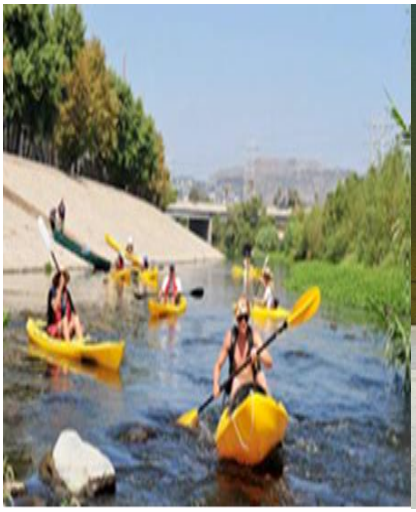
RECREATIONAL USE REASSESSMENT (RECUR) OF THE ENGINEERED CHANNELS OF THE LOS ANGELES RIVER WATERSHED



LA River Expedition 2008

Recreational Use Monitoring 2011

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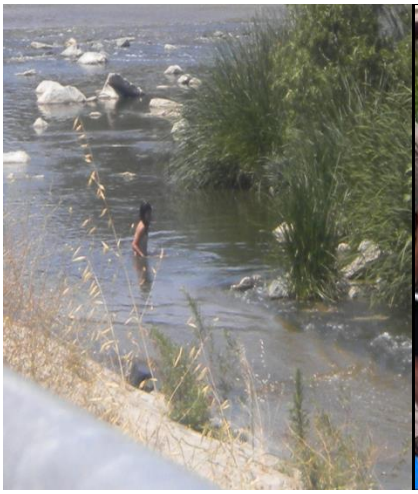

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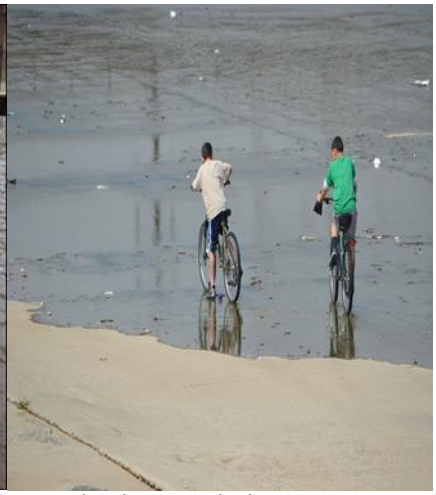


Recreational Use Monitoring 2012

DRAFT - December, 2013

Los Angeles Regional Water Quality Control Board

1. INTRODUCTION

In September 2010, the Los Angeles Regional Water Quality Control Board (Regional Board) initiated a re-evaluation of the designated recreational uses (water contact (REC-1) and non-water contact (REC-2)) in the engineered channels of the Los Angeles River system as identified in the Region's *Water Quality Control Plan* (Basin Plan). The reconsideration of the application of REC-1 and REC-2 beneficial uses in specific instances was selected by the Regional Board as one of the projects to be addressed during the 2008-10 triennial review period (Resolution No. R10-001). Additionally, during the Board hearing to adopt the Los Angeles River Bacteria TMDL (Resolution No. R10-007), several stakeholders indicated a strong desire for this issue to be prioritized for the Los Angeles River watershed.

This issue was identified as a priority because beneficial uses are the primary basis for the application of water quality objectives to the region's water bodies. Therefore, their designation has broad consequences regarding how the Regional Board regulates water quality in the region in terms of the specific requirements that are imposed on dischargers.

The assessment addresses all the engineered portions of the Los Angeles River system, which includes five of the six reaches of the Los Angeles River main stem - Reaches 1 through 4 and Reach 6, along with thirty-one major and secondary tributaries.

In 2010, USEPA determined that REC-1 uses including kayaking, occur along the main stem (Reaches 1 through 6) of the river and that flows exist in the river throughout the "vast majority" of the year to support such uses. Therefore, for the main stem of the Los Angeles River, the assessment was limited to evaluating the magnitude and frequency of these existing uses in order to determine whether or not sub-categorization of the REC-1 use should be considered.

For the tributaries, the assessment was conducted with the goal of determining (i) whether the physical conditions in these channels were or were not conducive to supporting recreational uses, and (ii) the potential of these channels to support recreational uses in the future based on an inventory and review of all existing or proposed restoration / revitalization plans.

This assessment was conducted in conformance with federal regulations at 40 C.F.R. sections 131.10(g) and 131.20 as well as USEPA's guidelines for conducting use attainability analyses (UAA) (USEPA 1994, 1996, 2006). The effort was enhanced by significant stakeholder participation in key aspects of the assessment. This level of participation allowed for a robust, multi-pronged study design.

The report includes the regulatory basis for the study, the methodology applied, and the results obtained. It provides a comprehensive assessment of the current

ability of the water bodies to support recreational use, along with their potential for future recreational opportunities. Recommendations regarding potential modifications to recreational beneficial uses, based on this report, will be provided in a separate document at a later time

1.1 Background on Recreational Use Considerations for Engineered Channels

Engineered channels are waterways that have been lined (at the bottom and/or on the sides) with rip-rap or concrete and, in most cases, straightened, with the intent of reducing flood risk by transporting storm water as quickly as possible to the ocean. However, these modifications sometimes create life-threatening "swift-water" conditions during and immediately following storm events, making it unsafe for recreational activities in, or in proximity to, such water bodies. In addition, the vertical walls and/or steep-sided slopes of these channels, often in conjunction with restrictive fencing, usually limit, to varying degrees, direct access to channelized creeks and streams for the purpose of recreational use. Furthermore, many of these channels have minimal flows and low water levels in the dry periods that occur throughout the year in southern California.

Given these conditions, the appropriateness of assigning the water contact recreation (REC-1) use to engineered channels has been questioned by a number of stakeholders throughout the region. Concerns have also been expressed regarding the potential for such beneficial use designations to encourage water contact recreational activities in areas that are unsafe.

At the same time, municipalities and federal agencies including the USEPA and the Army Corps of Engineers, along with non-profit organizations have been working to restore urban rivers in the region to provide greater recreational opportunities to urban residents and visitors. Thus, in addressing the issues of recreational use in engineered channels, it is important to balance concerns regarding the appropriateness of such uses with growing desire and efforts to restore streams and increase the recreational use of urban water bodies.

The Regional Board has previously addressed the issue of water contact recreation in engineered channels during unsafe conditions. In 2003, the Regional Board issued a categorical suspension of the recreational beneficial uses and associated bacteria objectives in some engineered channels during unsafe wet weather conditions, known as the "high flow suspension" (Resolution No. R03-010). Engineered channels subject to the high flow suspension have been identified in Ballona Creek, the Los Angeles River, the Dominguez Channel and the San Gabriel River. Also, in 2005, in response to stakeholder concerns that limited accessibility and low-flow conditions in engineered channels cannot support a REC-1 designated use, the Regional Board re-evaluated recreational uses in Ballona Creek and Estuary. The Ballona recreational use assessment resulted in the removal of the potential REC-1 use for Reach 1 (the uppermost reach) of Ballona Creek, which is a concrete-lined box channel with fencing that

limits access throughout its length. The Ballona recreational use assessment also resulted in the development and designation of a sub-category of REC-1 (Limited REC-1) for Reach 2 of the creek.[1]

[1] State Board Resolution No. 2005-0015

2. EXISTING POLICY AND GUIDANCE ON BENEFICIAL USE ASSESSMENT

Section 101(a)(2) of the Clean Water Act (CWA) sets the general tone for the designation of beneficial uses of water bodies throughout the United States. It states that, "it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983."

2.1 DESIGNATION OF BENEFICIAL USES

Per the Code of Federal Regulations (40 CFR § 131.3(f)) designated uses are defined as "those uses specified in water quality standards for each water body or segment whether or not they are being attained."

Title 40 of the Code of Federal Regulations section 131.10 directs States on the designation of uses as follows:

(a) Each State must specify appropriate water uses to be achieved and protected. The classification of the waters of the State must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial and other purposes including navigation. In no case shall a State adopt waste transport or waste assimilation as a designated use for any waters of the United States.

(b) In designating uses of a water body and the appropriate criteria for those uses, the State shall take into consideration the water quality standards of downstream waters and shall provide for the attainment and maintenance of the water quality standards of downstream waters.

(c) States may adopt sub-categories of a use and set the appropriate criteria to reflect varying needs of such sub-categories of uses, for instance, to differentiate between cold water and warm water fisheries.

(d) At a minimum, uses are deemed attainable if they can be achieved by the imposition of effluent limits required under sections 301(b) and 306 of the Act and cost-effective and reasonable best management practices for nonpoint source pollution.

The Water Quality Control Plan for the Los Angeles Region (Basin Plan) contains designated uses for surface and ground waters in the Los Angeles Region. These uses are generally classified as existing, potential, or intermittent. The water contact recreation uses of engineered channels of the Los Angeles River include all three classifications.

Existing Beneficial Uses. Those beneficial uses that have been attained for a water body on, or after, November 28, 1975 must be designated as "existing" in the Basin Plan. Certain other uses must be designated, whether or not they have been attained on a water body, in order to implement the federal CWA goal expressed in section 101(a)(2), often referred to as "fishable and swimmable" unless a UAA is conducted. Other uses can be designated, whether or not they

have been attained, in order to implement state mandates or goals.

Intermittent Beneficial Uses. Beneficial uses of streams that have intermittent flows, as is typical of many streams in southern California, are often designated as intermittent. During dry periods, however, shallow ground water or small pools of water can support some beneficial uses associated with intermittent streams; accordingly, such beneficial uses (e.g., wildlife habitat) are protected throughout the year.

Potential Beneficial Uses. Beneficial uses may be designated as "potential" for several reasons, as set forth in the Basin Plan, including:

- Implementation of the State Board's policy entitled "Sources of Drinking Water Policy" (State Board Resolution No. 88-63, described in Chapter 5),
- Plans to put the water to such future use,
- Potential to put the water to such future use,
- Designation of a use by the Regional Board as a regional water quality goal, or
- Public desire to put the water to such future use.

2.2 REMOVAL OF DESIGNATED USES: 40 CFR § 131.10 (g)

States may remove a designated use which is not an existing use, as defined in section 131.3, or establish sub-categories of an existing use if the State can demonstrate that attaining the designated use is not feasible because:

1. Naturally occurring pollutant concentrations prevent the attainment of the use; or
2. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or
3. Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or
4. Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; or
5. Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or
6. Controls more stringent than those required by sections 301(b) [Effluent Limitations] and 306 [National Standards of Performance] of the Act would result in substantial and widespread economic and social impact.

2.3 Restrictions on Removal of Use: 40 CFR § 131.10

Federal regulations restrict States from removing designated beneficial uses. Specifically, 40 CFR § 131.10 (h) prohibits States from removing designated uses if:

> They are existing uses, as defined in 40 CFR § 131.3, unless a use requiring more stringent criteria is added; or
>
> Such uses will be attained by implementing effluent limits required under sections 301(b) and 306 of the Act and by implementing cost-effective and reasonable best management practices.

