Final Water Quality Report Card for

City of Capitola

2013 Urban Watch Results

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Preserving and protecting our coastal watersheds

Introduction

The 2013 Capitola Urban Watch monitoring program was conducted by the Coastal Watershed Council (CWC) for the City of Capitola as part of their National Pollutant Discharge Elimination System (NPDES) Phase II Storm Water Management Program.

The goal of the Urban Watch Program is twofold: First, to serve as a tool for education and outreach to the community regarding the impacts that citizens have on local water quality through urban runoff; and secondly, to collect scientifically valid water quality data to support environmental management decisions at the local and state levels.

The 2013 dry-season monitoring program covered seven sites in the City of Capitola and included fifteen water quality monitoring events, from June through the end of September. During each event, CWC staff led trained teams of volunteers to record field observations and measurements. In addition, samples were collected on a monthly basis for laboratory analysis of nutrients and bacteria indicators, and once during the dry season for copper analysis.

CWC teams follow scientific protocols to ensure that our data are reliable and can be compared to water quality objectives. Water quality objectives ("WQOs") are used by regulators to determine if water quality is sufficient to support the "beneficial uses" of the water body as designated in the official Water Quality Control Plan (usually referred to as the "Basin Plan"). With respect to human activities, common beneficial uses include swimming, drinking water, or irrigation. When a WQO is exceeded, it indicates that the water quality may not be protective of one or more beneficial uses and the water body may be designated as "impaired".

More information and data about water quality in the river or creek nearest your home or business are available on the CWC website at http://coastal-watershed.org/.

The Urban Watch Program started regionally in 1997 as a joint effort between CWC, the City of Monterey, and the Monterey Bay National Marine Sanctuary. Since 2000, the City of Capitola Urban Watch Program has trained citizen volunteers to collect water samples and conduct water quality assessments, following established state and federal protocols.

Methods

Training

All CWC trainings for water quality monitoring focus on imparting knowledge and skills required to follow quality assurance protocols consistent with USEPA and State Water Resources Control Board procedures. CWC's trainings always stress the importance of volunteer safety above all other considerations.

Prior to the summer 2013 Urban Watch monitoring, volunteers received hands-on, in-the-field trainings for basic field water quality tests, including measurements of temperature, pH, dissolved oxygen, electrical conductivity, salinity, total dissolved solids (TDS), chlorine, detergent, and turbidity. They were also taught how to properly collect and preserve water

samples for laboratory analysis of nutrients (nitrate, ammonia, and orthophosphate), bacteria (*Escherichia coli* and total coliform), and copper.

Sites

This report card shows the results for samples collected at seven sites in the City of Capitola: three Soquel Creek stream sites and four storm drainages (two of which are on Noble Gulch Creek and flow through culverts). CWC and staff from the Public Works Department at the City of Capitola chose the stream and outflow/storm drain sites based on drainage basin characteristics and safe access for volunteer monitoring teams. Sites were also chosen to represent the upper, middle and lower reaches of Soquel Creek and its tributaries within the boundaries of the City of Capitola. Details on site characteristics are shown in Appendix A.

Data Collection

Field equipment included a YSI 556 multi-meter, which was used to measure water temperature, pH, electrical conductivity, salinity, TDS, and dissolved oxygen (both total mg/L and as a percentage of saturation), and a Hach turbidimeter to measure turbidity. A spirit bulb thermometer was used to measure air temperature. A portable field monitoring kit was used to test for the presence of chlorine, detergent, odor, and color. Physical observations such as flow, wetted width, weather, and site conditions (trash, oil sheen, scum, sewage sited or smelled, and wildlife) were also recorded on field data sheets.

Sample containers were filled with creek or storm drain water for laboratory analysis of nitrate, orthophosphate, ammonia, *E.*coli, total coliform, and copper. All collected water samples were analyzed as individual grab samples rather than as a composite of samples.

Appendices B and C provide raw data on field and laboratory constituents for each site.

Data Analysis

Monitoring results for nitrate, ammonia, copper, total dissolved solids, dissolved oxygen, pH, and turbidity were compared to the WQOs in Chapter III of the Central Coast Regional Water Quality Control Board's Basin Plan. *E.coli* results were compared to the USEPA 2012 Recreational Water Quality Criteria. Orthophosphate results were compared to the former Central Coast Ambient Monitoring Program (CCAMP) Attention Level. There is no applicable WQO in the Central Coast Basin Plan for total coliform; for report purposes the neighboring San Francisco Basin Plan is referenced. There are no applicable WQO's or attention levels for air temperature, water temperature, electrical conductivity, or salinity.

Exceedances are noted in the presentations of field results in Appendix B and lab results in Appendix C.

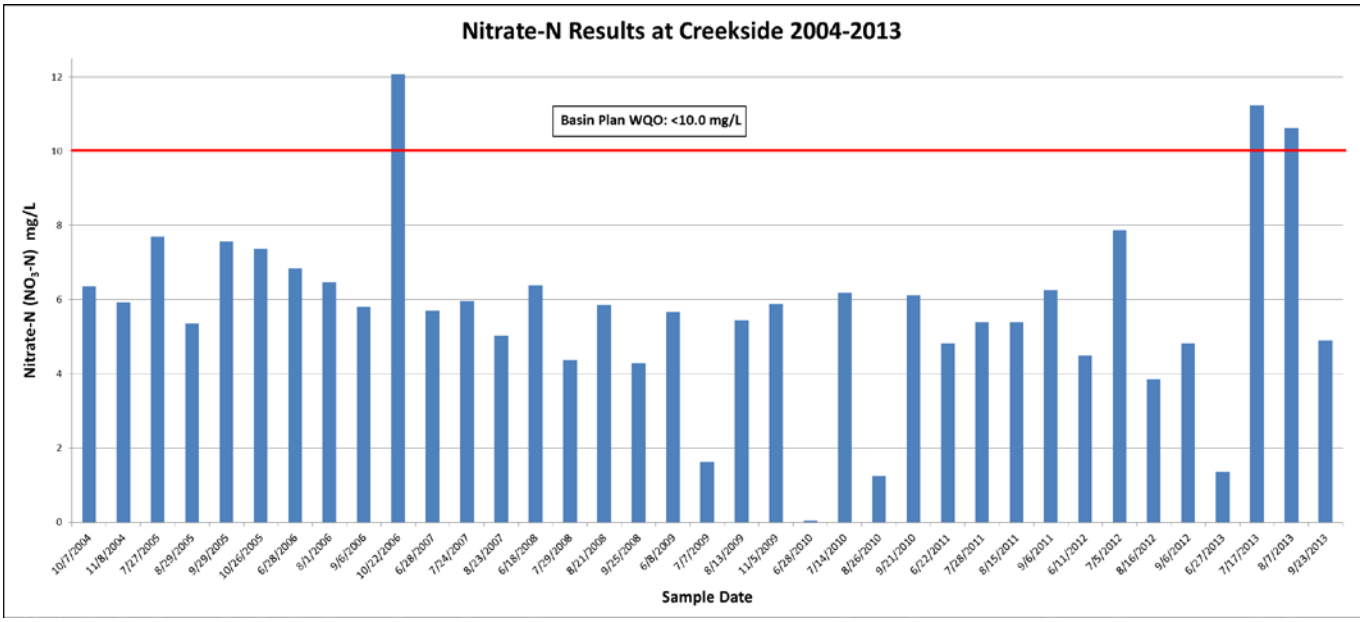
While it is essential to note that WQOs apply only to receiving waters (such as named creeks, rivers, and the Bay), and not to urban runoff discharges, comparisons of urban runoff monitoring results to WQOs provide a frame of reference by which results can be evaluated.

