

ATTACHMENT 1
WATERSHED ACTIVITY SUMMARY SHEETS

TITLE: Pet Waste Bag Dispenser Program in County Parks
ID NUMBER: TJ-001

ACTIVITY DESCRIPTION

The County of San Diego provides pet waste bag dispensers at County parks. The County installs, maintains, and inventories pet waste dispensers in its parks throughout the year. Two important goals of this program are to reduce the amount of pet waste found in parks and to educate the public on the need to cleanup after their pets. Realization of these goals will result in the reduction of pollutant loads, particularly bacteria and nutrients.

The County's jurisdictional goal for this five-year permit cycle is to increase the total number of parks with pet waste bag dispensers by 100% (i.e., from 26 parks to 52 parks).

ACTIVITY IMPLEMENTATION

FY 2007-08 ACTIVITY IMPLEMENTATION

During the FY 2007-08 reporting period the County of San Diego maintained 12 dispenser stations at three parks within the Tijuana River Watershed.

FY 2008-09 ACTIVITY IMPLEMENTATION

No additional stations were added in FY 2008-09. During this reporting period the County of San Diego continued to maintain 12 dispenser stations at three parks in the Tijuana River Watershed. The parks and the number of dispensers include:

- Lake Morena Park (4 dispensers)
- Pine Valley Park (2 dispensers)
- Potrero Park (6 dispensers)

The County's jurisdictional goal for this five-year permit cycle is to increase the total number of parks with pet waste dispensers by 100% (i.e., from 26 parks to 52 parks).

TMDL APPLICABILITY

N/A

TIME SCHEDULE FOR IMPLEMENTATION

- Maintenance of existing pet waste dispensers – Ongoing
- Addition of new dispensers in County parks – Ongoing

PARTICIPATING WATERSHED COPERMITTEES

- County of San Diego

OTHER PARTICIPATING ENTITIES

- None

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Bacteria
- Nutrients

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Bacteria and nutrients have been identified as priority water quality problems in the Tijuana River Watershed. Parks have been identified as potential sources of these pollutants. Since this activity addresses a priority water quality problem and a priority source, it is consistent with the collective watershed strategy.

EXPECTED BENEFITS

This activity will result in reductions of bacteria and nutrients from County parks.

EFFECTIVENESS MEASUREMENTS

As described in the table below, activity effectiveness will be measured by tracking the number of pet waste bags distributed at each County park on an annual basis (Level 1). Bacteria load reductions (Level 4) will be estimated based on the number of bags distributed and the following assumptions obtained from a 2004 study completed by the County at the San Elijo Lagoon Ecological Reserve:

- Assumption 1: The average weight of pet waste per bag is approximately 0.2 lbs
- Assumption 2: In addition to the bags taken from the County's dispensers, an additional 30% of pet waste bags are brought to the parks by the pet owners themselves.

| Facility Name | # of Stations | # of Bags Used | Waste Reduction Lbs. |
|----------------------|----------------------|-----------------------|---------------------------------|
| Lake Morena | 4 | 10,760 | 2,152 |
| Pine Valley | 2 | 6,840 | 1,368 |
| Potrero | 6 | 18,500 | 3,700 |
| Total | 12 | 36,100 | 7,220 |

TITLE: LAND ACQUISITIONS FOR TIJUANA RIVER WMA
ID NUMBER: TJ-002

ACTIVITY DESCRIPTION

The San Diego County Board of Supervisors approved the Multiple Species Conservation Program (MSCP) in 1997 as an integral part of the County's efforts to protect parks and open space. The goal of the MSCP (a 50-year program) is to maintain and enhance biological diversity in the region and maintain viable populations of endangered, threatened, and key sensitive species and their habitats. Land acquisition also provides a significant water quality benefit for the watersheds in which it occurs. MSCP acquisition precludes development from occurring and allows land to retain its natural perviousness.

The MSCP is a cooperative effort among the County and other local jurisdictions and the U.S. Fish and Wildlife Service and the California Department of Fish and Game (the Wildlife Agencies). These public partners work with various private landowners, conservation groups, and community planning groups, developers, and other stakeholders. The County of San Diego has adopted an MSCP for the southwestern portion of the County. MSCP plans for the Northern and Eastern portion of the County are in the planning stages. It is expected that the Northern Subarea Plan may be approved during the lifetime of the current stormwater permit. While the northern and eastern plan have yet to be approved by the County of San Diego, lands have been and will continue to be acquired from willing sellers.

ACTIVITY IMPLEMENTATION FY2007-08

During the FY2007-08 reporting period there was 5.52 acres of land acquired in the Tijuana River WMA.

ACTIVITY IMPLEMENTATION FY2008-09

During the FY2008-09 reporting period there was 113.39 acres of land acquired in the Tijuana River WMA.

| Property | Acres | Date | Watershed ID | APN(s) |
|----------------------------|---------------|-------------|---------------------|---------------|
| Potrero-Clarke | 19.60 | 8/20/2008 | 911.25 | 653-111-03 |
| Gavin et al Mason Wildlife | 80.61 | 10/31/2008 | 911.25 | 653-120-27 |
| Gavin- Mason Wildlife | 13.18 | 1/12/2009 | 911.25 | 653-120-28 |
| TOTAL | 113.39 | | | |

TMDL APPLICABILITY

While it may be supportive of TMDL goals, this activity is not specifically implemented as part of a TMDL compliance program.

TIME SCHEDULE FOR IMPLEMENTATION

The County of San Diego acquires land on an ongoing basis from willing sellers.

PARTICIPATING WATERSHED COPERMITTEES

- County of San Diego

OTHER PARTICIPATING ENTITIES

- U.S. Fish and Wildlife Service
- California Department of Fish and Game
- Private land owners
- Conservation groups
- Community planning groups
- Developers

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- All

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Land acquisition is consistent with the collective watershed strategy in that it averts development, thereby eliminating the possibility of future sources in need of abatement or future pollutant loads in need of reduction.

EFFECTIVENESS ASSESSMENT

Activity effectiveness will be measured by tracking the number and total acreage of land acquisitions within the watershed on an annual basis. It may also be possible to estimate pollutant loadings avoided as a result of these acquisitions. The County will consider presenting load reduction estimations in WURMP Annual Reports if it determines that they are helpful for the purposes of assessing overall program effectiveness.

TITLE: I Love a Clean San Diego Trash Cleanup Sponsorship
ID NUMBER: TJ-003

ACTIVITY IMPLEMENTATION

Each spring, I Love A Clean San Diego (ILACSD) conducts its Creek to Bay Cleanup event to target various inland and coastal sites in San Diego County in need of trash and debris removal. ILACSD recruits and organizes site captains and groups of volunteers for each site. A media center is also designated, which promotes environmental stewardship, including the importance of keeping litter and debris from spoiling the region's watersheds. The whole event is marketed throughout San Diego County through a variety of media, including television, radio public service announcements, newspapers, newsletters, electronic mail, bulletin boards, community outreach activities, calendar listings, and word of mouth.

The ILACSD Creek to Bay Cleanup occurred on April 25, 2009. The City of San Diego (City) sponsored the San Ysidro - Beyer Blvd. site in the Tijuana River Watershed Management Area (WMA). Approximately 105 volunteers removed and recycled 20,320 lbs of trash and debris.

Based on the information above, the effectiveness assessment section, and the total amount of trash removed leading to a load reduction of bacteria, a high priority water quality problem, the City requests credit for a trash cleanup activity as a watershed water quality activity.

TMDL APPLICABILITY

- None

TIME SCHEDULE FOR IMPLEMENTATION

The Creek to Bay Cleanup has historically been held in April of each year. Prior to that month, the City will coordinate with ILACSD staff to ensure that sites within the Tijuana River WMA are included in the list for cleanups and that proper sponsorship arrangements are made.

PARTICIPATING WATERSHED COPERMITTEES

- City of San Diego

OTHER PARTICIPATING ENTITIES

- I Love a Clean San Diego (ILACSD)
- Volunteers from general public

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Bacteria

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Both the City's *Strategic Plan for Watershed Activity Implementation* and the Collective Watershed Strategy for the Tijuana River WMA identify bacteria as a high priority water quality problem throughout the WMA, and recommend implementing load reduction/source abatement activities to address it. Sponsorship of the Creek to Bay Cleanup will result in load reduction of trash and debris directly and of bacteria indirectly.

EFFECTIVENESS ASSESSMENT

| Watershed: Tijuana River | | |
|--|--|---------------|
| ILACSD CREEK TO BAY CLEANUP SPONSORSHIP | | |
| Assess the Efficiency and Effectiveness of Sponsoring ILACSD's Cleanup Efforts to Remove Litter from Public Areas and Waterways | | |
| Management Questions | <ul style="list-style-type: none"> • What is the load reduction associated with sponsorship? • What is the efficiency of the sponsored cleanup? (\$/person or \$/lb collected) | |
| Targeted Measurable Outcome(s) | Load reduction due to reduction of trash (any amount) due to trash cleanup sponsorship | |
| Assessment Method(s) | <ul style="list-style-type: none"> • Tabulation (e.g., number of participants) • Quantification (e.g., pounds of trash collected) | |
| | Total pounds of trash removed and recycled (Outcome Level 4) | 20,320 pounds |
| | Number of participants (Outcome Level 1) | 105 |
| | Total money spent on cleanups for all six watersheds (Outcome Level 1) | \$30,000 |
| | Estimated amount of money spent on cleanups for Tijuana River watershed (Outcome Level 1) | \$5,000* |
| | Activity Efficiency (Total Cost/Total Pounds Removed) | \$0.25/pound |

*Calculated by dividing total sponsorship cost by six watersheds.

Objectives

The goal of this assessment is to determine the effectiveness and efficiency of trash cleanup days for actively reducing pollutant loads.

Analysis and Results

On April 25, 2009, 105 participants removed and recycled approximately 20,320 pounds of trash and debris from numerous sites in the Tijuana River WMA. The average estimated sponsorship cost for the City of San Diego was \$5,000 per watershed (\$30,000/6 watersheds with City sponsorship). Thus, there was a 20,320 pound load reduction associated with sponsorship per yearly event, with an efficiency of \$0.25 per pound collected. The efficiency was calculated by dividing the estimated sponsorship cost for the Tijuana River WMA by the pounds of trash removed.

Conclusions

Implementation and assessment of load reduction and efficiency for the Coastal Cleanup Day sponsorship will occur again in FY 2010. Future results may be used to compare various types of trash cleanups completed and their associated costs as well as comparing the same types of trash cleanups that are sponsored each year over time.

TITLE: Coastal Cleanup Day Sponsorship
ID NUMBER: TJ-004

ACTIVITY IMPLEMENTATION

Each fall, San Diego Coastkeeper (SDCK) conducts the Coastal Cleanup Day event to target various inland and coastal sites in San Diego County in need of trash and debris removal. Coastkeeper recruits and organizes site captains and groups of volunteers for each site. A media center is also designated, which promotes environmental stewardship, including the importance of keeping litter and debris from spoiling the region's watersheds. The whole event is marketed throughout San Diego County through a variety of media, including television, radio public service announcements, newspapers, newsletters, electronic mail, bulletin boards, community outreach activities, calendar listings, and word of mouth.

Coastal Cleanup Day occurred on December 6, 2008. The City of San Diego (City) sponsored the Otay Mesa Open Space site in the Tijuana River Watershed Management Area (WMA). Approximately 46 volunteers removed 1,860 pounds of trash and debris. Volunteers were asked to track the debris collected by filling out data cards provided by the Ocean Conservancy.

Based on the information above, the effectiveness assessment below, and the total amount of trash removed leading to a load reduction of bacteria, a high priority water quality problem, this trash cleanup activity fulfills credit as a watershed water quality activity for FY 2009.

TMDL APPLICABILITY

- None

TIME SCHEDULE FOR IMPLEMENTATION

Coastal Cleanup Day has historically been held in September of each year. Prior to that month, the City will coordinate with Coastkeeper staff to ensure that sites within the Tijuana River WMA are included in the list for cleanups, and that proper sponsorship arrangements are made.

PARTICIPATING WATERSHED COPERMITTEES

- City of San Diego

OTHER PARTICIPATING ENTITIES

- San Diego Coastkeeper
- I Love a Clean San Diego (ILACSD)
- Volunteers from general public

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Bacteria

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Both the City's *Strategic Plan for Watershed Activity Implementation* and the Collective Watershed Strategy for the Tijuana River WMA identify bacteria as a high priority water quality problem throughout the WMA, and recommend implementing load reduction/source abatement activities to address it. Sponsorship of Coastal Cleanup Day will result in load reduction of trash and debris directly and of bacteria indirectly.

EFFECTIVENESS ASSESSMENT

| Watershed: Tijuana River | | |
|--|---|-----------------|
| SDCK COASTAL CLEANUP DAY SPONSORSHIP | | |
| Assess the Efficiency and Effectiveness of Sponsoring SDKC's Cleanup Efforts to Remove Litter from Public Areas and Waterways | | |
| Management Questions | <ul style="list-style-type: none"> • What is the load reduction associated with sponsorship? • What is the efficiency of trash cleanup? (\$/person or \$/pound collected) | |
| Targeted Measurable Outcome(s) | Achieve load reduction due to reduction of trash due to trash cleanup sponsorship | |
| Assessment Method(s) | <ul style="list-style-type: none"> • Tabulation (e.g., number of participants) • Quantification (e.g., pounds of trash collected) | |
| Data Recorded | | |
| | Pounds of trash removed (Outcome Level 4) | 1,860 pounds |
| | Number of participants (Outcome Level 1) | 46 |
| | Amount of money spent on cleanups for all six watersheds (Outcome Level 1) | \$12,000 |
| | Amount of money spent on cleanups for the Los Peñasquitos watershed (Outcome Level 1) | \$2,000 |
| | Activity Efficiency (Total Cost/Total Pounds Removed) | \$1.08/pound |

Objectives

The goal of this assessment is to determine the effectiveness and efficiency of trash cleanup days for actively reducing pollutant load.

Analysis and Results

The event's debris removal was tracked using data cards provided by the Ocean Conservancy, a 1,860 pound load reduction was recorded. There was a total of \$12,000 estimated for the sponsorship cost for all six WMAs in the City's jurisdiction and 46 participants for this WMA. It was anticipated that the sponsorship fee at that level would remain the same for subsequent years. The event's efficiency, calculated by dividing the sponsorship cost for the Tijuana River WMA by the pounds of trash removed, was \$1.08 per pound.

Conclusions

Implementation and assessment of load reduction and efficiency for the Coastal Cleanup Day sponsorship will occur again in FY 2010. Future results may be used to compare various types of trash cleanups completed and their associated costs as well as comparing the same types of trash cleanups that are sponsored each year over time.

Based on the total amount of trash removed leading to a load reduction of bacteria, a high priority water quality problem, this trash cleanup activity fulfills a watershed water quality activity for FY 2009.

TITLE: Tijuana River Targeted Facility Inspections
ID NUMBER: TJ-007

ACTIVITY IMPLEMENTATION

This activity has been modified during the past two reporting periods. Initially the project was a focused inspection activity that included activities in several watersheds to increase the statistical significance of the data collected from such a collective effort. The focus was to be on restaurants, animal, landscaping and automotive facilities. However, in the past two reporting periods, the City determined that it would be more beneficial to specifically target automotive facilities in the Tijuana Watershed. As a result, the previous ID number TJ-006 will be retired and no longer used to identify this activity – it will be identified as TJ-007.

This activity is part of a larger study in the Mission Bay, San Diego Bay and Tijuana River watershed management areas. The City of San Diego developed and implemented a focused inspection activity designed and implemented to answer the following management questions related to the implementation of commercial/industrial inspection programs:

- 1) What is the optimal frequency (within resource limitations) of inspections for Automotive Repair Facilities?
- 2) Does type of business ownership change the required inspection frequencies?
- 3) Based on information collected during inspections, can the inventory of specific source types, in this case automotive facilities, be feasibly prioritized?

The focus of the activity during FY 2009 was to develop the activity and implement the first round of inspections that would establish the baseline data set for comparison after the second and third round of inspections are completed.

The initial findings included problems primarily in outdoor storage and activity areas without proper BMP implementation or good-housekeeping practices. The findings for the FY 2009 activity implementation do not completely answer the management questions, however, by the end of the program, it is anticipated that these questions will be answered.

In FY 2009 a total of 22 full inspections were completed at auto shops in the Tijuana River WMA.

Facilities

During FY 2009, the City conducted the first round of its automotive facility inspections from February through May 2009. 278 inspections were conducted as follows:

- Mission Bay Watershed – 65 inspections
- Chollas Watershed – 191 inspections
- Tijuana Watershed – 22 inspections

Approximately 50% of these businesses (139) are scheduled to receive a second inspection in FY 2010, starting in August 2009. In addition, all 278 businesses will be re-inspected again starting in February 2010 to be able to compare the results of the inspections for a complete annual cycle.

