

Monterey Urban Watch Report 2009

Prepared for
The City of Monterey, California



This program was administered in partnership with the City of Monterey and the Monterey Bay National Marine Sanctuary

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PROGRAM OVERVIEW

The City of Monterey Urban Watch storm drain monitoring program was initiated in June 1997 as a collaborative effort between the Coastal Watershed Council (CWC), the City of Monterey and the Water Quality Protection Program of the Monterey Bay National Marine Sanctuary. The purpose of this project is twofold: first is to serve as a tool for education and outreach to the general community regarding the impacts that the citizens have on local water quality; and secondly, to collect useful data to support local environmental management decisions. This is accomplished through the use of trained volunteers to monitor dry-season storm drain discharges at selected outflow areas from June through October-November of each monitoring year.

Working with staff from the City of Monterey Public Works Department, five sampling sites were selected based on drainage basin and safe access for volunteers. Figure 1 shows the locations of these sites. The five sampling sites are referred to as: (1) *Steinbeck Plaza* located at the end of Prescott Street on Cannery Row; (2) *Twin 51* located near the recreation trail at Heritage Harbor west of Fisherman’s Wharf; (3) *San Carlos* at San Carlos Beach near the Breakwater; (4) *El Dorado* aka Jack on Major Sherman Lane at El Dorado Street, north of Highway 1, Del Monte Shopping Center and Don Dahvee Park; and (5) *Library*, corner of Pacific Street and Madison Street.

Each site of the 2009 Urban Watch program is characterized as follows:

Station Name	Station ID	Drainage Area (acres)	Primary Land Use	Description	Location	Receiving Water
El Dorado (aka Jack) (Monterey)	MSD1		80% residential 20% commercial	Drainage ditch	Intersection of Major Sherman Lane at El Dorado Street	Lake
Twin 51 (Monterey)	MSD3	365	90% residential 10% commercial	Two 51' diameter concrete pipes	Below walking path at Heritage Harbor-adjacent to Wharf I, west ~500ft.	Ocean
San Carlos (Monterey)	MSD4	70	40% commercial 35% residential 25% public land	36' diameter concrete pipe	On the beach adjacent to the west side of Coast Guard pier.	Ocean
Steinbeck (Monterey)	MSD5	37	90% commercial 10% residential	36' diameter concrete pipe	At Steinbeck Plaza on Cannery Row at the end of Prescott Street	Ocean
Library (Monterey)	MSD6	467	100% residential	Drainage ditch	665 Pacific Street adjacent to the Monterey Public Library on the northeast side of Pacific Street.	Ocean

PROGRAM DESIGN

The program used the storm drain monitoring kit manufactured by the LaMotte Company (SSDK 7446) and designed in association with the City of Ft. Worth, Texas and the US Environmental Protection Agency (EPA) in 1990. The monitoring kit is designed to provide a method for volunteers to monitor dry-season storm drain discharges to identify common urban pollutants and contaminants within the study area. The kit was developed according to National Pollutant Discharge Elimination System (NPDES) Phase I dry weather monitoring requirements and is

designed to detect illegal storm drain connections and discharges. To this pre-assembled kit, we added the Oakton 'ECTestr' conductivity meters and a Hanna Instruments Low Reading Orthophosphate hand-held meter for measuring orthophosphates, and replaced the Oakton 'pHTestr' meter with pH strips for ease of use by volunteers.

Following a half-day training, thirteen volunteers were instructed to conduct sampling on a bi-monthly schedule. Of the thirteen volunteers, five were returning veterans. Volunteers were divided into two teams: a daytime team that monitored during the morning hours and the evening team that monitored after 5:00pm. Each team had 6-7 members to contact for availability to monitor on selected days. Samples times and dates were randomized through a flexible schedule with the volunteers. Parameters monitored included detergent surfactants, orthophosphates, ammonia nitrogen, chlorine, turbidity, pH, conductivity, water and air temperature, odor, and color. Volunteers also noted if there was oil sheen, sewage, trash, and surface scum present. They also determined turbidity visually using a "Low-Medium-High" designation, as well as any other observations of note. Trash was collected and tabulated by the volunteers on each site visit. Table 1 includes information on each of the parameters monitored and methods used for monitoring.

The Urban Watch Program culminates with the First Flush monitoring wherein the volunteers capture water samples from the storm drains monitored for the Urban Watch program during the first significant rain of the wet season. This rain covers the streets and flushes the gutters and storm drains of collected materials and pollutants that accumulate throughout the dry-season. Infield measurements of water temperature, conductivity, pH, and an assessment of transparency are taken by volunteers at the site, and samples are collected and sent to a professional lab where analysis for nitrate, orthophosphates, zinc, copper, lead, hardness, total coliform and *E. coli.*, are performed. The results are compared to the Central Coast Ambient Monitoring Program's (CCAMP) Action Levels. These action levels are not for regulatory purposes. Rather, they provide guidance on potential impacts to the health of the marine ecosystem.

QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

The Quality Assurance/Quality Control (QA/QC) program included the following components:

- Training on monitoring concepts, safety, sampling methods, and hands-on use of equipment.
- Training in use of data sheets and data entry for volunteers.
- Calibration of test equipment prior to the start of the monitoring season and as needed.
- Calibration records of instruments are available from the Sanctuary office.
- Monthly replicates of instrument measurements are done to check instrument accuracy.
- Use of Instrument ID numbers to track equipment used by teams
- Monitoring of reagent stores and expiration dates, waste management.
- Periodic review of data sheets to determine inconsistency in data entry.
- Continued supervision with the volunteers' sampling and analysis skills.
- Standard Operation Procedure for volunteers to use in the field while monitoring.
- Processing and analysis of data for report.

Table 1: Water Quality Parameters

Parameter	Possible Sources	Associated Problems	Method/Accuracy
Temperature	Illegal discharges, standing water, large paved surface areas	Affects rates of chemical and biochemical reactions in water.	Method - Digital thermometer Accuracy \pm 1% full scale
Turbidity	Microorganisms, sediment, erosion	Interferes with fish and other aquatic life	Method - Visual Octa-Slide Viewer against turbidity standard slide bar
pH	Aerosols and dust in air, mineral substances, soils, sewer overflows, animal wastes, pesticides & fertilizers, photosynthesis	Interferes with fish and other aquatic life	Method – MacHery-Nagel pH-Fix 4.5-10.0 color-fixed indicator strips Accuracy \pm 0.25 units Min detection: 4.5
Detergent surfactants	Illegal or unintended discharges, car washing, cleaning of screens and grills, leaking sanitary sewers	Can be toxic to many aquatic insects, plants, and fish; can lower dissolved oxygen available to aquatic life	Method - solvent extraction/ bromphenal blue indicator Accuracy \pm 0.1 ppm Min detection: >0.1 ppm
Copper	Brake pads, copper architectural elements such as roofs or gutters; Illegal discharge into the storm drain system; also can occur naturally in surface waters	Concentrations over 0.025 parts per million are toxic to most freshwater fish	Not tested during dry weather Urban Watch monitoring season. Measured during First Flush by professional lab.
Chlorine	Illegal or unintended connection to a stormdrain or draining of a swimming pool; potable water line leaks	Toxic to aquatic life, can create a "sterile" environment	Method – DPD Octa-Slide Comparator against color standard. Accuracy \pm 10% Min detection: >0.2ppm
Orthophosphate	Illegal or unintended discharges, car washing, cleaning of screens and grills, leaking sanitary sewers, fertilizers, natural deposits, potable water as applied to landscapes	Can be toxic to many aquatic insects, plants, and fish; can lower dissolved oxygen available to aquatic life	Hanna portable meter Accuracy \pm 10%. Min detection: 0.0mg/L
Ammonia Nitrogen	Wildlife, fertilizers, illegal connections to stormdrain systems, poorly functioning septic systems	At certain concentrations can be toxic to aquatic organisms	Hanna portable meter Accuracy \pm 0.04mg/L Min detection: 0.00 to 3.00mg/L
E. coli. bacteria	Wildlife, illegal connections to stormdrain systems, poorly functioning septic systems	Detrimental to human health and marine organisms.	IDEXX Standard Method ¹ 9223 b Duplicates within 95% confidence limits. Measured during First Flush by professional lab.
Conductivity	Discharges high in salts and minerals or metals, water moving through local geology	Possible agricultural, industrial or municipal wastewater runoff	Method –Electrode probe module. Accuracy \pm 1% Min detection: 10 mS
Color	Tannins from plant material, soils, dyes or chemicals	Interferes with aquatic Insects	Method - Visual Borger Color System
Odor	Product of plant decomposition; illegal discharge sources; "clean" drainage water should have no	Can indicate presence of contaminants	Method - Scent

	distinctive odor		
Oil sheen	Hydrocarbons such as oil, gasoline, and grease; decomposing plant materials (ie: eucalyptus); leaking underground petroleum storage tanks	Toxic to aquatic organisms	Method - Visual
Trash, sewage, scum	Illegal discharge or illegal dumping; scum may be result of plant material decomposition	Interferes with fish and other aquatic life	Method - Visual

VOLUNTEER TRAINING

Bridget Hoover and Lisa Emanuelson of the Monterey Bay Sanctuary Citizen Monitoring Network provided a three-hour hands-on training for volunteers on April 26, 2009. Topics included monitoring concepts, sampling procedures, the meaning of each parameter monitored, use of kits in the field, and safety protocols.

Volunteers were placed in teams according to general skill level, interest and time availability. They were assigned one week per month and asked to monitor twice in that week. An experienced monitor, Maris Sidenstecker, the water quality education consultant for the City of Monterey accompanies each team in the field and runs the day-to-day aspects of the program.

All the data collected by the volunteers was reviewed by Maris Sidenstecker before being entered into the Sanctuary data base.

RESULTS

Over the period of June 2, 2009 through October 6, 2009, the five sites were each visited 20 times for a total of 100 site visits. The sites were monitored when water was flowing and out of the 100 visits a total of 90 individual monitoring events occurred. We are grateful for the thirteen volunteers that donated a total of 297.25 hours toward the program which would not function without them. Volunteer availability and other influencing factors, such as the lack of water flow, were taken into consideration throughout the program and not every parameter was tested on every site visit.

