



Monterey Bay National Marine Sanctuary Citizen
Watershed Monitoring Network

Urban Watch Report 2007

Prepared for
The City of Pacific Grove, California

This program was administered in partnership with the City of Pacific Grove, Monterey Bay National Marine Sanctuary and the Coastal Watershed Council

Report prepared by Anna Holden-Martz,
Monterey Bay Sanctuary Citizen Watershed Monitoring Network Coordinator

Introduction/Overview

The Urban Watch Program is a dry season monitoring program that recruits, trains, and coordinates citizens to monitor storm drain outfalls. The program began in 1997 as a collaborative effort between the City of Monterey, Monterey Bay Sanctuary Citizen Watershed Monitoring Network (Network) and the Coastal Watershed Council (CWC). The Urban Watch program has two purposes: to educate the public on human impacts to water quality and to collect valuable, reliable data to be used in management decisions by local jurisdictions. Since 2000, the Urban Watch program has been educating local citizens and collecting data in the City of Pacific Grove (the “City”). Additionally, it has also helped the City to partially fulfill the education, outreach, and monitoring requirements of its Phase II National Pollution Discharge Elimination System (NPDES) storm water permit.

This year, the Urban Watch program monitored four sites in the City of Pacific Grove: Greenwood, located in Greenwood Park below Central Avenue; Pico, on Sunset Drive near the end of Pico Street; Congress, on Congress Avenue across the street from Pacific Grove High School; and Hopkins, outside of Hopkins Marine Station, below the tuna research facility. Sites were monitored by trained volunteers four times each month (twice a week, every-other week).

This year, twelve volunteers participated; seven were veteran volunteers from previous years. During the monitoring season (June 19th – September 12th), volunteers donated over 200 hours of their time to conduct monitoring.

In addition to traditional volunteer recruitment, we also held two “Backyard to Bay” events in the City. These events were advertized to the public in order to provide education about storm water issues. Subjects of the “Backyard to Bay” events included “What is a Watershed?” and “First Flush Clean-Up.” During the events, we spoke to over 100 individuals.

Methods

At the sites, volunteers recorded visual observations and field measurements on a field data sheet. Visual observations included presence of trash at the site, presence of an oil sheen, scum or bubbles, and if there was sewage present (sighted or smelled). Field measurements were taken for air and water temperature, electrical conductivity, pH, flow width, depth, and pipe wetted width. Volunteers then collected water samples to be processed at a central location.

Volunteers analyzed water samples for common urban pollutants: detergents, chlorine, ammonia, orthophosphate, color and odor. Chlorine is a problem because it is toxic to aquatic life; it can also create a “sterile” marine environment, where beneficial microorganisms cannot grow. Ammonia is also toxic to aquatic life. Our field kits measures total ammonia (NH₃-N), but the WQO for ammonia is expressed as ammonia (NH₃). Orthophosphate (PO₄), which has a WQO of 0.12 mg-P/l, is toxic to aquatic life and can lower the dissolved oxygen available to aquatic life.

This year, because of the limitations of our copper field test, the Network Steering Committee voted to omit copper from our suite of tests because the results were not reliable or valuable. All other tests were performed at each monitoring event. Volunteers also took bacteria samples once a month, which were analyzed at the Monterey Bay Analytical Services Laboratory. Monthly summaries were provided to the volunteers and PG Public Works to ensure timely notification of the volunteers' findings. The following three pages are the monthly summaries of monitoring results. For a tabular listing of all results, please see Attachment 1.



Pacific Grove Urban Watch

Fast Facts for June/July

Monitoring Dates: June 19, 23, July 3, 5

**Number of volunteers: 7
Number of volunteer hours: 56
Total season volunteer hours: 56**

Detection Averages (ppm)

