



## Technical Memorandum

*To: Stormwater Quality Standards Task Force*

*From: CDM*

*Date: July 2, 2009*

*Subject: Recreational Use Survey Data Report – Santa Ana River at Anaheim*

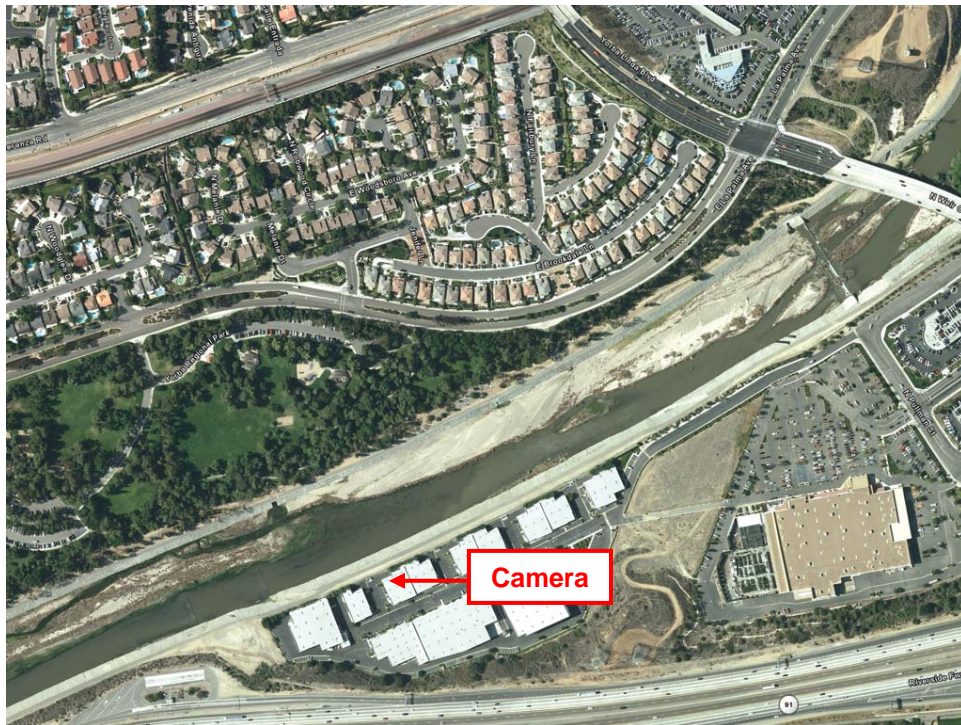
### Introduction

To support basin planning efforts in the Santa Ana River watershed, 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 Stormwater Quality Standards Task Force (“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. CDM and Risk Sciences, Inc. provide assistance to the Task Force. 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 the Santa Ana River at Anaheim.

### Study Location

The location for this study was the Santa Ana River southwest of North Weir Canyon Road and north of State Route 91 in the City of Anaheim. Figure 1 presents an aerial photo of the survey location. The predominant land use immediately surrounding the survey location is industrial/commercial and open space (Yorba Regional Park). As shown in Figure 2, the Santa Ana River is a trapezoidal channel with rip-rap side slopes and a natural channel bottom in the vicinity of the survey location.

Recreational Use Survey Data Report – Santa Ana River at Anaheim  
July 2, 2009



**Figure 1**  
**Santa Ana River at Anaheim Survey Location**



**Figure 2**  
**Photo of Santa Ana River at Anaheim Survey Location**

## **Survey Design**

Digital field observation cameras and data transfer technology, coupled with weekly on-location physical surveys were used to collect recreational use data. Observer IV™ cameras were equipped with cellular data transmission equipment to collect an image every fifteen minutes, and transfer the image to a secure data storage server via a file transfer protocol (FTP) site. Site visits were conducted to log recreational use observations, and to monitor and maintain the image collection equipment. This survey design was selected to provide unprecedented levels of data to characterize recreational use.

