City of Pacific Grove
Urban Watch Monitoring Program

PROGRAM OVERVIEW

The City of Pacific Grove Urban Storm Drain Monitoring Program was initiated in June 1999 and is a collaborative effort between the Coastal Watershed Council, the City of Pacific Grove, the City of Monterey, and the Water Quality Protection Program of the Monterey Bay National Marine Sanctuary. The purpose of this project is twofold: (1) to use trained volunteers to monitor dry weather storm drain activity in selected outflow areas from June through October, 2000; and (2) to identify common pollutants/contaminants within the storm drains in the study area. Working with staff from the Monterey Bay National Marine Sanctuary (MBNMS), five sampling sites (Figure 1) were selected based on drainage basin and safe access for volunteers. The five sampling sites are referred to as (1) *8th and Ocean* located at the intersection of Oceanview Blvd and 8th Street; (2) *Greenwood Park* located at 13th Street and Central Avenue, (3) *Lover's Point* at Forest Ave. (4) *Pico* on Sunset Drive, near Asilomar, between Arena Ave. and Pico Ave. directly across from the house with orange door and window frames at 1745 Sunset and Oceanview Blvd; and (5) *Asilomar* on Oceanview Blvd near the Asilomar Convention Center under the bridge at the last turnoff before passing the golf course.

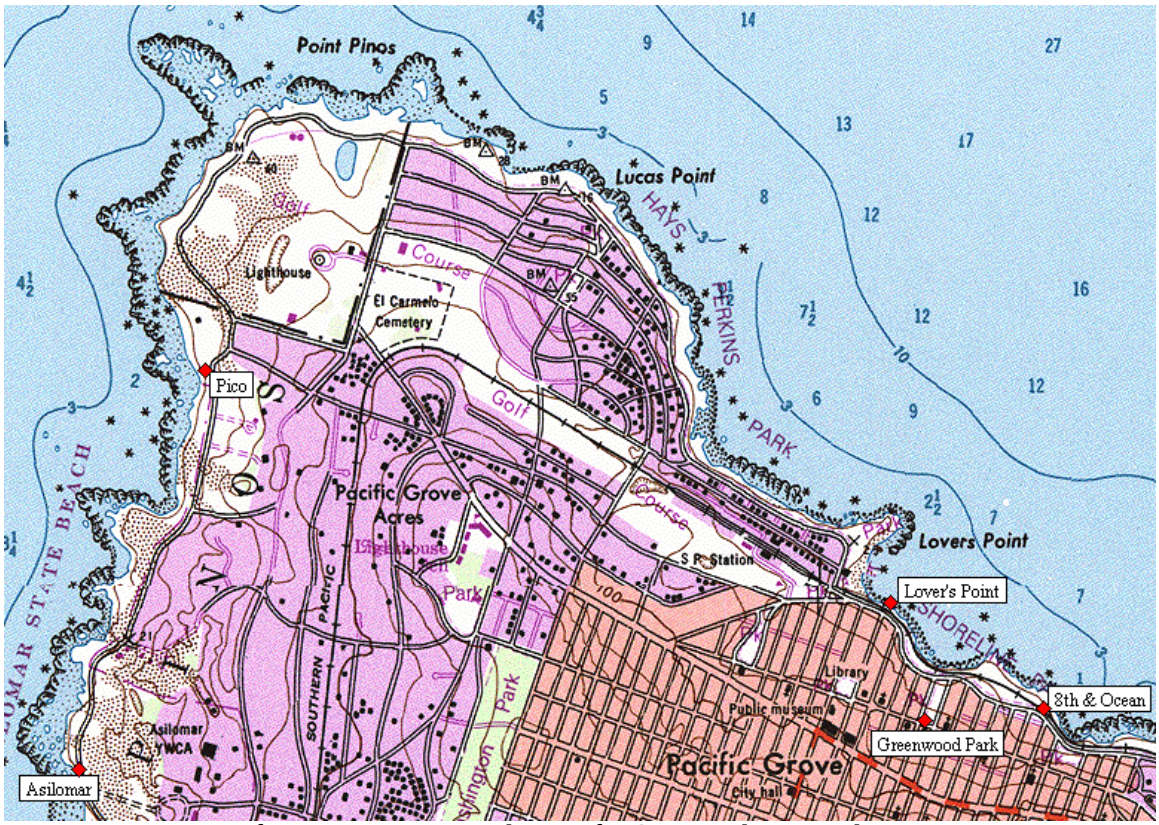

Figure 1. Locations of monitoring sites in the Pacific Grove Urban Watch Program

The program used the "Urban Watch" monitoring kit manufactured by the LaMotte Company and designed in association with the City of Ft. Worth, Texas. The Urban Watch monitoring kit is designed to provide a method for volunteers to monitor dry-season storm drain discharges. The kit was developed according to National Pollutant Discharge Elimination System (NPDES) Phase I dry weather monitoring requirements and is designed to detect illegal stormdrain connections and discharges.