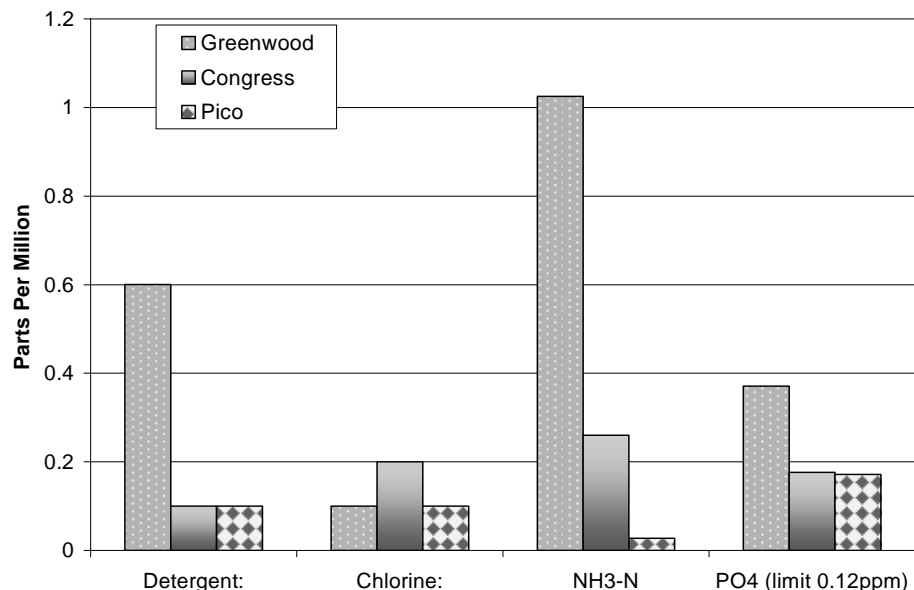
Site	Detergents	Chlorine	Ammonia	Orthophosphate
Greenwood	.60	.10	1.03	.37*
Congress	.10	.20	.26	.18*
Pico	.10	.10	.03	.17*

***Indicates exceedance of CCAMP Water Quality Objective**

Fast Facts

- During the first monitoring day, we noticed that the 8th street outfall was flowing even though it was supposed to be diverted to the Monterey Regional Water Pollution Control Agency in Marina. We sampled and found a detergent concentration of <0.3 ppm, chlorine of 0.2ppm, ammonia of 0.33 mg/l, and orthophosphate of 0.28 ppm.
- During all sample days, the Hopkins outfall was dry.
- On the 23rd of June, detergent concentrations at Greenwood park were <1.9ppm.

June-July 2007 Averages



Trash / Cleanup: This month, we recorded 2 plastic balls, 8 plastic bottles, a paper cup, over 10 food wrappers, 5 Styrofoam items, plastic cording, glass, 12 plastic bags, Q-tips, maracas, an aluminum plate, a paper plate. Most of this mess was cleaned up by YOU! THANKS!

For more information, contact Anna Holden-Martz, Citizen Watershed Monitoring Network Coordinator (831) 647-4227 or anna.holden@noaa.gov



Monterey Bay Sanctuary Citizen Watershed Monitoring Network

Pacific Grove Urban Watch

Fast Facts for July

Monitoring Dates: July 18, 19, 31 and August 1st, 2007

**Number of volunteers: 9
Number of volunteer hours: 72
Total season volunteer hours: 128**

Detection Averages

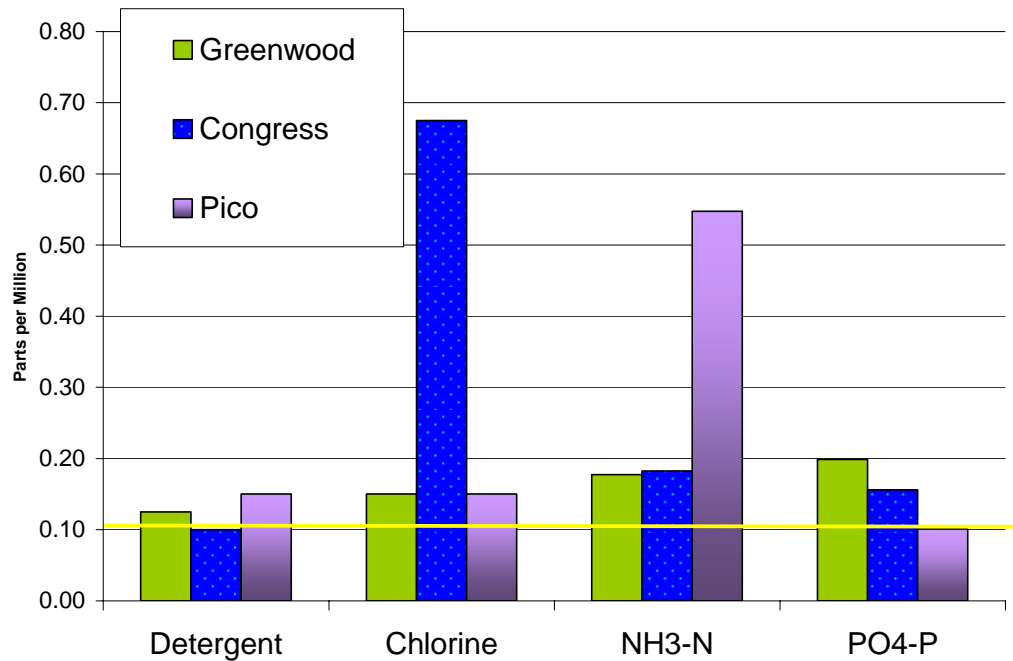
Site	Detergents	Chlorine	Ammonia	Orthophosphate
Greenwood	.13	.15	.18	.20*
Congress	.10	.68	.18	.16*
Pico	.15	.15	.55	.10

***Indicates exceedance of CCAMP Water Quality Objective**

Fast Facts

- On 7/18, volunteers noticed a strong chlorine odor at Congress—test results showed a concentration of 1.5ppm. The City is working with the school board to fix the chlorine culprit: the PG High swimming pool
- We had lower detergent results this month! Yahoo!
- The Hopkins site was dry during all monitoring dates
- We had a new volunteer join us—welcome Jane!