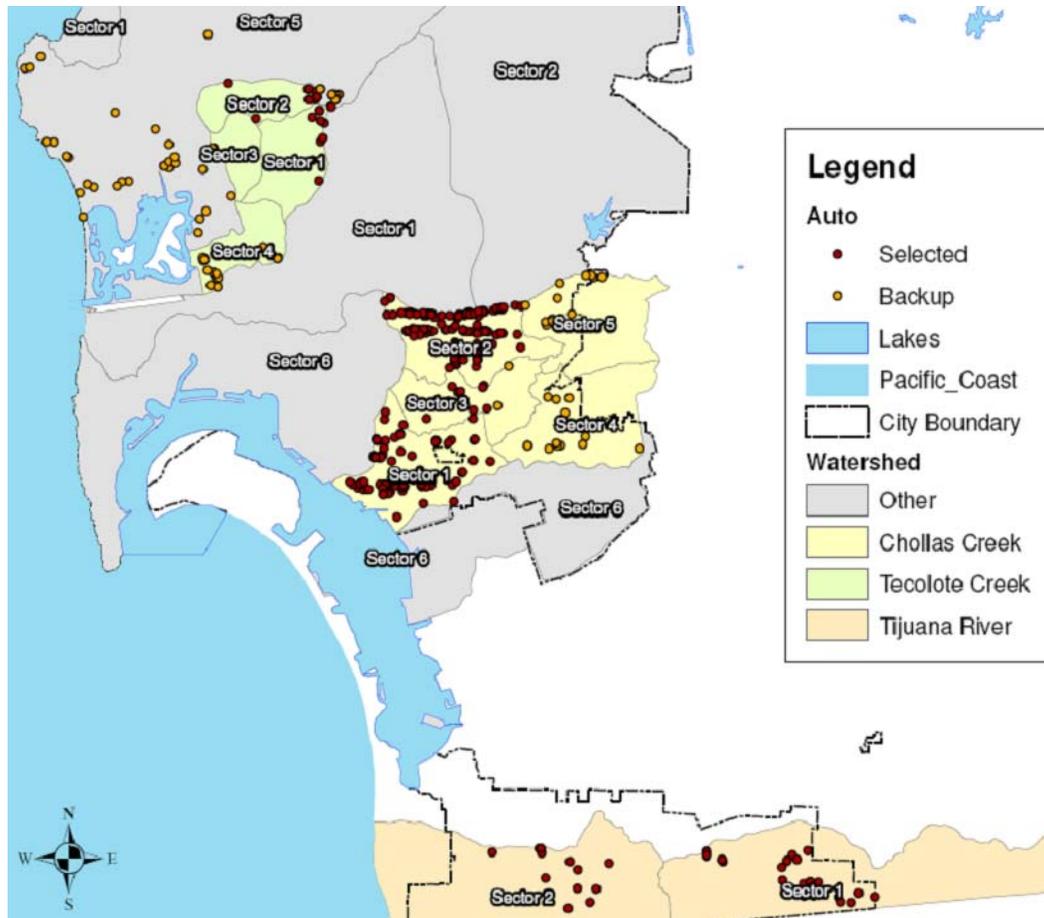


Figure 1 – Mapping of the facilities inspected (all three watershed areas)

During FY 2009, many of the alternative locations were utilized to obtain the 278 inspections due to the lack of primary and secondary sites to be inspected. Many of the businesses were no longer in business or had relocated and were not “inspectable”.

Public Outreach

The City sent out a letter to business owners informing them of the inspections. The notice provided basic information about the City’s inspection program and informed the recipient that they may be subject to multiple inspections.

TMDL APPLICABILITY

- N/A

TIME SCHEDULE FOR IMPLEMENTATION

The City will conduct its second and third rounds of inspections in August 2009 and February 2010 respectively. Data analysis and activity assessment will occur between April and June 2010 for reporting in the FY 2010 Annual Report.

PARTICIPATING WATERSHED COPERMITTEES

- City of San Diego

OTHER PARTICIPATING ENTITIES

- N/A

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

The Tijuana River WMA inspections target sources of heavy metals.

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

The Collective Watershed Strategy for the Tijuana River WMA identifies metals as high priority water quality problems in the Tijuana River WMA and recommends implementing load reduction/source abatement activities to address them. Implementation of these targeted inspections contributes to addressing discharges, correcting behaviors, and abating sources associated with bacteria and metals.

EFFECTIVENESS ASSESSMENT

Baseline Data

Baseline data collected during FY 2009 will be the basis of comparison for changes in findings when compared to mid-year inspections and annual inspections. Pollutant Discharge Potential Assessment (PDPA), BMP Knowledge and findings of violations will be compared to inspections conducted in FY 2010.

Data Collection Methods – Inspections

The City completed the inspections utilizing existing inspection forms with supplemental questions to capture the information necessary to answer the three management questions.

As with all inspections conducted by the City, during these watershed inspections, if violations were identified, they were noted for follow-up as appropriate. Follow-up inspections will occur as appropriate based on the identified violations. If discharges were identified, the City's inspector immediately reported these incidents to the City's code enforcement group. This enabled the City to take immediate actions to abate sources and have a direct positive impact on load reductions.

Findings

The following represents the primary findings of the activity. Of the 278 inspections conducted:

- One (1) had an illicit discharge identified during the inspections
- 60 had identifiable violations of the City's municipal code/minimum BMPs
- 25 had made at least one correction to violations during the inspections
- 89% (247 sites) implemented BMPs for liquids storage
- 23% (64 sites) performed at least some maintenance outdoors
- 57% (159 sites) have outdoor storage of materials – 29% (46 sites) did not implement any BMPs.

In general, the violations for poor BMP implementation were related to outdoor activities, materials/parts storage and lack of good-housekeeping practices. Many of the issues would be resolved if the facilities had structural changes to cover the outdoor operations and activities.

Additionally, the baseline data for the purposes of comparison of the varying inspection frequencies are identified in the table below. These assessment results will be compared to the 6-month inspection results as well as the final annual inspection results to compare and contrast the results based on the frequencies of inspections.

Table 1 – Stormwater Knowledge & BMP Assessments

| Inspection Category | Inspections | Average Knowledge* | Average BMP* |
|--------------------------------------|--------------------|---------------------------|---------------------|
| FY 2009 WURMP Automotive Inspections | 278 | 1.2 | 2.8 |
| Automotive inspections – non WURMP | 576 | 2.0 | 2.8 |
| All Inspections (historic JURMP) | 5,082 | 2.3 | 3.0 |

* Scale is from 1 (lowest) to 5 (highest)

Table 2–Effectiveness Assessment for Activity

| Watershed: Tijuana River | | |
|--|---|-----|
| TARGETED FACILITY INSPECTIONS | | |
| Assess Efficiency and Effectiveness of Facility Inspections | | |
| Management Questions | <ul style="list-style-type: none"> • What is the optimal frequency of inspections for Automotive Repair Facilities? • Does type of business ownership change the required inspection frequencies? • Based on information collected during inspections, can the inventory of specific source types, in this case automotive facilities, be feasibly prioritized? | |
| Targeted Measurable Outcomes | <ul style="list-style-type: none"> • Source abatement due to inspections • Increased BMP implementation due to inspections | |
| Assessment Methods | <ul style="list-style-type: none"> • Inspections (e.g., track number of BMPs implemented, increased number of BMPs, number of follow-up inspections) • Quantification (e.g., use frequency of BMP implementation to estimate source abatement) • Tabulation (e.g., amount of money spent on inspections, amount of money spent on educational materials) • Reporting (e.g., estimates of source abatement for BMPs from data) | |
| Data Recorded | Number of full inspections (Outcome Level 1) | 22 |
| | Number of facilities recommended for follow-up (Outcome Level 1) | 7 |
| | Number of Sites Needing Corrective Action (Outcome Level 1) | 22 |
| | Number of Sites that Implemented Some Corrective Action During Inspection (Outcome Level 3) | 2 |
| | Number of Sites with Source Abatement (based on corrective actions taken) (Outcome Level 4) | 2 |
| | Total IC/IDs Observed (Outcome Level 1) | 0 |
| | Total IC/IDs Eliminated During Inspection (Outcome Level 1) | N/A |

Conclusions

This activity fulfills the requirement of one of the two required watershed water quality activities for this watershed management area.

As a result of this activity, the City noted deficiencies at the facilities and made recommendations to the responsible parties at 22 sites. Additionally, the City noted 7 sites that needed to follow-up to verify that corrective actions/BMPs were implemented. However, the City can verify that at 2 locations, corrective actions were immediately taken. This demonstrates both a Level 3 (change in behavior/BMP implementation) and Level 4 (source abatement/load reduction) outcome was achieved as a direct result of this activity.

The City plans to implement the program in FY2010 to more obtain more data necessary to answer the management questions associated with the program activity.

TITLE: Municipal Rain Barrel Installation and Downspout Disconnect Project
ID NUMBER: TJ-009

ACTIVITY IMPLEMENTATION

The City of San Diego (City) is undertaking a municipal rain barrel installation and downspout disconnect project to reduce pollutant loading at municipal facilities. The municipal rain barrel installation and downspout disconnect project will consist of installing rain barrel systems, including downspout disconnects and infiltration systems, within the Tijuana River Watershed Management Area (WMA) to reduce pollutant loading from urban runoff during storm events. Rain barrels and downspout disconnects help to capture, store and divert storm water to reduce urban runoff, thus contributing to reduced flooding, erosion and the contamination of surface water with sediments, fertilizers, metals, pesticides and other urban runoff pollutants. Rain barrels collect storm water runoff from buildings and residential rooftops and store until discharged. Rain barrels can be connected to a slow-release, gravity-powered landscaping irrigation system in which the stored runoff is released to landscaped areas for irrigation purposes. These landscaped areas can be designed to promote pollutant load reduction using bioretention, bioswales and other Low Impact Development (LID) techniques. These areas can also be designed as lined planter boxes, swales and filtration systems that keep runoff away from existing structures and utilities.

Downspout disconnects are an additional option for redirecting runoff from roof areas to landscaped areas or constructed planter boxes, swales or filtration systems. The project will investigate the effectiveness of rain barrels/downspout disconnects in reducing pollutant loading and will assist the City in attaining its water quality goals. The project includes site evaluations and selections, the purchase of rain barrel/downspout disconnect systems and planter boxes, system installation, wet-weather monitoring, and effectiveness assessments.

In order to select appropriate sites for this pilot project, the City used the prioritization process outlined in its *Strategic Plan for Watershed Activity Implementation* to target high priority areas within the Tijuana River WMA. The site selection process was long and iterative. Field reconnaissance was required to identify sites within the Tijuana River WMA with adequate roof gutters, downspouts, and locations where rain barrels would be installed to capture flow. Sites were assessed for sources of electrical power for use with automated systems and for adjacent vegetated areas where captured water could be discharged. Sites were also selected for education/outreach opportunities.

Based on the prioritization plan and field reconnaissance, the San Ysidro Library was selected because it is located in one of the highest priority sectors of the Tijuana River WMA for potential pollutant loading. The recreation center is also a publically accessible City facility, making education and outreach opportunities easily implementable.

In April 2009, a City-approved contractor installed two rain barrel systems at the library. One 55-gallon rain barrel was installed and connected to an existing downspout directly adjacent to the main entrance of the library. This system utilizes a gravity release mechanism to deliver captured runoff to nearby landscaping. In addition, one 75-gallon

rain box was installed and connected to an existing downspout along the back side of the building. This system will also use a gravity release mechanism to deliver captured water to nearby landscaping.



Rain Barrel at front entrance



Rain Box

A one page informational flyer regarding the rain barrel pilot project was developed in June 2009. The flyer will be distributed to all participating municipal sites to be made available to the public. In addition, a brief description of the pilot project and a PDF version of the informational flyer will be posted on the City's *Think Blue* website during the first quarter of FY 2010.

This phase of the pilot project focuses on implementing and assessing the effectiveness of rain barrel/rain harvesting systems at selected municipal facilities. Ultimately, the City would like to incorporate the use of these LID techniques through a residential program that may include incentives for implementing these systems. Therefore, it is anticipated that the information gathered during this phase of the pilot project will be applied to implementation in residential areas.

Based on these findings, the City may modify its municipal rain barrel installation and downspout disconnect project to increase effectiveness and/or seek City Council approval for additional funding to implement future phases (i.e., incentives) and additional rain barrel/downspout disconnect systems.

TMDL APPLICABILITY

- None

TIME SCHEDULE FOR IMPLEMENTATION

Project planning, including site selection, began in July 2007 and was completed by the first quarter of FY 2008. Initially, the project was scheduled for completed by the fourth quarter of FY 2008. However, planning, site selection, and procurement of the rain barrels took longer than expected. Product screening for the rain barrels and concrete planters was completed in the first quarter of 2008. Procurement of rain barrels, planter boxes and rain chains concluded by the second quarter of 2009. The installation contract was awarded and approved by City Council during the second quarter of FY 2009. A

pre-construction meeting was held with the contractor in March 2009. Installation of all systems occurred in April 2009. Wet-weather monitoring will be performed from October 2009 to April 2010. Assessment and final reporting for this program will conclude by June 2010.

PARTICIPATING WATERSHED COPERMITTEES

- City of San Diego

OTHER PARTICIPATING ENTITIES

- None

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Bacteria

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Both the City’s *Strategic Plan for Watershed Activity Implementation* and the Collective Watershed Strategy for the Tijuana River WMA identify bacteria as a high priority water quality problem, and recommend implementing load reduction/source abatement activities to address it. Implementation of this activity will address both high priority water quality problems by reducing runoff volume via capture, retention and infiltration.

EFFECTIVENESS ASSESSMENT

| MUNICIPAL RAIN BARREL INSTALLATION PROGRAM | | |
|--|---|-----|
| Assess the Efficiency and Effectiveness of Rain Barrel Water Collection Containers at Reducing Runoff | | |
| Management Questions | <ul style="list-style-type: none"> • What is the effectiveness/efficiency of rain barrel/rain-harvesting systems in reducing storm water runoff volume? • What is the loading reduction of different systems? • Which system is most efficient in collecting and/or diverting rainwater? • Which system results in the largest load reductions? | |
| Targeted Measurable Outcome(s) | <ul style="list-style-type: none"> • Load reduction due to rain barrel installation • Runoff reduction due to rain barrel installation | |
| Data Recorded | Cost of site preparation, installation and start-up for the site | TBD |
| | Cost of operation and maintenance evaluation for all sites | TBD |
| | Cost of effectiveness monitoring for all sites | TBD |
| Recommended Data | <ul style="list-style-type: none"> • Number/type of barrels installed (Outcome Level 1) • Volume of storm water captured/diverted (Outcome Level 4) • Concentrations of COCs in rainwater or runoff (measured in rain barrel systems) (Outcome Level 4) • Percent capture of the different systems (acres drained) (Outcome Level 4) | |

Objectives

The goal of the rain barrel and rain harvesting assessment is to determine whether rain barrel/rain-harvesting systems reduce storm water runoff, thereby reducing metals and bacteria loads, and if so which system is most effective and efficient.

Analysis and Results

The pilot project was not in active implementation during FY 2009. Further analysis will take place after wet-weather monitoring data is collected, which is scheduled for completion by April 2010.

Conclusions

Effectiveness and efficiency will be determined by comparing load reduction values (determined via monitoring efforts) versus the cost of installing and maintaining the rain barrel system. Conclusions will be made after the effectiveness assessment is completed in June 2010. Any recommendations resulting from this pilot project will be reported in the FY 2010 WURMP Annual Report.

TITLE: City-Wide Clean-Up Events
ID NUMBER: TJ-010

ACTIVITY IMPLEMENTATION

Imperial Beach participates in a number of city-wide sponsored clean-up events including ILACSD Creek-to-Bay clean up, local community group sponsored events, and the annual Home Front Clean-Up event. The largest event in terms of participation is the annual Home Front Clean-Up, which the City has been implementing since the 2001-01 municipal permit. These annual City-wide activities serve both as an encouragement and a means for residents to eliminate waste that could otherwise contribute the release of contaminants into the storm water conveyance system.

TMDL APPLICABILITY

This activity is not specifically targeted for TMDLs in the Tijuana WMA.

TIME SCHEDULE FOR IMPLEMENTATION

City-wide clean up events will continue to be held throughout the duration of Municipal Permit R9-2007-0001. The City intends to sponsor ILACSD for the annual Creek-to-Bay clean up and continue the highly successful City-wide Home Front Clean Up event for the complete cycle of the current permit. The activity will be assessed and refined as necessary during years 3 and 4.

PARTICIPATING WATERSHED COPERMITTEES

- City of Imperial Beach

OTHER PARTICIPATING ENTITIES

- EDCO Waste and Recycling Services

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Bacteria

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Bacteria are identified as a priority water quality problem in the Tijuana WMA. The accumulation of waste by residents such as trash, green waste, and large bulky items are potential sources of bacteria. Since this activity addresses a priority water quality problem and a priority source, it is consistent with the collective watershed strategy.

EXPECTED BENEFITS

Expected benefits of implementing City-wide clean-up activities include compliance with permit requirements, changes in attitudes, knowledge, and awareness of the community, and lead to reductions in urban runoff and discharge quality by removing wastes that may have otherwise ended up in the storm drain system. City-wide clean-up events serve both as education and water quality activities. Reducing the amount of trash in the storm drain system also has the co-benefit of reducing bacteria which is identified as a water quality problem in the Tijuana WMA.

EFFECTIVENESS MEASUREMENTS

The effectiveness of this project meets the requirements of Outcome Level 1, Level 2, and Level 4 compliance with activity based permit requirements. Community wide clean-up events raise awareness of the connectivity of trash, urban runoff, storm drain systems, and receiving waters.

During FY 2008-09 Imperial Beach sponsored I Love a Clean San Diego for its 7th Annual Creek-to-Bay clean up event on April 25th, 2009. The City also held its annual Home Front clean up event on May 2nd, 2009. The Home Front clean up event had 732 participants and resulted in the proper disposal of 154.3 tons of waste including 19.8 tons of metals and 9.5 tons of green waste that were recycled.