Following a one-day training, volunteers were instructed to conduct sampling on a 10-12 day schedule. Volunteers were divided into two teams with three members each. Volunteers conducted sampling twice within a 24-hour period with at least 4 hours between each sampling event. Parameters monitored included detergents, phenols, ammonium nitrogen, chlorine, turbidity, pH, water and air temperature, odor, and color. Volunteers also noted if there was oil sheen, sewage, trash, and surface scum present, as well as any other observations of note. Table 1 includes information on each of the parameters monitored and method used for monitoring.

Samples were randomized by maintaining a flexible bi-monthly schedule with the volunteers. Volunteers sampled both on weekdays and weekends. Scheduling of field time was left up to the teams. Samples were taken a minimum of 4 hours apart within a 24-hour period.

VOLUNTEER TRAINING

Coastal Watershed Council staff Susanna Danner and Donna Meyers provided a six-hour hands-on training for volunteers on June 17, 2000. Topics emphasized included monitoring concepts, sampling procedures, the meaning of each parameter monitored, use of kits in the field, and safety procedures. Volunteers were placed in teams according to general skill level and time availability. An experienced monitor went out with each team until staff felt that the groups had a good understanding of the sampling and analytical skills outlined in the training packet given to them.

Table 1: Water Quality Parameters
Urban Watch Monitoring Program

Parameter	Possible Sources	Associated Problems	Method/Accuracy
Temperature	illegal discharges	affects rates of chemical and biochemical reaction in the water.	Method - Digital thermometer Accuracy - 1% full scale
Turbidity	microorganisms, sediment, erosion	interferes with fish and aquatic life	Method - Visual Octa-Slide Viewer against turbidity standard slide bar
pH	aerosols and dust in air, mineral substances, sewer overflows, animal wastes, pesticides & fertilizers, photosynthesis	interferes with fish and aquatic life	Method - Electrometric pH probe calibrated Accuracy ??0.2 pH units
Detergents	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 ??0.1 ppm
Copper	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	Method - Diethyldithiocarbamate Octa-Slide Comparator against color standard Accuracy ??10%
Phenols	disinfectants, toothpaste, mouthwashes from domestic wastewater	interferes with fish and aquatic life	Method - Aminoantipyrine Octa-Slide Comparator against color standard Accuracy ??10%
Chlorine	illegal or unintended connection to a stormdrain or draining of a swimming pool	toxic to aquatic life, can create a "sterile" environ-ment	Method - DPD Octa-Slide Comparator against color standard Accuracy ??10%
Ammonia-Nitrogen	illegal connections to stormdrain systems, poorly functioning septic systems, wildlife	at certain concentrations can be toxic to aquatic organisms	LaMotte Code 5864 Colo-Ruler against a color standard
Color	dyes or chemicals	interferes with aquatic insects	Method - Visual Borger Color System
Odor	illegal discharge or product of decomposition; "clean" drainage water should have no distinctive odor	can indicate presence of contaminants	Scent
Oil sheen	hydrocarbons such as oil, gasoline, and grease; leaking underground petroleum storage tanks	toxic to aquatic organisms	Method - Visual
Trash, sewage, scum	illegal connections to stormdrain systems, poorly functioning septic systems, illegal dumping	interferes with fish and aquatic life	Method - Visual

QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

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

- Training in monitoring concepts, safety, sampling methods, and hands-on use of equipment.
- Training in use of data sheet and data entry for volunteers.
- Calibration of the pH meter within 24 hours of use.
- Continued supervision until staff was confident in the volunteers' sampling and analysis skills.
- Weekly follow up and review of data sheets to determine inconsistency in data.
- CWC prepared a Standard Operation Procedure for volunteers to review and use in the field during each monitoring event.

RESULTS

I. Quantitative Parameters

Over the period of June through October 2000, monitoring took place on nine dates, with the exception of Asilomar, which was visited on eight dates. Each site was visited twice over a 24-hour period on each date. Therefore, a total of 88 events were monitored.