Absent other objective standards to use as a comparison, these WQOs are the most appropriate values to compare to environmental results for both receiving waters and discharges.

Results

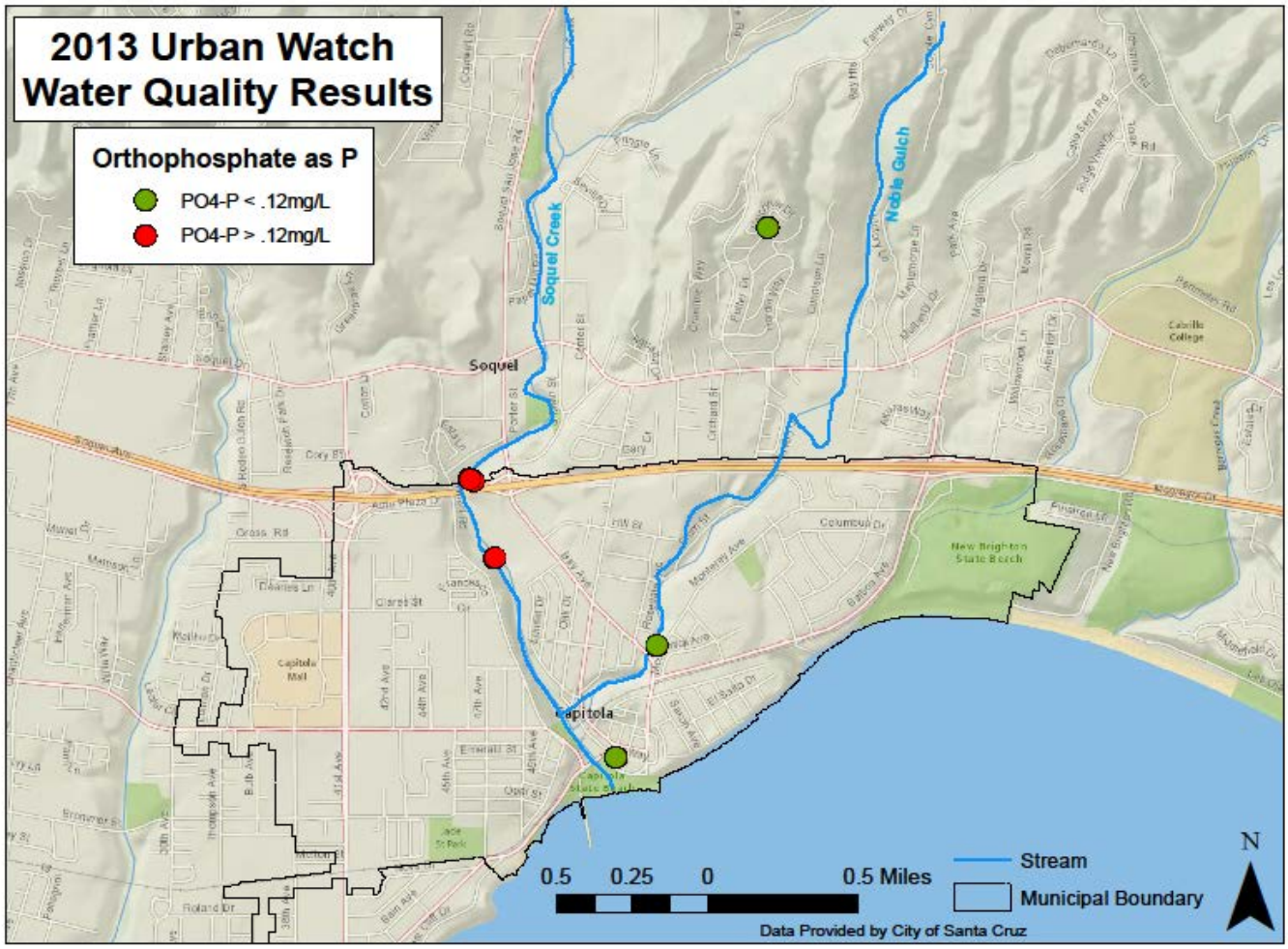
The analytical results from 2013 are provided in Appendix B for the field-measured parameters and in Appendix C for the laboratory-measured constituents. The data were evaluated and combined with historical data to illustrate temporal and spatial trends or patterns, as reflected in the following graphs and map.

The 2013 Urban Watch report cards that follow are designed to facilitate public education and awareness and to engage residents in best management practices in our local watersheds. The Urban Watch Report Card can also be viewed online at: http://coastal-watershed.org/cwc-reports/



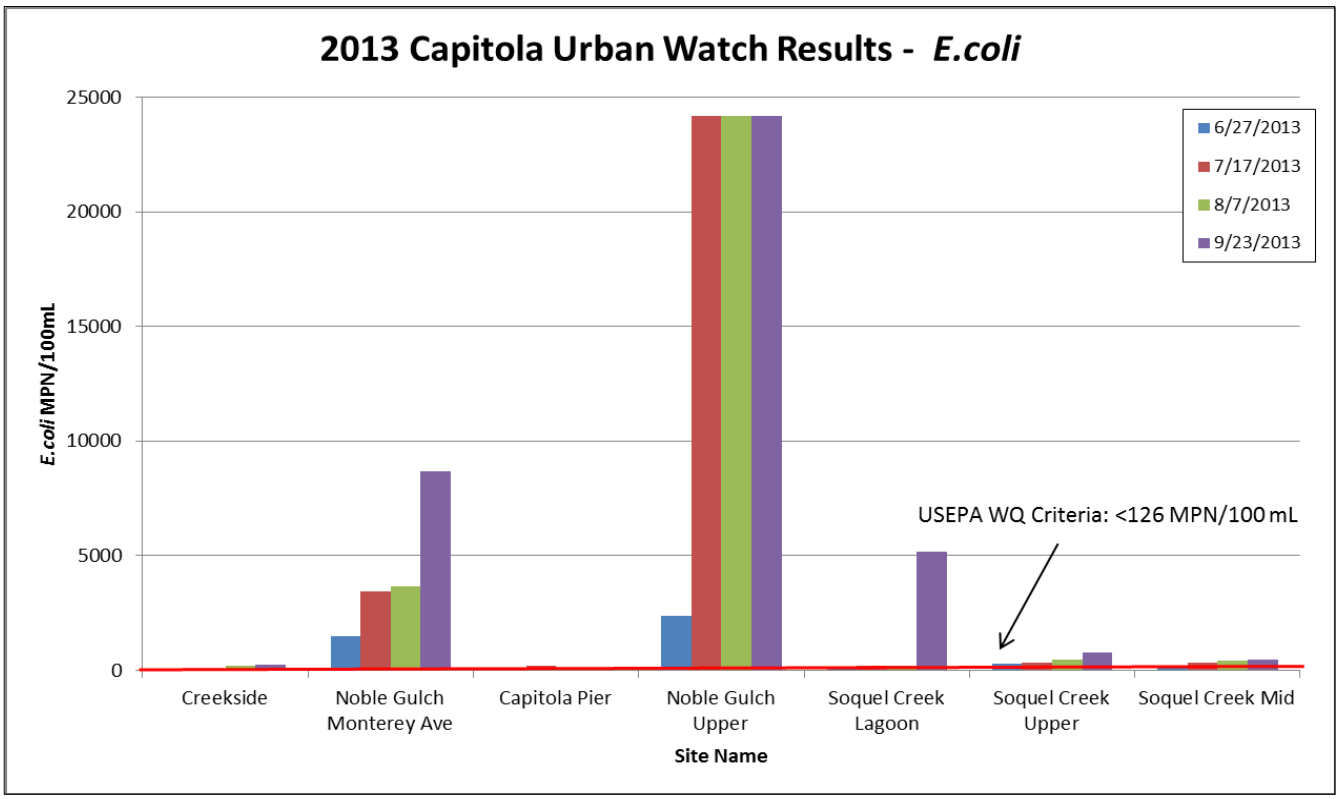
About Nitrate:

- **Historically, Creekside samples from 2004-2013 have the highest nitrate results of all sites**
- **Nitrate is necessary for healthy plant growth, but too much can lead to algal blooms that deplete oxygen in water**
- **Sources: runoff containing fertilizers, animal waste, wash water, industrial waste or sewage, or excess dumping of vegetative material**
- **What you can do: limit the use of chemical fertilizers; wash pets & cars where water won't run into a storm drain (use the lawn); place cut/dead vegetation in yard waste can or compost it.**
- **Learn more at: http://coastal-watershed.org/stewardship/**



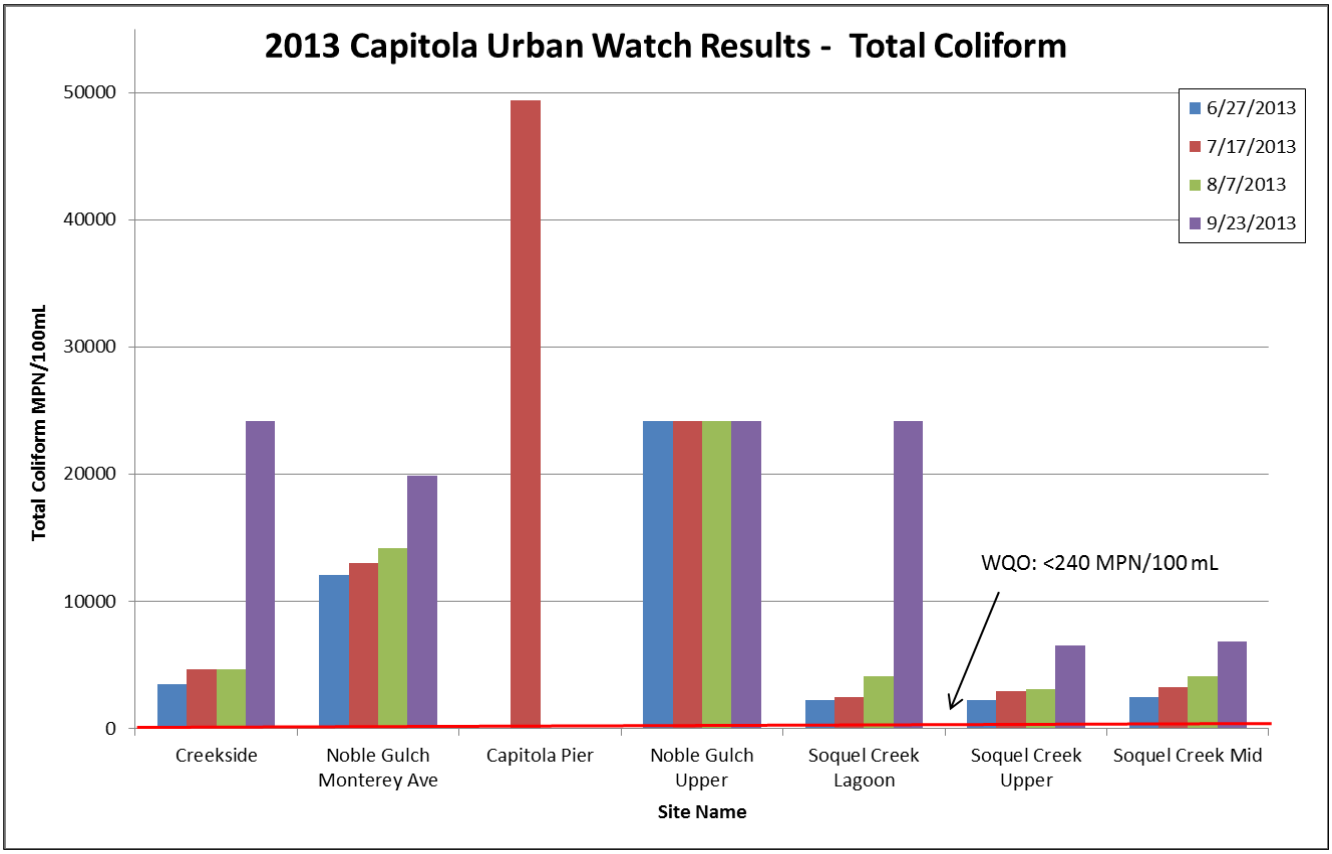
About Orthophosphate:

- **75% (18 of 24) of 2013 samples met the former CCAMP attention level; 25% (6 of 24) exceeded the former attention level**
- **Orthophosphate is a necessary nutrient for aquatic plants, but excess amounts can cause algal blooms, oxygen depletion, and death of fish, invertebrates & other aquatic species.**
- **Sources: runoff from fertilized lawns, field, or animal manure storage areas; wastewater treatment plants; failing septic systems; commercial cleaning products**
- **What you can do: maintain septic systems; limit the use of chemical fertilizers (especially before a rain).**
- **Learn more at: http://coastal-watershed.org/stewardship/**