Furthermore, 40 CFR § 131.10 (i) states that where existing water quality standards specify designated uses less than those which are presently being attained, the State shall revise its standards to reflect the uses actually being attained.

2.4 Use Attainability Analyses

Title 40 of the Code of Federal Regulations section 131.3(g) defines a UAA as a structured scientific assessment of the factors affecting the attainment of the use which may include physical, chemical, biological, and economic factors as described in § 131.10(g).

Under 40 CFR § 131.10(j) of the Water Quality Standards Regulation, States are required to conduct a UAA whenever the State wishes to remove a designated use that is specified in section 101(a)(2) of the Act or adopt subcategories of uses specified in section 101(a)(2) that require less stringent water quality objectives.

USEPA (2003) provides guidance on conducting UAAs for recreational uses and provides the following factors that may be addressed:

(i) Information concerning any existing recreational activities that occur in the water body, by type of activity, including frequency information (e.g., gathered from surveys or interviews with knowledgeable individuals, entities, or organizations);

(ii) Information that is useful in assessing the potential for various types of recreational uses to occur in the water body, which may include:

-

> (a) Physical analyses addressing: features that facilitate public access to the water body (e.g., road crossings, trails), facilities promoting recreation (e.g., rope swings, docks, picnic tables), features limiting access to the water body or that discourage recreation uses (e.g., fences, signs), location of the water body including proximity to residential areas, schools, or parks, projections of population growth/development in the area, safety

considerations, water temperatures, flows, velocity, depth, and width, and other physical attributes of the water body such as substrate characteristics;

(b) Chemical analyses of existing water quality for key parameters (bacteria, nutrients), including a comparison of available representative data for indicator bacteria to the criteria adopted by the state or authorized tribe (which may include both geometric mean and single sample maximum values);

(c) Identification of sources of fecal pollution, and an assessment of the potential for reduced loadings of bacterial indicators; and

(d) Economic/affordability analyses.

On the subject of physical analyses, USEPA has previously stated that physical factors, which are important in determining attainability of aquatic life uses, may not be used as the basis for removing or not designating a recreational use consistent with the CWA section 101(a)(2) goal (USEPA, 1994). This precludes states from using factor 2 (pertaining to low flows) or factor 5 (physical factors in general) as the sole basis for determining attainability of recreational uses. The reason for this preclusion is that, in certain instances, people will use whatever water bodies are available for recreation, regardless of the physical conditions (USEPA, 1994).

In addition, in its 1998 "Water Quality Standards Regulation: Proposed Rules," USEPA considered whether the regulation or Agency guidance should be amended to allow consideration of one of the physical factors, alone, as the basis for removing, or not designating primary contact recreational uses, and reaffirmed its position that one of the physical factors, alone, was not sufficient justification.

USEPA's suggested approach to the recreational use issue is for states to look at a suite of factors such as whether the water body is actually being used for primary contact recreation, existing water quality, water quality potential, access, recreational facilities, location, proximity to residential areas, safety considerations, and physical conditions of the water body in making any use attainability decision (USEPA, 1994).

More recently, in a 2006 memorandum titled "Improving the Effectiveness of the Use Attainability Analysis Process," USEPA made the following key points:

- **Getting the uses right requires both a useful set of designated uses and an effective process for conducting credible and defensible UAAs.** EPA realizes that deciding what uses are attainable is critical, and views the UAA process, properly applied and implemented, as a vital tool

in making those decisions. Early coordination among states and EPA is critical to making the process more efficient. UAAs are meant to assess what is attainable, it is not simply about documenting the current water quality condition and use (although documenting current conditions is often part of the analysis).

- **A credible UAA can result in a change in designated use in either direction.** A credible UAA can lead to refinements or changes in use that lead to either more or less protective criteria (i.e., water quality objectives in State terminology). The goal is that the new use is more accurate.

- **There is nothing wrong with changing designated uses after completion of a credible UAA.** It is an expected part of the process. If a credible and defensible UAA indicates a need for a water quality standards (WQS) change, then a change to WQS is appropriate to effectively implement the WQS program.

- **The UAA process should be better integrated with TMDL development.** EPA, states and tribes need to work together to ensure that as TMDLs are developed, there is also coordination on issues related to use attainability as needed. In practice, the information gathered to develop a TMDL, and the allocations in a TMDL, may point to the need to pursue a UAA. While in some cases it may be more effective to ensure that the right uses are in place prior to completing the TMDL, it is also important not to let uncertainty about a specific water quality endpoint delay implementation of needed water quality improvements. Scarce resources should be directed where they will be most effective and avoid duplicative efforts.

- **Improved public communication leads to improved public acceptance.** It is critical for EPA, states and tribes to engage the public in meaningful discussions regarding the importance and value of getting uses right in maintaining and restoring water quality. WQS that reflect the best available data and information should be used to direct the process of managing water quality. They are essential to informed decision making. Just as important, public understanding and acceptance of WQS is central to broader community support for addressing potentially difficult pollution control management decisions.

Along with this memorandum, EPA has made available a document titled “UAAs and Other Tools for Managing Designated Uses,” which is a compilation of different approaches to USEPA approved UAAs across the country. This report included the suspension of recreational beneficial uses in engineered channels in Los Angeles County during unsafe wet-weather conditions, conducted by the Los Angeles Regional Board, which relied on 40 CFR section 131.10(g) factors 2 and 4.

2.5 State Board Consideration of Beneficial Use Assessment

REC-1 Use in Old Alamo Creek, Central Valley Region - State Board Resolution No. 2002-0003

In October 2002, the State Board reviewed its decision concerning the City of Vacaville's (Vacaville) dispute of the Central Valley Regional Board's (CVRB) application of REC-1 and other water quality objectives in crafting the 2001 permit for the Easterly Wastewater Treatment Plant discharge to Old Alamo Creek. The CVRB had applied REC-1 and other uses to the creek via the "Tributary Rule." Vacaville contended the CVRB's approach to designating beneficial uses as well as the existence of specific uses (including REC-1) in Old Alamo Creek. Vacaville had conducted a receiving water survey in the fall of 1997 and concluded that REC-1 was not an existing use of the creek. In contrast, CVRB determined that the public has access to the creek, which runs by homes and provides riparian habitat that could attract users. CVRB staff also found evidence of fishing in the creek, and received accounts of wading from nearby residents who were interviewed. Based on these findings, the State Board determined that REC-1 was an existing use of the water body (SWRCB, 2002).

Recreational Use in Ballona Creek, Los Angeles Region - State Board Resolution No. 2005-015

In June 2003, the Los Angeles Regional Board considered proposed amendments to the Basin Plan to modify the recreational beneficial uses of Reaches 1 and 2 of Ballona Creek within the Santa Monica Bay Watershed Management Area. Both reaches had been hydromodified in the 1930s, had limited flow and restricted access. The Regional Board did not adopt the proposed amendments; the Board's action was later reviewed by the State Board in response to a petition by the Los Angeles County and Los Angeles County Flood Control District, and determined to have been in error. The State Board subsequently adopted the proposed amendments through State Board Resolution No. 2005-0015, thereby adding a subcategory of water contact recreation (Limited REC-1 [LREC-1]) to the Los Angeles Region's Basin Plan. This new beneficial use was applied to Reach 2 of Ballona Creek, while the water contact recreation component of the potential REC-1 use was removed from both Reaches 1 and 2 of Ballona Creek.

3. BACKGROUND ON THE LOS ANGELES RIVER SYSTEM

3.1 THE LOS ANGELES RIVER

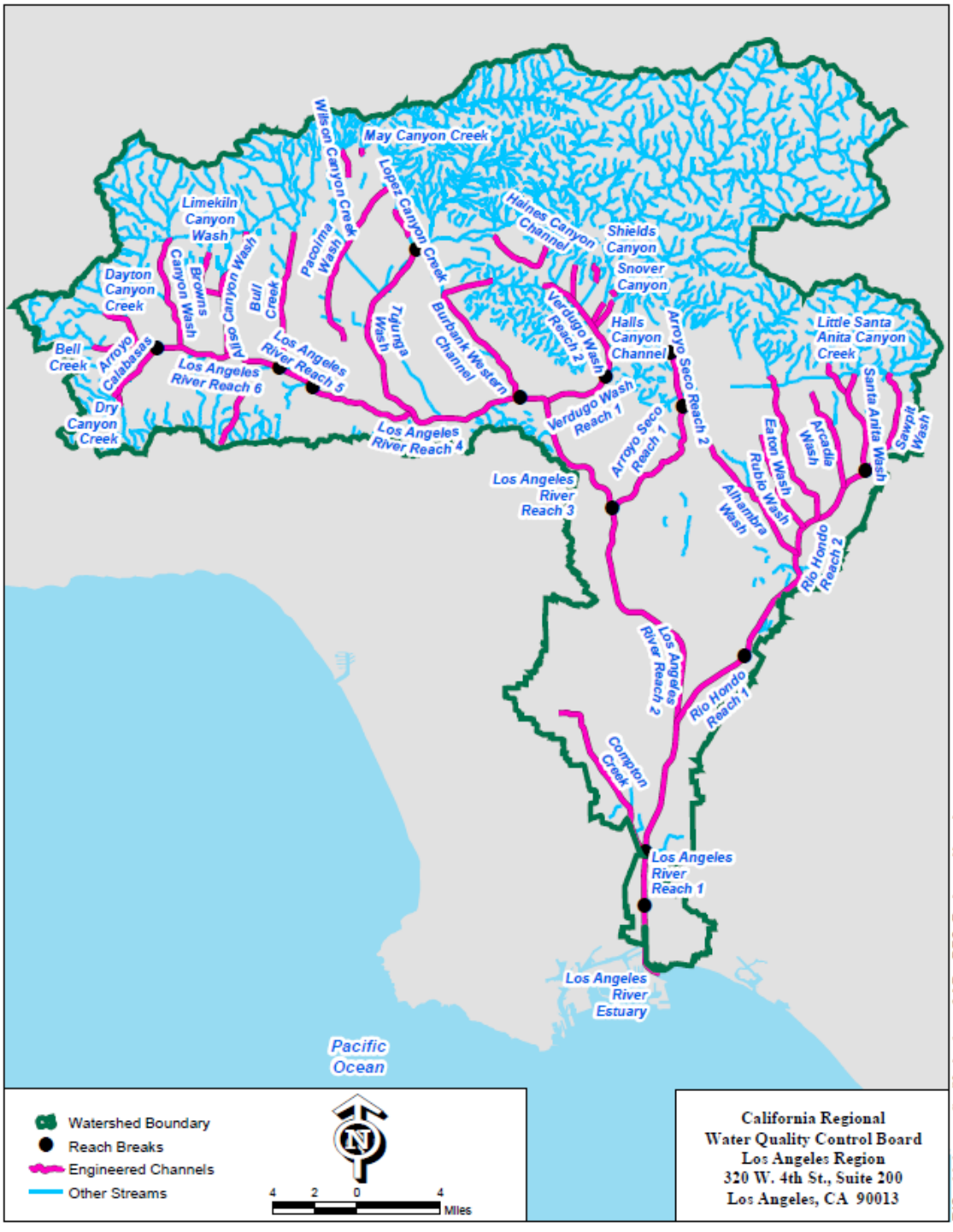
The Los Angeles River flows 51 miles from the western end of the San Fernando Valley to the Queensway Bay and Pacific Ocean at Long Beach (see Figure 3-1). The headwaters are at the confluence of Arroyo Calabasas and Bell Creek. Arroyo Calabasas drains Woodland Hills, Calabasas, and Hidden Hills in the northeastern portion of the Santa Monica Mountains. Bell Creek drains the Simi Hills and receives flows from Chatsworth Creek. From the confluence of Arroyo Calabasas and Bell Creek, the Los Angeles River flows east through the southern portion of the San Fernando Valley, bends around the Hollywood Hills before it turns south onto the broad coastal plain of the Los Angeles Basin, eventually discharging into Queensway Bay and thence into San Pedro Bay, west of Long Beach Harbor.

