porter-Cologne Water Quality Control Act, referred to respectively as the Federal and State Acts. The State Act established the nine Regional Water Quality Control Boards (Regional Boards) and the State Water Resources Control Board (State Board). The Federal Act has led to the development of aquatic life water quality criteria; the State Act has led to water quality objectives to protect aquatic life from adverse impacts for numerous water quality constituents. The criteria and objectives are hereinafter referred to collectively as criteria.

Water quality standards have also been developed to protect human health. Drinking water standards are established in federal regulations and in Title 22 of the California Code of Regulations, and requirements for recycled water use are established in Title 22. These

regulations and water quality impacts are addressed in more detail in Section 4.7, Public Health and Safety.

Numeric and narrative water quality criteria have been developed by EPA and other agencies to protect aquatic life and to protect against aesthetic water quality impacts. Aquatic life and aesthetic water quality criteria for the project area are contained in the EPA's California Toxics Rule (CTR) and the Water Quality Control Plan for the North Coast Region (Basin Plan) developed by the North Coast Regional Water Quality Control Board (NCRWQCB) (NCRWQCB 2007).

Other regulations that relate to surface water include Section 303(d) of the Clean Water Act and EPA and State Water Resources Control Board antidegradation policies.

### Regulations for Wastewater Treatment Ponds

The surface water regulations described above are applicable to all Waters of the U.S. However, federal regulations specifically exempt wastewater treatment ponds or lagoons from the definition of waters of the U.S. (40 CFR §122.2). This exclusion applies only to manmade bodies of water which neither were originally created in waters of the U.S. (such as disposal area in wetlands) nor resulted from the impoundment of waters of the U.S.

### GOALS, OBJECTIVES, AND POLICIES

In addition to the objectives described in the Surface Water Quality Regulations section above, city general plans identify surface water quality goals, objectives, and policies that relate to the SSP. These plans and policies are shown in Table 4.6-1. The table also indicates which criteria in the Surface Water Quality section are responsive to each set of policies.

**TABLE 4.6-3**  
**Goals, Objectives, and Policies – Surface Water Quality**

Adopted Plan Document	Document Section	Document Numeric Reference	Policy	Relevant Evaluation Criteria <sup>a</sup>
Santa Rosa General Plan	Open Space and Conservation	Goal OSC-D-9	Ensure that construction adjacent to creek channels is sensitive to the natural environment. Ensure that construction activities do not disrupt or pollute the waterway.	3
		Goal OSC-F-5	Maintain high levels of water quality for human consumption and other life systems in the region	1, 2, 3, and 4

Source: Santa Rosa 2002

Note: a. Evaluation criteria are identified in Table 4.6-4

## EVALUATION CRITERIA WITH SIGNIFICANCE THRESHOLDS

**TABLE 4.6-4**

**Evaluation Criteria with Significance Thresholds – Surface Water Quality**

<b>Evaluation Criteria</b>	<b>As Measured by</b>	<b>Significance Thresholds</b>	<b>Sources of Criteria</b>
1. Will SSP cause numeric-based criteria to be exceeded or otherwise substantially degrade water quality?	Concentration	Varies	U.S.EPA (California Toxics Rule) criteria; North Coast Region Basin Plan criteria CEQA checklist questions VIII.a) and VIII.f) <sup>a,b</sup>
2. Will the SSP cause narrative-based criteria to be exceeded or cause a substantial water quality degradation?	Varies	Varies	North Coast Region Basin Plan narrative criteria CEQA checklist questions VIII.a) and VIII.f) <sup>a,b</sup>
3. Will SSP construction and operation of SSP facilities result in a substantial degradation of surface runoff quality?	Compliance with local and state storm water quality regulations requiring implementation of effective Best Management Practices	Failure to implement effective, reasonable and appropriate measures	State of California General NPDES Permits for Discharges of Storm Water Associated with Construction and Industrial Activities Santa Rosa Area Urban Runoff and Storm Water NPDES Permit Standard Urban Storm Water Mitigation Plan (SUSMP) and any other jurisdictions that have SUSMPs at the time of construction California Storm Water Best Management Practice – Construction handbook CEQA checklist questions VIII.c) and VIII.e) <sup>c,d</sup>
4. Will the SSP result in non-attainment of established TMDLs?	Loads	TMDLs under development <sup>e</sup>	Clean Water Act section 303(d) and federal regulations (40 CFR 130) CEQA checklist questions VIII.a) and VIII.f) <sup>a,b</sup>

