CDM

# Technical Memorandum

*Date:* *October 10, 2006*

*To:* *Stormwater Quality Standards Task Force*

*From:* *CDM*

*Subject:* *Recreational Use Survey Data Report – Santa Ana Delhi Channel*

## Introduction

To support Santa Ana River Basin Plan triennial review efforts, an evaluation of the appropriateness of REC-1 beneficial use designations and associated bacteria water quality objectives in the Santa Ana River Watershed is being performed by the Santa Ana Stormwater Quality Standards Task Force. The Task Force consists of representatives from a variety of stakeholder interests, including the Santa Ana Watershed Project Authority; the counties of Orange, Riverside, and San Bernardino; special districts; the Santa Ana Regional Water Quality Control Board; EPA Region 9; and local environmental groups, with assistance from CDM and Risk Sciences, Inc. As part of study efforts, recreational use surveys were performed upon select waterbodies to obtain information regarding current levels of recreational use. This technical memorandum summarizes results from use surveys conducted at three locations on the Santa Ana Delhi Channel.

## Study Locations

Three locations were surveyed on the Santa Ana Delhi Channel, including:

- Santa Ana Delhi Channel at Sunflower Avenue
- Santa Ana Delhi Channel at Mesa Avenue
- Santa Ana Delhi Channel at Newport Bay

Figure 1 illustrates these survey locations and depicts the physical characteristics of each unique segment of the Santa Ana Delhi Channel. There are two red shaded segments on the map that indicate closed culvert sections, where the channel crosses under two major highways. Photos from each of the sites show the general conditions of the Santa Ana Delhi Channel in the vicinity of the surveyed locations (Figure 2).