The Los Angeles River and its tributaries have a total stream length of 837 miles of which approximately 205 miles are engineered. The watershed covers an area of about 834 square miles (see Figure 3-1). The incorporated cities and the urban but unincorporated portion of Los Angeles County comprise 599 square miles of the total area. The remaining acreage consists of managed forest and recreational areas within the Angeles National Forest and other largely undeveloped land uses.

Reach 6 is the uppermost reach of the Los Angeles River main stem. It begins at the confluence of Arroyo Calabasas and Bell Creek. In this reach, the river flows east from its origin, along the southern edge of the San Fernando Valley, to Balboa Boulevard in the Lake Balboa area of the City of Los Angeles. This reach of the Los Angeles River also receives flow from Browns Canyon, Aliso Canyon Wash, and Caballero Creek. The lower portions of Arroyo Calabasas and Bell Creek are channelized. Browns Canyon, Aliso Creek and Caballero Creek are completely channelized, as is Reach 6 itself.

Reach 5 of the Los Angeles River runs from Balboa Boulevard through the Sepulveda Flood Control Basin to the Sepulveda Dam. The Basin is one of the few “soft-bottom” portions of the main river channel. It is a 2,150-acre open space designed to collect floodwaters during major storms. Because the area is periodically inundated, it remains in natural or semi-natural conditions and supports a variety of low-intensity uses. The U.S. Army Corps of Engineers owns the entire basin and leases most of the area to the City of Los Angeles Department of Recreation and Parks, which has developed a multiuse recreational area that includes a golf course, playing fields, hiking trails and bicycle paths. The D.C. Tillman Water Reclamation Plant indirectly discharges tertiary-treated effluent to this Reach via two lakes in the Sepulveda Basin that are used for recreation and wildlife habitat. However, the bulk of this plant’s tertiary effluent is discharged directly to Reach 4 of the Los Angeles River just below the Sepulveda Dam.

FIGURE 3-1: LOS ANGELES RIVER WATERSHED



Reach 4 of the Los Angeles River runs from the Sepulveda Dam to Riverside Drive. Pacoima Wash and Tujunga Wash are the two main tributaries to this reach. Both tributaries drain portions of the Angeles National Forest in the San Gabriel Mountains. Pacoima Wash is channelized below Lopez Dam to the Los Angeles River. Tujunga Wash is channelized for the reach below Hansen Dam. Some of the discharge from Hansen Dam is diverted to spreading grounds for groundwater recharge, but most of the flow enters the channelized portion of Tujunga Wash.

Reach 3 of the Los Angeles River - from Riverside Drive to Figueroa Street - flows from the eastern end of the San Fernando Valley through Griffith Park and Elysian Park. This area is known as the Glendale Narrows. The area is fed by natural springs during periods of high groundwater. The river is channelized and the sides are lined with concrete. However, the river bottom in this area is unlined because rising groundwater routinely discharges into the channel, in varying volumes depending on the height of the water table, maintaining year-long flow in the river, downstream. The Los Angeles-Glendale Water Reclamation Plant discharges to the Los Angeles River in the Glendale Narrows. The two major tributaries to this reach are the Burbank Western Channel, which receives flows from the Burbank Water Reclamation Plant, and Verdugo Wash, which drains the Verdugo Mountains. Both tributaries are channelized.

Reach 2 of the Los Angeles River runs from Figueroa Street to Carson Street. It has two major tributaries – the Arroyo Seco and the Rio Hondo. The Arroyo Seco drains areas of Pasadena and portions of the Angeles National Forest in the San Gabriel Mountains, and lies just below the Glendale Narrows. The Rio Hondo and its tributaries drain a large area in the eastern portion of the Los Angeles River Watershed. At Whittier Narrows, flow from the Rio Hondo can be diverted to the Rio Hondo Spreading Grounds. During dry weather, virtually all the water in the Rio Hondo goes to groundwater recharge, so little or no flow exits the spreading grounds to Reach 1 of the Rio Hondo. During storm events, Rio Hondo flow that is not used for spreading, reaches the Los Angeles River. This flow is comprised of both storm water and treated wastewater effluent from the Whittier Narrows Water Reclamation Plant.

Reach 1 of the Los Angeles River, runs from Carson Street to the estuary at Willow St. Compton Creek is the major tributary for this reach.

3.2 Designated Recreational Beneficial Uses of the Los Angeles River

Designated beneficial uses for the Los Angeles Region's water bodies are contained in the Basin Plan. While the engineered channels of the Los Angeles River Watershed have several beneficial uses, the focus of this assessment was on the recreational uses. Per the Basin Plan, recreational beneficial uses include:

Water contact recreation REC-1 defined as "*uses of water for recreational activities involving body contact with water, where ingestion of water is*

reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs";

Limited Water Contact Recreation (LREC-1) defined as **"***uses of water for recreational activities involving body contact with water, where full REC-1 use is limited by physical conditions such as very shallow water depth and restricted access and, as a result, ingestion of water is incidental and infrequent*"; and

Non-contact Water Recreation (REC-2) defined as "*uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities*".

Table 3-1 lists the designated recreational beneficial uses for each of the engineered channels under consideration. These recreational uses are classified as either "Existing", "Intermittent", or "Potential" per the Basin Plan:

Table 3-1: List of Waterbodies for Recreational Use Re-evaluation

Name	Reach	REC-1	REC-2
Los Angeles River to Estuary	Reach 1	E	E
Los Angeles River	Reach 2	E	E
Los Angeles River	Reach 3	E	E
Los Angeles River	Reach 4	E	E
Los Angeles River	Reach 5	E	E
Los Angeles River	Reach 6	E	E
Compton Creek		E	E
Santa Anita Wash		E	E
Pacoima Canyon Creek		E	E
Wilson Canyon Creek		E	E
Rio Hondo below Spreading Grounds	Reach 1	P	E
Alhambra Wash		P	I
Rubio Wash		I	I
Eaton Wash		I	I
Eaton Wash (below dam)		I	I
Arcadia Wash (lower)		P	I
Arcadia Wash (upper)		P	I
Santa Anita Wash (lower)		P	E
Little Santa Anita Canyon Creek		I	I
Sawpit Wash		I	I
Arroyo Seco S. of Devil's Gates. (L)	Reach 1	I	I
Arroyo Seco S. of Devil's Gates (U)	Reach 2	I	I
Verdugo Wash	Reach 1 & 2	P	I
Halls Canyon Channel		I	I
Snover Canyon		I	I
Pickens Canyon		I	I
Shields Canyon		I	I
Dunsmore Canyon Creek		I	I
Burbank Western Channel		P	I
La Tuna Canyon Creek		I	I
Tujunga Wash		P	I
Lopez Canyon Creek		I	I
Haines Canyon Creek		I	I
Pacoima Wash		P	E
May Canyon Creek		I	E
Bull Creek		I	I
Caballero Creek		I	I
Aliso Canyon Wash and Creek		I	I
Limekiln Canyon Wash		I	I
Browns Canyon Wash and Creek		I	I
Arroyo Calabasas		P	I
Dry Canyon Creek		I	I
Bell Creek		I	I
Dayton Canyon Creek		I	I

3.3 Protecting Recreational Uses in the Los Angeles River Watershed

Water contact recreational use is generally impaired by the presence of high levels of fecal indicator bacteria. The Los Angeles River and many of its major tributaries (approximately 127 miles in total) were determined to be impaired by fecal indicator bacteria as a result of water quality assessments conducted in 1998, 2002, 2006, and 2008. Many reaches and tributaries exceed the bacterial water quality standards from 80% to up to 100% of the time. This severely limits the potential for recreational uses of the river and downstream beaches in the City of Long Beach.

In July 2010, a Total Maximum Daily Load (TMDL) was adopted for the water bodies of the Los Angeles River Watershed. This TMDL addressed water quality impairments due to elevated concentrations of indicator bacteria, which are widely used to indicate the presence of fecal matter and are correlated with increased health risks to individuals engaged in water contact recreation.

This TMDL considered the entire main stem of the Los Angeles River from above Sepulveda Basin to the estuary as well as the tributaries including Bell Creek, Tujunga Wash below Hansen Dam, Verdugo Wash, Arroyo Seco, Rio Hondo, Compton Creek, Bull Creek and Burbank Western Channel.

Similar to other bacteria TMDLs in this Region, this TMDL 1) used a reference system approach in that the River must not exceed standards more often than a “clean” reference water body; 2) set final allocations in number of days of allowed exceedance of targets; and 3) developed allocations and schedules for wet weather and dry weather separately.

The TMDL set targets for indicator bacteria based on numeric water quality objectives provided in the Basin Plan. Allocations were assigned to storm water and other dischargers in the watershed. The TMDL set a schedule for attainment in phases, segment by segment of the River. The final dry weather allocations are to be achieved 18 years after implementation has begun in a segment. Compliance with the final wet weather allocations is to be achieved by March, 2037.

Trash in waterways impacts the aesthetic enjoyment (non-contact recreation [REC-2]) of the water body and impedes water contact recreation to a lesser degree. In 2007, the Los Angeles Regional Water Board adopted a TMDL for trash in the Los Angeles River and its tributaries. This TMDL required a phased reduction of trash loading to these water bodies until the target of “zero trash” was reached. Full compliance with this TMDL is expected in 2016.

Other TMDLs developed for the Los Angeles River watershed include TMDLs for nutrients and metals. These nutrient and metal TMDLs primarily address impacts to aquatic life beneficial uses.

4. METHODOLOGY FOR THE RECREATIONAL USE RE-EVALUATION

Regional Board staff conducted the re-evaluation of the recreational uses in and along the concrete-lined segments of the Los Angeles River and its tributaries from September 2010 through July 2013. This re-evaluation consisted of reconnaissance surveys, field visits and monitoring of recreational uses, surveys of recreationers, a web-based survey, analysis of water depth data, consideration of water quality conditions, review of existing municipal and watershed plans, and consideration of on-going efforts to improve or provide recreational opportunities in these areas.