Of the five sites monitored throughout the program, most consistently exhibited flow and were monitored. The exceptions were Jack and San Carlos. Jack had no flow on 8/13/09, 8/24/09, 8/27/09, the month of September 2009 and on 10/5/09 and 10/6/09. San Carlos had no flow on 10/5/09. Ideally there should be no flow at the sites during the dry weather season.

The detection criteria for each parameter is based on the minimum detection limit for each respective test kit, see Table 1 (Method/Accuracy) for each parameter.

Quantitative Parameters

The parameters listed below were analyzed in the field using the LaMotte kit described in the Program Design section of this report. Volunteers divided up in teams and collected samples and then met back at a designated site to run the analysis with the LaMotte kit.

Detergent Surfactants

There were 90 samples tested for detergent from the five sampling sites. Of those, 10 tested positive for detergent. The site that detected the highest level of detergents was Steinbeck Plaza on 8/27/09 (1.4ppm). Steinbeck Plaza detergents were detected a total of 8 times that measured greater than 0.2ppm. Detergents ranged between 0.3ppm to 1.4ppm at Steinbeck Plaza. Of the 8 detections, two were greater than 1.0ppm and the remaining measurements were between 0.3ppm and 0.9ppm. At Twin 51, detergents were identified once and measured 0.3ppm. At San Carlos, detergents were detected once on 9/10/09 with result of 1.2ppm. At the remaining sites, Jack and Library, detergents were not detected during the monitoring period.

Ammonia Nitrogen

Ammonia values are reported as total ammonia (NH₃-N). When converted to ammonia (NH₃) the toxic form of ammonia two of the values exceeded the water quality objective of 0.025ppm NH₃. The Steinbeck site on 7/30/09 measured 0.041ppm NH₃ and on 8/27/09 measured 0.044ppm NH₃. It should be noted that on 7/30/09 the water was ice tea in color which caused analysis to be difficult by the laser sensitive instruments.

Chlorine

No chlorine was detected at San Carlos, Jack or Library sites during the monitoring program. The exception was two site visits at Twins and Steinbeck. All results were <0.2ppm or non-detect except for the following: Twins measured 0.4ppm on 6/19/09 and Steinbeck measured 0.4ppm on 7/30/09.

Orthophosphates

Of the 90 measurements taken, 76 of the samples indicated the presence of orthophosphates over the Water Quality Objective (WQO) criteria of 0.12ppm. The highest detected value was 3.63ppm at Steinbeck on 7/28/09, 7/30/09 and 8/27/09 followed by 3.06ppm at San Carlos on 10/6/09.

Of the remaining measurements 14 samples were under the WQO criteria of 0.12 with the lowest value of 0.06ppm detected at the Jack site on 7/1/09. On 8/24/09 at San Carlos the measurement was unable to be read due to the high turbidity in the water.

pH

The values for pH throughout the program averaged from 6.5 to 7.5. The most common pH measurement for all five sites was 7.0, which was recorded 64 of 91 times.

Measured Values

Flow Presence

Of the five storm drains that were visited, flow was detected in 90 of 100 site visits.

Air Temperature

Air temperature ranged between 14.2°C (57.56°F) and 24.1°C (75.38°F) for all sites throughout the program. The lowest recorded temperature was 14.2°C (57.56°F) at the Library site on 7/2/09, and the highest recorded temperature was 24.1°C (75.38°F) at San Carlos on 7/14/09.

Water Temperature

Water temperature ranged between 12.1°C (53.78°F) and 19.0°C (66.2°F) for all sites throughout the program. The lowest recorded temperature was 12.1°C (53.78°F) at the Jack site on 6/3/09, and the highest recorded temperature was 19.0°C (66.2°F) at San Carlos on 8/10/09.

Conductivity

Conductivity measurements were taken with the Oakton ECTester low range meter (0-1990 µS) and with the Oakton ECTester high range meter (0-19.90 mS). A total of 90 samples were measured across all five sites. In the low range meter, the lowest recorded conductivity was 980 µS at Steinbeck site on 9/10/09 and the highest measurable conductivity value was 1990µS collected at Twins on 9/25/09. Of the high range meter readings the low was 1.0mS at Steinbeck on 8/24/09. The high range was 12.2mS recorded at San Carlos on 10/6/09.

Qualitative Parameters

Volunteers were asked to make ‘presence or absence’ observations of the following parameters.

Odor

Odors were reported in 3 of 90 monitoring events. All odors were recorded at Steinbeck on 6/19/09, 8/10/09 and 10/5/09. Odors were recorded as ‘musty’ smells.

Color

Water samples were compared to a Borger Color System (BCS) booklet used to identify colors in nature. Fifty-four of the 90 samples were reported as colorless (BCS 93). Two unusual colors were measured this season. San Carlos on 10/6/09 (BCS 58) was a yellow/orange color and at Steinbeck on 7/30/09 (BCS 57) was an ice-tea color. Of the remaining samples, volunteers indicated the water samples to be a pale tan to drab gray in color.