Average Detections for July



— yellow line indicates CCAMP limit of 0.12 mg-P/l for PO4-P

Trash / Cleanup: Thanks to our volunteers, we cleaned up several candy wrappers, oodles of Styrofoam pieces, wooden fence stakes, water bottles, shopping bags, paper, plastic bottles, hazard tape, and aluminum cans. Most of this trash was at Greenwood and Congress. Keep up the great work!

For more information, contact Anna Holden-Martz, Citizen Watershed Monitoring Network Coordinator (831) 647-4227 or anna.holden@noaa.gov



Monterey Bay Sanctuary Citizen Watershed Monitoring Network

Pacific Grove Urban Watch

Fast Facts for August

Monitoring Dates: August 14, 15, 29, 30

Number of volunteers: 6
 Number of volunteer hours: 48
 Total season volunteer hours: 176

Detection Averages

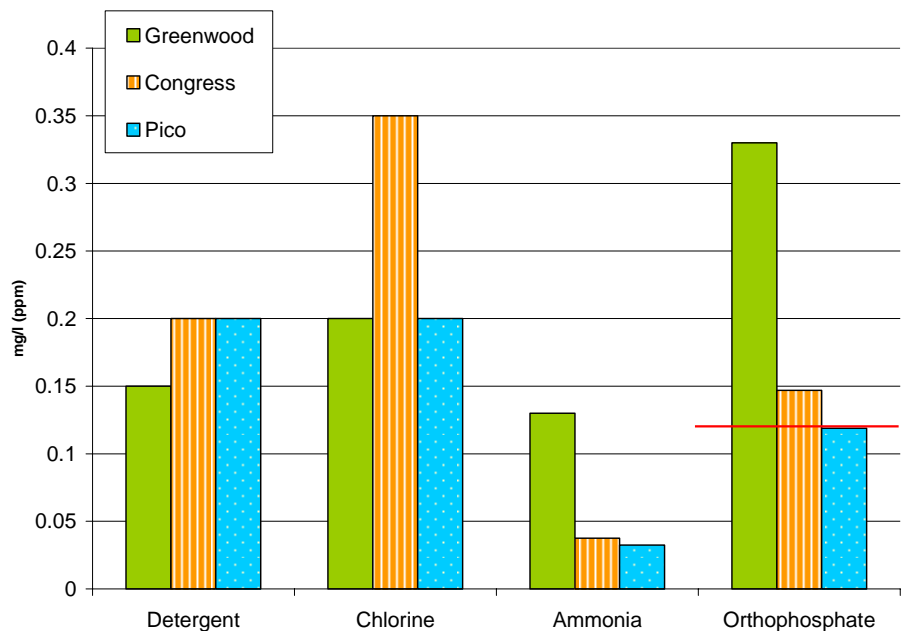
Site	Detergents	Chlorine	Ammonia	Orthophosphate
Greenwood	.15	.20	.13	.33*
Congress	.20	.35	.04	.15*
Pico	.20	.20	.03	.12

*Indicates exceedance of CCAMP Water Quality Objective

Fast Facts

- Monitoring continued as usual through August.
- On 8/30, a Ranger out at Pico told volunteers that the water in the outfall was a “very bad brown” color, as was the small cove.
- The Hopkins site was dry during all monitoring dates

August Average Concentration



Red line indicates CCAMP limit of 0.12 mg-P/l for PO4-P

Trash / Cleanup: Our volunteers cleaned up buckets of Styrofoam pieces, candy wrappers, water bottles, cigarette butts, bits of plastic, Powerbar wrappers, aluminum foil, McDonald’s cups, paper towels, packaging material, forks and straws. There was also an old tire and plastic sheet that were out of reach at the Congress site. Thanks for all the clean-up!