TITLE: Large Special Event Inspection and Clean-Up
ID NUMBER: TJ-011

ACTIVITY IMPLEMENTATION

The City hosts the annual U.S Open Sandcastle Competition that draws close to one million visitors to Imperial Beach in the month of July. The City also hosts additional special events during the year that draw a large number of visitors to the City. Along with the visitors are a number of mobile businesses, food vendors, and increased volume of trash that can potentially contribute to the problem of urban runoff. Starting in 2008 the City enhanced its special event application process to further target urban runoff and recycling during the planning and implementation stages for the special event. Program enhancements include providing storm water education for street vendors, providing education for the general public whenever possible, and inspections of street vendors for storm water violations. The City also enhanced its recycling and trash collection service for the Annual U.S. Open Sandcastle Competition.

TMDL APPLICABILITY

This activity is not specifically targeted for TMDLs in the Tijuana WMA.

TIME SCHEDULE FOR IMPLEMENTATION

Implementation of the activity has begun under the previous storm water permit 2001-01 and since been reviewed and enhanced for the new R9-2007-0001 permit. The City endeavors to increase recycling and urban runoff education targeted at both street vendors and general public at large special events. During the previous two years the activity was in active implementation phase. Starting during year 3 the activity will be assessed and refined as necessary to maximize the effectiveness.

PARTICIPATING WATERSHED COPERMITTEES

- City of Imperial Beach

OTHER PARTICIPATING ENTITIES

- EDCO Waste and Recycling Services

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Bacteria

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Bacteria are identified as a priority water quality problem in the Tijuana WMA. The increased number of visitors, larger volumes of waste, and water quality threat from mobile food vendors during large special events are potential sources of bacteria and urban runoff pollution. Since this activity addresses a priority water quality problem and a priority source, it is consistent with the collective watershed strategy.

EXPECTED BENEFITS

Expected benefits of enhancing large special event clean up and inspections include compliance with permit requirements, changes in attitudes, knowledge, and awareness of mobile businesses and local community, and reductions in urban runoff and discharge quality by enhancing recycling efforts and implementing storm water BMPs. This activity serves as both an education

and water quality activity. Enhancing recycling efforts, increasing education on urban runoff, and verifying the implementation of BMPs through inspections may lead to lower levels of bacteria and trash reaching the storm drain system.

EFFECTIVENESS MEASUREMENTS

The effectiveness of this project meets the requirements of Outcome Level 1, Level 2, and Level 4 compliance with activity based permit requirements. Community wide clean-up events raise awareness of the connectivity of trash, urban runoff, storm drain systems, and receiving waters.

During FY 2008-09 Imperial Beach required the proper disposal of recycled waste at all large special events and the implementation of storm water BMPs when appropriate. During the year the City held 12 large special events requiring conditions for storm water BMPs and recycling from the Public Works Department. The largest of these events was the annual U.S. Open Sandcastle Competition, which during the weekend of July 12th-13th drew an estimated crowd of over 800,000 visitors to the beach. In preparation for the U.S. Open Sandcastle event the City provided additional storm water BMP information to all street vendors before the event and then followed up with storm water inspections during the event, which resulted in 3 Notices of Violations. The City also enhanced its recycling efforts at the Sand Castle Competition by sponsoring a local Baptist Church group who worked with the City to enhance its recycling program implementation during the event. The recycling efforts resulted in a total of 1280 pounds of mixed recyclables and 960 pounds of cardboard being recycled.

As a result of the effectiveness assessment of this activity, the City recognizes a deficiency in education opportunities for the general public. Future efforts will continue implementing the existing large special event clean up and inspection activities while continuing to enhance the opportunities for education, especially for the general public. Program effectiveness for targeting water quality is expected to continually improve as special event applicants and vendors become familiar with City storm water and recycling programs.

TITLE: Smuggler's Gulch Sediment and Debris Removal
ID NUMBER: TJ-012

ACTIVITY DESCRIPTION

The County performs routine flood control maintenance activities on improved and unimproved channels pursuant to its Regional General Permit (RGP) 53. This activity is traditionally performed every two to four years depending on annual rainfall. The extent of the project includes the channel from the Mexican border, north approximately 5,400 feet to the confluence of the Tijuana River. Historically as much as 80,000 cubic yards of sediment can be removed from the channel. Trash is separated on site and recycled accordingly.

The sediment removal project is necessary to return the drainage facility to historic conditions and to convey flow properly, which will eliminate the potential for sediment and debris to build up causing future flooding events.

ACTIVITY IMPLEMENTATION 2007-08

There were no sediment and debris removal during the FY2007-08.

ACTIVITY IMPLEMENTATION 2008-09

There were no sediment and debris removal during the FY2008-09.

TMDL APPLICABILITY

N/A.

TIME SCHEDULE FOR IMPLEMENTATION

Typically removal takes place every other year but is based on precipitation patterns and erosion from the south. Dredging is planned for FY2009-10.

PARTICIPATING WATERSHED COPERMITTEES

- County of San Diego

OTHER PARTICIPATING ENTITIES

- California Department of Fish and Game
- California State Parks

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Sediment
- Trash

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Sediment and trash have been identified as high priority water quality problems in the Tijuana River WMA. This activity results in a direct load reduction of these pollutants, and is therefore consistent with the collective watershed strategy.

EFFECTIVENESS ASSESSMENT

This activity is considered a load reduction that can be measured. On an annual basis or as implementation occurs during the permitting period, the cubic yards of removal will be reported in the Tijuana River WMA WURMP Annual Report.

TITLE: TIJUANA RIVER WATERSHED BACTERIAL SOURCE IDENTIFICATION STUDY

ID NUMBER: TJ-013

ACTIVITY IMPLEMENTATION

The City of Imperial Beach initiated a Bacteria Source Identification study in November 2007 to identify and quantify sources of bacterial contamination in the U.S. portion of the Tijuana River Watershed. Unfortunately, the City was notified December 15, 2008 that the funding was on hold due to the state budget crisis. In June 2009 the project still had not received assurance from the state on the restoration of the CBI grant funds and the project was permanently put on hold until additional funding could be secured.

Once funding for the project is made available, work can be resumed and build upon the existing accomplishments of the Bacterial Source Identification Study to date. During this reporting period the Bacterial Source Identification Study accomplished the following tasks:

- Established a stakeholder group and held two meetings
- Completed a literature review and Quality Assurance Project and Monitoring Plans for the project
- Conducted field reconnaissance throughout the watershed and identified appropriate sampling locations
- Collected water quality samples for one sanitary survey and captured one wet weather storm event
- Collected preliminary flow measurement for the hydrologic component of the study

TMDL APPLICABILITY

While it may be supportive of TMDL goals, this activity is not specifically applicable as part of a TMDL compliance program.

TIME SCHEDULE FOR IMPLEMENTATION

The project is currently on hold until funding from the CBI Grant is made available or additional funding from another source can be secured. If and when funding for the project is restored, the City may rescind the stop work notice for the project and resume work on the Bacterial Identification Study. At which time the scope and terms of the initial agreement will need to be revisited to account for the work completed to date, the effects from schedule modifications, and start up costs to get the study running again.

PARTICIPATING WATERSHED COPERMITTEES

- County of San Diego
- City of San Diego
- City of Imperial Beach

OTHER PARTICIPATING ENTITIES

- State Water Resources Control Board
- Clean Beaches Initiative Task Force
- Regional Water Quality Control Board, San Diego
- U.S. Fish and Wildlife Service
- International Boundary and Water Commission (IBWC)

- California Department of Fish and Game
- Private land owners
- Conservation groups
- NGOs
- National Oceanic and Atmospheric Administration (NOAA)
- Tijuana River National Estuarine Research Reserve (TJNERR)

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Bacteria

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Bacteria are identified as a priority water quality problem in the Tijuana River Watershed. Trash, parks, and pet waste are potential sources of bacteria. Since this activity addresses a priority water quality problem and a priority source, it is consistent with the collective watershed strategy.

EXPECTED BENEFITS

There are limited data regarding bacterial loads from sources and activities on the U.S. side of the Tijuana River Watershed (TRW). In addition, detailed information regarding the impact of certain land uses, and the input of pollutants from point and nonpoint sources have not been assessed for the U.S. portion of the TRW. This study aims to quantify bacterial loads from potential sources and propose solutions to reduce the impact of bacterial loads in the TRW and Pacific Ocean. The implementation of successful best management practices will result in a reduction in beach postings and closures.

EFFECTIVENESS MEASUREMENTS

The effectiveness of this project meets the requirements of Outcome Level 1 compliance with activity based permit requirements. Information gained from this study will help in developing other programs that will further address changes in knowledge and behavior, load reductions, and improvements to water quality. Funding for the project was cut short before any analysis or conclusions could be drawn on the data collected from the first sanitary survey and wet weather storm event. Further effectiveness assessment is contingent upon funding for the project.

TITLE: LID and Watershed Planning Education for Community Planning and Sponsor Groups

ID NUMBER: TJ-014

ACTIVITY DESCRIPTION

This activity involves educating local planning and sponsor groups throughout the unincorporated County on low impact development (LID) and watershed planning principles, practices, and requirements. These groups act in an advisory capacity to local decision makers on a variety of issues, primarily discretionary planning projects. Because their input is valuable to the discretionary process, it is important that they have a strong understanding of regulations and guidelines that may affect the way watersheds are developed. Ultimately, the recommendations of local planning and sponsor groups have some influence over whether, and under what conditions, development projects are approved. LID and watershed planning education will aid local planning and sponsor groups in making informed recommendations on aspects of development projects that would affect watershed water quality.

During training, members of the planning or sponsor groups are provided with copies of the LID Handbook, including Management Strategies, the Appendices, and the Literary Guide. Advisory groups and audience members who wish to participate are given a pre- and post-survey to assess their general knowledge of watershed planning and LID both before and after the presentation. The training sessions average fifty minutes depending upon the amount and type of questions that are asked during the presentation.

Local planning and sponsor groups that received training within the Tijuana River Watershed during the FY 2008-2009 timeframe include those listed below. One tribe, the Manzanita band of Kumeyaay Nation, also participated at their request. However, because they are not subject to the permit and LID requirements, no pre- and post- survey was given.

- Lake Morena / Campo (11/24/2008)
- Potrero (10/9/2008)
- Boulevard (2/5/2009)
- Descanso (9/18/08)
- Cuyamaca (12/9/08)
- Pine Valley (10/14/2008)
- Alpine (1/22/2009)
- Jamul / Dulzura (3/24/2009)
- Manzanita Tribe (6/11/09)

ACTIVITY IMPLEMENTATION FY 07-08

This education program was successfully developed during the spring of FY 2007-2008, on schedule. The program consists of a PowerPoint presentation with a specific focus on the watershed(s) within which the community lies. Although County staff began conducting presentations to planning and sponsor groups in other watersheds during FY 2007-08, none were conducted in the Tijuana River Watershed.

ACTIVITY IMPLEMENTATION FY 08-09

As documented in the table below, presentations were delivered to eight planning and sponsor groups in the Tijuana River Watershed, which included 143 attendees. A total of 78 pre- and post- surveys were completed by these groups.

TITLE: LID and Watershed Planning Education for Community Planning and Sponsor Groups

ID NUMBER: TJ-014

| Community Group | Presentation Date | No. Of Attendees | Surveys Completed |
|------------------------|--------------------------|-------------------------|--------------------------|
| Alpine | 1/22/09 | 27 | 15 |
| Boulevard | 2/5/09 | 15 | 8 |
| Cuyamaca | 12/9/08 | 7 | 5 |
| Descanso | 9/18/08 | 10 | 10 |
| Jamul/Dulzura | 3/24/09 | 9 | 8 |
| Lake Morena / Campo | 11/24/08 | 35 | 8 |
| Manzanita Tribe | 6/11/09 | 12 | 0 |
| Pine Valley | 10/14/08 | 15 | 13 |
| Potrero | 10/9/08 | 13 | 11 |
| Total | | 143 | 78 |

TMDL APPLICABILITY

This activity is not specifically implemented in compliance with a TMDL.

TIME SCHEDULE FOR IMPLEMENTATION

This activity was completed during FY 2008-09. There is currently no further activity planned for future years.

PARTICIPATING WATERSHED COPERMITTEES

- County of San Diego

OTHER PARTICIPATING ENTITIES

- None

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- All

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

New development has been identified as having potentially significant impacts on watershed health. As such, this activity is consistent with the collective watershed strategy.

EFFECTIVENESS MEASUREMENTS

Activity effectiveness was assessed by tracking the number of presentations conducted, the number of participants in attendance, and the number and type of materials distributed (Level 1 Outcomes). Furthermore, attendees were asked to complete pre- and post- survey forms, which consisted of five multiple choice questions and one open answer section which asks the participant to provide information on drainage within the community planning area. Survey results were calculated to measure changes in attendee knowledge regarding watershed planning and LID principles (Level 2 Outcome).

The table below summarizes results from the 8 surveys administered to groups in the Tijuana River Watershed. Improvements on the post- survey ranged from a 2.67% increase to a 32.5% increase. This represents a demonstrable increase in knowledge among the target audience.

TITLE: LID and Watershed Planning Education for Community Planning and Sponsor Groups

ID NUMBER: TJ-014

| Community Group | Date | Total Attendees | # of Surveys Given | Pre-survey % correct | Post-survey % correct | % Increase |
|------------------------|-------------|------------------------|---------------------------|-----------------------------|------------------------------|-------------------|
| Alpine | 1/22/09 | 27 | 15 | 65.33% | 68% | 2.67% |
| Boulevard | 2/5/09 | 15 | 8 | 60% | 77.5% | 17.5% |
| Cuyamaca | 12/9/08 | 7 | 5 | 76% | 88% | 12% |
| Descanso | 9/18/08 | 10 | 10 | 82% | 88% | 6% |
| Jamul/Dulzura | 3/24/09 | 9 | 8 | 75% | 92.5% | 17.5% |
| Lake Morena / Campo | 11/24/08 | 35 | 8 | 52.5% | 85% | 32.5% |
| Manzanita Tribe | 6/11/09 | 12 | 0 | N/A | N/A | <i>No Survey</i> |
| Pine Valley | 10/14/08 | 15 | 13 | 53.85% | 83.08% | 29.23% |
| Potrero | 10/9/08 | 13 | 11 | 69.09% | 80% | 10.91% |

TITLE: Public Service Announcement: Karma, Karma Second Chance, Karma Tourist
ID NUMBER: TJ-015

ACTIVITY IMPLEMENTATION

The City of San Diego (City) retained a contract with a film production company to create three *Think Blue* Public Service Announcements (PSAs) specifically focused on bacteria, with gross pollutants (trash) profiled as a vector. The PSAs are entitled *Karma*, *Karma Second Chance*, and *Karma Tourist* and the goal of the PSAs is to educate the public about causes of pollution and to encourage positive behavioral change.

The PSA used humor to convey the importance of the public's part in the proper disposal of trash and the impacts litter and pollution have on our waterways and beaches. The PSAs were broadcast in both English and Spanish.

TMDL APPLICABILITY

- None

TIME SCHEDULE FOR IMPLEMENTATION

The PSAs were developed in FY 2007 and FY 2008 and were broadcast on several TV and radio stations throughout the Tijuana River Watershed Management Area (WMA) during FY 2009 from August 2008 to April 2009. The City will work with various broadcast media outlets to distribute and air the PSAs during FY 2010.

PARTICIPATING WATERSHED COPERMITTEES

- City of San Diego

OTHER PARTICIPATING ENTITIES

- Various Television and Radios Stations in San Diego

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Bacteria
- Gross Pollutants (Trash)

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Both the City's *Strategic Plan for Watershed Activity Implementation* and the Collective Watershed Strategy for the Tijuana River WMA identify bacteria as high priority water quality problems in the Tijuana River WMA. The *Karma*, *Karma Second Chance*, and *Karma Tourist* PSAs will result in both increased knowledge and awareness regarding bacteria and trash as a vector and future load reduction of trash and debris directly and of bacteria indirectly.

EFFECTIVENESS ASSESSMENT

| Watershed: Tijuana River | | |
|--|--|---------|
| PUBLIC SERVICE ANNOUNCEMENT: KARMA, KARMA SECOND CHANCE, KARMA TOURIST | | |
| Assess the Efficiency and Effectiveness of Public Service Announcements | | |
| Management Questions | <ul style="list-style-type: none"> • What changes in awareness/attitude regarding bacteria and gross pollutants was achieved after implementation? • How efficient is this education activity based on total cost versus number of people (targeted audience) reached? | |
| Targeted Measurable Outcome(s) | <ul style="list-style-type: none"> • Reach goal of number of listeners (radio) and homes (television) reached, based on survey results • Increased level of knowledge/attitude based on post-activity surveys | |
| Assessment Method(s) | <ul style="list-style-type: none"> • Survey (e.g., administer survey to assess knowledge and attitude of participants) • Quantification (e.g., number of residents reached by PSA) | |
| Data Recorded | Number of impressions made in homes through television in Tijuana River WMA (Outcome Level 1) | 446,835 |
| | Number of impressions made to the public through radio announcements in Tijuana River WMA (Outcome Level 1) | 613,459 |
| | Change in knowledge or attitude from survey results (Outcome Level 2) | 44% |
| | Change in pollutant-related behavior from survey results (Outcome Level 3) | Yes** |

**29% of residents reported making a change in their behavior as a result of seeing information about what polluted water in storm drains does to local rivers, beaches and the ocean. Of those residents that had heard of “Think Blue” 40% reported that they were taking steps to change behaviors. There was also a continued decrease in the percentage of residents who reported hosing down their driveways, as well as using pesticides and weed killers. Other decreases in pollutant-related behavior were percentages too small to fall within the acceptable range for statistical outcomes at a 95% confidence level. For those behaviors, the percentages of change were so small that they cannot be assumed to be a result of the activity based on this year’s survey and method of assessment.