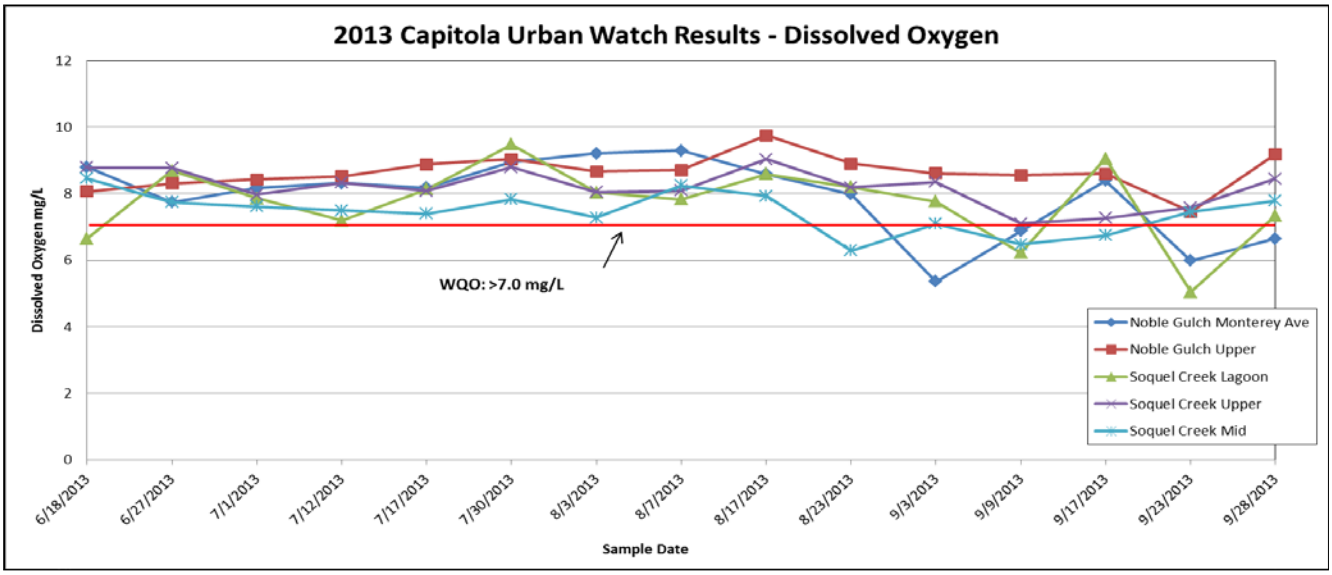
About *E.coli*:

- **8% of sites met the Water Quality Objective (WQO); 92% exceeded the USEPA WQ Criteria during the 2013 season**
- **Historically, highest *E.*coli results are from Soquel Creek Lagoon (2008-2013), Noble Gulch at Monterey Avenue (2005-2013) and Noble Gulch Upper (2010-2013)**
- ***E.coli* is an indicator of fecal pollution in water that may originate from animals or humans**
- **Sources: leaky sewer pipes, failing septic systems, pets, and wildlife (esp. birds)**
- **What you can do: maintain septic systems, clean up after pets, and report leaking sewer lines.**
- **Learn more at: http://coastal-watershed.org/stewardship/**



About Total Coliform:

- **100% of sites exceeded the Water Quality Objective (WQO) during the 2013 season**
- **Historically, highest total coliform results are from Noble Gulch at Monterey Avenue (2005-2013), Noble Gulch Upper (2010-2013), and Capitola Pier (2005-2013)**
- **Total Coliform is an indicator of fecal pollution in water that may originate from animals or humans**
- **Sources: leaky sewer pipes, failing septic systems, pets, and wildlife (esp. birds)**
- **What you can do: maintain septic systems, clean up after pets, and report leaking sewer lines.**
- **Learn more at: http://coastal-watershed.org/stewardship/**



About Dissolved Oxygen:

- **87% of sites met the Water Quality Objective (WQO) level; 13% exceeded the WQO during the 2013 season**
- **Historically, 93% of samples met the WQO from 2010-2013**
- **The amount of oxygen present in the water**
- **Essential for survival and growth of nearly all aquatic organisms & a good indicator of stream health**
- **Low levels can be caused by excess nutrients, warm water temperatures, and /or poor water circulation**
- **Learn more at: http://coastal-watershed.org/what-do-we-monitor/**

Discussion/Conclusions

This report summarizes results for the 2013 City of Capitola Urban Watch Program. Non-compliance with WQOs or attention levels was documented for certain field-measured parameters and some lab-measured constituents, including nutrients (nitrate and orthophosphate) and bacteria (*E.coli* and total coliform). Additionally, comparisons across the years are noted where feasible for these analytes.

Laboratory Constituents

- Nitrate levels were relatively low at all sites in 2013 with the exception of the Creekside (CSD-06) site, where exceedances occurred in two of four laboratory events; levels ranged from 1.35 to 11.24 mg/L NO_3-N.
    - Over a ten-year time period, results at the Creekside site have exceeded the Basin Plan WQO in 3 of 37 results (8%) since 2004, yet results are much higher than other sites. Thirty-three of 37 results ranged from 3.86 – 12.08 mg/L. In comparison, no other sites had exceedances of the WQO during that same time period. Of 123 results at the remaining Urban Watch sites over a ten-year time period eighteen results ranged from 1.03 – 2.36 mg/L; all other results were <1.02 mg/L.

- Orthophosphate met the former CCAMP attention level in 18 of 24 (75%) samples in 2013; in 15 of those samples the result was non-detect. For the six samples that exceeded the former attention level, concentrations ranged from 0.12 to 0.26 mg/L PO_4-P. Of the six exceedances, two were at Creekside, two at Soquel Creek Upper and two at Soquel Creek Nob Hill.
    - Historically, 94% of all samples across ten years met the WQO.

- Ammonia results were non-detect in all samples and therefore met the Basin Plan WQO in 100% of all samples during the 2013 monitoring program. Historically, ammonia has met the attention level in 89% of all samples across ten years.

- *E.coli* met the USEPA water quality criteria in 2 of 25 (8%) samples in 2013. Exceedances were found in all samples from Noble Gulch at Monterey Avenue, Noble Gulch Upper, Soquel Creek Upper, Soquel Creek Mid, Soquel Creek Lagoon, in 2 of 4 samples at Creekside, and in 1 of 1 sample at Capitola Pier.
    - Historically the highest *E.coli* results are from Noble Gulch at Monterey Avenue (97% of all samples across nine years), Noble Gulch Upper (94% of all samples across four years), Soquel Creek Upper (88% of all samples across six years), Soquel Creek Mid (82% of all samples across six years), and Soquel Creek Lagoon (100% of all samples across six years).

- Total coliform results exceeded the Basin Plan WQO of <240 MPN/100 mL in 100% of samples in 2013 (note: there is no applicable WQO in the Central Coast Basin Plan; for report purposes the neighboring San Francisco Basin Plan is referenced).
    - Historically, 1% of all samples across ten years met the WQO.

- Copper was measured in samples taken on 6/27/13. Each sample resulted in a detection of copper, but no results exceeded the Basin Plan WQO of <30.0 μg/L. In 2009 one sample, at the Lagoon Outlet, measured an exceedance of the Basin Plan WQO.

Field-measured Parameters

One turbidity result, one pH result, and ten dissolved oxygen results exceeded their respective Basin Plan WQO (see Appendix B).

Trash continued to be a fairly regular observation by field teams, with most observances at the Pier, Noble Gulch Upper and Soquel Creek Lagoon. Oil sheen was observed 23% of the time and was likely biologic in nature, except one time each at Soquel Creek lagoon and Noble Gulch at Monterey Avenue where it was noted as possibly petroleum based,

Typically the Pier site experiences consistent flow throughout most of the monitoring seasons. However, in the 2013 season, visible flow was observed only one time (on 6/18/13). During that event, specific conductivity, salinity, TDS, turbidity, and detergent results were all high and the water smelled musty and had a rusty brown color, potentially indicating a human source.

Detergent was detected at Creekside in 1 of 8 tests, Monterey Avenue in 2 of 8 tests, Noble Gulch Upper in 4 of 8 tests, and at Capitola Pier in 1 of 1 test (with the highest result of the season at 1.0 ppm). There was one detection of chlorine at the Noble Gulch Upper site on 9/3/2013.