Notes:

- a. CEQA checklist question VIII.a) asks if the Project would cause a violation of any water quality standards or waste discharge requirements or worsen any existing such violations. The water quality standards applicable to waters of California include the numeric CTR criteria, the numeric and narrative Basin Plan objectives, and any established TMDLs (human health standards other than CTR criteria are covered in the Public Health and Safety section). Waste discharge requirements are based on these criteria, objectives and TMDLs. Therefore, evaluating the Project relative to evaluation criteria 1, 2, and 4 will identify whether the Project will cause a violation of any water quality standards or waste discharge requirements or worsen any such existing violation.
- b. CEQA checklist question VIII.f) asks if the Project would otherwise substantially degrade water quality. Evaluation criterion 2 evaluates narrative criteria and CEQA checklist question VIII.f).
- c. CEQA checklist question VIII.c) asks if the Project will substantially alter the existing drainage pattern of the site or area, including the alteration of the course of stream or river in a manner which would result in substantial

erosion or siltation on- or off-site. Evaluation criterion 3 is designed to evaluate whether project construction and operations will result in erosion or siltation on- or of-site. CEQA checklist question VIII.c) is also addressed in the Surface Water Hydrology section.

- d. CEQA checklist question VIII.d) asks if the Project will create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. Evaluation criterion 3 is designed to evaluate whether project construction and operations will provide substantial additional sources of polluted runoff. The potential of the Project to exceed the capacity of existing or planned stormwater drainage systems is evaluated in the Public Services, Utilities, and Recreation section.
- e. TMDLs for Russian River and Laguna impairments are under development by the North Coast Regional Board.

## IMPACTS AND RECOMMENDED MITIGATION MEASURES

**TABLE 4.6-5**  
**Surface Water Quality Impacts**

Evaluation Criteria	Significance Threshold	Impact	Type of Impact <sup>1</sup>	Level of Significance <sup>2</sup>
6.1. Will the SSP cause an exceedance of numeric-based criteria?	See Tables A.D-1, and A.D-2 in Appendix D	None	O&M	==
6.2. Will SSP cause an exceedance of narrative-based criteria or cause a substantial water quality degradation?	See Table A.D-3 in Appendix D	None	O&M	==
6.3. Will the SSP construction and operation of facilities result in a substantial degradation of surface runoff quality?	Failure to implement effective, reasonable and appropriate measures	Project measures reduce risk of water quality impacts	C, O&M	○
6.4. Will the SSP result in non-attainment of established TMDLs?	TMDLs under development	None	O&M	==

Notes: 1. Type of Impact:

C: Construction

O&M: Operation and Maintenance

P: Permanent

2. Level of Significance:

● Significant impact before and after mitigation

◎ Significant impact before mitigation; less than significant impact after mitigation

○ Less than significant impact; no mitigation proposed

== No impact

**Impact: 6.1. and 6.2. Will the SSP cause an exceedance of numeric-based or narrative-based criteria or cause a substantial water quality degradation?**

**Analysis: Storage component - No Impact: KF1, KF2, BF1, BF2 and AF**

Stored recycled water has the potential to reach surface waters through seepage through the storage pond liner. The analysis presented in the *Seasonal Storage Project Groundwater Evaluation Technical Memorandum (TM 4)*, provided in Volume 5 of this EIR, concludes that no water from any of the proposed storage ponds would ultimately discharge to surface water

bodies. For the KF1 and KF2 sites, seepage would be downward and toward the north (Occidental Road) and the south (Sebastopol Road). For the BF1 and BF2 sites, seepage would be downward and toward the north (toward Sebastopol Road). For the AF site, seepage would be downward and toward the north and south (toward Sebastopol Road and Todd Road). Pond seepage would not affect surface water quality because seepage would not reach surface waters. Therefore, the Storage component would not result in an exceedence or any numeric-based or narrative-based criteria or result in degradation of surface waters. Thus, the beneficial uses of surface waters would be protected.

The potential exists for surface waters to be affected by the Storage component through a release of recycled water via the emergency spillway. This could occur as a result of unintentional over filling of recycled water into the pond during the winter or spring when water storage in the pond is at its maximum. The potential for a spillway release to occur due to over pumping would be reduced by implementation of Project Measure 3.2.25, which requires that pond instrumentation include a high water level sensor and alarm. The alarm would either alert City staff that the water level is reaching pond capacity or would shut down the pump automatically.