Objectives

The goal of this assessment is to determine the effectiveness of the *Karma*, *Karma Second Chance*, and *Karma Tourist* PSAs in educating the public about the causes of bacteria and trash loading, and to encourage positive behavioral change.

Analysis and Results

The city conducted an effectiveness assessment of *Think Blue* PSAs and storm water messages via field experiment in which 309 individuals were shown eight different *Think Blue* PSAs (including the *Karma*, *Karma Second Chance* PSAs). Participants were then asked questions to determine storm water knowledge, awareness and possible changes to future behavior as a result of the PSA. The results of the field experiment demonstrate the messages in the PSAs are effective in increasing public knowledge that storm water is not treated. 25% of participants were more likely to answer that storm water is not treated than those who had answered the question prior to watching the PSA. Additionally, awareness that storm water pollution is an important issue in San Diego also increased after watching the PSA. Lastly, the *Karma Second Chance* PSA scored the highest of the PSAs in motivating participants to take specific actions to prevent storm water pollution.

The city also obtained assessment information from its annual random-digit dial 2009 *San Diego Storm Water Survey* of 800 total residents from all WMAs. 55% of residents said they saw a *Think Blue* PSA last year (up from 52%) on television while 8% of residents heard the radio announcements in FY 2009. 51% said they prefer to get information about storm water via

television. This year's survey also noted that while 44% of residents know that storm water was not treated, significant increases in awareness were detected among women (particularly over the age of 50), residents under the age of 35 and over 64, those with no college education, Asians and Hispanics. Additionally, 29% of residents reported making a change in their behavior as a result of seeing information about what polluted water in storm drains does to local rivers, beaches and the ocean. Of those residents that had heard of "Think Blue" 40% reported that they were taking steps to change behaviors as well.

Respondents to the survey were selected randomly in order to fairly and accurately represent the city as a whole. To estimate the number of impressions in the Tijuana River WMA, the total number of estimated city-wide impressions, (11,170,888 for television and 15,336,488 for radio ads) was multiplied by the proportion of residents living in the Tijuana River WMA (4%) of the city's total population.

Conclusions

Based on assessment from both the survey and the field experiment as well as feedback from the public, *Think Blue* PSAs appear to have an impact on the public as it pertains to knowledge and awareness of storm water issues. While some residents have stated they have made changes to their behaviors due in part to the PSAs, the city will continue to monitor public perception and feedback to determine if this is actually occurring. The city will continue to work with appropriate broadcast media outlets to air *Think Blue* television and radio PSAs in FY 2010.

Additionally, the city continued to measure public awareness of the *Think Blue* program via surveys comprised of a random digit dial sample of the residents living in the Tijuana River WMA to determine whether this activity results in a change in knowledge and awareness associated with storm water issues, or results in a change in pollution-related behavior. Efficiency will be calculated by comparing measurable changes in knowledge, awareness and/or change in behavior with the cost of this activity.

Furthermore, while the *2009 San Diego Storm Water Survey* indicated that 39% had heard the phrase "Think Blue" during FY 2009, awareness that storm water is not treated increased. These results, coupled with a continued decrease in the percentage of residents hosing down their driveways, and in residents using pesticide or weed killers, demonstrate that the public's knowledge of storm water issues is moving in a positive direction.

It is worth noting that the City's PSAs continue to reach new individuals in the Tijuana River WMA, as evident by the estimated number of individual impressions from television and radio announcements watershed-wide. Although a direct, statistical correlation is not clear, the number of impressions and the results of the random survey indicate that this activity is effective in reaching residents and disseminating information to raise knowledge, awareness and/or create a change in behavior regarding storm water issues. This activity will continue in future fiscal years with the hopes that a long-term assessment will provide more complete results.

TITLE: Mobile Advertising
ID NUMBER: TJ-016

ACTIVITY IMPLEMENTATION

The City of San Diego (City) retained a contract with a mobile advertising firm, AdTruks, to advertise Think Blue messages on static billboard trucks in the Tijuana River Watershed Management Area (WMA) in FY08. The City created advertisements that targeted behaviors associated with bacteria and trash. The goal of mobile advertising was to educate the public about the impacts litter and pollution have on local waterways and beaches and to encourage positive behavioral change.

Based on results from the 2009 Storm Water Survey in which 17% of participants stated they received Think Blue messages via mobile advertising, it was determined that the program was not as effective in generating sufficient knowledge and awareness of the program or storm water issues. Additionally, the Department received a number of public comments objecting to the use of mobile advertising to convey an anti-pollution message. Therefore, the city did not conduct mobile advertising in the Tijuana River WMA in FY09, and has discontinued this activity.

TITLE: Invasive Species Removal Project in the Tijuana River Park
ID NUMBER: TJ-017

ACTIVITY DESCRIPTION

The SANDAG Transnet Environmental Mitigation Program (EMP) funded a grant to the Southwest Wetlands Interpretive Association (SWIA) to continue the Tijuana River Valley Invasive Plant Control Program (Phase IV) begun in 2002 in the extreme southwest part of San Diego County within a few miles from the mouth of the river. The program includes work in the County of San Diego's Tijuana River Valley Regional Park (TRVRP), California State Parks' Border Field State Park, and the U.S. Fish and Wildlife Services' Tijuana Estuary. Three invasive plant species are targeted within the Tijuana River Valley: giant reed (*Arundo donax*), castor bean (*Ricinus communis*) and salt cedar (*Tamarix ramosissima*). These species degrade the habitats they invade by displacing native vegetation, lowering insect food supply for birds, reducing groundwater, and increasing flood and fire hazards. The invasive removal program includes replanting with native species, a project that, coupled with natives returning naturally, will serve to filter pollutants and decrease sedimentation in the long term. The County cooperated with the SWIA in seeking grants, by writing letters of support and serving on a technical advisory group (TAG) for the program. In the implementation of the program, the County continues to serve on the TAG and provides SWIA with right-of-entry permits to County property. SWIA is committed to seeking grants for the on-going funding of this project and the County plans to continue its long-term cooperation with the association.

ACTIVITY IMPLEMENTATION FY2007-08

The following tasks were implemented as part of invasive plant removal program in the Tijuana River Valley Regional Park:

- Treated arundo and castor bean on 100 acres;
- Performed follow-up treatment of arundo and castor bean on old 511 acres;
- Treat tamarisk on 61 acres around Dairy Mart ponds;
- Maintained and planted native cuttings.
- Attended TAG meeting and provided right of entry letters to SWIA.

ACTIVITY IMPLEMENTATION FY2008-09

The following tasks were implemented as part of invasive plant removal program in the Tijuana River Valley Regional:

- The County participated in the annual TAG meeting, held July 20, 2008. The continued success of the program and the information disseminated through the TAG meetings has resulted in the signing of a "Declaration of Intent" by all public landowners in the Tijuana River Valley that acknowledges the problem of invasives and their commitment to support continuing efforts to control these species.

TMDL APPLICABILITY

N/A.

TIME SCHEDULE FOR IMPLEMENTATION

Phase IV, scheduled for Fall 2009 through Spring 2010, will enhance and restore prime riparian and mule fat habitats within 75.5 acres of the County of San Diego Tijuana River Valley

Regional Park. The goals are to improve these valuable sites for visitors, control the spread of invasive plants and restore native habitats. Additional funding provided by USFWS will provide treatment and revegetation to 31 acres within the U.S. Fish and Wildlife Services Tijuana Estuary. Treatment and planting is scheduled to start in October 2009.

PARTICIPATING WATERSHED COPERMITTEES

- County of San Diego

OTHER PARTICIPATING ENTITIES

- Southwest Wetlands Interpretive Association,
- U.S. Fish & Wildlife Service,
- California State Parks

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Sediment
- Pesticides
- Bacteria

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Sediment, pesticides, and bacteria are high priority water quality problems in the Tijuana River WMA. Therefore, this activity is consistent with the collective watershed strategy.

EFFECTIVENESS ASSESSMENT

Activity effectiveness will be measured by ensuring completion of all project elements (Level 1). Each invasive plant area will be monitored to determine which control methods would be most effective in the TJRV. Although no water quality monitoring is proposed for this project, water quality improvements may be able to be assessed qualitatively based on results from similar projects.

TITLE: Tijuana River and Estuary Trash and Sediment Characterization Study
ID NUMBER: TJ-018

ACTIVITY DESCRIPTION

Trash and sediment deposition in the Tijuana River and Estuary continue to threaten public health, safety, and the environment throughout the Tijuana River Valley. Public contact with trash, waste tires, and other solid wastes, including contaminated soil and sediments, is potentially injurious to human health. Moreover, excessive sedimentation has in recent years contributed to the loss and impairment of valuable estuarine habitat. Past efforts have removed some of the trash and sediment; however, they have been insufficient to address the entire area. The extent of trash and sediment deposition has not been adequately characterized to date and comprehensive alternatives to solve the problem remain elusive.

The objective of this project is to characterize trash and sediment in the Tijuana River and Estuary and to identify comprehensive remediation alternatives for removing existing trash and sediment deposition. The County and City of San Diego are partnering with the San Diego Regional Water Quality Control Board, the California Integrated Waste Management Board (CIWMB), and other stakeholders to complete this study.

As a first step, a consultant was retained to characterize trash and sediment in the Tijuana River and Estuary and to prepare a workplan to identify remediation alternatives for removing existing trash and sediment deposition. The following tasks and deliverables are scheduled to be completed no later than June 15, 2009 at a cost not to exceed \$100,000.

Task 1: Inventory of Existing Information and Field Reconnaissance

- Research and review plans and pertinent studies.
- Research topographic maps to determine boundaries of the River and Estuary
- Conduct field investigation and take digital photos of the existing trash and sediment depositions.
- Determine the extent of the existing trash, waste tires, and sediment deposition in the river, estuary, and tributaries.
- Geo-reference location of trash, waste tires, and sediment depositions
- Quantify the depth, width, and length of the trash, waste tires, and sediment deposition.

Task 2: Digitize/Compile Existing Information

- Prepare orthophoto base maps with the existing trash, waste tires, and sediment information.
- Import from the County of San Diego GIS database information such as land use classifications, soil groups, and transfer into project database.

Task 3: Characterization

- Determine the types and quantities of trash in the deposition. Develop a matrix showing the general types of trash and the disposal methods.
- Determine the amount of sediment in the deposition.
- Determine the amount of recyclable materials that can be recovered from the deposition.
- Determine the amount of waste tires in the deposition.
- Determine the viability of recycling sand.
- Plot percentage of trash versus sedimentation on the base map.

TITLE: Tijuana River and Estuary Trash and Sediment Characterization Study
ID NUMBER: TJ-018

Task 4: Analyze Alternatives

- Develop alternatives for removing existing trash, waste tires, and sediment deposition. Consider alternatives that do not require cross-border solutions.
- Consider the following in developing the alternatives:
 - Cost to haul to landfill
 - Temporary or Permanent Transfer Station
 - Segregating recyclables
 - Segregating sand
 - Waste tire recycling and disposal
- Include cost to restore river, tributary, and estuary to natural condition.
- Develop cost estimate for various alternatives.
- Determine the viability of each alternative. Consider unit costs as a factor.

Task 5: Report Submittals

- Submit quarterly progress reports and meet with CIWMB/County/City Staff for review and comments.
- Submit Draft and Final Reports with all text, graphs, and GIS maps in both hard copy and electronic formats.

ACTIVITY IMPLEMENTATION FY08-09

The following activities were implemented in FY08-09:

- Compilation of existing historical aerial photographs for the valley for specific years;
- Review of historical aerial photographs to identify the active channels on the floodplain;
- Completion of a trash survey in the areas east of the plug near Hollister Street, east to the International Border along the main river channel, and along Smuggler's Gulch;
- Preparation of a database with georeferenced information collected during the trash survey;
- Permitting associated with test pits and borings to be completed in the same areas as indicated above;

TMDL APPLICABILITY

There are no TMDLs currently adopted for the Tijuana River or Estuary; however, US EPA has indicated to watershed stakeholders that it is in the initial phases of data gathering for the development of trash and sediment TMDLs.

TIME SCHEDULE FOR IMPLEMENTATION

The test pits and borings described above could not be completed in FY08-09 due to restrictions related to the breeding season of threatened and endangered bird species. These activities could not be conducted until the breeding season ended on September 15, 2009. Activities to be completed in FY09-10 include the following:

- Completion of permitting to excavate test pits and drill borings in the valley;

TITLE: Tijuana River and Estuary Trash and Sediment Characterization Study

ID NUMBER: TJ-018

- Conduct sediment sampling to analyze chemicals of potential concern and evaluate grain-size distribution;
- Conduct trash survey in Goat Canyon and areas west of the plug on the main channel to the beach;
- Additional sediment and trash characterization as needed
- Develop cleanup alternatives for addressing trash, waste tires and anthropogenic sediment

PARTICIPATING WATERSHED COPERMITTEES

- County of San Diego (project/consultant management)
- City of San Diego

OTHER PARTICIPATING ENTITIES

- San Diego Regional Water Quality Control Board
- California Integrated Waste Management Board (Funding Source)

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Trash
- Sediment

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

The trash and sediment characterization study is consistent with the collective watershed strategy in that it will provide information regarding the location and extent of trash and sediment within the Tijuana River Valley. This will lead to the identification of effective water quality activities to reduce the amount of trash and sediment within the valley.

EXPECTED BENEFITS

This activity is an important step toward the ultimate goal of improving public and environmental health in the Tijuana River Valley. The direct benefits of this activity will be a better understanding of the types, quantities, and locations of trash and sediment in the River Valley. It will also identify and evaluate various alternatives for removing existing waste, preventing future waste transport, and restoring the watershed to a more natural condition.

EFFECTIVENESS ASSESSMENT

Characterization of the location and extent of trash and sediment will provide the basis for load reduction activities. Future activities will be evaluated through the amount of trash and sediment removed from the system.

TITLE: City of San Diego Strategic Plan Implementation
ID NUMBER: TJ-019

ACTIVITY IMPLEMENTATION

In spring 2006, the City of San Diego (City) initiated efforts to proactively address present and anticipated Total Maximum Daily Load (TMDL), Area of Special Biological Significance (ASBS) protection, and Municipal Storm Water Permit requirements using an integrated approach to maximize resources and achieve efficiencies. The result of these efforts was the *Strategic Plan for Watershed Activity Implementation* (Strategic Plan). Its preparation involved reviewing and assessing available monitoring and source data, land use data, and current and anticipated regulatory drivers. The review and assessment were used to prioritize the water quality problems and their sources for the Watershed Management Areas (WMAs) that the City has jurisdiction in and to geospatially prioritize the City's portion of each of those WMAs, using best professional judgment, for activity implementation.

The Strategic Plan uses an integrated, tiered, and phased approach with regards to activity implementation. Activities that address multiple regulations simultaneously and offer multiple environmental sustainability benefits are favored over those that do not (integration). Activities that target pollutant sources and prevent pollutant generation and release in the first place are emphasized and maximized before the implementation of more expensive structural and treatment solutions (tiering). Furthermore, the City pilots activities on a limited scale to measure their effectiveness and efficiency before it implements them on a broad scale (phasing).

In addition, the City is of the opinion that the integration of storm water and urban runoff pollution management with other environmental efforts and infrastructure improvements is crucial for achieving efficiencies and cost savings in a period of seemingly perpetual municipal budget deficits. This integration is also crucial for obtaining the public's support of storm water and urban runoff pollution management efforts.

Development of the Strategic Plan included the formulation of a list of activities to implement during Phase I. These activities have been integrated into the various Watershed Urban Runoff Management Programs (WURMPs) that the City implements in conjunction with other local jurisdictions. Each fiscal year, the City updates its list of activities to reflect new data, schedule changes, and staffing and budgetary considerations. Many of these activities are reported as watershed water quality and education activities in the various WURMPs. However, the City has a list of project types and sources it plans to implement/target with no specific information. Because these are so conceptual in nature, the City does not report on them as specific activities. Those that are concepts not yet into development but planned for initiation within the next few years are listed in the table below.