For more information, contact Anna Holden-Martinez, Citizen Watershed Monitoring Network Coordinator
 (831) 647-4227 or anna.holden@noaa.gov



Pacific Grove Urban Watch

Fast Facts for September

Monitoring Dates: September 10th and 12th

Number of volunteers: 6
 Number of volunteer hours: 24
 Total season volunteer hours: 200

Detection Averages

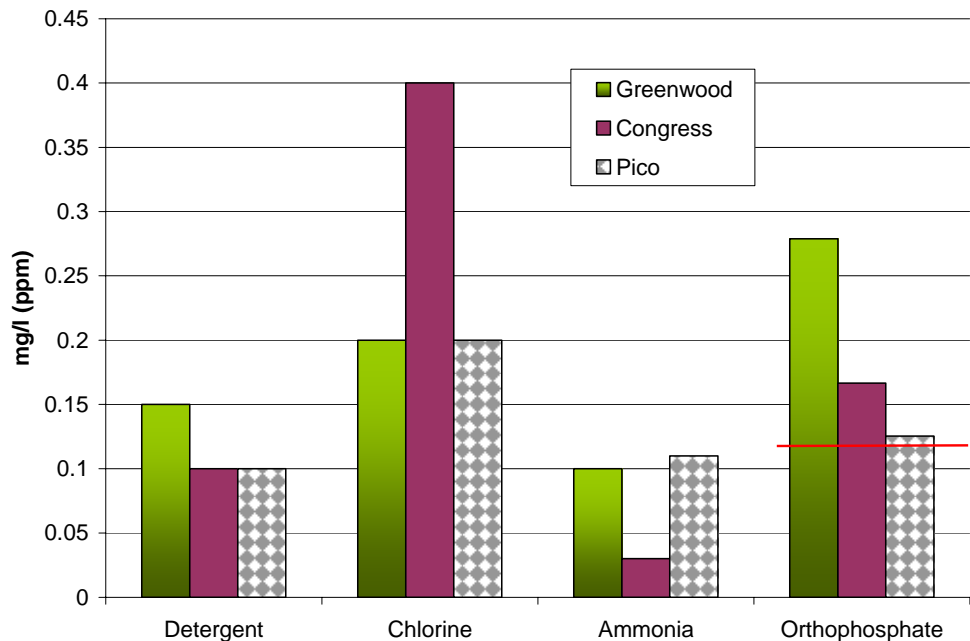
Site	Detergents	Chlorine	Ammonia	Orthophosphate
Greenwood	.15	.20	.10	.28*
Congress	.10	.40	.03	.17*
Pico	.10	.20	.11	.13*

***Indicates exceedance of CCAMP Water Quality Objective**

Fast Facts

- We ran into a bad batch of chlorine tabs which limited the number of tests we could run until we could reorder; therefore, chlorine was only measured at Congress on the 10th and at Greenwood and Pico on the 12th.
- Because of early rains, Urban Watch monitoring was cut short after the First Flush event on September 22nd.
- The Hopkins site was dry during all monitoring dates

September Average Concentrations



Red line indicates CCAMP limit of 0.12 mg-P/l for PO4-P

Trash / Cleanup: This month, our volunteers cleaned up wrappers, hard black plastic, paper, Styrofoam, aluminum cans and cigarette butts. Without our volunteers, most of this trash would end up in the ocean!

Results by Site

Volunteers monitored a total of 14 times. The Hopkins site was dry during each monitoring event, so no data was collected from that site.

Ammonia values are reported as total ammonia (NH₃-N). When converted to ammonia (NH₃), none of the values exceeded the water quality objective of 0.25ppm NH₃.

Congress – Congress is located just downhill of Pacific Grove High School. During sampling, we regularly had detections of chlorine (0.4 ppm) at Congress. We learned that the plumbing at PG High School’s pool allows overflow/splash to wash into the storm drain. The City is working with the school board to resolve the issue.

Total ammonia concentrations were highest on July 3rd (0.60 ppm) and detergent concentrations spiked once in late August (0.5 ppm); otherwise, concentrations were relatively low (usually < 0.1 ppm). Orthophosphate (PO₄-P) levels were consistently over the Water Quality Objective of 0.12 ppm, averaging 0.16 ppm (Figure 1).

Volunteers noted the presence of trash during all sampling events except one; much of this trash was out of reach and too dangerous for volunteers to collect. A chlorine smell was recorded three times, sewage was smelled or sighted once, and bubbles or a surface scum were recorded twice. Average water temperature at Congress was 20.1° C.