4.1 FIELD RECONNAISSANCE

The list of engineered water body segments to be considered was developed with Geographic Information Systems (GIS). Water body reaches named in the Basin Plan (from the National Hydrography Dataset, NHD) were overlaid with the "open channel" layer from the Los Angeles County storm drain geodetic network to determine which segments were engineered. In areas where there were uncertainties, the results were fine-tuned, and discrepancies resolved, by overlaying an aerial photograph from the California Department of Fish and Wildlife image server. Field reconnaissance was conducted to verify and finalize the list, as well as to document the physical conditions.

Regional Board Staff conducted field reconnaissance from November 12, 2010 through February 11, 2011. This consisted of twelve trips covering 131 sites, including all six reaches of the Los Angeles River main stem and 35 engineered tributary segments (see Figure 4-1.1). For eight of these trips, the Los Angeles County Department of Public Works provided transportation and staff members from their Watershed Division and Flood Control District field offices (see Table 4-1). Their familiarity with the watershed and its network of engineered channels, along with the facilitation of access to the areas of interest, was key to the timely completion of the reconnaissance effort.

These field visits were focused largely on the engineered tributaries of the Los Angeles River and to a lesser extent on the main stem because earlier work by George Wolfe (2008) and CREST - Cleaner Rivers through Effective Stakeholder TMDLs (CREST, 2010) documented the physical conditions of the main stem.

Where possible, water body segments were surveyed at the most upstream concrete sections, midpoints, and at confluences with their receiving waters. Photographs were taken at each site, along with information on channel configuration, accessibility, presence of flow, adjacent land use and presence of recreational facilities.

These and other information are contained in the March 2011 Field Reconnaissance Report provided in Appendix 2.

FIGURE 4-1.1: FIELD RECONNAISSANCE SURVEY LOCATIONS

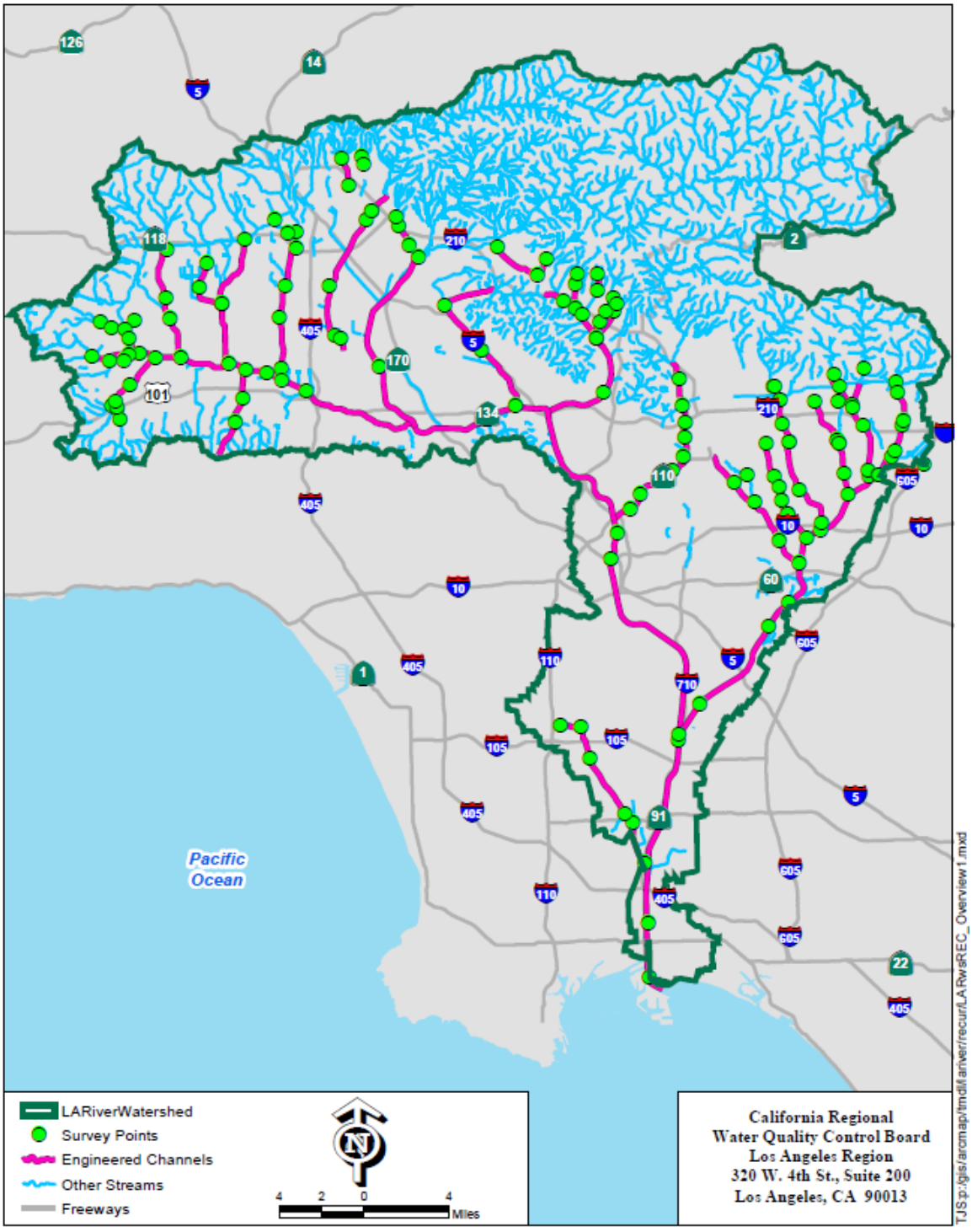


Table 4-1: Field Visits to the Engineered Channels of the Los Angeles River Watershed

Trip	Date	Locations	Field Team
1	November 12, 2010	Santa Anita Wash	RB Staff
2	November 16, 2010	Sawpit Wash, Sierra Madre, Arcadia Wash, Buena Vista	RB Staff
3	November 18, 2010	Eaton Wash, Rubio Wash, Alhambra Wash	RB Staff
4	November 30, 2010	LA River Estuary, LA River R1, R2, Compton Creek, Rio Hondo	RB and County Staff
5	December 7, 2010	Arroyo Seco, Eaton Wash, Rubio Wash, Alhambra Wash, Rio Hondo	RB and County Staff
6	December 9, 2010	Arcadia Wash, Santa Anita Wash, Sawpit Wash	RB and County Staff
7	December 16, 2010	LA River Reach 4, Burbank Western Channel, La Tuna Canyon Creek, Tujunga Wash, Lopez Canyon Creek	RB and County Staff
8	January 13, 2011	LA River R5, Pacoima Wash, Wilson Canyon Creek, May Canyon Creek, Bull Creek	RB and County Staff
9	January 18, 2011	LA River R6, Caballero Creek, Aliso Canyon Wash, Limekiln Canyon Wash, Browns Canyon Creek	RB and County Staff
10	January 20, 2011	Arroyo Calabasas, Dry Canyon Creek, Bell Creek, Dayton Canyon Creek, Vasquez Creek	RB and County Staff
11	January 27, 2011	LA River R3, Verdugo Wash, Halls Canyon Creek, Snover Canyon, Pickens Canyon, Shields Canyon, Dunsmore Canyon Creek, Haines Canyon Creek	RB and County Staff
12	February 11, 2011	Bull Creek, Dry Canyon Creek, Chatsworth	RB Staff

RB: Los Angeles Regional Water Quality Control Board
County: Los Angeles County Department of Public Works and Flood Control District

4.2 Field Surveys and Recreational Use Monitoring

Regional Board staff and staff and volunteers from a number of agencies, conducted site and recreational use monitoring over a period of eighteen months – from July 2011 through December 2012. Monitoring included field observations of physical conditions (e.g. flow, weather) and recreational use activity, along with photo documentation of such activity - where possible (see Field Sheet 2 in Appendix 2). In addition, some of the recreationers encountered were asked to respond to recreational use questionnaires.

4.2.1 Selection of Monitoring Sites

The reconnaissance effort finalized the list of water bodies to be evaluated, but also highlighted the limited accessibility of several of the water body segments. Therefore, in order to effectively capture recreational use, through field monitoring, it was necessary to identify areas where the potential for public access to the various engineered segments of the Los Angeles River and its tributaries was greatest.

As an initial step, parks and other recreational facilities adjacent to the river were identified using Thomas Guide Maps (see Table 4-2.1). Field visits were made to all locations from April through May 2011 to determine their suitability as monitoring points for future recreational assessments. Suitability was based on (i) direct physical access (via bike path or multi-use trails) or (ii) visual access (from parks or bridge overpasses). The sites with potential public access are provided in Table 4-2.1.

Table 4-2.1: Monitoring Sites for the RECUR Effort

Waterbody	Monitoring site - Recreational Facility	Bike Path/ Trail	Location
Los Angeles River Reach 1	Wrigley Green belt	Yes	Long Beach
Compton Creek	Raymond Street Park Compton Creek Bile Path	Yes Yes	Compton Compton
Los Angeles River Reach 2	DeForest Park Cudahy Park Maywood Riverfront Park	Yes Yes Yes	Long Beach Cudahy Maywood
Rio Hondo	Ford Park Treasure Island Pk Grant Rea Park Rio Hondo Park	Yes Yes Yes Yes	Bell Gardens Downey Montebello Pico Rivera
Alhambra Wash	Whittier Narrows County Golf Course	No	Alhambra
Rubio Wash	Sally Tanner Park San Gabriel Country Club	No No	Rosemead
Eaton Wash	Eaton Blanche Park Gwinn Park	No No	Pasadena Pasadena
Arcadia Wash	Santa Anita County Golf Course	No	Arcadia
Santa Anita Wash	Arcadia Golf Course Eisenhower Park	Yes No	Arcadia Arcadia
Sawpit Wash	Pamela County Park	No	Los Angeles County