The potential for a release of recycled water via the spillway during a storm event or as a result of a breach in the pond embankment is addressed in Chapter 2, Project Description, where the section on Emergency Scenarios shows that the probability of pond embankment failure or spillway use is so low that evaluation of the surface water quality impact of such a rare event is not reasonable.

*Pump Station component - No Impact: KF1, KF2, BF1, BF2 and AF*

Pump stations would not result in direct or indirect discharge to surface waters, so the proposed pump stations would not affect water quality with respect to numeric or narrative criteria.

Mitigation: No mitigation is needed.

**Impact: 6.3. Will the SSP construction and operation of facilities result in a substantial degradation of surface runoff quality?**

Analysis: *Storage component - Less than Significant: KF1, KF2, BF1, BF2 and AF*

Construction could increase sedimentation into the Laguna as a result of increased on-site vehicle traffic, vegetation clearing activities, pond excavation, pipeline trenching, and use of an on-site staging area during construction. These activities would expose soil, making sedimentation in nearby waterways more likely to occur. Construction activities also would temporarily alter onsite drainage patterns which could cause localized streambank erosion, potentially affecting surface water quality. Under Project Measure 3.2.3 Storm Water Pollution Prevention Plan, the City shall prepare a

site-specific Storm Water Pollution Prevention Plan (SWPPP) for each construction area. The plan would include implementation of BMPs to prevent increases in downstream runoff volume during construction. The SWPPP would provide for stormwater controls during construction and would reduce these temporary impacts to a level that is less than significant. After construction, ground surfaces in construction areas would be restored to their pre-construction condition, and thus the net effect on post-construction surface water quality would be less than significant.

The creation of new impervious surfaces by Storage component facilities may increase runoff from the site, which in turn could cause local streambank erosion and surface water quality degradation. Project Measure 3.2.24 provides for compliance with local SUSMP requirements (if applicable), which includes designing the Project to minimize the introduction of pollutants and to prevent increases in storm water runoff from the two-year 24-hour storm event for Sonoma County. This measure would limit post-development runoff to pre-development conditions to the maximum extent practical, and thus would reduce potential streambank erosion and surface water quality impacts to a level that is less than significant.

*Pump Station component - Less than Significant: KF1, KF2, BF1, BF2 and AF*

The Pump Station component, including construction of the pump station on the pond embankment and installation of electrical distribution lines either above or below ground, would involve construction that has the potential to disturb soil in waterways and result in a substantial degradation of surface runoff quality. However, Project Measures insure that construction and operation of the Pump Station component would occur such that impacts are less than significant. Measures that are part of the Project include 3.2.2, Revegetate Temporarily Disturbed Sites; 3.2.3, Storm Water Pollution Prevention Plan; 3.2.9 Protect Creeks from Toxic Discharge, and 3.2.24, Standard Urban Stormwater Management Plan (SUSMP).

Mitigation: No mitigation is needed.

**Impact: 6.4. Will the SSP result in non-attainment of established TMDLs?**

Analysis: *Storage component - No Impact: KF1, KF2, BF1, BF2 and AF*

As described under Impacts 6.7.1 and 6.7.2, above, the Storage component is not expected to result in direct or indirect discharge to surface waters; therefore, there would be no effect on TMDL attainment in the Laguna or Russian River due to any of the proposed storage ponds.

*Pump Station component - No Impact: KF1, KF2, BF1, BF2 and AF*

Pump stations would not result in direct or indirect discharge to surface waters, so there would be no effect on TMDL attainment in the Laguna or Russian River due to any of the proposed storage ponds.

Mitigation: No mitigation is needed.

## No Project Alternative

**Impact: 6.1, 6.2 and 6.4. Will the No Project Alternative cause surface water quality impacts based on evaluation criteria 1, 2 and 4?**

Analysis: *Significant*

Under this alternative, the Subregional System would include only storage facilities that were existing as of March 2007.

Without additional storage capacity, the Subregional System would need to seek out other means of complying with temperature and dissolved oxygen objectives for implementation of the Discharge Compliance Project (DCP). These other means would likely consist of cooling towers, adjustment of the rate and/or timing of discharge, storage pond aerators, provision of additional riparian canopy, or a combination of these measures. The DCP Draft EIR (Santa Rosa 2008) concludes that some of these other measures would be effective at achieving compliance with temperature and oxygen objectives if the Laguna Discharge Alternative were to be selected. The DCP Draft EIR also concludes that if the Russian River Discharge Alternative were selected, none of these alternate measures would be fully effective at mitigating temperature impacts in the cumulative condition if the proposed Basin Plan amendment for temperature and dissolved oxygen were approved by the North Coast Regional Water Quality Control Board. No decision has yet been made by either the City or the North Coast Regional Board whether discharge would continue in the Laguna or would need to be relocated to the Russian River.