Table 1 – Conceptual Projects

| Activity Description | Activity Type Classification | Type | Class | Primary Target Pollutant | Status |
|--|---|---------------|----------------|---|---|
| Irrigation Hardware Giveaway and Cash for Plants Program | Smart Irrigation Control Incentive Program | Water Quality | Non-structural | Pesticides, bacteria, nutrients, heavy metals | Planning, Implementation and assessment is anticipated to be completed in FY2013. WMA: TBD. |
| Mission Bay Drive Trash BMP | Inlet Trash/Debris Separation | Water Quality | Structural | Trash | Pre-planning |
| County Operations Center Green Roof Project Collaboration | Roof Rain Harvesting | Water Quality | Structural | Targeted Multiple Pollutants | Pre-planning |
| Erosion & Sediment Control Detention Basin | Erosion/Sediment Control BMP | Water Quality | Structural | Sediment, TSS, Metals, Pesticides & Trash | Pre-planning |
| "Green Mall" Infiltration Retrofit | Green Mall | Water Quality | Structural | Targeted Multiple Pollutants | Pre-planning |
| Green Roof Project | Roof Rain Harvesting | Water Quality | Structural | Targeted Multiple Pollutants | Pre-planning |
| Copper Brake Pad Alternative Legislative Mandate | Product Substitution | Water Quality | Non-structural | Metals | Sponsorship of the Brake Pad Partnership is in progress. |
| Wild Animal Park Demonstration Wetlands Treatment Project | Large-Scale Storm Flow and Multi-Pollutant Treatment System | Water Quality | Structural | Bacteria, Dissolved Minerals, Gross Pollutants, Metals, Nutrients, Oil & Grease, Organics, Pesticides, & Sediment | Cancelled |
| Basin Plan Triennial Review | N/A | Monitoring | Non-structural | N/A | As needed |
| Municipal Park Artificial Turf Pilot Project (1) | Artificial Turf | Water Quality | Non-structural | Targeted Multiple Pollutants | Feasibility study in progress. |
| Municipal Park Artificial Turf Pilot Project (2) | Artificial Turf | Water Quality | Non-structural | Targeted Multiple Pollutants | Feasibility study in progress. |
| Municipal Park Artificial Turf Pilot Project (3) | Artificial Turf | Water Quality | Non-structural | Targeted Multiple Pollutants | Feasibility study in progress. |
| Targeted Mobile Hazardous Household Waste Collection Centers | Hazardous Waste Collection | Water Quality | Non-structural | Metals, Trash, Oil & Grease | Pre-planning |
| Residential Rain Barrel, Downspout Disconnect, and Xeriscaping Incentive Program (1) | Downspout Disconnect; Rain Barrel Incentives | Water Quality | Non-structural | Targeted Multiple Pollutants | Pre-planning |
| Residential Rain Barrel, Downspout Disconnect, and Xeriscaping Incentive | Downspout Disconnect; Rain Barrel | Water Quality | Non-structural | Targeted Multiple Pollutants | Pre-planning |

| Activity Description | Activity Type Classification | Type | Class | Primary Target Pollutant | Status |
|--|--|---------------|------------------------------|--|--|
| Program (2) | Incentives | | | | |
| Rain Garden, Xeriscaping, and Landscape Filtration (1) | Rain Garden, Xeriscaping, and Landscape Filtration | Water Quality | Structural or Non-Structural | Targeted Multiple Pollutants | Pre-planning |
| Rain Garden, Xeriscaping, and Landscape Filtration (2) | Rain Garden, Xeriscaping, and Landscape Filtration | Water Quality | Structural or Non-Structural | Targeted Multiple Pollutants | Pre-planning |
| Sediment Basin Endowment Fund (1) | Sediment Basin Endowment | Water Quality | Non-structural | Sediment | Pre-planning |
| Sediment Basin Endowment Fund (2) | Sediment Basin Endowment | Water Quality | Non-structural | Sediment | Pre-planning |
| Commercial Pest Control | Product Sub | Education | Non-Structural | Pesticides | Planning |
| Residential Pesticide Management | Product Sub | Education | Non-Structural | Pesticides | In progress through JURMP education program. |
| LID Regulatory Barriers and Solutions | Municipal Code Modification | Water Quality | Non-structural | Targeted Multiple Pollutants | Pre-planning |
| Roof Rain Harvesting/Incentives | Roof Rain Harvesting | Water Quality | Structural or Non-structural | Targeted Multiple Pollutants | Pre-planning |
| Targeted Storm Drain Cleaning Pilot Project | Storm Drain Maintenance | Water Quality | Non-structural | Targeted Multiple Pollutants | Pre-planning |
| Targeted Behavioral Training (staff) | Targeted Behavioral Training (staff) | Education | Non-structural | Specific to Activity | Pre-planning |
| Rose Creek Homeless Reduction Program Sponsorship | Homeless Encampment Removal | Water Quality | Non-structural | Bacteria & Trash | Pre-planning |
| Enforcement Referrals | Enforcement Referrals | Water Quality | Non-structural | Specific to Activity | Pre-planning |
| Infiltration Vault/Pit Installation (1) | Infiltration Vault/Pit | Water Quality | Structural | Targeted Multiple Pollutants | Pre-planning |
| Infiltration Vault/Pit Installation (2) | Infiltration Vault/Pit | Water Quality | Structural | Targeted Multiple Pollutants | Pre-planning |
| Green Street Filtration | Green Street | Water Quality | Structural | TSS, Metals, Bacteria, Pesticides & PAHs | Pre-planning |
| Green Lot Filtration | Green Lot | Water Quality | Structural | TSS, Metals, Bacteria, Pesticides & PAHs | Pre-planning |
| Green Mall Filtration | Green Mall | Water | Structural | TSS, Metals, | Pre-planning |

| Activity Description | Activity Type Classification | Type | Class | Primary Target Pollutant | Status |
|---|--|---------------|----------------|------------------------------|---------------------------|
| | | Quality | | Bacteria, Pesticides & PAHs | |
| Limited Low-Flow Storm Drain Inlet Multi-Pollutant Treatment System (1) | Low-Flow Storm Drain Inlet Multi-Pollutant Train | Water Quality | Structural | Targeted Multiple Pollutants | Pre-planning |
| Limited Low-Flow Storm Drain Inlet Multi-Pollutant Treatment System (2) | Low-Flow Storm Drain Inlet Multi-Pollutant Train | Water Quality | Structural | Targeted Multiple Pollutants | Pre-planning |
| Limited Low-Flow Storm Drain Inlet Multi-Pollutant Treatment System (3) | Low-Flow Storm Drain Inlet Multi-Pollutant Train | Water Quality | Structural | Targeted Multiple Pollutants | Pre-planning |
| Small-Scale Storm Flow Storage and Multi-Pollutant Treatment System (1) | Small Scale Treatment Train | Water Quality | Structural | Targeted Multiple Pollutants | Pre-planning |
| Small-Scale Storm Flow Storage and Multi-Pollutant Treatment System (2) | Small Scale Treatment Train | Water Quality | Structural | Targeted Multiple Pollutants | Pre-planning |
| Small-Scale Storm Flow Storage and Multi-Pollutant Treatment System (3) | Small Scale Treatment Train | Water Quality | Structural | Targeted Multiple Pollutants | Pre-planning |
| Large Scale Storm Flow Storage and Multi-Pollutant Treatment System (1) | Large Scale Treatment Train | Water Quality | Structural | Targeted Multiple Pollutants | Pre-planning |
| Large Scale Storm Flow Storage and Multi-Pollutant Treatment System (2) | Large Scale Treatment Train | Water Quality | Structural | Targeted Multiple Pollutants | Pre-planning |
| Large Scale Storm Flow Storage and Multi-Pollutant Treatment System (3) | Large Scale Treatment Train | Water Quality | Structural | Targeted Multiple Pollutants | Pre-planning |
| Hydromodification BMP (1) | Hydromod BMP | Water Quality | Structural | Sediment & TSS | Pre-planning |
| Hydromodification BMP (2) | Hydromod BMP | Water Quality | Structural | Sediment & TSS | Pre-planning |
| Hydromodification BMP (3) | Hydromod BMP | Water Quality | Structural | Sediment & TSS | Pre-planning |
| Erosion/Sediment Control BMP (1) | Erosion/Sediment Control BMP | Water Quality | Structural | Sediment & TSS | Pre-planning |
| Erosion/Sediment Control BMP (2) | Erosion/Sediment Control BMP | Water Quality | Structural | Sediment & TSS | Pre-planning |
| Home Auto Activities (Metals) Outreach | Outreach | Education | Non-structural | Metals, Oil & Grease & PAHs | In progress through JURMP |

| Activity Description | Activity Type Classification | Type | Class | Primary Target Pollutant | Status |
|--|----------------------------------|---------------|------------------------------|---|--------------------|
| | | | | | education program. |
| Commercial Landscaping Targeted Enforcement | Targeted Enforcement | Water Quality | Non-structural | Nutrients & Pesticides | Pre-planning |
| Targeting Marinas and Boat Repair as a Pollutant Source | Targeted Source | Water Quality | Structural or Non-Structural | Metals & Bacteria | Pre-planning |
| Construction Contractors - Home and Commercial Improvements Inspection Generated Enforcement | Inspection Generated Enforcement | Water Quality | Non-structural | Metals, Sediment, Gross Solids & Oil & Grease | Pre-planning |

TMDL APPLICABILITY

- San Diego Region Beaches and Creeks Bacteria TMDL

Note: In addition to current and pending TMDLs, the Strategic Plan reviewed the Clean Water Act 303(d) list of impaired water bodies for the San Diego region and used the information to help prioritize the water quality problems, pollutant sources, and areas of the City to target for activity implementation.

TIME SCHEDULE FOR IMPLEMENTATION

Each activity has its own specific implementation schedule. However, implementation of Phase I of the Strategic Plan (the piloting stage before implementation on a broader scale) is anticipated to occur from FY 2008 through FY 2013.

PARTICIPATING WATERSHED COPERMITTEES

- City of San Diego

OTHER PARTICIPATING ENTITIES

- None

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- All Water Quality Problems are addressed as the goal of the Strategic Plan is to address multiple problems simultaneously as feasible to achieve efficiencies.

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Subsequent to the adoption of the Municipal Storm Water Permit (Order No. R9-2007-0001) in January 2007, the Copermittees developed a Model Watershed Strategy to help guide their planning, implementation, and assessment efforts in the various WMAs. The Model Watershed Strategy assists the Copermittees in developing a Collective Watershed Strategy for each WMA. Application of the Model Watershed Strategy results in prioritizing areas within each WMA for activity implementation; selecting and prioritizing appropriate watershed activities, including monitoring and pollutant source identification studies, for each of the prioritized areas; and identifying data gaps with regards to monitoring and pollutant sources, which need to be filled to enable more refined future management decisions.

Although developed independently of each other, the City's Strategic Plan and the Copermittees' Model Watershed Strategy share the approach of reviewing the best available data (e.g., water quality and pollutant source data) and analyzing them geospatially to make management

decisions regarding: (1) water quality problems to target and activities to implement; and (2) geospatial prioritization of the WMAs for focused activity implementation.

Note that the Strategic Plan is primarily an activity implementation approach. However, the conclusions that it makes regarding priority water quality problems are in harmony with the conclusions made in Section 3, Water Quality Assessment, of this WURMP Annual Report.

EFFECTIVENESS ASSESSMENT

| |
|--|
| Watershed: Tijuana River |
| CITY OF SAN DIEGO STRATEGIC PLAN IMPLEMENTATION |

Each activity will be assessed independently, and programmatic assessment will occur annually in Section 4 of the WURMP annual report.

Assessment of the Strategic Plan is a long-term effort and will involve tracking the City's progress on piloting activities over the next five years to be able to make conclusions on how to optimize the efficiency of its storm water program to meet water quality goals and regulations.

TITLE: Pet Waste Bag Dispenser Program
ID NUMBER: TJ-020

ACTIVITY IMPLEMENTATION

This activity will target areas frequented by pet owners such as municipal parks and/or street and sidewalk right of ways in the Tijuana River Watershed Management Area (WMA). When pet waste bags are available, pet owners are more apt to pick up pet wastes and dispose of it properly, thereby eliminating pollutants from the environment and potentially from receiving waters. Pet waste bag dispensers will be installed in areas lacking them or in need of additional ones.

This project was in its design and planning stage during FY 2009. Coordination meetings were held between the City of San Diego Education outreach staff and project consultant outlining the strategy associated with educating pet owners about the importance of cleaning up after their pets. Watershed maps were developed and utilized to assist in the selection of potential installation. Criteria used were:

- a) High Density Residential areas
- b) Routes connecting residential areas to a destination (park, trail, waterbody, commercial area)
- c) Established Trail locations
- d) Destination (Park, Open Space area)
- e) Areas draining to a water body impaired for bacteria, phosphorus or nitrogen
- f) Potential for Partnership
- g) Areas of Complaints/Chronic Pet Waste Observations

Three watershed management areas (WMAs) were selected for implementation in FY 2010: Los Peñasquitos, San Dieguito River and Tijuana River.

TMDL APPLICABILITY

- San Diego Region Beaches and Creeks Bacteria TMDL

TIME SCHEDULE FOR IMPLEMENTATION

Project planning and design started in FY 2009. Program implementation is anticipated to occur in FY 2010.

PARTICIPATING WATERSHED COPERMITTEES

- City of San Diego

OTHER PARTICIPATING ENTITIES

- None

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Bacteria

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Both the City's *Strategic Plan for Watershed Activity Implementation* and the Collective Watershed Strategy for the Tijuana River WMA identify bacteria as high priority water quality problems and recommends implementing load reduction/source abatement

activities to address them. Implementation of this activity will address the high priority water quality problems by reducing exposed pet waste carrying bacteria.

EFFECTIVENESS ASSESSMENT

| Watershed: Tijuana River | |
|--|--|
| PET WASTE BAG DISPENSER PROGRAM Assess the Effectiveness of Pet Waste Bag Dispensers | |
| Management Questions | <ul style="list-style-type: none"> • Does the implementation of dog waste bag dispenser stations help reduce bacteria? • What is the estimated load reduction efficiency of implementing dog waste bag dispenser stations? • Can the number of pet waste bags dispensed be related to a reduction in bacteria in run-off from the park? |
| Targeted Measurable Outcome(s) | <ul style="list-style-type: none"> • Number of pet waste bags distributed • Reduction in bacteria in run-off from the park |
| Assessment Method(s) | <ul style="list-style-type: none"> • Monitoring (e.g., collect special study information to collect concentrations and flows to estimate load reduction) • Quantification (e.g., use number of pet waste disposal bags and their average weight to calculate estimated load reduction) • Tabulation (e.g., amount of money spent on implementation and maintenance, amount of money spent on educational materials, amount of money spent on pet waste disposal bags) |
| Recommended Data | <ul style="list-style-type: none"> • Change (%) in load reduction pre and post implementation (Outcome Level 4) • How much money spent on implementation and maintenance • Dataset of load contributions for specific activities (Outcome Level 4) • Change in use of pet waste disposal bags (Outcome Level 3) |

Objectives

The goal of this assessment is to determine the effectiveness and efficiency of installing pet waste bag dispensers to reduce bacteria loading and improve water quality.

Analysis and Results

The pilot project was not in active implementation during FY 2009. Program launch is anticipated to occur in FY 2010.

Conclusions

Effectiveness and efficiency will be determined by comparing load reduction values (determined via monitoring efforts) to the cost of installing and maintaining the pet waste bag dispensers. Conclusions will be made after the assessment is complete.

TITLE: San Ysidro Centennial Celebration
ID NUMBER: TJ-021

ACTIVITY IMPLEMENTATION

In order to prevent bacteria pollution in the Tijuana River Watershed Management Area (WMA) in FY 2009, the City of San Diego's *Think Blue* program participated in the San Ysidro Centennial Celebration, a community festival commemorating the 100th birthday of San Ysidro. The celebration was held at the San Ysidro Athletic Center in Larsen Field on May 16, 2009.

The celebration targeted key sources of bacteria in the Tijuana River. Participation provided direct outreach to watershed residents dedicated to preserving water quality in San Diego, but primarily focused on water bodies in the Tijuana River WMA. Goals were to increase knowledge and awareness and to encourage everyone to take positive steps in preventing pollution from entering the storm drain.

With more than 7,000 people in attendance, our presence at the event provided a great opportunity to increase direct public education and interact with citizens and visitors about the benefits of pollution prevention.

Think Blue provided an outreach booth with *Think Blue* staff and consultants, in order to increase direct public education and interaction. The San Ysidro Festival turned out to be predominantly Spanish speaking citizens and *Think Blue* provided public education materials in both Spanish and English. Public education materials available at the booth included brochures and tip cards, along with Best Management Practice (BMP) giveaways, such as dustpans, pet trash bag containers, and pet trash bag refills. Promotional giveaways included *Think Blue* stickers, eco-friendly pens, pencils, and Frisbees.

Think Blue also set up an interactive watershed model demonstration where children were able to interactively participate and learn about a watershed and specific pollutants affecting the water body they lived closest to. The demonstration was given in both English and Spanish.

TMDL APPLICABILITY

- None

TIME SCHEDULE FOR IMPLEMENTATION

Think Blue plans to participate in the San Ysidro Centennial Celebration during FY 2010.

PARTICIPATING WATERSHED COPERMITTEES

- City of San Diego

OTHER PARTICIPATING ENTITIES

- None

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Bacteria
- Sediment
- Gross Pollutants (Trash)

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Both the City's *Strategic Plan for Watershed Activity Implementation* and the Collective Watershed Strategy for the Tijuana River WMA identify bacteria, sediment, and gross pollutants

as high priority water quality problems throughout the WMA, and recommend implementing load reduction/source abatement activities to address them. Implementation of this outreach effort will result in both increased knowledge and awareness regarding bacteria and trash as a vector and future load reduction of trash and debris directly and of bacteria indirectly.