Oil sheen

A small oil patch was noted on 7/28/09 at the Library site. This was the only observation of oil.

Sewage

No sewage smell or sewage was detected.

Surface scum

Surface scum was reported 16 times of 90 monitored events at the five sites. In most cases small surface bubbles, and foam were reported to be a component of the surface scum.

Trash

Trash was reported in most site visits. Trash was noted at all five sites with the highest frequency at Steinbeck followed by Twins, Library, San Carlos and Jack. The descriptions of the types of trash collected can be found in the monthly summaries in the following pages. The most common trash observations included Styrofoam, cigarette butts, and plastic wrappers.

Some of the highlights this season were the following observations: on 6/2/09 the Steinbeck site had very little trash and on 7/14 the Twins had NO TRASH to collect and on 8/24 the Twins site was remarkably clean of trash and on 9/8/09 following Labor Day weekend at the Library site there was very little trash. This is an improvement from last year.

Turbidity

Out of the 90 samples, turbidity was consistently low for all sites except for Steinbeck on 7/30/09 (medium) and San Carlos on 8/24/09 recorded as high turbidity.

Day of Week/Time of Day

Volunteer monitoring occurred during Monday-Friday with the most monitoring data collected on Tuesday and Thursday. Weekend data was not collected. The monitoring times varied; however, they were in the morning to early afternoon hours for the daytime team and after 5:00pm for the evening team.



Above: the daytime team volunteers with Charlie Yang and Robert Armstrong. Below: the evening team with Kitako Henderson, Steve & Kathleen Million, and Gary Hoffmann.



Monterey Urban Watch June 2009

Dates Monitored: 6/2/09, 6/3/09, 6/18/09, 6/19/09
Number of volunteers: 12 **Volunteer hours: 65.5**
Volunteer training hours: 24
Total season volunteer hours: 89.5
Team Leader: Maris Sidenstecker

Average Detection for June (ppm)

<u>Site</u>	<u>Chlorine</u>	<u>Detergent</u>	<u>Ammonia</u>	<u>Orthophosphate</u>
Steinbeck	0.2	0.2	0.90	0.51*
Twins	0.25	0.1	0.51	1.09*
San Carlos	0.2	0.125	0.46	0.13*
Jack	0.2	0.1	0.48	0.11
Library	0.2	0.1	0.59	0.21*

*Exceeds Central Coast Ambient Monitoring Program (CCAMP)
Water Quality Objective.

Fast Facts

- 6/2 Little trash at Steinbeck. A volunteer leaned into pipe to get balloon.
- 6/3 Ammonia results at San Carlos, Library and Twins were under range.
- 6/18 & 6/19 Twins had higher orthophosphate readings. 50% dilution on 6/18 yielded a reading of 4.96ppm and on 6/19 a 50% dilution yielded 4.44ppm.
- 6/19 Trickle of water from Jack site.

Trash collected by volunteers: paper, food wrappers, styrofoam peanuts, plastic bottle, 2 plastic bags, 44 cigarette butts, straws, strapping tape, cork, water bottle, cup, 1 balloon, 1 metal spoon, condom below Twins.

Monterey Urban Watch July 2009

Dates Monitored: 7/1/09, 7/2/09, 7/13/09, 7/14/09, 7/28/09, 7/30/09

Number of volunteers: 19 Volunteer hours: 98.75

Total season volunteer hours: 188.25

Team Leader: Maris Sidenstecker

Average Detection for July (ppm)

<u>Site</u>	<u>Chlorine</u>	<u>Detergent</u>	<u>Ammonia</u>	<u>Orthophosphate</u>
Steinbeck	0.23	0.52	7.47	1.59*
Twins	0.2	0.1	0.87	0.49*
San Carlos	0.2	0.12	0.69	0.14*
Jack	0.2	0.1	1.2	0.11
Library	0.2	0.1	0.81	0.19*

***Exceeds CCAMP Water Quality Objective.**

Fast Facts

- On 7/1 eight high school students from across the country helped monitor as part of a visiting National Geographic photography class.
- 7/1 Flow at Jack very low.
- 7/13 & 7/14 Ammonia meter broken.
- 7/14 Tap water (gives background on ortho.) from Monterey lounge faucet measured 0.43ppm for orthophosphate.
- 7/14 Twins had no trash to collect.
- 7/30 Water from Steinbeck was an ice tea color which caused analysis to be difficult. Ammonia & orthophosphate were out of range even at 25% dilution. Sanctuary went to Steinbeck to source track and found nothing.

Trash collected by volunteers: styrofoam peanuts, cigarette butts, paper plate, snack bags, drink umbrella, paper napkin, movie ticket, popcorn bag, tissue, wrappers, paper plate, styrofoam pellets, aluminum foil, plastics, rubber band, straw, receipts, broken glass, bottle cap.