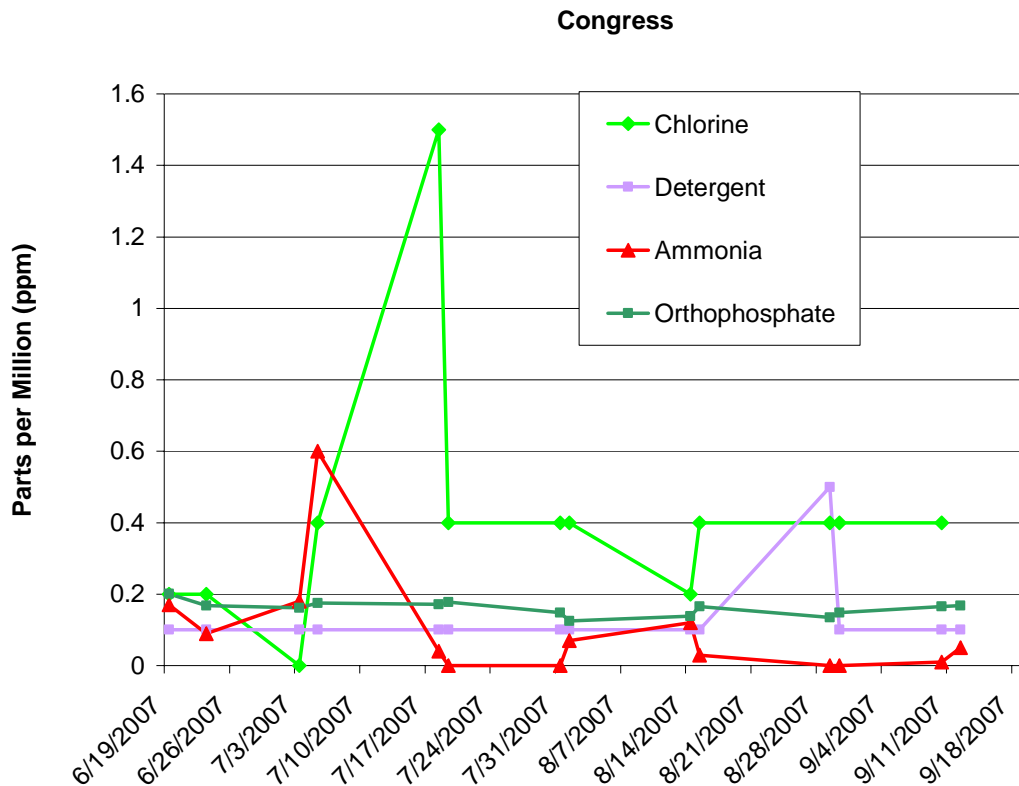


Figure 1: Field analytes for the Congress site from June 19th to September 12th, 2007.

In June, Congress had an *E.coli* concentration of <1 MPN/100ml. On July 31st, the concentration was <20 MPN/100ml. These concentrations are far below the EPA Water Quality Objective for *E. coli* of 400 MPN/100ml, most likely due to the chlorine in the system.

Pico – Pico was usually the cleanest site, especially for trash, but it still recorded some elevated levels of pollutants. Total ammonia was generally low (< 0.1 ppm), but spiked twice: on July 17th to 1.51 ppm, and again on August 1st to 0.35 ppm. Detergent levels were also usually below 0.1ppm, spiking once on July 18th to 0.3 ppm and on August 29th to 0.5 ppm. Chlorine was always <0.2 ppm (non-detect). Orthophosphate levels were consistently close to the WQO of 0.12 ppm, averaging 0.13 ppm for the season (Figure 2).

Trash was only recorded three times at Pico and was removed each time. There was no sewage reported the entire season. Oil sheen was recorded once, and scum or bubbles three times. No odors were detected. The average water temperature for Pico was 16.5° C.