EFFECTIVENESS ASSESSMENT

| Watershed: Tijuana River | | | | | | |
|--|--|---|--|-----------------------------|---|------------------------------------|
| Assess the effectiveness of direct public outreach to increase awareness about storm drain pollution and prevention. | | | | | | |
| Management Questions | <ul style="list-style-type: none"> • What change in awareness /attitude regarding bacteria and trash pollutants was achieved after implementation? • How efficient is this education activity based on total cost versus number of people (targeted audience) reached? | | | | | |
| Targeted Measurable Outcome(s) | <ul style="list-style-type: none"> • Reach pre-set percentage of residents within target watershed • Increased level of knowledge/attitude based on post-activity surveys | | | | | |
| Assessment Method(s) | <ul style="list-style-type: none"> • Survey (e.g., administer survey to assess knowledge, attitude and willingness to prevent pollution of participants) • Quantification (e.g., number of residents/ visitors reached and number of materials distributed) | | | | | |
| Data Recorded | Think Blue FY 2009 San Ysidro Centennial Celebration Survey | | | | | |
| | | <i>Number of Visitors to Outreach Booth</i> | <i>Gender</i> | <i>Heard of Think Blue?</i> | <i>How have you heard about Think Blue?</i> | <i>Total Materials Distributed</i> |
| | San Ysidro Centennial Celebration, 2009 | 156 | 101 Reported 25% Male 75% Female | 66% Yes 34% No | 78% TV | 2585* |
| | Estimated total visitors exposed to the <i>Think Blue</i> Booth at the San Ysidro Centennial Celebration in FY 2009 (Outcome Level 1) | | | | | 7,000 |
| | Number of Surveys administered in FY 2009 (Outcome Level 1) | | | | | 156 |
| | Percentage of individuals surveyed that believed storm water was an extremely important issue (Outcome Level 2) | | | | | 95% |
| | Data Recorded | Percentage of individuals surveyed that knew storm water is not treated (Outcome Level 2) | | | | |
| Percentage of individuals able to name a concrete action to prevent storm water pollution (Outcome Level 3) | | | | | 84% | |
| Percentage of individuals surveyed who reported a willingness to take steps to engage in behavior that would prevent pollution (Outcome Level 3) | | | | | 100% | |

Objectives

The goal of this assessment was to determine community knowledge and awareness about storm water issues and whether or not residents would adopt non-polluting behaviors. The goal was to

create positive behavioral change that will reduce bacteria and gross sediment in water bodies in the Tijuana River WMA.

Analysis and Results

The campaign targeted key areas of concern for pollutants in the Tijuana River WMA. The celebration provided direct outreach to residents living within the San Ysidro area. Based on the assessment, many citizens knew about pollution issues in neighboring waterways (95%). However, many were unaware the sewer system and storm drain system are not connected, and that water in the storm drain system is not treated (34%). Efforts were made to educate attendees on awareness of pollutant sources (specifically bacteria), and pollution prevention methods in order to reduce and prevent pollution.

Conclusions

The San Ysidro Centennial Celebration attracted predominantly Spanish speaking residents living in the local watershed. The event provided Storm Water staff an open venue to interact with the community. *Think blue* provided the booth for continued outreach dedicated in preserving water quality in San Diego. The goal was to encourage everyone to take positive steps in preventing pollution from entering the storm drain system. With approximately 7,000 people in attendance, presence at the event provided a great opportunity to spread the message about storm drain pollution prevention.

TITLE: Tijuana River Gross Solids and Sediment BMPs Design
ID NUMBER: TJ-022

ACTIVITY IMPLEMENTATION

This activity is the design and construction of trash and sediment storm water Best Management Practices (BMPs) to reduce the volume of sediments and gross solids which are transported to the Tijuana River's main channel and the Tijuana River Estuary during storm events.

Initial efforts for this activity began in February 2009 at which time URS was contracted under a Storm Water As-Needed Engineering Contract. In May 2009, URS was engaged under Task Order 8 to prepare 15% concept designs for these projects which included screening and selection of suitable sites and technologies using exiting hydrology and hydrological studies and gross estimates of loading along with number of basic selection criteria. This exercise which yielded initial estimates of the required scale and sizing of the trash and sediment facilities that would be necessary to handle the anticipated loads. Screening criteria also considered basic constrains such as access, available utilities, operations and maintenance, and community acceptance. A basis of design technical memorandum was prepared summarizing an order-of-magnitude cost estimates and scheduling for the design, permitting and construction of the BMPs.

Follow activities shall will consist of the completion of o an ongoing trash and sediment characterization studies and more specific studies and reports to include hydrology and hydraulic studies, sediment and trash loading of the Tijuana River valley streams will be prepared to be utilized in more advanced design documents as well as provide information for future permitting and environmental documentation.

Next steps consist of further design, permitting and finally construction and operation of these facilities. It is estimated that this effort will continue through 2010 until an estimated project construction completion in mid 2014. Under the current schedule, operation and maintenance of these facilities would commence in winter of the first of these facility would begin in winter of 2014 – 2015.

TMDL APPLICABILITY

- None

TIME SCHEDULE FOR IMPLEMENTATION

At this time schedules as estimated and are based on the availability of funding for these remainder of the project. Schedules developed from the concept design estimated the following implementation schedule:

- 30 % design which will include design specific sizing, siting, hydrology and hydrology studies, stream bed profile and initial design drawings shall be developed by summer of 2012.
- Future design phases of the project including 60% design, 100% design, environmental documentation and permit process are slated to being in summer 2012 until mid 2013.
- Award of construction contracts and construction activities would commence in early 2014 and the initial facilities would be operational by winter of 2014 - 2015.

- Water quality monitoring will be conducted before and after construction to assess the effectiveness in reducing storm water volume and trash and sediment loading including trash characterization. This shall include data from ongoing trash characterization studies.

PARTICIPATING WATERSHED COPERMITTEES

- County of San Diego
- City of San Diego

OTHER PARTICIPATING ENTITIES

- None

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Gross pollutants (Trash)
- Sediment

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Both the City’s *Strategic Plan for Watershed Activity Implementation* and the Collective Watershed Strategy for the Tijuana River WMA identify gross pollutants (trash) and sediment as high priority water quality problems in the WMA, and recommend implementing load reduction/source abatement activities to address them. Implementation of this activity will address the high priority water quality problems by reducing the volume of trash and sediment in the stream via siltation basins and trash interceptor devices.

EFFECTIVENESS ASSESSMENT

| Watershed: Tijuana | |
|--|---|
| TIJUANA RIVER GROSS SOLIDS AND SEDIMENT BMPs | |
| Assess the Efficiency and Effectiveness Trash & Sediment BMPs | |
| Management Questions | <ul style="list-style-type: none"> • What is the load reduction efficiency due to implementation of these BMPs? • How effective are the Trash BMPs and Siltation basins at reducing loads of priority pollutants? • What are the operation and maintenance costs associated with these facilities? • Does the implementation of the trash sediment result in a detectible receiving water quality improvement? |
| Targeted Measurable Outcome(s) | <ul style="list-style-type: none"> • Change (%) in load reduction pre and post-implementation (Outcome Level 4) • Receiving water quality improvement |
| Assessment Method(s) | <ul style="list-style-type: none"> • Inspections (e.g., ensure the infiltration is working as designed) • Quantification (e.g., use drainage area and rainfall information to calculate estimated load reduction) • Monitoring (e.g., collect special study information to collect concentrations and flows to estimate load reduction) • Tabulation (e.g., amount of money spent on implementation and maintenance, revenues and outlays for reclaiming or reusing materials recovered, amount of money spent on educational materials) • Reporting (e.g., estimates of load reduction from 3rd party data) |

Objectives

The goal of the analysis is to determine the load reduction efficiency of the Trash and Sediment Best Management Practice (BMP) facilities.

Analysis and Results

After construction and initiation data shall be collected from the trash and sediment BMP facilities on an ongoing basis as part of operations. These data shall be analyzed to determine BMP facility efficiency and summarized in periodic reports.

Conclusions

Anticipated future monitoring will be conducted to assess pollutant removal efficiencies.

TITLE: Tijuana River Watershed Brochure
ID NUMBER: TJ-023

ACTIVITY IMPLEMENTATION

The City of San Diego (City) and *Think Blue* will implement a new brochure program for the six (6) watershed management areas (WMAs) assigned to the City. These brochures will be used to inform San Diego residents on the benefits of taking steps to reclaim an environmentally and economically healthy watershed. The education pieces will help address high priority water quality problems in each WMA. It will also be used to make citizens aware of specific pollutants and ways individual action can be used to protect each water source as a way to promote a watershed stewardship (all individual actions within each watershed adds up in a cumulative way to influence the health of the water resource).

The main goals of the brochures are to capture the audience's attention, enhance the public's understanding of basic watershed principals, address the high priority water quality problems in each WMA, educate best management practices (BMPs) for future use, and encourage citizens to take positive steps in preventing pollution from entering the storm drain system.

The following WMAs will have a watershed specific brochure created:

- Tijuana River
- San Diego River
- San Diego Bay
- Mission Bay
- San Dieguito River
- Los Peñasquitos

TMDL APPLICABILITY

Brochures will target pollutants associated with TMDLs as applicable.

TIME SCHEDULE FOR IMPLEMENTATION

Project planning began in FY 2009 and will continue through FY 2010. Implementation and distribution is expected to occur in late FY 2010.

PARTICIPATING WATERSHED COPERMITTEES

- City of San Diego

OTHER PARTICIPATING ENTITIES

- None

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Bacteria
- Nutrients
- Organic Compounds
- Trace Metals
- Pesticides
- Gross Pollutants
- Sediments, TSS, Turbidity

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

This activity will address the high priority water quality problems identified in both the City's *Strategic Plan for Watershed Activity Implementation* and the Collective Watershed Strategy for each of the Watershed Management Areas.

EFFECTIVENESS ASSESSMENT

Objectives

The goal of this assessment is to determine the effectiveness of the watershed brochure in increasing knowledge and awareness in each watershed to create positive behavioral changes that will reduce bacteria and gross pollutants. The City is planning a figurative assessment of this exercise. Assessment is still being developed for this activity. Potential assessment methods could include a focused evaluation with two target audiences in combination with various event booths (or workshops). Event attendees would be randomly selected to either receive or not receive the brochure, then asked to complete a response card. At a later point, they will be contacted and asked a series of questions about awareness, knowledge, and behavior to determine if the brochure had an impact.

Analysis and Results

An effectiveness assessment of this activity is not possible at this time because the watershed brochure has not yet been distributed.

Conclusions

The City plans to continue to implement the brochure program in FY 2010. Effectiveness assessments will be conducted after the watershed brochures are implemented in FY 2010. This activity will be used as a watershed education activity as required by the Municipal Permit for education activities.

TITLE: Water Quality Monitoring at Additional Mass Loading Stations
ID NUMBER: TJ-024

ACTIVITY DESCRIPTION

This activity consists of the installation and monitoring of five mass loading stations (MLS) in the Sweetwater, Otay and Tijuana watersheds. Approximate locations for the Tijuana River Watershed are described below.

| Site Designation | Location Description | Lat. | Long. |
|------------------|------------------------------------|----------|------------|
| TIJ02 | Pine Valley Creek @ Old Highway 80 | 33.83776 | -116.53725 |
| TIJ04 | Campo Creek @ Highway 94 | 32.60917 | -116.47419 |

The overall purpose of the activity is to acquire more representative data for the southern watersheds which generally only included dry weather grab samples. This will be accomplished through two different sampling methods for dry and wet weather events. For dry weather samples 24 hour continuous sampling will be completed and for wet weather a flow weighted sampling method will be used. Grab samples will be used for all bacteria sampling. A secondary purpose of the study is to compare water quality data from these upper watershed locations with data collected from Mass Loading Stations which are typically located toward the lower portion of the watershed.

The project was designed to collect both field (5) and laboratory (33) parameters during two storm events and two dry weather events. Field parameters included Temperature, Dissolved Oxygen, pH, Conductivity, and Turbidity. Laboratory parameters measured included: Ammonia-N, Antimony, Arsenic (total/dissolved) Cadmium (total/dissolved) Chlorpyrifos, Chromium (total/dissolved), Coliform (total/fecal) and Entrococcus, Copper (total/dissolved), Diazinon, Hardness (total), Iron (total), Lead (total/dissolved), Manganese (total) Malathion, Nickel (total/dissolved) Nitrate-N, Nitrite-N, Orthophosphate-P, Selenium (total/dissolved)TDS, Total Kjeldahl Nitrogen, Total Phosphate-P, TSS, and Zinc (total/dissolved). In addition to these parameters flow measurements will be taken at each station to develop discharge rates and to calculate a discharge equation.

FY 07-08 ACTIVITY IMPLEMENTATION

This activity was planned for the FY07-08 reporting period but due to a large wildfire in October 2007 it was delayed until FY08-09.

July 2007 Agreement between County and Brown and Caldwell signed.
 October 2007 Study postponed due to wildfires

FY 08-09 ACTIVITY IMPLEMENTATION

Two dry weather and one wet weather events were monitored during FY08-09. A second wet weather monitoring event did not occur due to a lack of measurable rain.

July 2008 First Dry Weather Monitoring event
 February 2009 First Wet Weather Monitoring event
 March 2009 Second Dry Weather Monitoring Event

A report describing the methodology, monitoring reporting titled, "County of San Diego Southern Watersheds Water Monitoring Program Report" by Brown and Caldwell is as attached.

This report also included a comparison of the data collected to the Water Quality Objectives established for a numerous constituents. General findings regarding these are listed below:

Metals

All of the metals except Cadmium were detected in at least one sample. Iron was the metal with the highest concentrations. Total Metal concentrations of copper and zinc were lower than at the Tijuana MLS and were lower than the WQO for these constituents.

Nutrients

All dry weather results for nutrients were below WQO's, while one wet weather sample exceeded the WQO for nitrite at the lower MLS site.

Bacteria

In general bacteria indicators are found at higher levels during wet weather events. Bacteria levels in Tijuana Watershed are 3 to 4 orders of magnitude higher at the MLS location than in the other sites which is indicative of raw sewage.

Pesticides

Diazinon was banned for certain uses in the United States since 2003. Most of the monitoring sites of this study seem to indicate this has had a positive effect on this pesticide. Since Mexico still allows the use of this and other pesticides, Diazinon levels in the lower watershed often still exceed the WQO's.

Solids

TSS was lower during dry weather than wet weather samples. And all were below WQO's. However TSS samples at the lower Tijuana River Watershed MLS exceeded the WQO's in 16 of 18 samples tested. Higher TSS could be correlative to sewage and industrial wastes inputs.

TDS on the other hand appeared at higher levels during dry weather events. However, for the Tijuana watershed no exceedances were identified.

TMDL APPLICABILITY

This activity is not specifically implemented in compliance with a TMDL.

TIME SCHEDULE FOR IMPLEMENTATION

This project was completed during FY 2008-09. No further activity is currently planned.

PARTICIPATING WATERSHED COPERMITTEES

- County of San Diego

OTHER PARTICIPATING ENTITIES

- None

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Metals
- Nutrients
- Bacteria
- Pesticides
- Solids

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

This activity supports the following principles that have been established to guide the selection and implementation of watershed activities as part of the Tijuana River Watershed WURMP:

- Characterize water quality conditions throughout the watershed.
- This may be accomplished by conducting special studies where appropriate or by better managing existing data sources.

EFFECTIVENESS MEASUREMENTS

Activity effectiveness was be measured by confirming successful completion of all project elements (Level 1). All project elements were completed during FY 2008-09.

COUNTY OF SAN DIEGO SOUTHERN WATERSHEDS WATER MONITORING PROGRAM REPORT

Prepared for
County of San Diego
Department of Public Works, Watershed Protection Program
March 2009

BROWN AND CALDWELL

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COUNTY OF SAN DIEGO SOUTHERN WATERSHEDS WATER MONITORING PROGRAM REPORT

1. INTRODUCTION

1.1 Background

The County of San Diego Department of Public Works, Watershed Protection Program (County) desired to collect dry weather and wet-weather samples at five mass loading stations located in creeks in the southern portion of San Diego County. Brown and Caldwell was selected to perform these services, which consisted of verifying the sampling locations, installing automated sampling equipment, collecting the water samples, submitting the samples to an analytical laboratory for analysis, removal of the sampling equipment, and preparation of this report summarizing the activities and findings..

The agreement for this work was signed in July 2007, with the intent that two dry-weather and two wet-weather events be sampled between July 2007 and October 2008. In late October 2007, several major wildfires devastated large portions of the County, including much of the watershed lands draining to the mass loading stations that were to be monitored under this program. Subsequently, the County decided to postpone monitoring activities in these watersheds. The County elected to resume activities under this agreement in February 2008, and monitoring was conducted between July 2008 and March 2009.

1.2 Purpose

The County routinely collects water samples from creeks located throughout San Diego County. However, these samples are generally collected as grab samples that provide data for one point in time only. Also, samples are collected during dry weather only. The monitoring described in this report provides more representative samples because the samples were collected over a longer period of time (24 hours for dry weather samples, and flow-weighted across the duration of storms, with the exception of bacteria which must always be collected as grab samples). The data also provide some information about water quality following a major wildfire.

2. MONITORING PROGRAM DESIGN

This section describes the monitoring program design, including the locations of the monitored sites, equipment used, laboratory analyses conducted, and field procedures implemented to conduct the monitoring.

2.1 Monitoring Locations

The monitoring locations for this project were specified in the Request for Proposals, and included the following sites:

| Table 2-1. Monitoring Site Locations | | | | |
|--------------------------------------|------------|---|----------|------------|
| Site ID | Watershed | Site Location | Latitude | Longitude |
| SWT21 | Sweetwater | North Fork of Sweetwater River @ Tavern Road | 32.80879 | -116.78036 |
| SWT07 | Sweetwater | Drainage Channel @ Quarry Road and Swap Meet Road | 32.70114 | -117.00927 |
| OTY03 | Olay | Dulzura Creek @ Olay Lakes Road | 32.63624 | -116.88456 |
| TIJ02 | Tijuana | Pine Valley Creek @ Old Highway 80 | 32.83776 | -116.53725 |
| TIJ04 | Tijuana | Campo Creek @ Highway 94 | 32.60917 | -116.47419 |

On August 9, 2007, Brown and Caldwell staff conducted a field reconnaissance visit to all 5 sites. The visit was conducted with Steve Di Donna of the County, who was familiar with the specific features of each site. The purpose of the visit was to verify the locations and determine the physical layout of equipment at each of the sites.