Monterey Urban Watch August 2009

Dates Monitored: 8/10/09, 8/13/09, 8/24/09, 8/27/09
Number of volunteers: 10 **Volunteer hours: 44**

Total season volunteer hours: 232.25
Team Leader: Maris Sidenstecker

Average Detection for August (ppm)

<u>Site</u>	<u>Chlorine</u>	<u>Detergent</u>	<u>Ammonia</u>	<u>Orthophosphate</u>
Steinbeck	0.2	0.45	3.71	1.25*
Twins	0.2	0.1	0.58	0.73*
San Carlos	0.2	0.1	0.99	0.19*
Jack	0.2	0.1	0.25	0.11
Library	0.2	0.1	0.61	0.27*

*Exceeds CCAMP Water Quality Objective.

Fast Facts

- 8/10 Orthophosphate reading from Monterey lounge sink = 0.45ppm.
- 8/10 Jack had very low water flow.
- 8/13-8/27 No flow at Jack just big drips.
- 8/24 Twins was remarkably clean of trash.
- 8/24 San Carlos ammonia below range and ortho. unable to read due to high turbidity.
- 8/27 Steinbeck greater than 1.4 addition for detergent, ammonia at 25% dilution still 3.30ppm or out of range and ortho. at 25% dilution over 2.75ppm and out of range.

Trash collected by volunteers: styrofoam peanuts & chunk, cigarette butts, paper, broken bottle, bottles, disposable lighter, wrappers, paper, electrical tape, plastic pieces and plastic wrap, straws, salt packet, cigarette carton, bottle caps, clear plastic food wrap.

Monterey Urban Watch September 2009

Dates Monitored: 9/8/09, 9/10/09, 9/24/09 & 9/25/09
Number of volunteers: 12 **Volunteer hours: 40**
Total season volunteer hours: 272.25
Team Leader: Maris Sidenstecker

Average Detection for September (ppm)

<u>Site</u>	<u>Chlorine</u>	<u>Detergent</u>	<u>Ammonia</u>	<u>Orthophosphate</u>
Steinbeck	0.2	0.35	0.66	0.40*
Twins	0.2	0.15	0.27	0.38*
San Carlos	0.2	0.37	0.13	0.23*
Jack	No Flow All Month			
Library	0.2	0.1	0.19	0.22*

*Exceeds CCAMP Water Quality Objective.

Fast Facts

- No flow at Jack all month- just big drips.
- 9/8 ran out of reagent A for ammonia and unable to do Steinbeck & Twins.
- 9/8 Library very clean of trash considering after Labor Day weekend.
- 9/8 Background orthophosphate from Monterey lounge kitchen sink =0.29ppm.
- 9/10 Detergent result at Steinbeck <1.2ppm.
- 9/10 Ortho. background from sink 0.34ppm.
- 9/10 Replicates done for quality assurance.
- 9/24 Very low flow at San Carlos.

Trash collected by volunteers: paper, plastic bag, plastic pieces, styrofoam cup & peanuts and chunk, cigarette butts, tennis ball, wrappers, chip bag, purple crayon, squashed can, tissue, pen, piece of kitchen counter.

Monterey Urban Watch October 2009

Dates Monitored: 10/5/09 & 10/6/09

Number of volunteers: 6 Volunteer hours: 25
Total season volunteer hours: 297.25
Team Leader: Maris Sidenstecker

Average Detection for October (ppm)

<u>Site</u>	<u>Chlorine</u>	<u>Detergent</u>	<u>Ammonia</u>	<u>Orthophosphate</u>
Steinbeck	0.2	0.45	0.33	0.30*
Twins	0.2	0.1	0.09	0.36*
San Carlos	0.2	0.2	1.90	3.06*
Jack	No Flow On Either Day			
Library	0.2	0.1	0.19	0.22*

*Exceeds CCAMP Water Quality Objective.

Fast Facts

- 10/5 No flow at San Carlos.
- 10/5 & 10/6 No flow at Jack.
- 10/6 Replicates done for quality assurance.
- 10/6 San Carlos had a yellow /orange color (BCS 58) to the water which may have thrown off the results for ammonia and orthophosphate readings. Ammonia = 1.90 at a 50% dilution and orthophosphate = 9.28 at a 25% dilution.

Trash collected by volunteers: Styrofoam peanuts, cigarette butts, wrappers, plastic tags, plastic bag, broken glass, and drink lid cap.

Average Detection for June (ppm)

Site	Chlorine	Detergent	Ammonia	Orthophosphate
Steinbeck	0.20	0.20	0.90	0.51
Twins	0.25	0.10	0.51	1.09
San Carlos	0.20	0.125	0.46	0.13
Jack	0.20	0.10	0.48	0.11
Library	0.20	0.10	0.59	0.21

Average Detection for July (ppm)

Site	Chlorine	Detergent	Ammonia	Orthophosphate
Steinbeck	0.23	0.52	7.47	1.59
Twins	0.20	0.10	0.87	0.49
San Carlos	0.20	0.12	0.69	0.14
Jack	0.20	0.10	1.20	0.11
Library	0.20	0.10	0.81	0.19

Average Detection for August (ppm)

Site	Chlorine	Detergent	Ammonia	Orthophosphate
Steinbeck	0.20	0.45	3.71	1.25
Twins	0.20	0.10	0.58	0.73
San Carlos	0.20	0.10	0.99	0.19
Jack	0.20	0.10	0.25	0.11
Library	0.20	0.10	0.61	0.27