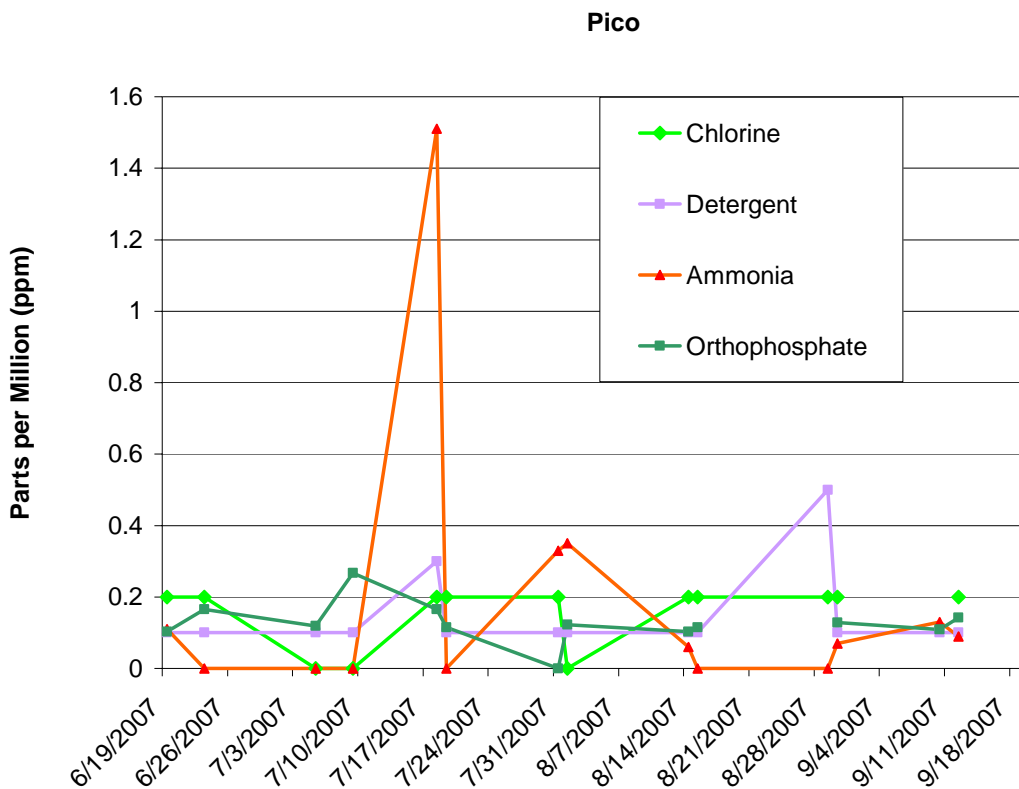


Figure 2: Field analytes for the Pico site from June 19th to September 12th, 2007.

One June 19th, Pico had an *E. coli* concentration of 74 MPN/100ml. On July 31st, the site had an *E.coli* concentration of 2306 MPN/100ml, which exceeded the EPA Water Quality Objective of 400 MPN/100ml.

Greenwood – Greenwood Park had the most detections of parameters measured. On June 23rd, Greenwood had high concentrations of total ammonia (3.3 ppm), detergent (2 ppm), and orthophosphate (.91 ppm). After this date, the concentrations of pollutants stayed relatively even. For the season, total ammonia averaged 0.45 ppm, detergent averaged 0.27 ppm, and orthophosphate averaged 0.30, the highest of all the sites. Chlorine was always <0.20 ppm (Figure 3).

Greenwood Park usually had the most trash out of all the sites, and generally had large amounts of dog waste, as well. Trash was recorded all monitoring days except two; sewage was recorded three times and scum five times. There were no recordings of oil. Twice, a musty or septic odor was reported at the site. The average water temperature at Greenwood Park was 17.33° C.

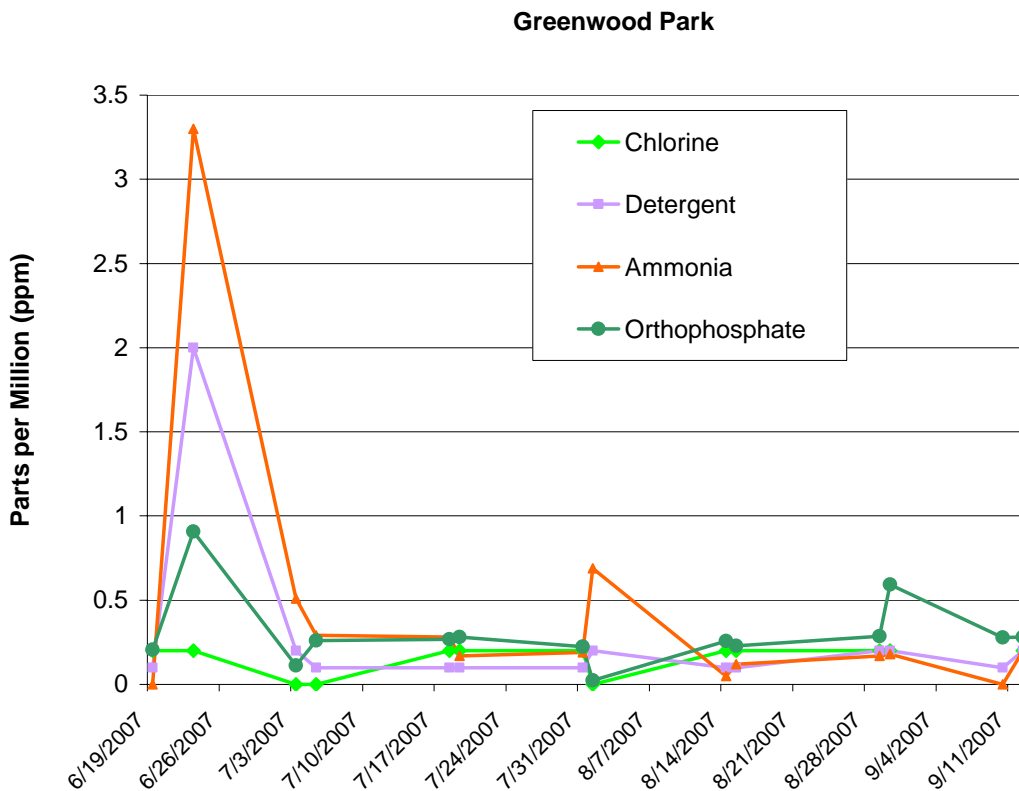


Figure 3: Field analytes for the Greenwood site from June 19th to September 12th, 2007.