Summary/Follow-up

Where WQOs or attention levels are exceeded, a need for additional investigative and/or remedial work is indicated. While the City's pollution reduction efforts are likely preventing even higher levels of pollution, a particular challenge for coastal communities involves educating visitors, as opportunities for shaping visitor behavior are limited. As in the past, the City is encouraged to focus on visible signage with educational messages and instructions, and strategic placement of waste bins for these audiences.

Soquel Creek is a key natural asset to the local community, and to the larger region. The City of Capitola is acknowledged for its leadership and efforts in striving to not just reduce but eliminate non-point source pollution in the Creek. The approach of partnering with other organizations and engaging the community through citizen-based monitoring is an excellent example for other communities to follow.

Key recommendations to improve water quality for the future include:

1) Continue water quality monitoring involving volunteers from the public at the selected stations. Data from continued monitoring offer opportunities to measure improvements or degradation in water quality over time, and volunteer-based monitoring in particular helps to raise public awareness of local water quality issues.

2) Investigate the potential watershed sources of elevated nitrate levels in the Creekside drainage area.

3) Investigate the potential watershed sources of elevated indicator bacteria levels throughout the study area.

4) Continue and expand outreach programs targeting local populations and visitors to the City, such as strategic signage, environmental film and lecture series, efficient utilization of social media networks and new media (e.g., CWC's Stewardship Toolkit and Data & Stewardship Portal), continued implementation of school-based stormwater education programs, and expansion of public participation in existing monitoring programs.

5) Collaborate with other cities and counties in the region to collectively fund monitoring and education efforts related to NPDES permit requirements, achieving efficiency in funding and sharing of success stories and challenges.

CWC will continue to partner with the City in water quality monitoring to engage the public and generate useful data to measure the effectiveness of public education and infrastructure investments. With support from the City of Capitola Public Works Department, CWC has been and will continue to host a series of environmental water tours free to the public, to facilitate greater public understanding and appreciation of local water resources.

Volunteers collecting this valuable information play a key role in our community as stewards of our watersheds. The information they provide is used by resource agencies, local governments and community groups to protect and improve the health of our local streams.

The results in this report and from other monitoring programs can be used to facilitate pollution prevention efforts by identifying which constituents are of greatest concern. Environmental data, by their very nature, are extremely variable, and conclusions are often difficult to make based on limited data points. Nonetheless, these results are of use in shaping regional programs to inform the public about environmental stewardship.

CWC's mission is to preserve and protect coastal watersheds through community stewardship, education and monitoring. The Urban Watch program and the partnership between CWC and the City of Capitola represent a collaboration that supports the goals of each organization and benefits the overall community.

More information about local water quality data is available at http://coastal-watershed.org or by contacting Debie Chico-Macdonald at (831) 464-9200 or djchirco@coastal-watershed.org.

Appendix A: 2013 City of Capitola Urban Watch sites

Site ID	Site name	Site Description	LAT	LONG
304-CSD-06	Creekside	From Porter Street (Bay Street turns into Porter after HWY 1) turn left at the stop light into Creekside Plaza. Park at the very end of the parking lot, close to the freeway overpass. There will be a trail that leads to the creek. Before reaching the freeway overpass, the storm drain will be to your right, on the hill.	36.9834	-121.9588
304-CSD-08	Noble Gulch @ Monterey Avenue	At Noble Gulch Park on Monterey Ave	36.9770	-121.9500
304-CSD-09	Capitola Pier	Under the Capitola Pier	36.9713	-121.9538
304-CSD-10	Noble Gulch Upstream	(Directions from the North) From Bay Street, pass Capitola Avenue and proceed down Monterey Avenue. Pass New Brighton Middle Scool and turn left on Kennedy Drive. Park the at the City of Capitola Maintenance Yard. Walk right out of the parking lot along the road and go down the hill to the downstream side of the culvert.	36.9933	-121.9447
304-SOQUE-22	Lagoon Outlet	At mouth of Soquel Creek	36.9726	-121.9520
304-SOQUE-26	Soquel Creek - Uppper	At Creekside Plaza	36.9835	-121.9590
304-SOQUE-28	Soquel Creek - Mid	Behind Nob Hill on Bay Avenue	36.9804	-121.9578

Appendix B: 2013 Field Results

Appendix B provides the summary of field results for each parameter at each site. Results that exceed the applicable WQO or attention level are shaded in order to highlight these results. Not all tests were performed during every monitoring event (detergent tests were every other event and the Pier had measureable water during one event); these instances are listed as "NA" when the test was not performed or "NR" if the datum was not recorded. Applicable WQOs and attention levels are as follows:

Analyte	WQO or Attention Level	Averaging Period	Units	Source of WQO/AL
Air Temperature	NA	NA		NA
Water Temperature	Not Evaluated	Inst. Value	°C	CCRWQCB Basin Plan Objective for Cold Water Habitat
Specific Conductivity	NA	NA		NA
TDS	San Lorenzo @ Bear Creek: 400 & @ Tait St. Check Dam 250	Annual Average Mean	mg/L	CCRWQCB Basin Plan
Salinity	NA	NA		NA
Dissolved Oxygen	>7	Inst. Value	mg/L	CCRWQCB Basin Plan Objective for Cold Water Habitat
pH	>7.0 and <8.5	Inst. Value	pH units	CCRWQCB Basin Plan Objective for Cold Water Habitat
Turbidity	Not Evaluated	Inst. Value	NTU	CCRWQCB Basin Plan

CSD-06: Creekside Storm Drain

Date	Air Temperature	Water Temperature	Specific Conductivity	TDS	Salinity	pH	Turbidity	Flow Depth	Wetted Width	Trash	Sewage	Oil Sheen	Scum	Detergent	Chlorine	Odor	Color
	°C	°C	uS/cm	g/L	ppt		FTU	cm	cm	T/F	T/F	T/F	T/F	ppm	ppm	T/F	BCS#
6/18/2013	16.5	14.4	654	0.425	0.32	7.5	0.74	0.2	12.5	F	F	F	F	<0.1	<0.2	F	93
6/27/2013	22.5	16.1	672	0.437	0.33	7.8	1.11	0.2	7.0	F	F	F	F	NA	<0.2	F	93
7/1/2013	17.0	15.2	689	0.448	0.34	8.0	0.49	0.2	8.8	T	F	F	T	<0.1	<0.2	F	93
7/12/2013	15.0	14.9	674	0.438	0.33	8.0	0.40	0.3	7.0	F	F	F	F	<0.1	<0.2	F	93
7/17/2013	15.5	14.9	692	0.45	0.34	7.9	0.49	0.3	6.0	F	F	F	F	NA	<0.2	F	93
7/30/2013	16.5	15.1	669	0.435	0.33	8.0	0.43	0.2	16.0	F	F	F	F	<0.1	<0.2	F	93
8/3/2013	13.5	NA	NA	NA	NA	NA	0.53	0.1	5.0	F	F	F	F	NA	<0.2	F	93
8/7/2013	15.0	15.0	683	0.444	0.34	7.6	0.33	0.4	8.0	T	F	F	F	<0.1	<0.2	F	93
8/17/2013	19.0	16.0	659	0.429	0.32	7.9	2.13	0.5	17.0	F	F	F	F	NA	<0.2	F	93
8/23/2013	15.5	15.4	669	0.435	0.33	8.1	0.27	0.4	7.7	F	F	F	T	<0.1	<0.2	F	93
9/3/2013	23.0	18.0	675	0.439	0.33	7.8	0.67	0.1	13.8	F	F	F	F	NA	<0.2	F	93
9/9/2013	15.5	16.0	645	0.419	0.32	7.9	0.34	0.3	12.0	F	F	F	F	<0.1	<0.2	F	93
9/17/2013	16.0	15.5	672	0.437	0.33	7.8	0.44	0.2	22.5	F	F	F	F	NA	<0.2	F	93
9/23/2013	16.0	15.1	665	0.432	0.33	7.8	0.33	0.1	20.5	T	F	F	F	<0.2	<0.2	F	93
9/28/2013	20.0	14.5	687	0.447	0.34	7.9	2.66	0.1	14.5	F	F	F	F	NA	<0.2	F	91