A camera was installed on the top of a nearby roof facing downstream on the Santa Ana River. Figure 3 shows the camera installation.



**Figure 3**  
**Photo of the Recreational Use Survey Camera Installation for Santa Ana River at Anaheim**

Table 1 summarizes the survey duration and number of images collected from Santa Ana River at Anaheim between October 2, 2007 and October 5, 2008. 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.

During the first half of the survey period, additional images were occasionally posting to the FTP site in addition to the standard 0-, 15-, 30-, and 45-minute timestamp images. The additional image postings were a result of a technical communication interchange error between the camera and FTP site. The FTP site technical issue was resolved in early April 2008. The percent image capture rate of the camera over the second half of the survey period was approximately 90 percent. The capture rate over the first half of the year was skewed by the additional image posting.



<b>Table 1 Recreational Use Survey Duration</b>			
<b>Survey Location</b>	<b>Start Date</b>	<b>End Date</b>	<b>Number of Images</b>
SAR at Anaheim	10/2/07	10/5/08	25,904

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 data gaps of one week or longer. The most significant data gap occurred from January 15 to February 11, 2008. During this period, significant FTP site and camera troubleshooting/repair were necessary.

<b>Table 2 Recreational Use Survey Data Gaps</b>		
<b>Location</b>	<b>Data Gap Period</b>	<b>Cause</b>
SAR at Anaheim	December 23, 2007 – January 3, 2008	Camera Issue
	January 15 – February 11, 2008	FTP Site/Camera Issue
	February 28 – March 6, 2008	Battery Failure
	March 16 – 26, 2008	Battery Failure
	April 10 – 24, 2008	Camera Issue

Images were stored and individually reviewed for activity. A use/activity categorization protocol was established for logging and categorizing observed activity from both image review and physical surveys. As part of the protocol, information regarding water contact activity (including the type or magnitude of contact) and non-water contact activity, was collected and logged 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 were considered “events”. On-site surveys where a person or persons were observed were also 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. Similarly, if an activity was observed within two consecutive fifteen-minute interval images, the duration was reported as <45 minutes.

## Survey Results

At the Santa Ana River at Anaheim survey location, no water contact activity was observed over the one-year survey period. Non-water contact activity was observed on a number of occasions. The total number of individuals observed, estimated duration of activity, and seasonal patterns are included in Table 3. 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 the dry season; October 1 to March 31 for the wet season).

Appendix A of this report contains representative images of non-contact activities.

Table 3 Non-Water Contact Activity Recorded for Santa Ana River					
Location	Number of Individuals			Estimated Duration (min)	Types of Activities
	Total	Dry Season	Wet Season		
SAR At Anaheim	57	28	29	1,770	Walking and Biking

## Summary of Findings

Approximately 26,000 recreational use data points (images) were collected over a one-year period from the Santa Ana River at Anaheim survey location. Results indicate no evidence of water contact recreational use over the survey period.

Non-water contact activity, such as walking and biking in the channel area, was observed throughout the survey period with results indicating an increase in the frequency of non-contact activity during the dry season at the survey location. Appendix A of this report contains representative images of non-water contact activities.

**Appendix A**  
**Select Images from Santa Ana River at Anaheim Survey**  
**Location**

Recreational Use Survey Data Report – Santa Ana River at Anaheim  
July 2, 2009



**No Activity: 06/17/2008 08:30**



**Non-Contact Activity: 10/30/2007 11:31**



Recreational Use Survey Data Report – Santa Ana River at Anaheim  
July 2, 2009



**Non-Contact Activity: 03/27/2008 14:30**



**Non-Contact Activity: 08/07/2008 14:45**

Recreational Use Survey Data Report – Santa Ana River at Anaheim  
July 2, 2009



**Non-Contact Activity: 09/13/2008 10:00**



**Non-Contact Activity: 09/30/2008 08:30**