On June 19th, Greenwood Park had an *E.coli* concentration of 5800 MPN/100ml. On July 31st, the concentration was 5819 MPN/100ml. Both of these concentrations exceed the EPA Water Quality Objective of 400 MPN/100ml.

Conclusion

The Urban Watch program is an important component for the City in fulfilling the Minimum Control Measures set forth by the Monterey Regional Stormwater Management Program. Specifically, the monitoring conducted by Urban Watch volunteers helps the city to fulfill its requirements of public participation and involvement, whereas the Backyard to Bay events fulfill requirements toward public education and outreach.

The 2007 Urban Watch monitoring season was successful in that it reached a larger number of the public through volunteer recruitment and Backyard to Bay events. Over half of our volunteers were those returning from previous years, which provided new volunteers with additional resources and oversight.

The three sites were monitored consistently from June until September, when the first significant rain event of the season fell. All sites had random spikes of ammonia, detergent, and orthophosphate. Orthophosphate levels at all sites were generally above the WQO of 0.12 ppm. Once converted, we found that none of the total ammonia values exceeded the ammonia WQO of 0.25ppm. Eight times, detergent levels were above 0.1ppm; six of those occurred at Greenwood Park. All chlorine detections (above 0.2 ppm) occurred at Congress.

Bacteria levels were high in both June and July at Greenwood Park, and in July at Pico. It would be useful to conduct a study to find not only where the bacteria is entering the storm drain, but also the source of *E.coli* bacteria (i.e. human or other) found the City's storm drain system.

Upstream source tracking is recommended above Greenwood Park to look for sources of detergent. Further testing at Congress will be needed after the PG High School pool is fixed to ensure that no more chlorine is entering the storm drain. Orthophosphate levels were high across the board and source tracking of orthophosphate would be beneficial at any of the sites.

Thanks to our dedicated volunteers, a large amount of trash was cleaned up from the areas around these three Pacific Grove storm drains. Without these volunteers, this trash would have probably ended up in Monterey Bay. We would like to thank our volunteers for their time monitoring the quality of storm drain runoff in Pacific Grove and for their efforts in cleaning up the city. Without them, none of this would be possible.

Attachment 1: Tabular Results. Yellow highlight represents exceedance of WQO.