Waterbody	Monitoring site - Recreational Facility	Bike Path/ Trail	Location
Arroyo Seco	Montecito Rec Center Hermon Park Lower Arroyo Park	Bike Path Bike Path Trail	Montecito Heights Highland Park Pasadena
Los Angeles River Reach 3	Elysian Park Marsh Street Park Griffith Park Soccer Field Los Feliz Golf Course	Yes Yes Yes Trail	Los Angeles Los Angeles Los Angeles Los Angeles
Verdugo Wash	Glorietta Park Crescenta Valley Park	No No	Glendale Glendale
Halls Canyon Channel	*In stream*	No	Verdugo City
Snover Cyn Channel	*In stream*	No	L:a Canada Flintridge
Pickens Cyn Channel	*In stream*	No	Montrose
Shields Cyn Channel	*In stream*	No	Verdugo City
Dunsmore Channel	Dunsmore Park Crescenta Valley Park *In stream*	No No No	Glendale Glendale Glendale
Burbank Channel	LA Equestrian Center Compass Park Bike Path	Trail Yes Yes	Glendale Burbank Burbank
La Tuna Cyn Channel	*In stream*	No	La Tuna Canyon
Los Angeles River Reach 4	Buena Vista Park Valleyheart Greenway/LA River Greenway Park	Trail Trail	Burbank Studio City
Tujunga Wash	Moorpark Park Tujunga Greenway	No Yes/Trail	Studio City Valley Glen
Lopez Canyon Creek	Hansen Dam Park	No	Lake View Terrace (LA)
Haines Channel	*In stream*	No	Lake View Terrace
Pacoima Wash	Sepulveda Rec Center Paxton Park	No No	North Hills (LA) Pacoima (LA)
May Canyon Creek	*In stream*	No	Tujunga
Wilson Canyon Creek	*In stream*	No	Los Angeles
Los Angeles River Reach 6*	Reseda Park & Rec Center Valley Bikeway	No Yes	Winetka (LA)
Aliso Canyon Creek	Vanalden Park Northridge Rec Center	No No	Northrridge Northridge
Limekiln Canyon Wash	*In stream*	No	Los Angeles
Caballero Creek	*In stream*	No	Reseda
Browns Canyon Creek	Browns Cyn Crk Bike Path	Yes	Chatsworth
Arroyo Calabasas	*In stream*	No	Canoga
Dry Canyon Creek	*In stream*	No	Woodland Hills
Bell Creek	Mae Boyer Rec Center West Hills Rec Center	No No	West Hills West Hills
Dayton Canyon Creek	*In stream*	No	Chatsworth

*Not part of initial monitoring. 2.5 mile bikeway opened up in October 2012 and was added to sites.

There were twelve water body segments for which no areas of potential public access were identified. For these segments, the City of Los Angeles and the Los Angeles County Department of Public works, both of whom have direct access to the restricted segments, volunteered to conduct recreational use monitoring from August 2011 through August 2012.

4.2.2 Site Visits

In June 2011, staff developed standard operating procedures (SOP) for the volunteer participants in recreational use monitoring (see Appendix 3). This SOP was vetted by the State Board Volunteer Monitoring Coordinator, and commented on by stakeholders involved in the coordinated monitoring committee. Following this, training sessions were conducted for all participants in recreational use field monitoring exercises.

The first watershed-wide coordinated monitoring effort was conducted in July 2011. This involved recreational use monitoring at forty different sites covering five reaches of the main stem and fifteen tributaries across the watershed. Participants included staff and volunteers from the Council for Watershed Health, Friends of the Los Angeles River, Generation Water, City of Burbank and Regional Board Staff. Seven other monitoring efforts were conducted in September and November of 2011, and February, March, June, August, and December of 2012.

Each site visit was two hours long and was conducted during peak daylight hours on either a weekday or weekend day. All recreational activity observed was documented on field sheets, and where possible, with photos. Information on physical conditions (weather, flow, trash, accessibility) was also collected.

For those channels with no public access, the City of Los Angeles – Bureau of Sanitation, and staff of the Los Angeles County Flood Control District, conducted separate monitoring events. Each of these sites was visited a total of six times by these agencies. Table 4-2.2 lists the schedule of monitoring for the RECUR effort.

4.2.3 Recreational Use Questionnaires

As part of the field visits, surveys of recreationers were conducted, where possible, via a bi-lingual recreational use questionnaire. While field monitoring captured a snapshot of recreational uses, the surveys allowed the reach/scope of the study to be expanded beyond the monitoring period – thereby providing more robust information on the nature and scope of recreational uses, in addition to providing information on historical use, which is crucial element in this study.

Recreating adults (persons perceived to be above 16 years of age) were solicited for participation in this survey, and willing respondents provided information on the nature of recreational activities that they observed - in and along the various water body segments. Information was also collected on the frequency and history of the respondents' own recreational use. A copy of the bi-lingual survey is provided in Appendix 1.

The number of questionnaires completed was somewhat limited by the personal safety protocols that Board staff and volunteers were required to abide by, as well as the willingness of recreationers to participate.

TABLE 4-2.2: SCHEDULE OF SITE VISITS TO THE ENGINEERED CHANNELS OF THE LOS ANGELES RIVER WATERSHED

Event	Date	Agency	Sites Visited
1	Jul 1, 4, 5, 2011	Friends of the Los Angeles River, Council for Watershed Health, City of Burbank, Generation Water, Regional Board Staff	LA River Reaches 1,2,3,4,6; Compton Creek, Rio Hondo, Santa Anita Wash, Rubio Wash, Eaton Wash, Arroyo Seco, Verdugo Wash, Dunsmore Canyon Creek, Burbank Western Channel, Tujunga Wash, Pacoima Wash, Bell Creek, Aliso Canyon Wash, Browns Canyon Wash
2	Aug 25, 26 2011	City of Los Angeles -Bureau of Sanitation	Las Tunas Canyon Channel, Haines Canyon Wash, Lopez Canyon Wash, May Canyon Wash, Wilson Canyon Wash, Limekiln Wash, Aliso Canyon Wash, Caballero Creek, Arroyo Calabasas, Dayton Canyon Creek, Dry Canyon Creek
3	Sept 2,3, 2012	Regional Board Staff	LA River Reaches 1,2,3; Compton Creek, Arroyo Seco, Rio Hondo, Burbank Western Channel
4	Sept 7,8 2011	City of Los Angeles -Bureau of Sanitation	Las Tunas Canyon Channel, Haines Canyon Wash, Lopez Canyon Wash, May Canyon Wash, Wilson Canyon Wash, Limekiln Wash, Aliso Canyon Wash, Caballero Creek, Arroyo Calabasas, Dayton Canyon Creek, Dry Canyon Creek
5	Sept 26	Los Angeles County- Flood Control District	Shields (Eagle) Canyon Wash, Halls Canyon Wash, Pickens Canyon Wash, Snover Canyon Wash, Dunsmore Canyon Wash, Tujunga Wash, Arroyo Seco
6	November 30, 2011	City of Los Angeles -Bureau of Sanitation, Los Angeles County-Flood Control District	Las Tunas Canyon Channel, Haines Canyon Wash, Lopez Canyon Wash, May Canyon Wash, Wilson Canyon Wash, Limekiln Wash, Aliso Canyon Wash, Caballero Creek, Arroyo Calabasas, Dayton Canyon Creek, Dry Canyon Creek, Shields (Eagle) Canyon Wash, Halls Canyon Wash, Pickens Canyon Wash, Snover Canyon Wash, Dunsmore Canyon Wash, Tujunga Wash, Arroyo Seco
7	Nov 1 2011	Regional Board Staff, CoWH	LA River Reach 1, Compton Creek, Rio Hondo, Santa Anita Wash, Verdugo Wash, Dunsmore Canyon Channel, Burbank Western Channel, Tujunga Wash, Pacoima Wash, Lopez Canyon Creek,
8	Jan 31, 2012	City of Los Angeles -Bureau of Sanitation	Las Tunas Canyon Channel, Haines Canyon Wash, Lopez Canyon Wash, May Canyon Wash, Wilson Canyon Wash, Limekiln Wash, Aliso Canyon Wash, Caballero Creek, Arroyo Calabasas, Dayton Canyon Creek, Dry Canyon Creek
9	February 23, 2012	Los Angeles County- Flood Control District	Shields (Eagle) Canyon Wash, Halls Canyon Wash, Pickens Canyon Wash, Snover Canyon Wash, Dunsmore Canyon Wash, Tujunga Wash, Arroyo Seco
10	Feb 24, 2012	Regional Board Staff	LA River Reaches 2,3; Rio Hondo
11	March 31, 2012	Regional Board Staff	LA River Reaches 1,2,3,4,; Compton Creek, Rio Hondo, Arroyo Seco, Burbank, Pacoima, Browns Canyon Wash

Event	Date	Agency	Sites Visited
12	May 7, 2012	Los Angeles County FCD Los Angeles County- Flood Control District	Shields (Eagle) Canyon Wash, Halls Canyon Wash, Pickens Canyon Wash, Snover Canyon Wash, Dunsmore Canyon Wash, Tujunga Wash, Arroyo Seco
13	May 17, 2012	City of Los Angeles -Bureau of Sanitation	Las Tunas Canyon Channel, Haines Canyon Wash, Lopez Canyon Wash, May Canyon Wash, Wilson Canyon Wash, Limekiln Wash, Aliso Canyon Wash, Caballero Creek, Arroyo Calabasas, Dayton Canyon Creek, Dry Canyon Creek
14	July 10, 2012	Los Angeles County- Flood Control District	Shields (Eagle) Canyon Wash, Halls Canyon Wash, Pickens Canyon Wash, Snover Canyon Wash, Dunsmore Canyon Wash, Tujunga Wash, Arroyo Seco
15	Aug 20, 2012	Los Angeles County- Flood Control District	Shields (Eagle) Canyon Wash, Halls Canyon Wash, Pickens Canyon Wash, Snover Canyon Wash, Dunsmore Canyon Wash, Tujunga Wash, Arroyo Seco
16	Aug 31, 2012	Regional Board Staff	Santa Anita Wash, Eaton Wash, Verdugo Wash, Dunsmore Canyon Creek, Aliso Wash, Browns Canyon Creek
17	Dec 7, 2012	Regional Board Staff, Council for Watershed Health	LA River Reaches 1,2,3,4,6; Compton Creek, Rio Hondo, Arroyo Seco

4.3 DATA/INFORMATION COLLECTION AND ANALYSIS

Water Depth and Flow

Consideration of water depth was part of the assessment of physical conditions of the Los Angeles River Watershed's engineered channels.

Analysis of flow and water depth for the main stem (Reaches 1 through 6) of the Los Angeles River was conducted by USEPA as part of the 2010 study that led to the determination of the Los Angeles River as a Traditional Navigable Waterway. Therefore no further data collection or analysis for these reaches was necessary. However, the results of USEPA's 2010 analyses are presented as part of this report.

For water depth data on the engineered tributaries, the Los Angeles County Department of Public Works provided Regional Board staff with daily and monthly flow gauge data from 2000 through 2012, for twelve of the tributaries under consideration. This data was obtained from the County's flow gauge stations located in various water bodies throughout the watershed. The data was analyzed to provide daily maximum and minimums for each moth of available data. The data was also plotted to display daily depth averages over a 12-month period, and monthly averages over 12-year period.

The remaining engineered tributaries under consideration do not have flow gauge stations and therefore no data was available for these reaches. However, the County of Los Angeles Department of Public Works and the City of Los Angeles Bureau of Sanitation volunteered to conduct manual measurements of flow and water depth in these tributaries from August 2011 through August 2012. During this period six separate measurements were conducted at each site - where feasible. Table 4-3.1 presents the reaches for which gauge data and manual measurements were collected.