Please see attached tables for averages, maximum values, and frequency of parameters encountered.

Detergents

Detergents were found at all sites with the exception of Pico. The highest frequency of detergents was found at the 8th and Ocean outfall, where detergents were detected on 5 of 18 total visits. Generally, concentrations detected were 0-0.1 ppm. The highest concentration found was at 8th and Ocean, where the measurement on 09/04/2000 was 1.4 ppm.

Phenols

Phenols were found at all sites. The highest readings of 0.5 ppm were found on 08/12/2000 at all sites. Each site had phenols detected only twice, with the exception of Asilomar, where phenols were detected once.

Ammonia Nitrogen

Ammonia nitrogen was found in higher frequency than any other chemical parameter. Concentrations of ammonia nitrogen measured were most commonly between 0.1-0.25 ppm. Ammonia nitrogen was detected most often at 8th and Ocean and Greenwood Park. The highest concentration detected was 1 ppm at 8th and Ocean on 08/12/2000. At all sites, 39 monitored events tested positive for ammonia nitrogen, out of a total of 88 monitored events.

Copper

Copper was not detected during the dates monitored.

Chlorine

Chlorine was found three times at the Asilomar site, twice at Greenwood Park, and once at Lover's Point. Chlorine was not detected at the 8th and Ocean or Pico sites. The highest concentration of chlorine detected was 2 ppm at Greenwood Park on 08/03/2000.

Turbidity

Turbidity was detected, but was consistently low for all sites.

II. Qualitative Parameters

Odors

Odors were detected on only three of all visits. On 07/18/2000, volunteers reported an unidentified solvent odor at the Lover's Point site. A putrid odor was also reported on 10/06/2000 at Pico. On 10/19/2000, a sweet smell was noted at 8th and Ocean.

Color

Water color was found to be transparent at all sites during all visits.

Oil sheen

Oil sheen was noticed infrequently at three sites and was absent from all other sites. The sites where oil sheen was reported were 8th and Ocean, Asilomar, and Greenwood Park.

Surface scum

Surface scum was noticed a total of 4 times at 8th and Ocean, 4 times at Greenwood Park, 2 times at Pico, and 2 times at Asilomar. Surface scum was not noted at Lover's Point. In many cases, algae were reported to be a component of the surface scum.

Trash

Trash was found at four sites with great frequency. The highest frequency recorded was at Greenwood Park, where the volunteers noticed trash during 18 of the 18 total visits to the site. Volunteers did not find trash during any visits to the Asilomar site.

III. Additional Data

Please refer to attached data summary tables.

CONCLUSIONS

Results from the data collected showed that ammonia nitrogen is the most common contaminant entering storm drains within the study area. Of the 88 monitored events for all sites and visits, ammonia nitrogen was found 39 times (44%), detergents were found 13 times (15%), phenols were found 9 times (10%), chlorine was found 6 times (7%), and copper was found 0 times (0%). These data demonstrate the possibility of illic it discharges into the drains monitored.

Data from Pacific Grove in 2000 show lower frequencies of detection, on average, than measured in the City of Pacific Grove during summer 1999. Periodic spikes in chemical concentrations and constant low-level concentrations of some contaminants illustrate the need for continued dry-season monitoring.

The data results show the need for a targeted public outreach program for urban runoff control within the city limits. Other ideas may include working with local newspapers to publish weekly monitoring results from the Urban Watch program and working with the Chamber of Commerce and other business associations to promote clean water practices.

The 2000 Pacific Grove Urban Watch Monitoring Program continued piloting the Urban Watch kit first used in the City of Monterey in summer 1997. The Urban Watch kit was developed for use by volunteers to monitor dry-weather storm drain flow. The kit is easy to use and provides consistent data throughout the monitoring period. It is recommended that project organizers develop a relationship with a certified lab to periodically run QA/QC checks on the equipment. It is also recommended that when positive results are found for constituents that volunteers collect an additional sample for processing by a lab. Program coordinators would then inform the City of Pacific Grove of findings as soon as they are recorded.

It is recommended that the City of Pacific Grove continue the Urban Watch monitoring program in the coming year to add to the data presented in this report. All sites should continue to be monitored. At sites where episodic flows and/or chemical detections have been reported, such as 8th and Ocean and Greenwood Park, it is recommended that upstream sources of discharge be assessed and mapped. If upstream sources prove to be accessible, it would be advantageous to compare upstream and downstream chemical analyses.