StationID	Date	Time	Trash	Savage	Sum	AirTemp	CHL	Clr	Conductivity	DET	NH-N	pH	FO4	FO4P	WaterTemp
309CENTR31	6/19/2007	121600PM	TRUE	FALSE	FALSE	17.6	02	97	1490	01	0	7	0.62	0.20	157
309CENTR31	6/23/2007	95000AM	TRUE	FALSE	TRUE	16	02	92	1530	2	33	7	2.75	0.91	16
309CENTR31	7/3/2007	90600AM	TRUE	FALSE	FALSE	16	0	97	1490	02	0.51	7	0.34	0.11	164
309CENTR31	7/5/2007	91800AM	TRUE	FALSE	FALSE	14	0	97	1700	01	0.29	65	0.79	0.26	161
309CENTR31	7/18/2007	60000PM	TRUE	TRUE	FALSE	21.5	02	36	1670	01	0.28	65	0.81	0.27	17.9
309CENTR31	7/19/2007	54800PM	TRUE	TRUE	FALSE	19.5	02	91	1.3	01	0.17	7	0.85	0.28	181
309CENTR31	7/31/2007	22200PM	TRUE	FALSE	TRUE	16.5	02	91		01	0.19	7.5	0.68	0.22	17
309CENTR31	8/1/2007	23000PM	TRUE	FALSE	FALSE	19	04	120	1410	01	0.07	7.5	0.38	0.13	168
309CENTR31	8/1/2007	21000PM	TRUE	FALSE	FALSE	21	0	36	1770	02	0.69	7	0.07	0.02	168
309CENTR31	8/14/2007	60000PM	TRUE	FALSE	TRUE	15	02	93	1340	01	0.05	7	0.78	0.26	17
309CENTR31	8/15/2007	55000PM	FALSE	FALSE	FALSE	17	02	36	1680	01	0.12	7	0.69	0.23	17.2
309CENTR31	8/29/2007	1:4800PM	TRUE	FALSE	TRUE	22.7	02	91	156	02	0.17	7	0.87	0.29	17.8
309CENTR31	8/30/2007	3:1500PM	TRUE	TRUE	TRUE	22.7	02	36	1600	02	0.18	65	1.35	0.72	186
309CENTR31	9/10/2007	5:4500PM	FALSE	FALSE	FALSE	20		93	1710	01	0	7	0.84	0.28	17.9
309CENTR31	9/12/2007	6:5200PM	TRUE	FALSE	FALSE	19.2	02	91	1920	02	0.2	65	0.85	0.28	17.7
309FGSD01	6/19/2007	11:2500AM	TRUE	FALSE	TRUE	16.3	02	97	1570	03	0.33	65	0.87	0.29	17
309FGSD04	6/19/2007	12:3700PM	TRUE	FALSE	FALSE	16.4	02		1570	01	0.11	65	0.31	0.10	15.1
309FGSD04	6/23/2007	10:2500AM	FALSE	FALSE	FALSE	15.5	02	120	1450	01	0	65	0.5	0.17	14.7
309FGSD04	7/5/2007	9:4300AM	FALSE	FALSE	FALSE	14.5	0	97	1230	01	0	65	0.36	0.12	15.1
309FGSD04	7/9/2007	9:3600AM	FALSE	FALSE	FALSE	17	0	92	1290	01	0	7	0.91	0.17	15.5
309FGSD04	7/18/2007	5:4600AM	FALSE	FALSE	FALSE	29	02	58	1.1	03	1.51	7	0.5	0.17	16.5
309FGSD04	8/1/2007	2:1500PM	FALSE	FALSE	FALSE	24	0	36	1100	01	0.35	7.5	0.37	0.12	15.9
309FGSD04	8/14/2007	5:5000PM	FALSE	FALSE	FALSE	18.1	02	91	1570	01	0.06	7	0.31	0.10	15.6
309FGSD04	8/15/2007	5:5400PM	FALSE	FALSE	TRUE	17	02	91	1550	01	0	7	0.35	0.12	15.9
309FGSD04	8/30/2007	4:1500PM	FALSE	FALSE	FALSE	27.8	02	91	1000	01	0.07		0.39	0.13	21.7
309FGSD04	9/10/2007	5:5000PM	TRUE	FALSE	FALSE	21.6		91	1100	01	0.13	7.5	0.33	0.11	17
309FGSD04	9/12/2007	5:5200PM	FALSE	FALSE	TRUE	18	02		1160	01	0.09	7	0.43	0.14	16.6
309FGSD06	6/19/2007	12:5400PM	TRUE	FALSE	FALSE	18.1	02	92	1510	01	0.17	65	0.61	0.20	18.1
309FGSD06	6/23/2007	10:4500AM	TRUE	FALSE	FALSE	18	02	92	1620	01	0.09	7	0.51	0.17	19.1
309FGSD06	7/3/2007	9:5800AM	TRUE	FALSE	FALSE	20.5	0	93	730	01	0.18	7	0.49	0.16	18.9
309FGSD06	7/5/2007	10:0000AM	TRUE	TRUE	FALSE	17	04	92	1020	01	0.6	7	0.53	0.17	18.9
309FGSD06	7/18/2007	6:0400PM	TRUE	FALSE	TRUE	25.5	1.5	93	0.5	01	0.04	7.5	0.52	0.17	22.6
309FGSD06	7/19/2007	6:1600PM	TRUE	FALSE	FALSE	18.6	04	92	1530	01	0		0.54	0.18	19.8
309FGSD06	7/31/2007	2:0000PM	TRUE	FALSE	FALSE	17.5	04	91	1550	01	0	7.25	0.45	0.15	19.2
309FGSD06	8/14/2007	6:0900PM	TRUE	FALSE	FALSE	19.7	02	93	1500	01	0.12	7.5	0.42	0.14	19.7
309FGSD06	8/15/2007	6:0900PM	TRUE	FALSE	FALSE	18	04	93	1520	01	0.03	7.5	0.5	0.17	20.3
309FGSD06	8/29/2007	3:2400PM	TRUE	FALSE	TRUE	20.5	04	91	1640	05	0	7.5	0.41	0.14	20.3
309FGSD06	8/30/2007	3:3000PM	TRUE	FALSE	FALSE	23.6	04	93	1070	01	0	7	0.45	0.15	21
309FGSD06	9/10/2007	6:1000PM	TRUE	FALSE	FALSE	17.9	04	106	1520	01	0.01	7.5	0.5	0.17	21.2
309FGSD06	9/12/2007	6:1500PM	FALSE	FALSE	FALSE	17.2		107	1450	01	0.05	7	0.51	0.17	21.8