TABLE 4-3.1: SOURCES OF WATER DEPTH DATA FOR THE ENGINEERED CHANNELS OF THE LOS ANGELES RIVER WATERSHED

Waterbody	Source	Period
Los Angeles River Mainstem Reaches 1 through 6	USEPA's 2010 Traditional Waterway Analysis	2003-2008
Compton Creek, Arroyo Seco, Rio Hondo, Alhambra Wash, Eaton Wash, Rubio Wash, Arcadia Wash, Alhambra Wash, Verdugo Wash, Burbank Western Channel, Tujunga Wash, Pacoima Wash, Browns Canyon Creek	Flow Gauges - Los Angeles County Flood Control District	2000-2012
Las Tunas Canyon Channel, Haines Canyon Wash, Lopez Canyon Wash, May Canyon Wash, Wilson Canyon Wash, Limekiln Wash, Aliso Canyon Wash, Caballero Creek, Arroyo Calabasas, Dayton Canyon Creek, Dry Canyon Creek	Manual Measurements – City of Los Angeles Bureau of Sanitation	Aug 2011 - May 2012

Waterbody	Source	Period
Shields (Eagle) Canyon Wash, Halls Canyon Wash, Pickens Canyon Wash, Snover Canyon Wash, Dunsmore Canyon Wash, Tujunga Wash, Arroyo Seco	Manual Measurements –Los Angeles County Flood Control District	Sep 2011 - Aug 2012

4.4 Electronic (Web-Based) User Surveys

The web-based survey was intended to cast a wider net in terms of the universe of potential recreational-use survey respondents, thereby expanding the scope of the study. The electronic survey was initially planned via e-mail as it was done during the use attainability analysis for Ballona Creek and Estuary in 2003.

However, after the initial stakeholder meeting in 2010, staff became aware of a community based effort by the public television station KCET to focus attention on the Los Angeles River. The effort is part of KCET's "Departures" series and includes Los Angeles River news and oral histories of the River. Regional Board staff worked closely with staff from Councilmember Reyes' Office (Council District 1, City of Los Angeles) and KCET to develop a web-based survey soliciting information from respondents regarding their use of the Los Angeles River for recreational purposes. This survey was made available on the KCET website: http://www.kcet.org/socal/departures/production-notes/la-river-2/how-do-you-use-the-los-angeles-river.html. In April 2011, interested parties were notified of the availability of the survey and provided with a link to the web page. The survey was also publicized on the websites of KCET, the Ad Hoc Committee on the LA River, and Friends of the Los Angeles River, and is still available at this time.

Staff was provided access to all the data collected by the survey from April 2011 through April 2013, and this was analyzed and summarized as part of this report.

4.5 Review of Plans for Future Recreational Use

Planning Documents

Staff conducted review of relevant watershed and municipal master planning documents to determine whether or not planned activities could result in a change in the nature or extent of recreational uses in the water body segments being re-evaluated. The review sought out proposed actions in and around a water body that would (i) increase or improve access, and/or (ii) result in increased opportunities for recreation.

Watershed planning documents that were reviewed include:

- Los Angeles River Revitalization Master Plan
- Los Angeles River Master Plan
- Compton Creek Watershed Master Plan
- Compton Creek Regional Garden Master Plan

- Compton Creek Earthen Bottom Enhancement Feasibility Study
- Rio Hondo Watershed Management Plan
- Arroyo Seco Watershed Management and Restoration Plan
- Arroyo Seco Watershed Assessment (Draft)
- Burbank Bike Path Feasibility and Planning Study
- Re-Transforming Landscape at the Confluence of Arroyo Seco and the Los Angeles River
- Tujunga /Pacoima Watershed Plan
- Pacoima Beautiful
- Upper Bell Creek Watershed Management Plan

Other Relevant Reports/Studies

Staff also reviewed a number of relevant studies pertaining to recreational use within the Los Angeles River Watershed. These studies included:

- CREST Waterbody Use Survey. This study was conducted for the purpose of identifying areas of frequent recreational use so that recreational use could be used in the prioritization of implementation strategies to comply with the watershed's TMLDL for bacterial indicator densities; (CREST, 2010)
- Council for Watershed Health (formerly the Los Angeles San Gabriel River Watershed Council) Swimming Survey. This study was conducted recently to identify REC-1 activities at specific locations in the Los Angeles River Watershed (LASGRWC, 2009)
- FOLAR Fish Survey. This study identified some popular fish locations and types of fish caught (FOLAR, 2008)
- FOLAR's access report. This study included a description of current access conditions and recommendations for access (FOLAR, 2012)
- USEPA's Traditional Navigable Water determination - USEPA conducted this evaluation of the entire mainstream of the Los Angeles River to determine the River's status as a Traditional Navigable Water (TNW) (USEPA, 2010)
- Total Maximum Daily Loads for Bacteria Indicator Densities in the Los Angeles River Watershed (CRWQCB-LA, 2010)
- Los Angeles River Expedition - Members of the Los Angeles River Expedition undertook a 52-mile exploratory expedition of the Los Angeles River to confirm and document the Los Angeles River's ability to support kayaking (Wolfe, 2008)

Information gleaned from these reports was included in the recreational use assessment.

4.6 Recent and On-going Watershed Activities

Future recreational use considerations also included expected improvements in water quality as a result of Total Maximum Daily Loads (TMDLs) and storm water

programs, and current efforts underway by various organizations to increase and/or improve recreational opportunities in and around the water
Staff made every effort to keep abreast of new and on-going recreational activities in the watershed. This included participation in the Urban Waters Federal Partnership (www.urbanwaters.gov), subscription to the Los Angeles River Revitalization Plan LARRMP mailing list, and close communication with staff of Friends of the Los Angeles River, KCET Departures and other stakeholders.

4.7 STAKEHOLDER PARTICIPATION

A number of agencies and members of the public were instrumental to the thoroughness of the re-evaluation. Participating agency and individuals include:

- The Los Angeles County Department of Public Works and the Los Angeles County Flood Control District
- The City of Los Angeles Bureau of Sanitation
- Council for Watershed Health (and their volunteers)
- Friends of the Los Angeles River (and their volunteers)
- KCET
- Councilman Reyes' Office
- Generation Water (and their volunteers)
- City of Burbank
- Student Volunteers
- RECUR Coordinated Monitoring Committee

In addition, Regional Board staff and management from other program areas were involved in the re-evaluation process. Table 4-4 summarizes the contributions of these participants.

Table 4-4: Degree of Stakeholder Participation in RECUR Effort

AGENCY	MANNER OF PARTICIPATION	DATES
Los Angeles County Department of Public Works/Flood Control Districts	• Field Reconnaissance • Provision of Flow Gauge Data • Flow and Water depth Measurement • REC Monitoring • Coordinated Monitoring Committee	Nov 2010 – Feb 2011 Sep 2011 – Aug 2012 Oct 2010 – Jun 2011
City of Los Angeles, Bureau of Sanitation	• Flow and Water Depth Measurement • REC Monitoring • Coordinated Monitoring Committee	Sep 2011 – May 2012 Oct 2010 – Jun 2011
Council for Watershed Health	• REC Monitoring • Information Sharing	July, Sept 2011 Continuous

AGENCY	MANNER OF PARTICIPATION	DATES
	• Coordinated Monitoring Committee	Oct 2010 – Jun 2011
Friends of the Los Angeles River	• REC Monitoring • User Surveys • Information Sharing • Coordinated Monitoring Committee	July 2011 Sept & Nov 2011 Continuous Oct 2010 – Jun 2011
KCET	• Web Survey	April 2011 to Present
Councilman Reyes' Office	• Web Survey • Coordinated Monitoring Committee	April 2011 to Present Oct 2010 – Jun 2011
Generation Water	• REC Monitoring	July 2011
Urban Semillas	• Review of Spanish Language Questionnaire • Bacteria Indicator Monitoring (proposed) • Coordinated Monitoring Committee	June 2011 Oct 2010 – Jun 2011
City of Burbank	• REC Monitoring • Coordinated Monitoring Committee	July 2011 Oct 2010 – Jun 2011
Student Volunteers	• REC Monitoring	Continuous
Other Coordinated Monitoring Committee Members	• Review of Work Plan, Field Sheets, and Standard Operating Procedures	Oct 2010 – Jun 2011

Coordinated Monitoring Committee: City of Burbank, City of Downey, Heal the Bay, Los Angeles County Flood Control District, City of Los Angeles, Friends of the Los Angeles River, Council for Watershed Health, Urban Semillas, Flow Science, Kevin Powers (for MS4 cities), Mountains Recreation and Conservation Authority Agency, Richard Watson & Associates (representing CPR), Larry Walker & Associates, the River Project, LA River Expeditions.

4.7.1 Keeping Stakeholders Informed

On September 27, 2010 staff convened a workshop to inform stakeholders of the intent to conduct an evaluation of the recreational uses of engineered channels within the Los Angeles River Watershed. Staff discussed the components of the re-evaluation – field work, electronic survey, and review of plans, water level and flow data among other components as well as the potential outcomes of the re-evaluation. Stakeholders were encouraged to sign up as participants in the coordination of the monitoring efforts (RECUR Coordinating Committee) and/or to participate as volunteers for the field monitoring. Staff also drafted an informal workplan to provide more detail on the methodology for the project, which was distributed to stakeholders in October 2010 (see Appendix 1).

In October 2011, staff gave the Regional Board an update on the status of the project at the Regional Board public hearing, where interested parties had the opportunity to comment. In April of 2012, a stakeholder workshop was held to present preliminary results of the RECUR effort. Staff presented another project

update at the July 2012 Regional Board public hearing where stakeholders again had the opportunity to comment on the process.

Stakeholders will have further opportunity to make formal comments on the final draft of this report when it is released for public review, and when it is brought before the Regional Board for their consideration of recommended actions.

4.7.2 The Coordinated Monitoring Committee

During the stakeholder workshop in September 2010, interested parties were encouraged to participate in the planning of monitoring events as part of a Coordinating Committee. The RECUR Coordinated Monitoring Committee met in October 2010, and March and June of 2011 to discuss and comment on the draft informal work plan, the reconnaissance work, and the SOP for the volunteer participants.

Stakeholder comments were reflected in the updated field and recreational use surveys that were used for this effort, as well as in the SOP for the volunteer participants developed. Other comments relating to the scope of the project were directly addressed during meetings of the RECUR Committee.

The Coordinated Monitoring Committee was formed for the express purpose of coordinating recreational use monitoring events. Therefore, after the June 2011 meeting, once it became apparent that most individual participants would not choose to contribute to the monitoring efforts, the committee was discontinued and Regional staff worked directly with the several contributing agencies and organizations to coordinate the monitoring.