The impacts of the No Project Alternative are largely speculative. In the event the SSP is not implemented, other approaches would have to be used to ensure compliance with temperature and dissolved oxygen objectives for implementation of the DCP. The approaches that would have to be used would depend on regulatory and permitting decisions that have yet to be made by the Regional Board, particularly with respect to temperature and oxygen objectives. At this time, the most that can be said is that alternative approaches would have to be taken. Which alternative approaches will be implemented cannot be determined at this time<sup>1</sup>.

Although additional seasonal storage capacity could solve the compliance challenges of the DCP regarding temperature and dissolved oxygen, much more capacity would be required than provided by the 500 MG of this Seasonal Storage Project. Up to 970 MG additional capacity would be needed to comply with the proposed Basin Plan Amendment for continued Laguna

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<sup>1</sup> The environmental impacts of the alternative approaches (cooling towers, adjustment of the rate and/or timing of discharge, storage pond aerators, provision of additional riparian canopy, or a combination of these measures) have been evaluated in the DCP Draft EIR (Santa Rosa March 2008) and mitigation measures have been recommended.

Discharge; up to 2,910 MG of additional capacity would be needed for Russian River Discharge<sup>2</sup>.

The Seasonal Storage Project is therefore an important contributor for discharge water quality compliance, but does not solve the challenges for all configurations. Without the SSP, that is, if the No Project alternative were implemented, the options for discharge compliance would be restricted, flexibility in solving discharge challenges would be reduced, and potentially, significant discharge water quality impacts would result, causing a significant and unavoidable impact to numeric and narrative water quality criteria and potential TMDLs.

Mitigation: Not applicable.

**Impact: 6.3. Will the No Project alternative cause result in a substantial degradation of surface runoff quality**

Analysis: *No Impact*

Under the No Project Alternative no new facilities would be constructed or operated. Therefore, the No Project Alternative would not impact surface waters.

Mitigation: Not applicable.

## CUMULATIVE IMPACTS

Potential impacts of the SSP on surface water as described in the impacts analysis above are only through activities such as construction near water bodies. Residential and commercial development allowed by the general plans in the nearby jurisdictions would create potential cumulative impacts on surface water quality from runoff during construction when combined with cumulative project construction:

**Impact: 6.1C, 6.2C and 6.4C. Will the SSP plus cumulative projects cause surface water quality impacts based on evaluation criteria 1, 2 and 4?**

Analysis: *No Impact*

Because the Project does not affect surface waters except during construction, there is no contribution to cumulative impacts.

Mitigation: No mitigation is needed.

**Impact: 6.3C. Will the SSP construction and operation of facilities plus cumulative projects result in a substantial degradation of surface runoff quality?**

Analysis: *Less than Significant*

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<sup>2</sup> The environmental impacts of up to 3,200 MG of additional storage were evaluated in the IRWP Program EIR.

Land development can increase the concentration of water quality constituents in stormwater runoff from the site. Stormwater runoff from some of the cumulative projects could, in turn, affect the water quality of the Russian River, the Laguna, and other waterways. The Santa Rosa Area Urban Runoff and Storm Water NPDES Permit Standard Urban Storm Water Mitigation Plan (SUSMP) and other jurisdictions SUSMPs are designed to reduce stormwater runoff. Additionally, the stormwater permit (draft) for Santa Rosa and Sonoma County Water Agency prohibits discharges from municipal storm sewers (MS4s) from causing or contributing to exceedences of water quality standards or objectives for surface water. Therefore, stormwater discharge from urban sources would not cause significant cumulative impacts, and the contributions of the SSP would not be considerable.

Mitigation: No mitigation is needed.

## SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION MEASURES

**TABLE 4.6-6**

**Summary of Significant Impacts and Mitigation Measures – Surface Water Quality**

Impact	Level of Significance	Mitigation Measure
<b>No Project</b>		
6.1, 6.2 and 6.4. Will the No Project alternative cause surface water quality impacts based on evaluation criteria 1, 2, and 4?	●	Not applicable.

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