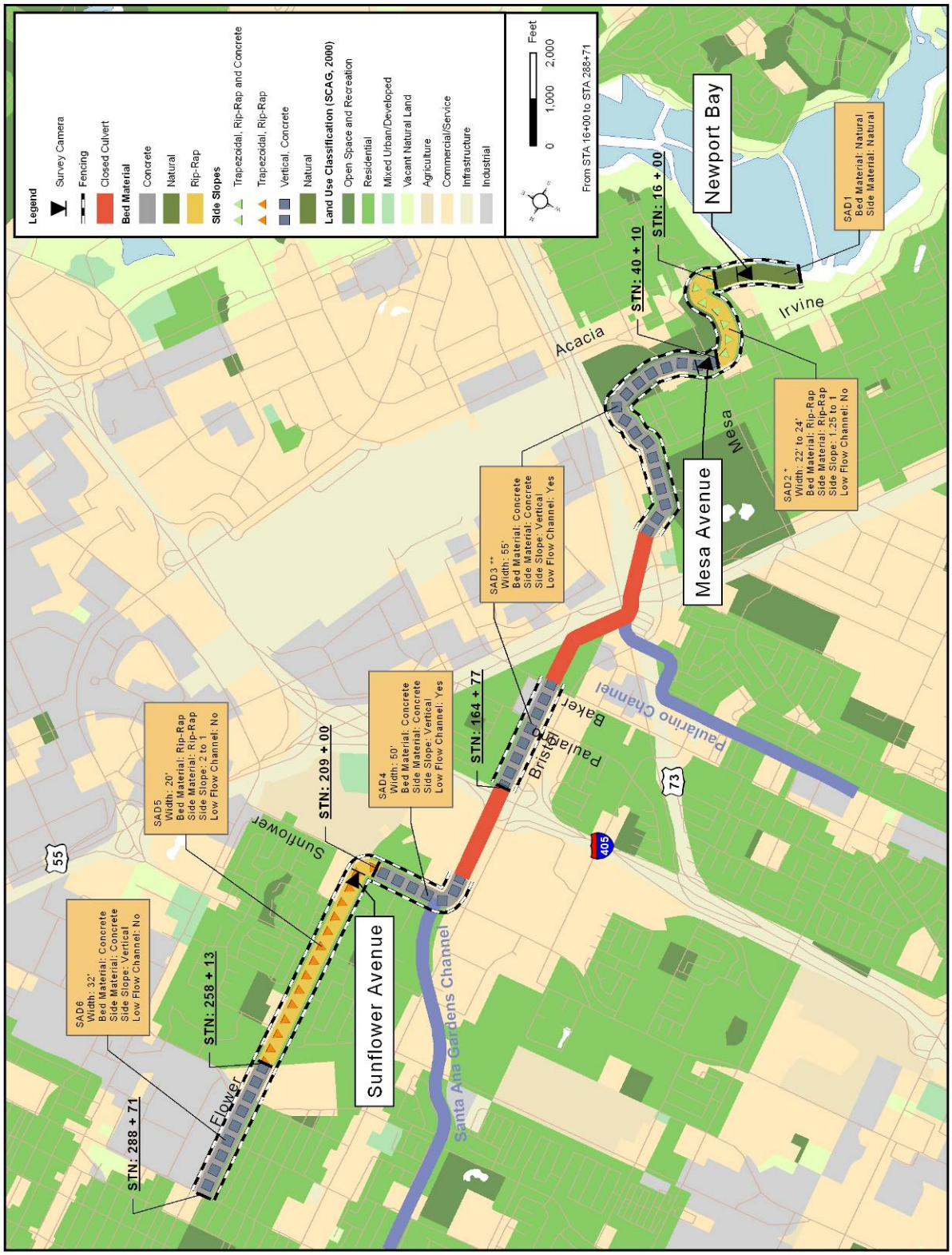


**Figure 1**
**Location of Recreational Use Surveys and Physical Characteristics for the Santa Ana Delhi Channel**

**Figure 2a**
**Photo of the Santa Ana Delhi Channel at the Upper Newport Bay Recreational Use Survey Location**

**Figure 2b**
**Photo of the Santa Ana Delhi Channel at the Mesa Avenue Recreational Use Survey Location**


**Figure 2c**
**Photo of the Santa Ana Delhi Channel at the Sunflower Avenue Recreational Use Survey Location**

## Survey Design

Advanced digital cameras and data transfer technology, coupled with weekly on-location physical surveys were used to collect recreational use data at each location. Observer IV ™ cameras were equipped with cellular data transmission equipment to collect an image at each location every fifteen minutes, and transfer the image to a secure data storage server via a file transfer protocol (FTP) site. Weekly site visits were conducted to log recreational use observations, and monitor and maintain the image collection equipment. This survey design was selected to provide unprecedented levels of data to characterize recreational use. Figure 3 shows the final camera installation at each of the recreational use survey locations.

The duration of survey and number of images collected for each location on the Santa Ana Delhi Channel is shown in Table 1. An image was collected every fifteen minutes throughout the study duration unless signal strength fluctuations or equipment failures precluded collection and transmission. Images were not collected at night due to darkness.


**Figure 3a**
**Photo of the Santa Ana Delhi Channel at the Upper Newport Bay Recreational Use Survey Camera Installation**


**Figure 3b**
**Photo of the Santa Ana Delhi Channel at the Mesa Avenue Recreational Use Survey Camera Installation**


**Figure 3c**
**Photo of the Santa Ana Delhi Channel at the Sunflower Avenue Recreational Use Survey Camera Installation**

**Table 1**
**Recreational Use Survey Duration**

| Survey Location | Start Date | End Date | Number of Images |
|---|---|---|---|
| Newport Bay | 6/20/05 | 6/6/06 | 20,203 |
| Mesa Avenue | 6/20/05 | 7/13/06 | 21,284 |
| Sunflower Avenue | 7/7/05 | 7/9/06 | 20,978 |

The image collection equipment and technology worked reliably throughout the survey period at all three survey locations on the Santa Ana Delhi Channel, but due to signal strength fluctuation issues and other equipment functionality issues, periodic, short term gaps in image collection occurred. These gaps ranged from relatively minor single, fifteen-minute interval image gaps, which occurred on numerous days, to gaps in image collection spanning several days. Table 2 summarizes the more significant data gaps.

**Table 2**
**Recreational Use Survey Data Gaps**

| Location | Data Gap Period | Cause |
|---|---|---|
| **Sunflower Avenue** | October 23 – 26, 2005 | Battery Failure |
| | January 13 – 19, 2006 | FTP Server Down |
| | April 11 – 14, 2006 | Battery Failure |
| **Mesa Avenue** | November 11 - 18, 2005 | Battery Failure |
| | November 24 - 30, 2005 | Battery Failure |
| | January 13 – 19, 2006 | FTP Server Down |
| **Newport Bay Location** | December 23 – 29, 2005 | Battery Failure |
| | January 13 – 19, 2006 | FTP Server Down |
| | June 7 – End of Survey Period | Camera Failure |

Images were stored and individually reviewed for activity at the channel locations. A use/activity categorization protocol was established for logging and categorizing observed activity from both image review and physical surveys. Within the protocol, information was collected upon water contact activity, including the type or magnitude of water contact and non-water contact activity, in the following categories:

- Date / Time
- Number of People
- Type of Contact
  - Incidental Contact
  - Contact Below Ankle
  - Contact Between Ankle and Waist
  - Contact Between Waist and Neck
  - Contact Above Neck
  - Non-Recreation Contact
- Non-Contact Activity

Images containing a person or persons within channel fencing or boundaries (and on-site surveys where a person or persons were observed) were considered "events".