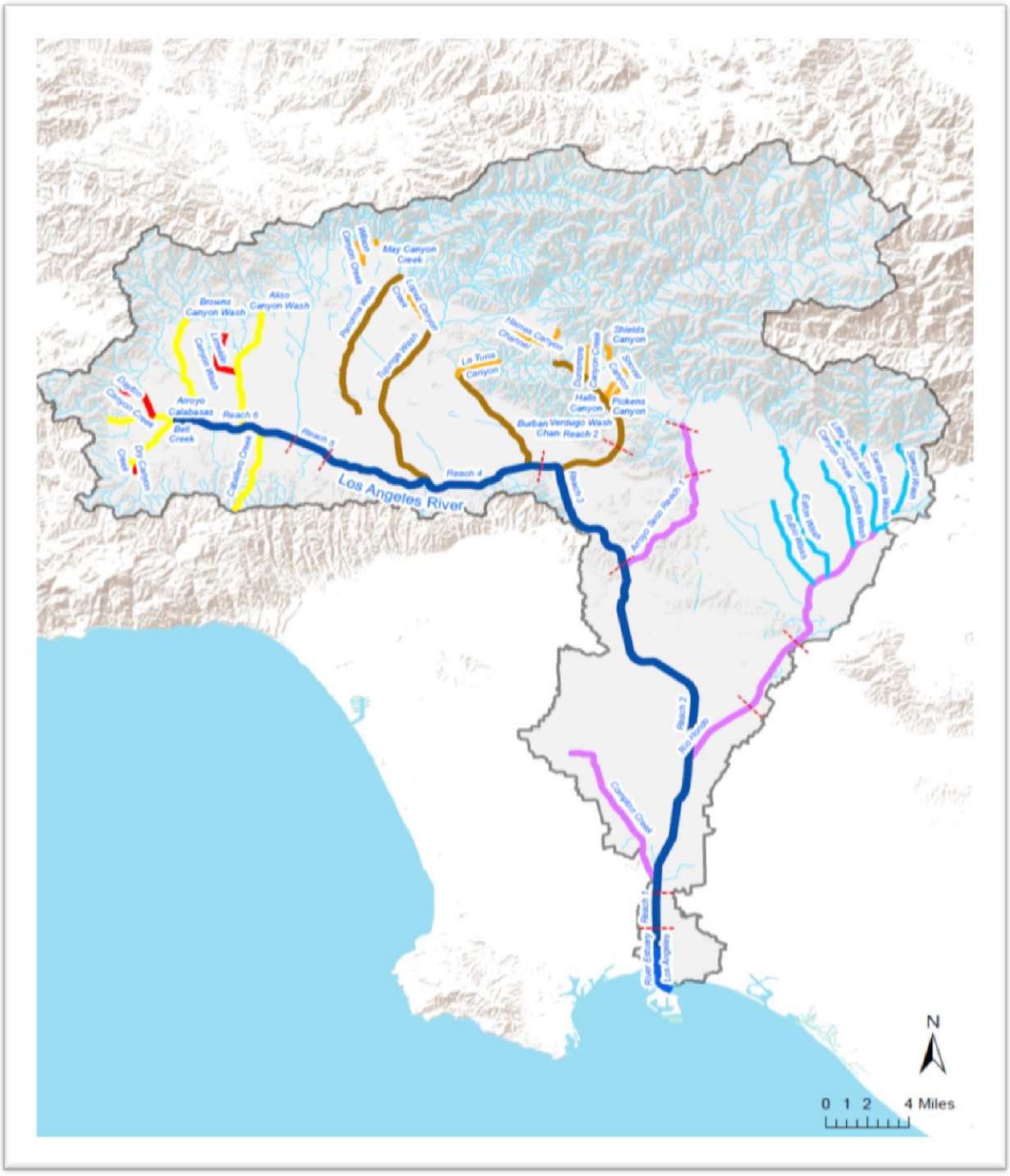
5. RESULTS

Due to the of the large number of water bodies and the large amount of data/information being considered, the engineered channels of the Los Angeles River Watershed were grouped in seven sections (see Figure 5-0), for the purpose of presenting results of the RECUR effort:

(1) Mainstem of the Los Angeles River (shown in dark blue)
(2) Major Tributaries of Lower Los Angeles River (Reaches 1 and 2) (shown in pink)
(3) Secondary Tributaries of the Lower Los Angeles River (Reaches 1 and 2) (shown in light blue)
(4) Major Tributaries of Middle Los Angeles River (Reaches 3 and 4) (shown in brown)
(5) Secondary Tributaries of Middle Los Angeles River (Reaches 3 and 4) (shown in orange)
(6) Major Tributaries of Upper Los Angeles River (Reach 6) (shown in yellow)[2]
(7) Secondary Tributaries of Upper Los Angeles River (shown in red)

[2] Note that there are no tributaries to Reach 5 of the Los Angeles River.

FIGURE 5-0. GROUPING OF ENGINEERED CHANNELS FOR RECUR EFFORT



5.1 MAINSTEM LOS ANGELES RIVER

While the mainstem of the Los Angeles River consists of six reaches and the estuary, the recreational use assessment focused on the concrete-lined segments and therefore only addressed Reaches 1 through 4 and Reach 6. Geographic descriptions of the mainstem are provided in Section 3 of this report.

Physical conditions

The engineered reaches of the mainstem of the Los Angeles River are concrete-lined on the sides and bottom except for Reach 3 (the Glendale Narrows area) where groundwater upwelling prevented concreting of the channel bottom. In Reaches 1 through 3 and most of Reach 6, the channel is trapezoidal (i.e. with sloping walls). In Reach 4, however, the Los Angeles River flows as a box channel (i.e. with vertical walls).

In 2008, members of the Los Angeles River Expedition kayaked the entire mainstem of the Los Angeles River from the headwaters to the estuary and documented physical conditions from an in-stream perspective (Wolfe, 2008). A summary of their observations is provided in Table 5-1.1.

Table: 5-1.1 Assessment of Physical Attributes of Mainstem of the Los Angeles River – (LA River Expedition, 2008)

LA River Reach	Sec.	Location	Length (Miles)	Channel Description	Water depth	Access	Recreation
6	1	Headwaters (Owensmouth) to Mason Ave. [Canoga Park]	1.25	Vertical concrete walls that turn into concrete trapezoid walls	1-4 inches	Signs specifically forbid entry	Non-existent, due to access limits
	2	Mason Ave. (Browns Creek) to Louise Ave. [Winnetka, Reseda]	4.25	Concrete trapezoid. Wide channel with central narrow low-flow channel	4-12 inches	Signs specifically forbid entry. maintenance access ramp at Reseda Blvd.	Non-existent, due to access limits and the baking, barren landscape
5	3	Sepulveda Basin (at Louise Ave.) to Burbank Blvd. bridge. [Encino, Lake Balboa]	2.0	Grouted rip-rap on earthen banks from Louise Ave. to Hayvenhurst Creek; dirt, shrub & tree-lined natural banks then continue through to Burbank Blvd. bridge. Soft bottomed	4 inches to 8+ feet	Surrounding parks, with nearby Lake Balboa and the Wildlife Reserve, make this stretch one of the most highly accessed along the river	A bikeway follows the river for a portion of this stretch, as does a popular jogging & walking trail; fishermen are frequently seen, and kids like to explore the riverbanks; two golf courses and a model airplane field are adjacent to the river here.
	4	Sepulveda Dam — from Burbank Blvd. bridge to Sepulveda Blvd. bridge. [Encino]	1.0	Grouted rip-rap on earthen banks leading to the dam, then changing to tall vertical concrete walls after the dam. The lead-up to the dam is still soft-bottomed; after the dam, it changes to a wider, shallower channel spanning roughly 50 feet	3 inches to 3 feet	Up to the dam, access seems open; after the dam, there is a sense that it's off-limits, but there are no signs to that effect. A maintenance ramp is just upstream of Sepulveda Blvd.	Bird watching, fishing

Table: 5-1.1 Assessment of Physical Attributes of Mainstem of the Los Angeles River – (LA River Expedition, 2008)

LA River Reach	Sec.	Location	Length (Miles)	Channel Description	Water depth	Access	Recreation
4	5	from Sepulveda Blvd. bridge to Fulton Ave. bridge [Van Nuys & Sherman Oaks]	2.75	Vertical concrete walls (approx. 20' high), with chain-link fencing and barbed-wire topping. Flat concrete (roughly 50' wide) bottom.	3-8 inches	Highly limited; there are periodic ladders for accessing/exiting the river, and an access ramp at Hazeltine Ave.	Boating. Due to access limits, however, recreational activities are kept to a minimum.
	6	beginning at Fulton Ave. bridge and ending at Bob Hope Drive. (Johnny Carson Park) [Studio City, Toluca Lake & Burbank]	6.0	Vertical concrete walls with mostly chain-link fencing and barbed-wire topping, except along the south bank from Whitsett to Radford, where ornamental steel fencing has been installed along completed greenway sections. Channel bottom - Narrow channel (roughly 5' wide), with wide & flat concrete on either side	8 inches to 3 feet	Maintenance ramps at Coldwater and Lankershim	Lots of pedestrian and some bicycling activity in Studio City
3	7	from the end of the narrow channel, down to the Verdugo Wash (just before the Glendale Narrows) [Glendale, Griffith Park]	3.0	Vertical concrete walls transition to concrete trapezoid sides. Channel bottom - Flat-wide concrete (roughly 150' wide), then a short, soft-bottomed stretch at Bette Davis Park, then the flat-wide concrete again	2-4 inches	Beginning at Bette Davis Park, there is much easier access via riverside bike routes	Equestrian activities are strongest in this section (as well as portions of the next section) — there are numerous riverside horse stables; Bette Davis Park and Griffith Park are used for many different recreational purposes

Table: 5-1.1 Assessment of Physical Attributes of Mainstem of the Los Angeles River – (LA River Expedition, 2008)

LA River Reach	Sec.	Location	Length (Miles)	Channel Description	Water depth	Access	Recreation
	8	from the beginning of the Verdugo Wash to the end of the Glendale Narrows (at the 110 freeway bridge). [Atwater Village, Glassell Park, Silver Lake, Cypress Park]	6.5 miles	Concrete trapezoid. Soft-bottomed	3 inches to 6 feet	Good.	Fishing, birdwatching, biking, jogging, walking, yoga, equestrian activity, dog-walking, painting, filmmaking, photography, barbequeing, birthday parties, skateboarding, performance art, and other signs of communal riverside activity.
2	9	the end of Glendale Narrows to the City of Vernon, [Chinatown, Lincoln Heights, Boyle Heights]	4.5	Mostly concrete trapezoid. Narrow channel, concrete bottom	1-2 feet	Just a few access points for entering/exiting the river (such as the one @ 6th St. Tunnel"	
	10	the mile prior to Farmer John's establishment (the resumption of the narrow channel), in the vicinity of the landmark City of Vernon water tower [Vernon]	1.0	Very tall vertical concrete walls, and wide-flat concrete.. Two split channels	3-5 inches	Limited	Not many options here
1	11	from the end of the Vernon Split to Willow St. bridge in North Long Beach [Maywood, Bell, Bell Gardens, Cudahy,	16.0	Concrete trapezoid. Channel bottom - Narrow channel	6 inches to 2 feet	Fair	Some recreational motorcycle riding

Table: 5-1.1 Assessment of Physical Attributes of Mainstem of the Los Angeles River – (LA River Expedition, 2008)

LA River Reach	Sec.	Location	Length (Miles)	Channel Description	Water depth	Access	Recreation
		South Gate, Lynwood, Downey, Paramount, Rancho Dominguez, Compton, Carson, North Long Beach]					
Estuary	12	Long Beach Estuary (at Willow St.) to Shoreline Park (across from The Queen Mary dock) [Long Beach]	3.5	Small boulders lined along concrete trapezoid levees. Soft-bottomed	2 feet to 30 feet	Good	Fishing, birding, biking, jogging, walking; Golden Shores Park and Shoreline Park provide plenty of recreational activities.