Site Descriptions

- Site SWT21 (North Fork of Sweetwater River at Tavern Road).** This site is located adjacent to the Tavern Road bridge over the river in the unincorporated community of Alpine. The surrounding land use is rural residential, with some equestrian and agricultural uses. At the location of the bridge, the creek is constrained between rock walls and passes through a box culvert beneath the bridge that is divided into two conduits. The monitoring location was sited on the downstream side of the bridge where the creek is no longer constrained by armored banks.



- Site TIJ02 (Pine Valley Creek @ Old Highway 80).** This site is located beneath the Old Highway 80 bridge spanning Pine Valley Creek in the community of Pine Valley. The area immediately surrounding the site is open space and rural residential. The bridge is approximately 50 feet above the creek, and the valley constraining the creek is several hundred feet across at that point. Due to concerns about the ability of a pump to draw water so far, it was decided that the sampling equipment would be housed on the bank of the creek below the bridge, adjacent to one of the support structures (yet above the level of the creek in wet weather).



This monitoring site is accessed via a dirt trail from the side of the bridge.

- **Site TIJ04 (Campo Creek at Highway 94).** The site is located adjacent to the Highway 94 crossing of Campo Creek in the community of Campo. At the location of the bridge, the creek is constrained within a box culvert that is divided into three conduits. The area surrounding the creek is heavily vegetated.



Sampling Site TIJ04
(Campo)

- **Site OTY03 (Dulzura Creek @ Otay Lakes Road).** This site is located at the creek crossing of Otay Lakes Rd., northeast of Chula Vista. There is a small box culvert conveying the creek across the road that functions during low flows; however, water flows over the road under high flow conditions. The monitoring equipment was installed along the bank of the creek. This area was severely burned during the Cedar Fire in October 2007, eliminating nearly all vegetation on the surrounding hillsides (except for riparian vegetation along the creek bed).



Sampling Site OTY03
(Otay Lakes)

- **Site SWT07 (Drainage Channel @ Quarry Road and Swap Meet Road).** Site SWT07 is located in the community of Spring Valley, adjacent to newly constructed State Highway 125, and near a vacant parcel used to hold weekend swap meets. The surrounding land uses are residential in nature. The equipment was installed on the bank of the creek (right side of photo).



Sampling Site SWT07
(Spring Valley)

2.2 Analytical Parameters

The field and laboratory analyses for this project were specified in the RFP. The specific field and laboratory parameters to be analyzed are presented in Tables 2-2 and 2-3, along with information regarding field instrument specifications and laboratory methods, sample volume, preservative, holding time, and reporting limit. The analytical laboratories selected for this project included CRG Marine Laboratories (Torrance, CA) for most analyses, and Weston Solutions (Carlsbad, CA) for bacteria analyses (due to short holding times).

| Table 2-2 Field Parameters | | | | | | | | |
|----------------------------|-------------------------------|----------------------|-----------|-----|--------------|---|----------|------------------------------------|
| Parameter | Principle | Units | Range | TRL | Accuracy | Precision | Recovery | Completeness |
| Temperature | Thermistor | Degrees Celsius (°C) | 0 – 50 oC | N/A | +/- 0.1 °C | No SWAMP requirement; will use + 0.5 or 5% | N/A | No SWAMP requirement; will use 90% |
| Dissolved Oxygen | Membrane/galvanic cell | mg/L | 0 – 19.9 | 0.2 | +/- 0.1 mg/L | No SWAMP requirement; will use + 0.5 or 10% | N/A | No SWAMP requirement; will use 90% |
| pH | Glass Electrode | s.u. | 0 – 14.0 | N/A | +/-0.1 s.u. | No SWAMP requirement; will use + 0.5 or 5% | N/A | No SWAMP requirement; will use 90% |
| Conductivity | Alternating four-electrode | uS/cm | 0 - 100 | 2 | +/-1 uS/cm | No SWAMP requirement; will use + 5% | N/A | No SWAMP requirement; will use 90% |
| Turbidity | Scattering/transmitting light | NTUs | 0 - 800 | 5 | +/-1 NTU | No SWAMP requirement; will use + 10% or 0.1, whichever is greater | N/A | No SWAMP requirement; will use 90% |

*Equipment is Horiba U-10 or other multi-parameter meter; accuracy verified with the manufacturer.

Table 2-3. Laboratory Analytical Requirements

| Parameter | Method | Volume | Preservative | Holding Time | Reporting Limit |
|----------------------|-----------------|---------|---|--|------------------------------|
| Ammonia-N | EPA 350.2 | 250 mL | Acidify to pH<2 with H ₂ SO ₄ | 28 days | 0.50 mg/L |
| Antimony (Dissolved) | EPA 200.7/200.8 | 250 mL | None | 6 months after filtration and preservation with HNO ₃ | 5.0 ug/L |
| Antimony (Total) | EPA 200.7/200.8 | 250 mL | HNO ₃ | 6 months | 5.0 ug/L |
| Arsenic (Dissolved) | EPA 200.7/200.8 | 250 mL | None | 6 months after filtration and preservation with HNO ₃ | 1.0 ug/L |
| Arsenic (Total) | EPA 200.7/200.8 | 250 mL | HNO ₃ | 6 months | 1.0 ug/L |
| Cadmium (Dissolved) | EPA 200.7/200.8 | 250 mL | None | 6 months after filtration and preservation with HNO ₃ | 1.0 ug/L |
| Cadmium (Total) | EPA 200.7/200.8 | 250 mL | HNO ₃ | 6 months | 1.0 ug/L |
| Chlorpyrifos | EPA 8081 | 1000 mL | None | 7 days | 0.05 ug/L |
| Chromium (Dissolved) | EPA 200.7/200.8 | 250 mL | None | 6 months after filtration and preservation with HNO ₃ | 5.0 ug/L |
| Chromium (Total) | EPA 200.7/200.8 | 250 mL | HNO ₃ | 6 months | 5.0 ug/L |
| Coliform (Fecal) | SM 9221 C | 100 mL | Na ₂ S ₂ O ₃ | 6 hours @ 4°C | 20 MPN/100 mL |
| Coliform (Total) | SM 9221 C | 100 mL | Na ₂ S ₂ O ₃ | 6 hours @ 4°C | 20 MPN/100 mL |
| Copper (Dissolved) | EPA 200.7/200.8 | 250 mL | None | 6 months after filtration and preservation with HNO ₃ | 5.0 ug/L |
| Copper (Total) | EPA 200.7/200.8 | 250 mL | HNO ₃ | 6 months | 5.0 ug/L |
| Diazinon | EPA 8081 | 1000 mL | None | 7 days | 0.05 ug/L |
| Enterococcus | SM 9230 B | 100 mL | Na ₂ S ₂ O ₃ | 6 hours @ 4°C | 20 MPN/100 mL |
| Hardness (Total) | SM 2340 C | 250 mL | None | 6 months | 2.0 mg CaCO ₃ /mL |
| Iron (Total) | EPA 200.7/200.8 | 250 mL | Acidify to pH<2 with HNO ₃ | 6 months | 20.0 ug/L |
| Lead (Dissolved) | EPA 200.7/200.8 | 250 mL | None | 6 months after filtration and preservation with HNO ₃ | 2.0 ug/L |
| Lead (Total) | EPA 200.7/200.8 | 250 mL | HNO ₃ | 6 months | 2.0 ug/L |
| Manganese (Total) | EPA 200.7/200.8 | 250 mL | HNO ₃ | 6 months | 1.0 ug/L |
| Malathion | EPA 8081 | 1000 mL | None | 7 days | 0.05 ug/L |
| Nickel (Dissolved) | EPA 200.7/200.8 | 250 mL | None | 6 months after filtration and preservation with | 2.0 ug/L |

| Table 2-3. Laboratory Analytical Requirements | | | | | |
|---|-----------------|---------|--------------|--|-----------------|
| Parameter | Method | Volume | Preservative | Holding Time | Reporting Limit |
| | | | | HNO3 | |
| Nickel (Total) | EPA 200.7/200.8 | 250 mL | HNO3 | 6 months | 2.0 ug/L |
| Nitrate-N | EPA 300.0 | 250 mL | None | 48 hours | 0.2 mg/L |
| Nitrite-N | EPA 354.1 | 250 mL | None | 48 hours | 0.005 mg/L |
| Orthophosphate-P | EPA 365.2 | 250 mL | None | 48 hours | 0.02 mg/L |
| Selenium (Dissolved) | EPA 200.7/200.8 | 250 mL | None | 6 months after filtration and preservation with HNO3 | 5.0 ug/L |
| Selenium (Total) | EPA 200.7/200.8 | 250 mL | HNO3 | 6 months | 5.0 ug/L |
| Total Dissolved Solids | EPA 160.1 | 1000 mL | None | 7 days | 25.0 mg/L |
| Total Kjeldahl Nitrogen | EPA 351.3 | 1000 mL | H2SO4 | 28 days | 0.80 mg/L |
| Total Phosphate-P | EPA 365.3 | 250 mL | H2SO4 | 28 days | 0.02 mg/L |
| Total Suspended Solids | EPA 160.2 | 1000 mL | None | 7 days | 2.5 mg/L |
| Zinc (Dissolved) | EPA 200.7/200.8 | 250 mL | None | 6 months after filtration and preservation with HNO3 | 5.0 ug/L |
| Zinc (Total) | EPA 200.7/200.8 | 250 mL | HNO3 | 6 months | 5.0 ug/L |

2.3 Field Equipment Installation and Calibration

The monitoring stations were installed at the locations described above during Spring 2008. At each location, a concrete pad measuring approximately 4 feet square was formed and poured in place as a base for the equipment. Knaack utility boxes were then mounted on the pads and bolted from the inside to the concrete pad to provide secure housing for the automated sampling equipment. Flow was monitored at all stations using American Sigma (Hach) autosamplers and flow meters. Field crews measured the flow rate of each stream using a hand held flow meter (Marsh McBirney FloMate). Based on these data, discharge rates were developed for each of the streams at the locations of the monitoring stations. These discharge rates were used to calculate a discharge equation, which was used to program the flow monitoring equipment. Each station was also equipped with a solar panel to recharge the batteries and a rain gauge mounted on a pole to record rainfall at each location. The installations were performed in April, 2008. Most of the installations were straightforward, with the exception of Station TIJ02 (Pine Valley Creek @ Old Highway 80) which required the use of a crane to lower the utility box and equipment down from the bridge to the sampling location.



Autosampler installation at Pine Valley site TIJ04

3. MONITORING ACTIVITIES AND RESULTS

3.1 Sampling Schedule

Monitoring was conducted on the following dates and stations:

| Date of Sampling | Rainfall Amount* | Type of Sampling | Stations Monitored | Comments |
|--------------------|------------------|--|---------------------------------------|--|
| July 30-31, 2008 | N/A | Dry-weather, 24-hour time weighted composite | SWT07, SWT21, and TIJ02 | Stations OTY03 and TIJ04 were dry. |
| February 6-7, 2009 | 1.23 in. | Wet-weather, flow-weighted composite | OTY03, SWT07, SWT21, and TIJ04 | Insufficient rainfall at Station TIJ02 to capture the storm event. |
| March 30-31, 2009 | N/A | Dry-weather, 24-hour time weighted composite | OTY03, SWT07, SWT21, TIJ02, and TIJ04 | All stations captured. |

* Rainfall measured at Campo Rain Gauge No. MCMNC1 (Cameron Fire Station).

This project was intended to capture a second storm event; however, a second event was not sampled due to limited rain events that produced adequate runoff in the southeastern part of the County, or because the rain events occurred on holidays.

3.2 Sampling Protocols

Field Data sheets were completed at each sample location, for each event, and are included in Appendix A. Digital photographs were also taken at each site, showing the actual sample collection point, as well as conditions upstream and downstream of the sampling site.

CRG Marine Laboratories and Weston Solutions provided chain of custody (COC) forms for the project. Sampling crews completed these forms while on site in the field. Copies of all COC forms are included in Appendix A.

In the field, all samples were placed on wet ice or frozen ice packs until shipment. Identification information for each sample was recorded on the field data sheets and chain-of-custody forms. Samples were handled, prepared, transported, and stored in a manner so as to minimize loss, misidentification, contamination, and/or degradation. Samples were transported on ice and in insulated containers (e.g., insulated cooler). All caps and lids were checked for tightness prior to shipping. Efforts were taken to minimize the leakage of any melted ice from the sample shipment container. Sample packaging included the following steps:

- Grab samples (for bacteria) were placed in a sealed plastic bag (Ziploc) to prevent leakage. Ice (double bagged in plastic trash bags) was placed in the cooler with the samples to maintain the samples at 4° C during transport to Weston Solutions' Carlsbad facility for analysis.
- Grab samples were delivered to Weston Solutions in time to meet 6-hour holding times for bacteria.
- 19-liter glass bottles were placed in individual trash containers sized small enough to fit them for transport to CRG Marine Laboratories.

- The Chain-of-Custody (COC) records were placed in a waterproof plastic bag and placed inside the cooler with the grab samples or taped to the outside of the trash containers (for 19-liter samples).
- 19-liter samples were picked up by the CRG Marine Lab courier in time to meet sample holding times.

The collected samples were delivered to the laboratory for analyses as soon as practicable. Any delay in the receipt of the samples by the laboratory could necessitate a re-sampling and analysis effort.

At the end of the sampling activities, each crew will deliver the samples for chemical analyses with the respective COC forms to Babcock, or coordinate with a reliable courier for sample drop off. Table 4-4 provides contact information and driving directions to Babcock Laboratories. In the event that samples need to be dropped off on a weekend or after standard hours of operation, the Brown and Caldwell Project Manager contacted CRG and Weston to make special arrangements for laboratory staff to be available.

The sample receipt personnel at the laboratory will open the container and perform an initial inspection of the contents to check for evidence of breakage and/or leakage. The container will be inspected for COC documents and any other information or instructions. The sample custodian will verify that all information on the sample bottle labels is correct and in accordance with the COC documents and will sign for receipt. If discrepancies are noted between the COC and the sample labels, the project contact will be notified immediately. Contract laboratories will follow the sample custody procedures outlined in their QA plans. These QA plans are on file with each respective laboratory. All samples will be stored in a refrigerated, secure area. Samples will be removed from storage as needed by the analyst; analysts check out samples by signing a logbook maintained in sample control for tracking samples.

3.3 Quality Assurance/Quality Control

Water quality samples were collected in order to ensure the collection of representative water samples. CRG Marine Laboratories and Weston Solutions implemented quality assurance and quality control programs in accordance with guidelines established by the State of California and the U.S. EPA., and are certified under the State Environmental Laboratory Accreditation Program (ELAP). Field duplicates were collected at the rate of 10 percent and analyzed blind by the laboratories.

3.4 Results

The following sections provide a summary and interpretation of the data collected during the three water sampling events that were analyzed. Laboratory analytical results are summarized in Table 3-2.