CSD-08: Noble Gulch at Monterey Avenue

Date	Air Temperature	Water Temperature	Specific Conductivity	TDS	Salinity	Dissolved Oxygen	pH	Turbidity	Flow Depth	Wetted Width	Trash	Sewage	Oil Sheen	Scum	Detergent	Chlorine	Odor	Color
	°C	°C	uS/cm	g/L	ppt	mg/L		FTU	cm	cm	T/F	T/F	T/F	T/F	ppm	ppm	T/F	BCS#
6/18/2013	20.0	15.9	621	0.404	0.30	8.79	7.9	3.85	1.1	36.0	T	F	F	F	<0.1	<0.2	F	93
6/27/2013	20.5	17.9	569	0.370	0.28	7.74	7.4	3.78	1.1	33.0	F	F	T	T	NA	<0.2	F	93
7/1/2013	18.0	15.9	641	0.417	0.31	8.17	7.6	4.22	1.1	38.0	F	F	T	T	<0.2	<0.2	F	93
7/12/2013	13.5	14.5	607	0.395	0.30	8.32	7.4	3.96	1.0	10.0	T	F	T	F	<0.1	<0.2	F	92
7/17/2013	19.0	15.8	614	0.399	0.30	8.18	7.5	3.88	1.1	28.5	T	F	F	T	NA	<0.2	F	93
7/30/2013	18.5	15.8	606	0.394	0.30	8.95	7.9	4.66	1.1	40.5	T	F	F	T	<0.1	<0.2	F	93
8/3/2013	15.5	14.8	604	0.392	0.29	9.21	7.7	3.58	0.9	35.0	F	F	F	F	NA	<0.2	F	93
8/7/2013	19.5	15.7	456	0.296	0.22	9.29	7.7	3.41	1.0	35.5	F	F	F	T	<0.1	<0.2	F	91
8/17/2013	20.0	17.1	592	0.385	0.29	8.59	7.6	2.68	0.8	16.5	F	F	T	F	NA	<0.2	F	91
8/23/2013	15.8	15.8	611	0.397	0.30	7.98	7.7	3.33	1.0	41.0	F	F	T	T	<0.1	<0.2	F	93
9/3/2013	21.5	17.1	622	0.404	0.30	5.36	7.2	2.38	0.9	28.2	F	F	T	F	NA	<0.2	F	36
9/9/2013	16.0	15.8	595	0.386	0.29	6.87	7.5	0.83	1.2	29.0	T	F	F	F	<0.1	<0.2	F	93
9/17/2013	18.0	14.8	602	0.392	0.29	8.39	7.8	1.59	2.0	18.5	NR	NR	NR	NR	NA	<0.2	F	93
9/23/2013	18.0	14.2	600	0.390	0.29	5.99	7.3	3.91	0.9	46.5	F	F	T	F	<0.2	<0.2	F	36
9/28/2013	24.5	13.5	608	0.395	0.30	6.65	7.3	2.89	0.9	29.5	F	F	F	F	NA	<0.2	F	91

CSD-09: Capitola Pier Storm Drain

Date	Air Temperature	Water Temperature	Specific Conductivity	TDS	Salinity	pH	Turbidity	Flow Depth	Wetted Width	Trash	Sewage	Oil Sheen	Scum	Detergent	Chlorine	Odor	Color
	°C	°C	uS/cm	g/L	ppt		FTU	cm	cm	T/F	T/F	T/F	T/F	ppm	ppm	T/F	BCS#
6/18/2013	23.0	22.2	5012	3.258	2.70	7.70	71.80	0.1	8.0	F	F	F	F	1.0	0.2	T	60
6/27/2013	21.0	NA	NA	NA	NA	NA	NA	NA	NA	T	NA	NA	NA	NA	NA	NA	NA
7/1/2013	16.0	NA	NA	NA	NA	NA	NA	NA	NA	F	NA	NA	NA	NA	NA	NA	NA
7/12/2013	15.0	NA	NA	NA	NA	NA	NA	NA	NA	F	NA	NA	NA	NA	NA	NA	NA
7/17/2013	16.5	NA	NA	NA	NA	NA	NA	NA	NA	T	NA	NA	NA	NA	NA	NA	NA
7/30/2013	18.0	NA	NA	NA	NA	NA	NA	NA	NA	F	NA	NA	NA	NA	NA	NA	NA
8/3/2013	13.5	NA	NA	NA	NA	NA	NA	NA	NA	T	NA	NA	NA	NA	NA	NA	NA
8/7/2013	16.0	NA	NA	NA	NA	NA	NA	NA	NA	T	NA	NA	NA	NA	NA	NA	NA
8/17/2013	16.5	NA	NA	NA	NA	NA	NA	NA	NA	T	NA	NA	NA	NA	NA	NA	NA
8/23/2013	17.0	NA	NA	NA	NA	NA	NA	NA	NA	F	NA	NA	NA	NA	NA	NA	NA
9/3/2013	22.0	NA	NA	NA	NA	NA	NA	NA	NA	T	NA	NA	NA	NA	NA	NA	NA
9/9/2013	15.0	NA	NA	NA	NA	NA	NA	NA	NA	T	NA	NA	NA	NA	NA	NA	NA
9/17/2013	18.5	NA	NA	NA	NA	NA	NA	NA	NA	F	NA	NA	NA	NA	NA	NA	NA
9/23/2013	17.0	NA	NA	NA	NA	NA	NA	NA	NA	NR	NA	NA	NA	NA	NA	NA	NA
9/28/2013	17.5	NA	NA	NA	NA	NA	NA	NA	NA	T	NA	NA	NA	NA	NA	NA	NA