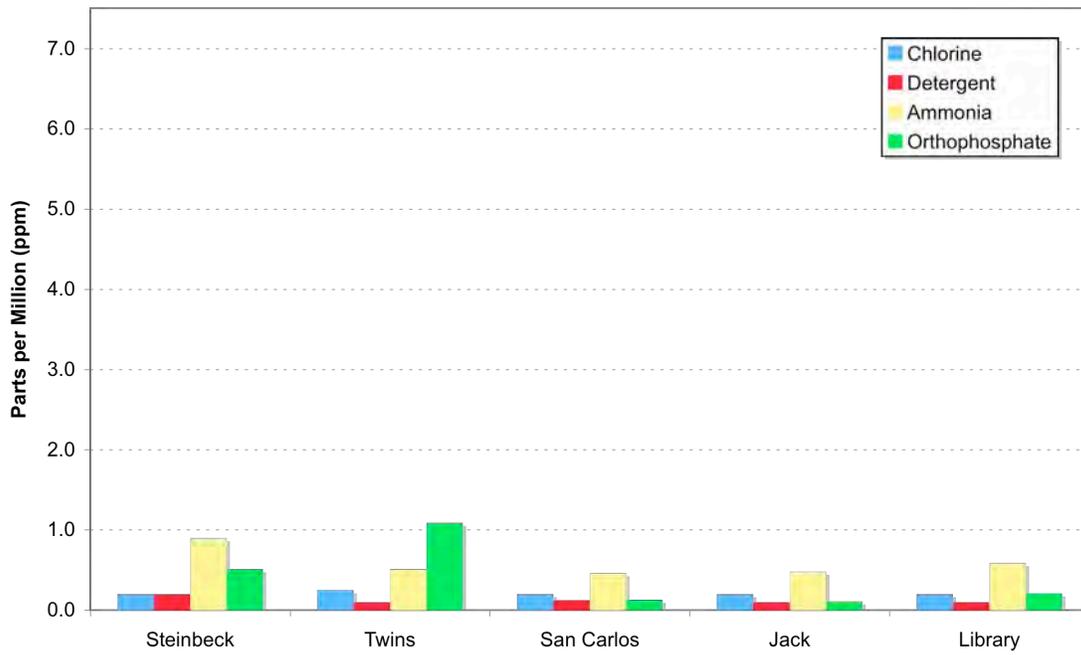
Average Detection for September (ppm)

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Twins	0.20	0.15	0.27	0.38
San Carlos	0.20	0.37	0.13	0.23
Jack				
Library	0.20	0.10	0.19	0.22

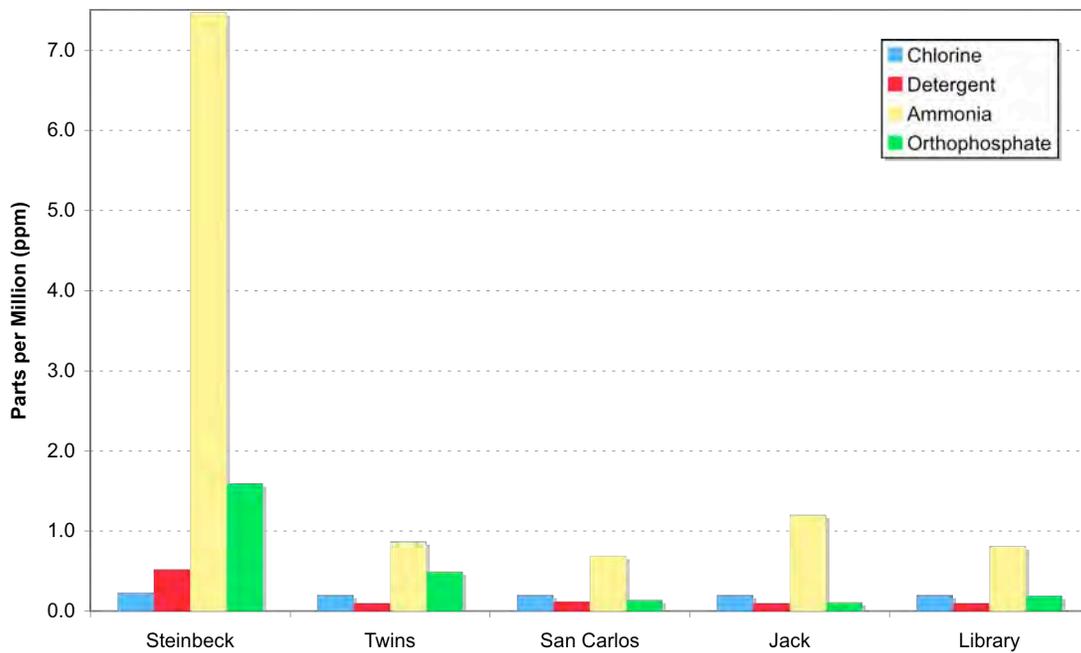
Average Detection for October (ppm)

Site	Chlorine	Detergent	Ammonia	Orthophosphate
Steinbeck	0.20	0.45	0.33	0.30
Twins	0.20	0.10	0.09	0.36
San Carlos	0.20	0.20	1.90	3.06
Jack				
Library	0.20	0.10	0.19	0.22