Table 3-2. Analytical Results and Comparison to Water Quality Objectives

| Parameter/Units | WQO | Source | Dry Weather Event July 31, 2008 | | | Dry Weather Event March 2009 | | | | | Wet Weather Event February 6, 2009 | | | |
|------------------------------------|------------|----------------------------------|---------------------------------|------------------------|-------------------|------------------------------|------------------------|-------------------|------------------------|------------------|------------------------------------|------------------------|-------------------|------------------|
| | | | TIJ02 (Pine Valley) | SWT07 (Spr. Valley) | SWT21 (Alpine) | OTY03 (Otay Lakes) | SWT07 (Spr. Valley) | SWT21 (Alpine) | TIJ02 (Pine Valley) | TIJ04 (Campo) | OTY03 (Otay Lakes) | SWT07 (Spr. Valley) | SWT21 (Alpine) | TIJ04 (Campo) |
| Ammonia-N, mg/L | | | ND | 0.07 | 0.05 | ND | 0.1 | ND | 0.03 | ND | 0.03 | 0.12 | 0.08 | 0.12 |
| Antimony (Dissolved), ug/L | calculated | 40CFR 131 | ND | 0.4 | 0.1 | 0.1 | 0.5 | 0.1 | ND | 0.1 | NA | NA | NA | NA |
| Antimony (Total), ug/L | 6 | Basin Plan | ND | 0.4 | 0.1 | 0.1 | 0.5 | 0.1 | ND | 0.1 | NA | NA | NA | NA |
| Arsenic (Dissolved), ug/L | 340 | 40CFR 131 | 0.3 | 4.4 | 2.2 | 1.3 | 4.4 | 1.9 | 0.3 | 1.6 | 1.3 | 2.7 | 1 | 1.9 |
| Arsenic (Total), ug/L | 340/50 | 40CFR131/ Basin Plan | 0.5 | 4.6 | 2.3 | 1.2 | 4.6 | 1.7 | 0.5 | 1.5 | 1.4 | 2.8 | 1.3 | 2.6 |
| Cadmium (Dissolved), ug/L | calculated | 40CFR 131 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Cadmium (Total), ug/L | 4.3 | 40 CFR 131 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Chlorpyrifos, ng/L | 20 | CA Dept. of Fish & Game | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Chromium (Dissolved), ug/L | calculated | 40CFR 131 | ND | 0.1 | 3.9 | ND | 0.1 | 5.7 | ND | ND | 0.1 | 0.4 | 0.9 | ND |
| Chromium (Total), ug/L | 550 | 40CFR 131 | ND | 0.2 | 4 | 0.1 | 0.4 | 5.7 | ND | ND | 0.3 | 1.1 | 1.8 | 0.5 |
| Coliform (Fecal), MPN/100 mL | 400 | Basin Plan | 40 | 170 | 500 | <20 | 220 | 40 | <20 | <20 | 20 | 3,500 | 1,100 | 160,000 |
| Coliform (Total), MPN/100 mL | | | 500 | 14,000 | 700 | 1,100 | 8,000 | 3,000 | 2,200 | 1,300 | 3,500 | 160,000 | 13,000 | 160,000 |
| Copper (Dissolved), ug/L | calculated | 40CFR 131 | ND | 1.8 | ND | 1.7 | 2.8 | 0.8 | 0.4 | 0.5 | 1.4 | 4.3 | 2.4 | 1 |
| Copper (Total), ug/L | 13 | 40CFR 131 | 0.4 | 2.7 | 0.8 | 1.4 | 3 | 0.8 | ND | 0.5 | 2.4 | 10.3 | 4.9 | 2.5 |
| Diazinon, ng/L | 80 | CA Dept. of Fish & Game | ND | 35.1 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Enterococcus. MPN/100 mL | | | 80 | 80 | 340 | <20 | 800 | 220 | 70 | 300 | 500 | 50,000 | 5,000 | 17,000 |
| Hardness (Total), mg/L | | | 149.7 | 795.1 | 574.3 | 321.1 | 757.8 | 585.6 | 137 | 397.6 | 354.8 | 93.6 | 157.8 | 385.8 |
| Iron (Total), ug/L | | | 68 | 80 | 47 | 97 | 70 | 37 | 64 | 86 | 267 | 704 | 897 | 1046 |
| Lead (Dissolved), ug/L | calculated | 40CFR 131 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.15 | ND | ND |
| Lead (Total), ug/L | 65 | 40CFR 131 | ND | 0.19 | 0.06 | 0.21 | 0.21 | ND | ND | 0.06 | 1.09 | 7.71 | 2.22 | 3.97 |
| Manganese (Total), ug/L | | | 19.8 | 102.9 | 47.6 | 20.9 | 134.4 | 18.1 | 23.3 | 62.6 | 92 | 82.6 | 91.5 | 212.3 |
| Malathion, ng/L | 430 | CA Dept. of Fish & Game | ND | ND | ND | ND | ND | ND | ND | ND | ND | 34.8 | 18.9 | ND |
| Nickel (Dissolved), ug/L | calculated | 40CFR 131 | 0.4 | 2.1 | 0.9 | 0.4 | 2.2 | 1 | 0.4 | 0.3 | 0.5 | 1.2 | 0.8 | 0.6 |
| Nickel (Total), ug/L | 100 | Basin Plan | 0.5 | 2.2 | 1.1 | 0.4 | 2.2 | 1 | 0.4 | 0.3 | 0.9 | 2 | 1.5 | 1 |
| Nitrate-N, mg/L | 10 | Basin Plan | 0.8 | 8.1 | 16.26 | 0.03 | 7.21 | 14.37 | 0.47 | ND | 0.68 | 1.04 | 2.96 | 0.09 |
| Nitrite-N, mg/L | 1 | Basin Plan | ND | 0.07 | ND | ND | 0.14 | ND | ND | ND | ND | 0.09 | 0.09 | ND |
| Orthophosphate-P (Dissolved), mg/L | | | 0.0363 | 0.0812 | 0.0644 | ND | 0.1238 | 0.0505 | 0.0075 | 0.0075 | ND | 0.1411 | 0.1208 | 0.0721 |
| Orthophosphate-P (Total), mg/L | | | ND | 0.07 | 0.05 | 0.03 | 0.16 | 0.06 | 0.03 | 0.1 | 0.03 | 0.2 | 0.19 | 0.15 |
| Selenium (Dissolved), ug/L | 20 | 40 CFR 131 | 2.4 | 6 | 1.3 | 0.4 | 4.8 | 1.8 | 2.1 | 0.2 | 0.5 | 0.4 | 0.3 | 0.2 |
| Selenium (Total), ug/L | 20 | 40 CFR 131 | 2.2 | 5.8 | 1.2 | 0.3 | 4.9 | 1.5 | 2.3 | ND | 0.5 | 0.4 | 0.3 | 0.2 |
| Total Dissolved Solids, mg/L | 1500 | Basin Plan | 388 | 3226 | 1116 | 936 | 3008 | 1206 | 332 | 1086 | 994 | 358 | 410 | 1114 |
| Total Kjeldahl Nitrogen, mg/L | | | 0.63 | 1.8 | 0.98 | 0.91 | 1.1 | 0.84 | 0.84 | 0.98 | 0.84 | 1.5 | 1.7 | 1.1 |
| Total Suspended Solids, mg/L | 100 | USEPA Multisector General Permit | 1.5 | 4 | 8 | 10 | 2.3 | 4 | 2.3 | 0.7 | 51.6 | 93 | 86 | 52 |

Table 3-2. Analytical Results and Comparison to Water Quality Objectives

| Parameter/Units | WQO | Source | Dry Weather Event July 31, 2008 | | | Dry Weather Event March 2009 | | | | | Wet Weather Event February 6, 2009 | | | |
|------------------------|------------|-----------|---------------------------------|------------------------|-------------------|------------------------------|------------------------|-------------------|------------------------|------------------|------------------------------------|------------------------|-------------------|------------------|
| | | | TIJ02 (Pine Valley) | SWT07 (Spr. Valley) | SWT21 (Alpine) | OTY03 (Otay Lakes) | SWT07 (Spr. Valley) | SWT21 (Alpine) | TIJ02 (Pine Valley) | TIJ04 (Campo) | OTY03 (Otay Lakes) | SWT07 (Spr. Valley) | SWT21 (Alpine) | TIJ04 (Campo) |
| Zinc (Dissolved), ug/L | calculated | 40CFR 131 | 0.6 | 3.6 | 0.5 | 0.1 | 7.8 | ND | 0.2 | ND | 1.5 | 10.8 | 4.8 | 4 |
| Zinc (Total), ug/L | 120 | 40CFR 131 | 2.3 | 6.8 | 4 | 0.1 | 10.6 | 2.2 | 3.1 | ND | 12.5 | 56.7 | 23.6 | 21.6 |

ND: Non-detect NA: Not analyzed

3.5 Data Interpretation and Comparison to Data from Mass Loading Stations and Water Quality Objectives

The San Diego Stormwater Copermittees conduct dry and wet-weather monitoring for compliance with their areawide NPDES stormwater permit (RWQCB Order 2007-001). This sampling is conducted at mass loading stations (MLS), typically located toward the lower end of each major watershed, above the zone of tidal influence. Data from the southern watersheds study were compared to data collected at the Sweetwater and Tijuana River mass emissions stations reported in the 2006-07 Annual Monitoring Report, the most recent season these stations were monitored. These MLS stations were selected because 2 of the southern watersheds sites are located in the upstream portions of the Sweetwater River watershed, and 2 are located in the Tijuana River watershed. The first station is located in the Otay River watershed, but there is no downstream MLS station on the Otay River to compare to. The report provides a comparison of the southern watersheds data with MLS stormwater data collected over 6 years of monitoring (from 2001-02 through 2006-07).

The data from the southern watersheds study were also compared to the Water Quality Objectives (WQOs) established for a number of constituents. The following section provides a summary and discussion of these comparisons.

Metals

Water samples from the southern watersheds sites were analyzed for a large suite of total and dissolved metals including antimony, arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, selenium, and zinc. All of the metals except cadmium were detected in at least one sample. The highest metals concentrations were observed for iron. Total iron ranged between 137 ug/L and 795.1 ug/L in dry weather samples and between 93.6 ug/L and 385.8 ug/L in wet weather samples. This is likely due to the presence of iron in solids. Total metals concentrations of copper and zinc which are often used as indicators of heavy metals in urban runoff were similar to those observed at the Sweetwater MLS, but lower than those from the Tijuana River MLS. None of the southern watersheds samples exceeded the WQOs for either constituent. Total copper ranged between ND and 2.7 ug/L in dry weather samples and between 2.4 and 10.3 ug/L in wet weather samples. Total zinc ranged between ND and 10.6 ug/L in dry weather samples and between 12.5 and 56.7 ug/L in wet weather samples. By comparison, stormwater samples collected at the Sweetwater MLS ranges from <5 ug/L to 18 ug/L for total copper and between <20 ug/L to 47 ug/L for total zinc. In Total metals were higher in wet weather, suggesting a likely association with sediments. In contrast, stormwater samples at the Tijuana River MLS exceeded the WQO for copper in 9 of the 18 samples collected at this station since 2001-02, ranging in concentration from 8 ug/L to 197 ug/L. Similarly, zinc exceeded the WQO 6 times, with concentrations ranging from <20 ug/L to 1,530 ug/L. The Tijuana River receives significant inputs of industrial waste and municipal wastewater, in addition to urban runoff, which likely explains the elevated levels in the downstream portions of that watershed.

Nutrients

Water samples in this study were analyzed for several nutrient indicators (nitrate-N, nitrite-N, total orthophosphate-N, and dissolved orthophosphate-N). All results were below WQOs except both dry weather samples collected from the SWT21 (Alpine) site, which had concentrations of 16.26 mg/L and 14.37 mg/L, both above the Basin Plan objective of 10 mg/L. A possible source of the nitrate could be septic tank leakage from rural residential parcels in this area (this has not been confirmed). Nitrite was ND in 7 of the 8 dry weather samples and 2 of the 4 wet weather samples. All detections were less than or equal to 0.14 mg/L. Total orthophosphate ranged from ND to 0.16 mg/L in dry weather samples and between 0.03 mg/L and 0.2 mg/L in wet weather samples. In comparison the stormwater samples from the MLS stations, none of the

samples from the Sweetwater or the Tijuana River MLS exceeded the WQO for nitrate. One sample from the Tijuana River MLS exceeded the WQO of 0.1 mg/L for nitrite. The MLS samples were not analyzed for orthophosphate-P.

Bacteria

Bacterial indicators analyzed in this study included total and fecal coliform and enterococcus. In general, bacterial indicators were present at higher levels in wet weather samples than in dry weather samples. Monitoring indicated exceedance of the Basin Plan WQO for fecal coliform (400 MPN/100 mL) in one dry weather sample and in 3 of the 4 wet weather samples. The highest level of fecal coliform (160,000 MPN/100 mL) was observed in the wet weather sample from site TIJ04 (Campo). Total coliform counts ranged from 500 MPN/100 mL to 14,000 MPN/100 mL in dry weather samples and between 500 MPN/100 mL and 50,000 MPN/100 mL in wet weather samples. Enterococcus counts ranged between <20 and 800 MPN/100 mL in the dry weather samples, with a median level of 80 MPN/100 mL. In wet-weather, counts were higher, from 500 MPN/100 mL at the Otay Lakes (OTY03) site to 50,000 MPN/100 mL at Spring Valley (SWT07). Similar counts of bacterial indicators were observed in stormwater at the Sweetwater River MLS. At the Tijuana River MLS, bacteria levels in stormwater samples were 3-4 orders of magnitude higher than in the southern watersheds samples (as high as >16,000,000 MPN/100 mL). This is consistent with the fact that portions of the Tijuana River receive inputs of sewage.

Pesticides

Diazinon and chlorpyrifos were generally non-detect (diazinon was observed in one dry weather sample from the Spring Valley SWT07 site at a concentration of 35.1 ng/L). Malathion was ND in the dry weather samples, but was detected twice in wet weather (at concentrations of 34.8 ng/L at Spring Valley site SWT07, and 18.9 ng/L at Alpine site SWT21). All pesticide detections were below their respective WQOs. Compared with the MLS data, the following observations were made. At the Sweetwater MLS site, diazinon and chlorpyrifos were detected at levels in excess of the WQOs in samples collected between 2001-02 and 2003-04. However, both pesticides were ND in samples collected since that time. Diazinon was banned for certain uses in the United States beginning in 2003, and the decreased concentrations in stream waters appear to correlate with this ban. In contrast, levels of diazinon at the Tijuana River MLS continued to exceed the WQO in samples collected through 2006-07. This may be partly because Mexico has not banned the use of diazinon and significant portions of this watershed are in Mexico. Over the six year MLS monitoring period, malathion was occasionally detected in stormwater samples from the Sweetwater River MLS (all below the WQO). Malathion was detected at levels above the WQO in 8 of the 15 samples at the Tijuana River MLS over this period.

Solids

Total suspended solids (TSS) concentrations were lower in dry weather than wet weather events. All TSS measurements were below the WQO of 100 mg/L. Specifically, TSS ranged between 0.7 and 15 mg/L in dry weather and between 51.6 and 93 mg/L in wet weather samples. Over the six years of stormwater monitoring at the Sweetwater River MLS, TSS ranges between <20 mg/L and 102 mg/L, with one exceedance of the WQO. By comparison, samples from the Tijuana River MLS exceeded the WQO in 16 of 18 samples, with concentrations ranging between 48 and 8,140 mg/L. Higher TSS levels may be correlative with sewage and industrial waste inputs.

Total dissolved solids (TDS) levels were high, especially in dry weather, and particularly at the Spring Valley site (SWT07), where concentrations exceeded the WQO of 1,500 mg/L during both dry weather events (3,226 mg/L and 3,008 mg/L, respectively).. Wet-weather TDS concentrations were lower, ranging from 358 mg/L at Spring Valley site SWT07 to 1,114 mg/L at the Campo site (TIJ04). Over six years of stormwater

monitoring at the Sweetwater River MLS, TDS exceeded the WQO in 13 out of 18 samples. In contrast, TDS in stormwater from the Tijuana River MLS did not exceed the WQO in any of the 18 samples.

APPENDIX A

Copies of Field Forms, Analytical Laboratory Reports and QA/QC
Documentation

APPENDIX B

Copies of Weston Solutions' Wet-Weather Data for Sweetwater River and Tijuana River MLS (from 2006-07 Annual Monitoring Report)

TITLE: Smuggler's Gulch, Pilot Channel & Northern Channel Sediment and Debris Removal
ID NUMBER: TJ-025

ACTIVITY IMPLEMENTATION

The City of San Diego (City) performs routine flood control maintenance activities on improved and unimproved channels pursuant to the Regional General Permit (RGP) 53 granted to the County of San Diego. In FY 2009, the City expanded the routine maintenance to include excavation and removal of sediment and trash including tires to include the restoration of the Pilot Channel profile under US Army Corp of Engineers Permit: SPL 2009- I 0719-TCD. The expanded channel excavation activity is performed approximately every four to eight years depending on annual rainfall and sediment deposition and assessed flood risk. In FY 2009, re-establishment of the channel profiles to reduce the risk of flooding in these channels was deemed to be more urgent because of the perceived threat of additional sediment deposition from the recently constructed Federal Border Fence Infrastructure project, and because of the flood which occurred in late November 2008. Consequently, emergency permits were sought from various resource agencies. The extent of the project is the portions of the Smuggler's Gulch from Monument Road overpass to the confluence of the pilot channel approximately 1,400 feet; the portion of the pilot from 100 feet east of the Hollister Street Bridge 5,400 feet westward along the Pilot Channel alignment toward the Tijuana River Estuary.

It is expected that approximately as much as 65,000 cubic yards of sediment will be removed from the channel and as much as 1,000 tons of trash and over 5,000 tires. Trash is separated on site and recycled when practicable; the remained or sediment and trash mixes deemed to uneconomical to separate are disposed of at a landfill. Tires are removed and disposed of by a certified tire disposal and recycling contractor. Sediment impacted less by trash deposition shall be stored off site, once operations are completed where it will be screened and reused onsite or used with the Tijuana River Valley for fill material.

The sediment removal project is necessary 1) to return the drainage facility to a condition where adjacent property is not threatened by flooding, 2) storm water flows convey properly to the main channel, and 3) channel profiles and conditions are restored to reduce the potential for sediment and debris to accumulate and thereby increase the potential of flooding.

TMDL APPLICABILITY

N/A.

TIME SCHEDULE FOR IMPLEMENTATION

During the FY2008-09, sediment and debris was removed along the Smuggler's Gulch. Approximately 5,900 cubic yards of material including sediment, tires and trash were removed and disposed at a Class III sanitary landfill. Typically, removal takes place every other year, but based on precipitation, erosion, and observed patterns of deposition of the trash and sediment, excavation and removal of sediment and trash is underway for FY2009-10.

PARTICIPATING WATERSHED COPERMITTEES

- City of San Diego

OTHER PARTICIPATING ENTITIES

- California Department of Fish and Game
- California State Parks
- County of San Diego

HIGH PRIORITY WATER QUALITY PROBLEM(S) ADDRESSED

- Sediment
- Trash
- Gross Pollutants

CONSISTENCY WITH THE COLLECTIVE WATERSHED STRATEGY

Both the City's *Strategic Plan for Watershed Activity Implementation* and the Collective Watershed Strategy for the Tijuana River WMA identify sediment and trash as high priority water quality problems and recommend implementing load reduction/source abatement activities to address them. This activity results in a direct load reduction of these pollutants.

EFFECTIVENESS ASSESSMENT

This activity will be assessed based on the amount and type of sediment and debris removed.