CSD-10: Noble Gulch Upper

Date	Air Temperature	Water Temperature	Specific Conductivity	TDS	Salinity	Dissolved Oxygen	pH	Turbidity	Flow Depth	Wetted Width	Trash	Sewage	Oil Sheen	Scum	Detergent	Chlorine	Odor	Color
	°C	°C	uS/cm	g/L	ppt	mg/L		FTU	cm	cm	T/F	T/F	T/F	T/F	ppm	ppm	T/F	BCS#
6/18/2013	20.5	14.6	612	0.398	0.30	8.07	7.6	2.03	0.4	79.0	T	F	F	T	<0.1	<0.2	F	93
6/27/2013	20.0	16.3	714	0.464	0.35	8.31	7.5	1.53	0.3	147.0	T	F	T	T	NA	<0.2	F	93
7/1/2013	17.5	14.8	646	0.420	0.32	8.42	7.6	2.57	0.3	169.0	T	T	NR	T	<0.2	<0.2	F	93
7/12/2013	13.5	14.2	603	0.392	0.29	8.52	7.4	1.94	0.4	170.0	T	T	T	F	<0.1	<0.2	F	93
7/17/2013	17.0	14.6	604	0.392	0.29	8.88	7.7	2.09	0.6	68.0	T	F	F	T	NA	<0.2	F	93
7/30/2013	18.5	14.8	677	0.440	0.33	9.03	7.6	3.73	0.3	168.0	F	F	F	T	<0.1	<0.2	F	93
8/3/2013	14.5	14.2	562	0.365	0.27	8.66	7.7	4.28	0.3	166.0	T	T	F	T	NA	<0.2	F	93
8/7/2013	17.0	14.9	619	0.402	0.30	8.71	7.8	2.12	0.4	142.0	F	F	F	T	<0.1	<0.2	F	91
8/17/2013	19.0	15.6	552	0.359	0.27	9.75	7.7	7.74	0.4	170.0	T	F	F	T	NA	<0.2	F	91
8/23/2013	18.5	15.2	743	0.483	0.37	8.90	7.8	3.30	0.4	68.5	T	F	F	T	<0.2	<0.2	F	93
9/3/2013	23.0	16.7	516	0.335	0.25	8.61	7.4	3.72	0.4	182.0	T	F	T	T	NA	<0.4	F	120
9/9/2013	16.5	15.3	612	0.398	0.30	8.56	7.5	4.07	0.4	172.0	F	F	F	T	<0.2	<0.2	F	93
9/17/2013	17.5	15.2	581	0.378	0.28	8.60	7.8	3.35	0.3	170.0	F	F	F	T	NA	<0.2	F	93
9/23/2013	18.0	14.8	569	0.370	0.28	7.45	7.4	4.15	0.2	149.4	F	F	F	T	<0.2	<0.2	F	93
9/28/2013	22.5	14.6	531	0.345	0.26	9.18	7.4	5.20	0.2	173.7	F	F	T	T	NA	<0.2	F	97

SOQUE-22: Soquel Creek Lagoon

Date	Air Temperature	Water Temperature	Specific Conductivity	TDS	Salinity	Dissolved Oxygen	pH	Turbidity	Flow depth	Wetted Width	Trash	Sewage	Oil Sheen	Scum	Chlorine	Odor	Color
	°C	°C	uS/cm	g/L	ppt	mg/L		FTU	cm	cm	T/F	T/F	T/F	T/F	ppm	T/F	BCS#
6/18/2013	20.0	20.5	824	0.535	0.40	6.65	7.9	1.06	NA	NA	T	F	F	F	<0.2	F	93
6/27/2013	23.0	20.3	287	0.186	0.14	8.69	7.8	1.72	NA	NA	T	F	T	T	<0.2	F	93
7/1/2013	17.0	21.5	907	0.590	0.45	7.86	7.7	2.01	NA	NA	T	F	F	F	<0.2	F	93
7/12/2013	15.0	20.8	887	0.577	0.44	7.19	7.9	1.46	NA	NA	F	F	F	T	<0.2	F	93
7/17/2013	17.0	20.5	896	0.582	0.44	8.13	8.0	1.75	NA	NA	T	F	F	T	<0.2	F	93
7/30/2013	20.0	20.2	882	0.573	0.43	9.48	8.1	1.35	NA	NA	T	F	F	F	<0.2	F	93
8/3/2013	15.0	20.3	883	0.574	0.44	8.03	7.6	1.07	NA	NA	T	F	F	F	<0.2	F	93
8/7/2013	18.0	19.6	905	0.588	0.45	7.83	8.0	1.24	NA	NA	F	F	F	F	<0.2	F	93
8/17/2013	17.0	21.4	893	0.580	0.44	8.59	7.8	1.04	NA	NA	T	F	F	F	<0.2	F	91
8/23/2013	18.0	21.2	918	0.596	0.45	8.20	8.1	0.96	NA	NA	F	F	F	F	<0.2	F	93
9/3/2013	23.0	22.7	934	0.607	0.46	7.76	8.0	1.01	NA	NA	T	F	F	F	<0.2	F	93
9/9/2013	16.5	21.8	944	0.613	0.47	6.23	7.9	1.08	NA	NA	F	F	F	T	<0.2	F	93
9/17/2013	19.5	20.5	992	0.645	0.49	9.05	8.1	1.72	NA	NA	F	F	F	T	<0.2	F	93
9/23/2013	18.0	18.6	532	0.346	0.26	5.04	7.5	1.40	NA	NA	T	F	F	T	<0.2	F	93
9/28/2013	18.0	17.7	888	0.577	0.44	7.34	7.5	1.18	NA	NA	T	0	F	F	<0.2	F	91

SOQUE-26: Soquel Creek Upper

Date	Air Temperature	Water Temperature	Specific Conductivity	TDS	Salinity	Dissolved Oxygen	pH	Turbidity	Flow depth	Wetted Width	Trash	Sewage	Oil Sheen	Scum	Chlorine	Odor	Color
	°C	°C	uS/cm	g/L	ppt	mg/L		FTU	cm	cm	T/F	T/F	T/F	T/F	ppm	T/F	BCS#
6/18/2013	16.5	16.0	251	0.163	0.12	8.78	8.0	0.62	26.0	1200	T	F	F	F	<0.2	F	93
6/27/2013	22.5	18.7	393	0.256	0.19	8.77	8.0	0.58	30.6	1197	F	F	F	F	<0.2	F	93
7/1/2013	17.0	17.2	796	0.517	0.39	7.97	7.9	0.81	24.0	1246	F	F	F	F	<0.2	F	93
7/12/2013	15.0	16.1	763	0.496	0.38	8.33	8.0	0.72	28.5	1138	F	F	F	F	<0.2	F	93
7/17/2013	15.5	16.1	473	0.308	0.23	8.08	7.4	0.69	26.9	1231	F	F	F	F	<0.2	F	93
7/30/2013	16.5	16.5	749	0.487	0.37	8.79	7.7	0.50	19.0	1165	F	F	F	F	<0.2	F	93
8/3/2013	13.5	15.8	745	0.484	0.37	8.05	7.7	1.31	22.0	1175	F	F	F	F	<0.2	F	93
8/7/2013	16.2	16.2	755	0.491	0.37	8.09	7.1	0.83	21.5	1170	T	F	F	F	<0.2	F	93
8/17/2013	19.0	17.8	738	0.480	0.36	9.03	7.8	0.82	16.4	1193	T	F	F	F	<0.2	F	91
8/23/2013	15.5	16.4	742	0.482	0.36	8.19	7.8	0.79	16.8	1145	T	F	F	F	<0.2	F	93
9/3/2013	23.0	19.8	733	0.476	0.36	8.35	7.9	1.15	14.6	1185	F	F	T	T	<0.2	F	93
9/9/2013	15.5	16.3	711	0.462	0.35	7.10	7.5	1.24	18.0	1150	F	F	F	F	<0.2	F	93
9/17/2013	16.0	15.3	443	0.288	0.21	7.26	7.4	3.01	18.0	1160	F	F	F	F	<0.2	F	93
9/23/2013	16.0	14.5	706	0.459	0.35	7.58	7.6	0.66	23.0	1231	T	F	F	F	<0.2	F	93
9/28/2013	20.0	13.8	773	0.502	0.38	8.45	7.6	3.08	22.5	1234	F	F	T	F	<0.2	F	92