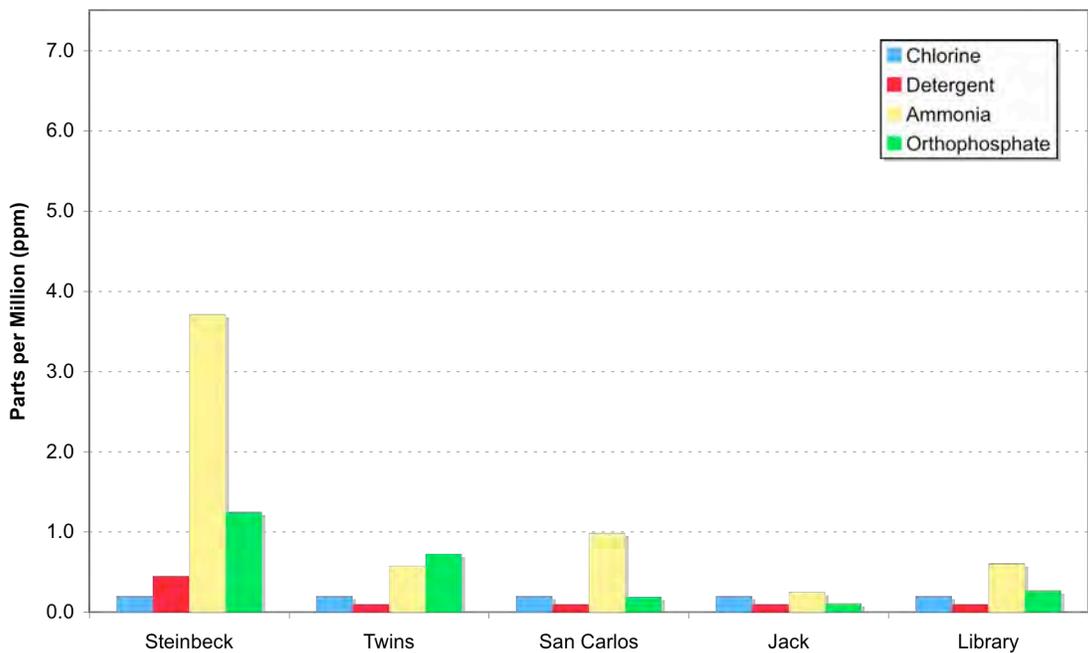
June 2009 Average



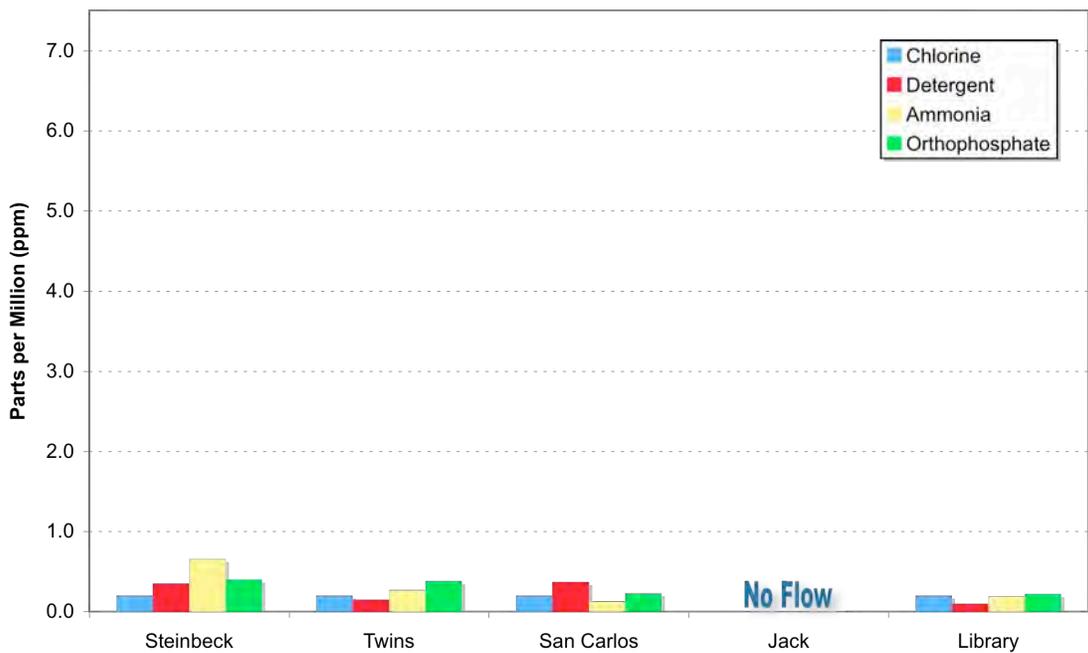
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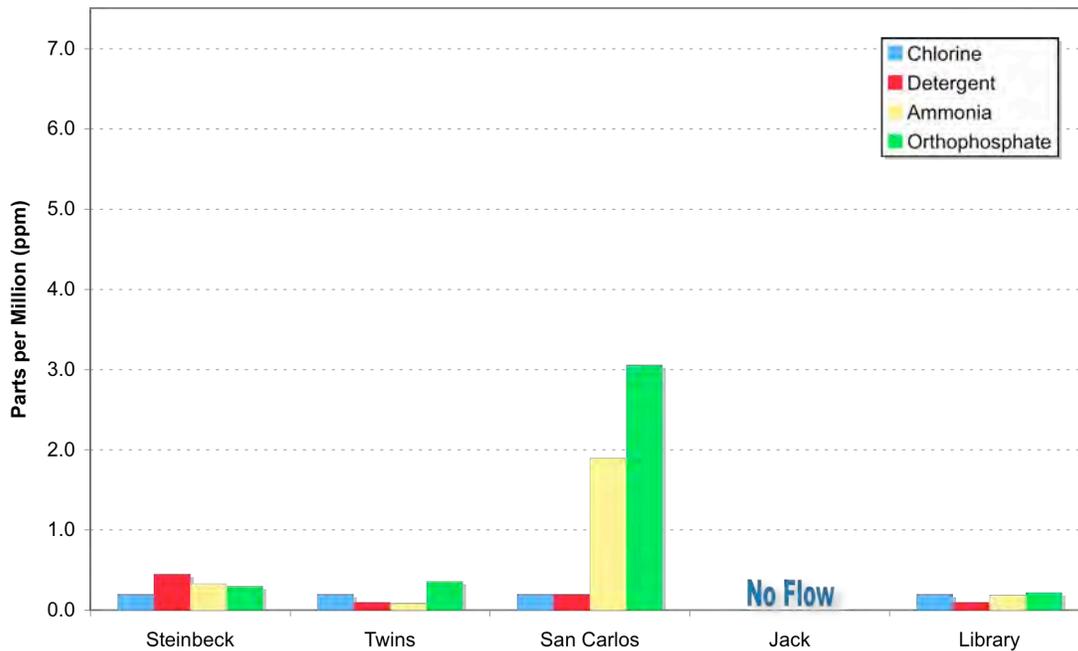
August 2009