An event could include one or more persons. For each event, each person's activity (type), and its duration and magnitude were logged per the established protocol. If an activity was captured within one image, an activity duration was reported as <30 minutes. Likewise, if an activity was observed within two consecutive fifteen-minute interval images, the duration was reported as <45 minutes. At the Newport Bay location, persons on the highly used walking trail were not considered as events. An event was defined as a person that stepped off the trail onto the channel banks. Over the course of the survey period, there were over 1,500 persons observed walking, jogging, or horseback riding along this trail.

Appendix A of this report includes images of all events that were counted as water contact or non-water contact recreational use. Some images included in Appendix A show examples of other types of activities, such as non-contact recreation and channel maintenance.

Captured channel maintenance activities were observed in several images but not considered to be recreational use activity. These activities were observed at the Mesa Avenue and Sunflower Avenue locations and primarily consisted of crews collecting trash. One image was captured of an Orange County Coastkeeper water quality sampler. Images were captured of Task Force members performing site visits at the Upper Newport Bay and Sunflower Avenue locations. These images were not counted in the analysis of recreational use activities.

## Survey Results

Table 3 summarizes all contact recreational events (individuals) observed for each of the survey locations and provides the date, potential duration, and magnitude of contact.

Table 4 summarizes non-contact types of recreational use for each of the survey locations. The total number of individuals recreating, estimated duration of recreation, and seasonal patterns are included in the summary table. The commonly used seasonal periods in southern California NPDES stormwater permits were used to categorize the observations by season (April 1 to September 30 for Summer, October 1 to March 31 for Winter).

## Summary of Findings

Approximately 63,000 recreational use data points (images) were collected over a one-year duration from three locations along the Santa Ana Delhi Channel, each location with differing channel characteristics. Survey results indicate a very low frequency of water contact recreational use at all three locations, regardless of season. Three data points out of 63,332 collected indicated actual water contact. The duration of each was short, less than thirty minutes in each case. The images indicate the potential magnitude of contact as low, always foot or hand contact, with no data points indicating full body contact or immersion at any location surveyed.

**Table 3**
**Water Contact Recreation Events Recorded for the Santa Ana Delhi Channel**

| Location / Date | Time | Duration (min) | Magnitude of Contact | Image ID |
|---|---|---|---|---|
| ***Newport Bay*** | | | | |
| 7/24/2005 | 14:30 | < 30 | Below Ankle | Delhi_Bay-05-07-24-14-30 |
| 5/19/2006 | 12:30 | < 30 | Below Ankle | Delhi_Bay-06-05-19-12-30 |
| ***Mesa Avenue*** | | | | |
| No events were observed | | | | |
| ***Sunflower Avenue*** | | | | |
| 2/11/2006 | 14:45 | < 30 | Below Ankle | Delhi_Sunflower-06-02-11-14-45 |

Note: The event captured on 5/9/06 at 19:20 was not counted as water contact recreation. Given the quality of the image, contact could not be discerned

**Table 4**
**Non-Water Contact Recreation Events Recorded for the Santa Ana Delhi Channel**

| Location | Number of Individuals | | | Duration (min) | Types of Activities |
|---|---|---|---|---|---|
| | Total | Summer | Winter | | |
| Newport Bay | 36 | 32 | 4 | 1,110 | Sitting, Dog Walking, Boating |
| Mesa Avenue | 6 | 4 | 2 | 180 | Walking, Bicycling |
| Sunflower Avenue | 6 | 4 | 2 | 180 | Walking |

Non-contact recreational activity, such as walking along the channel banks or boating, was more frequent than contact activity, and results indicate an increase in the frequency of non-contact activity during the summer season at the Newport Bay location.

# Appendix A
# Select Photos from Santa Ana Delhi Channel Survey Locations

# Santa Ana Delhi Channel at Sunflower Avenue

**12/21/05 11:00**

**2/11/06 14:45**

**5/8/06 19:30**

**6/17/06 16:45**

**6/27/06 13:15**

# Santa Ana Delhi Channel at Mesa Avenue

**8/2/05 11:15**

**8/17/05 13:15**

**1/23/06 17:15**

**2/4/06 17:30**

**7/8/06 14:30**

# Santa Ana Delhi Channel at Newport Bay

**6/29/05 10:50**

**7/5/05 9:45**

**7/6/05 12:36**

**7/24/05 14:30**

**7/26/05 19:30**

**9/10/05 12:00**

**9/11/05 13:30**

**9/16/05 11:30**

**10/10/05 14:30**

**11/6/05 11:30**

**1/6/06 11:45**

**1/6/06 16:15**

**2/17/06 14:00**

**4/22/06 17:15**

**4/30/06 12:15**

**5/4/06 15:30**

**5/5/06 12:45**

**5/7/06 15:15**

**5/9/06 19:20**

**5/14/06 14:45**

**5/19/06 12:30**

**5/20/06 11:30**

**5/21/06 10:30**