SOQUE-28: Soquel Creek Mid

Date	Air Temperature	Water Temperature	Specific Conductivity	TDS	Salinity	Dissolved Oxygen	pH	Turbidity	Flow depth	Wetted Width	Trash	Sewage	Oil Sheen	Scum	Chlorine	Odor	Color
	°C	°C	uS/cm	g/L	ppt	mg/L		FTU	cm	cm	T/F	T/F	T/F	T/F	ppm	T/F	BCS#
6/18/2013	21.0	16.9	458	0.298	0.22	8.46	8.0	0.69	45.5	1325	F	F	F	F	<0.2	F	93
6/27/2013	20.5	17.9	787	0.511	0.39	7.74	7.6	0.52	53.1	1290	T	T	T	F	<0.2	F	93
7/1/2013	20.0	17.8	821	0.533	0.40	7.61	8.0	0.98	44.0	1550	F	F	F	T	<0.2	F	93
7/12/2013	17.0	16.4	766	0.498	0.38	7.49	7.9	0.79	46.0	1302	T	F	F	F	<0.2	F	93
7/17/2013	18.0	16.5	773	0.502	0.38	7.40	7.9	0.70	38.5	1321	T	F	F	F	<0.2	F	93
7/30/2013	20.0	16.3	536	0.348	0.26	7.83	7.4	0.75	46.3	1341	T	F	F	F	<0.2	F	93
8/3/2013	14.0	15.9	536	0.348	0.26	7.28	7.6	0.73	43.0	1310	F	F	T	F	<0.2	F	93
8/7/2013	17.0	16.1	760	0.494	0.37	8.24	7.4	0.67	49.0	1320	F	F	T	F	<0.2	F	93
8/17/2013	17.5	18.9	744	0.484	0.36	7.93	7.7	0.96	44.0	1335	F	F	T	F	<0.2	F	91
8/23/2013	16.5	16.6	750	0.487	0.37	6.29	6.8	0.86	48.0	1325	F	F	F	F	<0.2	F	93
9/3/2013	24.0	20.7	748	0.486	0.37	7.09	7.8	1.42	40.8	1310	F	F	T	F	<0.2	F	93
9/9/2013	15.5	16.7	731	0.475	0.36	6.47	7.7	0.94	40.5	1340	T	F	T	F	<0.2	F	93
9/17/2013	16.0	16.0	660	0.429	0.32	6.75	7.7	2.08	38.0	1302	F	F	F	T	<0.2	F	93
9/23/2013	20.0	15.6	705	0.458	0.35	7.45	7.8	0.48	40.5	1341	F	F	F	T	<0.2	F	36
9/28/2013	21.5	15.2	782	0.509	0.39	7.79	7.6	0.89	37.0	1314	T	F	T	F	0.2	F	91

Appendix C: 2013 Laboratory Results

Appendix C provides a summary of laboratory results for each constituent at each site. Results that exceed the applicable WQO or attention level are shaded in order to highlight these results. Not all tests were performed during every lab event (the Pier had measureable water during one event, but only enough to run bacteria tests); these instances are listed as "NA" when the test was not performed. Applicable WQOs and attention levels are as follows:

Analyte	WQO or Attention Level	Averaging Period	Units	Source of WQO/AL
Nitrate (NO_3-N)	<10.0	Inst. Value	mg/L	CCRWQCB Basin Plan
Orthophosphate (PO_4-P)	<0.12	Inst. Value	mg/L	Former CCAMP Attention Level
Ammonia (NH_3)	<0.025	Annual Average Mean	mg/L	CCRWQCB Basin Plan
E.coli	126	Geo Mean/30 day	MPN/100 mL	USEPA 2012 Recreational WQ Criteria
Total Coliform*	<240	Median/30 day	MPN/100 mL	SF Bay Region Basin Plan for Water Contact Recreation
Copper (Cu) **	<30	Inst. Value	µg/L	CCRWQCB Basin Plan

* Total coliform: there is no applicable WQO in the CCRWQCB Basin Plan; for report purposes the neighboring SF Basin Plan is referenced.

* Listed copper WQO pertains to hard water, with hardness of >100 mg/L CaCO3

Constituent	WQO or Attention Level	Site Name	Creekside	Monterey Ave.	Pier	Noble Gulch	Lagoon Outlet	Soquel Creek Upper	Soquel Creek Mid
		Site ID	CSD-06	CSD-08	CSD-09	CSD-10	SOQUE-22	SOQUE-26	SOQUE-28
		Type	SD	SD	SD	SD	Stream	Stream	Stream
		Date							
Nitrate (NO_3-N)	<10.0 ppm	6/27/2013	1.35	1.59	NA	ND	ND	ND	0.08
		7/17/2013	11.24	0.51	NA	1.23	ND	ND	ND
		8/7/2013	10.62	0.55	NA	1.23	ND	ND	ND
		9/23/2013	4.90	0.21	NA	0.55	ND	ND	ND
Orthophosphate (PO_4-P)	0.12 ppm	6/27/2013	ND	ND	NA	ND	ND	ND	ND
		7/17/2013	ND	ND	NA	ND	ND	ND	ND
		8/7/2013	0.19	ND	NA	ND	ND	0.14	0.12
		9/23/2013	0.12	0.06	NA	0.08	0.08	0.26	0.16
Ammonia (NH_3)	0.025 ppm	6/27/2013	ND	ND	NA	ND	ND	ND	ND
		7/17/2013	ND	ND	NA	ND	ND	ND	ND
		8/7/2013	ND	ND	NA	ND	ND	ND	ND
		9/23/2013	ND	ND	NA	ND	ND	ND	ND
E.coli	126 MPN/100 mL	6/27/2013	20	8664	NA	24196	213	318	350
		7/17/2013	199	1500	194	2359	158	298	189
		8/7/2013	245	3448	NA	24196	189	448	402
		9/23/2013	75	3654	NA	>24196	5172	794	441
Total Coliform	<240 MPN/100 mL	6/27/2013	3448	19863	NA	24196	2247	3076	2481
		7/17/2013	4611	12033	49392	24196	4106	2247	6867
		8/7/2013	4611	12997	NA	24196	2488	6488	4106
		9/23/2013	>24196	14136	NA	>24196	>24196	2909	3255
Copper (Cu)	30.0 µg/L	6/27/2013	3.4	0.74	NA	J 0.27	1.1	0.61	0.64

Shading indicates results above WQO

ND = Non-detect result

NA = Not analyzed/no sample

J = reflects estimated analytical result value detected below the Reporting Limit (RL) and above the Method Detection Limit (MDL)