September 2009



October 2009 Average



CONCLUSION

The five sites were each visited 20 times for a total of 100 site visits and monitored (when flowing) for a total of 90 events from June 2, 2009-October 6, 2009. On October 13, 2009 the first significant rain event of the season took place and Urban Watch officially ended. Most of the sites had random spikes of ammonia, detergent, and orthophosphate. Orthophosphate levels at almost all sites were generally above the WQO of 0.12 ppm. Once converted, two of the total ammonia values exceeded the ammonia-N WQO of 0.025ppm.

Upstream source tracking continues for Steinbeck Plaza in 2010 to look for sources of detergent. Due to the location along Cannery Row and the many restaurants that surround the site several different avenues of educating restaurant owners have been tried. A DVD was made several years ago in English and Spanish to inform food service employees about proper Best Management Practices for cleaning practices. Presently these DVDs are being distributed with posters and brochures during the restaurant inspection process by the Monterey Regional Water Pollution Control Agency. In addition, workshops have been held to encourage restaurant owners to practice proper cleaning practices to prevent stormwater pollution. This season, college students also assisted with reaching out to restaurants to distribute bilingual educational materials.

Orthophosphate levels continue to be high across the majority of sites and source tracking of orthophosphate would be beneficial. Testing municipal tap water for orthophosphate in 2008 revealed levels above the WQO exceedence value. We had volunteers test the tap water again this season and had levels (from 0.25ppm-0.45ppm). Simply watering the lawn or hosing down driveways with municipal tap water could be a source for the levels. Monterey plans to conduct orthophosphate studies in the summer of 2010 to examine the potential sources, natural or anthropogenic, of the elevated orthophosphate concentrations

The City of Monterey has a robust public outreach program in partnership with neighboring cities and the County of Monterey as part of its Phase II National Pollution Discharge Elimination System (NPDES) storm water permit known as the Monterey Regional Storm Water Management Program (MRSWMP). Through MRSWMP, the City of Monterey does an excellent job utilizing marketing techniques (i.e., bus ads, posters, movie ads, radio ads, TV ads, print ads, outreach at local events, school presentations and outreach to nurseries to use less toxic pesticides) and providing outreach materials as public education tools in pollution prevention. The program works with many local nonprofit partners and agencies to reach as many people as possible. To learn more about the MRSWMP permit visit www.montereysea.org

In conclusion, it is recommended that the City of Monterey continue the Urban Watch next season and 1) conduct source tracking of pollutant sources for the Steinbeck site with the Sanctuary staff 2) conduct orthophosphate studies in the summer of 2010 to examine the potential sources , natural or anthropogenic, of the elevated orthophosphate concentrations 3) continue outreach programs targeting local businesses, schools and residents to further reduce urban runoff pollution from entering the ocean.

Thanks to our volunteers, a large amount of trash was cleaned up from the areas around the five Monterey storm drains that were sampled and there seemed to be a reduction in trash this year. The monitoring program would not have been possible without the devoted volunteers. We wish to thank the following participants:

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