Accessibility

Direct access to all engineered river channels is generally discouraged via fencing and “No Trespassing” signs along their course. However, river-adjacent parks, paths and trails are open to the public and these facilities sometimes provide a means of direct and/or visual access to the channels. Permitted use of the channels does occur for certain activities such as river clean-ups and filming.

A continuous bike path runs adjacent to the river channel from the estuary through Reach 3 and ends just below the confluence of the Los Angeles River and Burbank Western Channel. In Reach 4, a trail runs adjacent to the river channel for just under one mile (0.85 mile) in Studio City, and as of July 2013 work was initiated on a half-mile extension of this trail. In Reach 6 a 2-mile bike path was opened to the public in October 2012 providing public access to the creek in this segment for the first time since the river was channelized.

Generally there are two levels of fencing along the channel and bike path – one that flanks the channel, and the other fencing off the adjacent bike path or trail from the surrounding area with access gates that are usually locked right before a rain event and 24-hours following. In some areas, in Reaches 1, 2, 3, and 6, the fencing between the path and river is discontinuous and direct access to the river is possible. In other instances the fencing is such that access is possible despite it (see Figure 5-1). In Reach 4, the fencing between the channel and trail is more restrictive, providing only visual access to the channel. Several parks are adjacent to the channel some of which provide access to the bike path, and thence to the river, itself. The sloped channel walls, breaks in fencing, and the open fencing make direct access to the channel bottom possible in these reaches.

In January 2011, Friends of the Los Angeles River (FOLAR), an environmental organization, released a report titled “*Recommendations for Near-Term Recreational Access and Use of the Los Angeles River*”. This report focused on three sections of the river – Reach 5 (Sepulveda Basin), Reach 3 (Glendale Narrows) and the estuary. It included a discussion of current public use of the river and the public’s right to access the river, along with recommendations for conditions under which the uses should be allowed (see Table 5-1.2). The report further recommended the creation of “Recreational Use Zones” within these areas of interest. The intent of the report was to initiate consideration of a policy that would allow for increased permitted access while addressing concerns of physical safety which are the basis for current access restrictions.

TABLE 5-1.2: CURRENT CONDITIONS OF USE AND RECOMMENDED CHANGES (FOLAR, 2011)

Type of Current Use	Currently Allowed?	Area of River	Permit Currently Required?	Recommendation
Major events (e.g., River cleanups)	Yes	General	Yes	Allow, subject to permitting
Education/classes/tours	Policy unclear	General	For large events	Allow, permitting for large events only
Biking (on approved paths)	Policy unclear	Where available	No	No change
Swimming/wading	No	GN/SB/LB	No	Potential future use, subject to water quality and safety studies.
Canoeing/kayaking	Policy unclear	General	Unclear	Allow subject to safety requirements
Fishing	Policy unclear	GN/SB/LB	Unclear	Allow, subject to DFG & safety requirements
Horseback riding in channel	Policy unclear	GN/SB/LB	No	Allow, subject to safety requirements
Hiking, bird watching in channel	Policy unclear	GN/SB/LB	No	Allow, subject to safety requirements
Performances, art work	Policy unclear	General	Unclear	Allow, subject to permitting

GN-Glendale Narrows; SB-Sepulveda Basin Area; LB-Long Beach Estuary

In August 2012, Senate Bill 1201 which promoted increased public access to the Los Angeles River was signed into law by Governor Brown. The bill amended the Los Angeles County Flood Control Act to direct the Los Angeles County Flood Control District to provide for "*public use of navigable waterways under the district's control that are suitable for recreational and educational purposes, when these purposes are not inconsistent with the use thereof by the district*

Following this, in May 2013, the Los Angeles River Recreational Zone Pilot Project was launched granting the public access to the river channel in Reach 3 (Glendale Narrows) for non-motorized boating (kayaking. canoeing, etc.) and fishing. This program was managed by the Mountains Recreation and Conservation Agency from Memorial Day through Labor Day.

FIGURE 5-1.1 DIRECT AND VISUAL ACCESS TO THE MAINSTEM OF THE LOS ANGELES RIVER

Reach 1 at Wrigley Greenbelt

Reach 2 at Maywood Riverfront Park

Reach 3 at Marsh Street Park

Reach 4 at Valleyheart Greenway

Reach 6 at Valley Bikeway

Flow depth - USEPA's Analysis

As part of its determination of the Los Angeles River's status as a Traditional Navigable Waterway, USEPA conducted an analysis of the flow conditions and water depth using data from the Los Angeles County gauges located in different reaches along the mainstem of the river. Per this analysis, the mainstem was determined to have sufficient flow and depth to support recreational uses such as kayaking. Table 5-1.3 presents the statistics of the daily flow depth data over a five year period from October 2003 through September 2008.

TABLE 5-1.3: DAILY AVERAGE FLOW DEPTH STATISTICS FOR PAST FIVE WATER YEARS (IN FEET)

Station Location	Mean Depth	Min Depth	Depth Percentile					Max Depth	% Non-zero Depth
			10%	25%	50%	75%	90%		
Reach 1	1.04	0.78	0.80	0.87	0.89	0.95	1.10	8.0	100%
Reach 2	0.92	0.86	0.87	0.87	0.88	0.89	0.95	3.3	100%
Reach 3	1.08	0.71	0.88	0.91	0.95	1.01	1.37	5.4	100%
Reach 4	1.38	0.64	0.85	0.95	1.07	1.25	2.16	8.9	100%
Reach 5	0.59	0.30	0.40	0.44	0.48	0.54	0.66	8.0	100%

Source: USEPA, 2010

Field Monitoring of Recreational activities

Staff and volunteers from different agencies conducted field monitoring of recreational uses from July 2011 through December 2012. In all 57 visits were made to the monitoring sites along the mainstem of the Los Angeles River. Twelve (12) of these visits were conducted in-stream in Reach 6. A summary of the observed recreational activities is provided in Table 5-3. Based on these observations, Reaches 1, 2 and 3 appear to be the most frequented areas of the river channel. The most commonly observed activities were biking (2485), walking/running (716), and walking pets (77). REC-1 activities - including fishing (10), wading (4), and swimming (3), were also observed in Reaches 2 and 3.

In July 2013, staff visited the newly delineated Recreation Zone in Reach 3 of the Los Angeles River (see Figure 5-1.3), and observed people in canoes in the channel, as well as bikers, walkers and runners along the adjacent bike path.

User Surveys

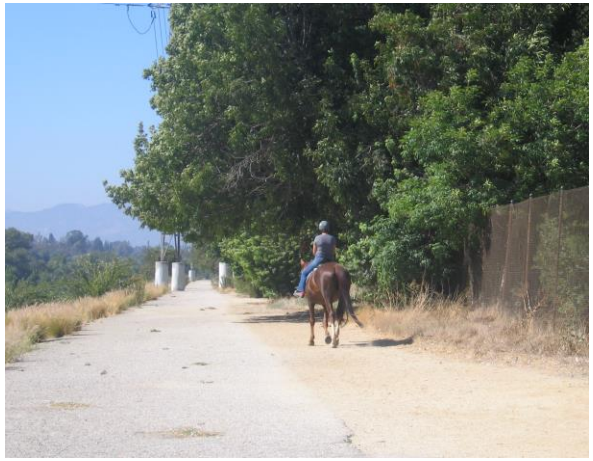
User surveys helped to broaden the scope of the field observations capturing recreational activities observed by recreationers over a more extensive period of time. RECUR volunteers completed one hundred and forty (140) surveys with recreationers on the Recreational Use questionnaire. Most of these surveys were conducted at Reach 2 (70) and Reach 3 (59). The survey respondents ranged in age from 12 to 76 years, and had been recreating in the area for up to thirty-five years. Table 5.1-5 provides a breakdown of the recreational activities engaged in or observed by the respondents. Wading (25), swimming (15) and kayaking (6) were the most commonly reported REC-1 activities, in Reaches 1, 2, and 3. No water contact activities were reported for Reaches 4 and 6. Walking/running and biking were recreational activities reported along all reaches of the main channel

FIGURE 5-1.2: RECREATION IN THE MAINSTEM OF THE LOS ANGELES RIVER

Cycling in Reach 1

Wading in Reach 2

Swimming in Reach 3



Horseback Riding in Reach 3

Walking in Reach 4

Bicycling in Reach 6

TABLE 5-1.4: RECREATIONAL ACTIVITY OBSERVED IN AND ALONG THE LOS ANGELES RIVER DURING FIELD MONITORING

Water body	# of site visits	Swimming	Wading	Fishing	Biking	Running/Walking	Skateboarding	Others
Los Angeles River R1	6				627	73	5	14
Los Angeles River R2	13		3		583	269	12	14
Los Angeles River R3	18	3	1	10	1264	335	25	110
Los Angeles River R4	5				5	35		6
Los Angeles River R6	15				6	4		

*Others: Horseback Riding, Maintenance, Bird/Wildlife watching, Rollerblading, Walking Pets, Picnicking, Sunbathing, Sitting, Sightseeing, Camping, Cultural Activities, Clean-up Activities, Bathing

TABLE 5-1.5: RECREATIONAL ACTIVITY REPORTED BY SURVEY RESPONDENTS ALONG THE LOS ANGELES RIVER (Eng: no of survey respondent engaged in activity; Obs: number of survey respondents that observed an activity**)**

#	Water body	# of Surveys	Age	Frequency of visits	Historical Use	Swimming		Fishing		Wading		Kayaking	
						Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.
1	LA River Reach 1	7	29-30	1/wk-2/day	2 mo-7yrs				2	1	1		1
2	LA River Reach 2	70	12-76	1/mo-7/wk	1day-35yrs		6		7		10		1
3	LA River Reach 3	59	15-82	6/yr-7/wk	1day-entire life	1	9	8	32	4	14	1	4
4	LA River Reach 4	2	~33	6/wk-7/wk	6mo-10yrs								
5	LA River Reach 6	2	59-60	1/wk-3/wk	2wks								

CONTINUATION OF TABLE 5.1.5

#	Biking				Walking				Running				Skateboarding				Others	
	In Channel		Adjacent		In Channel		Adjacent		In Channel		Adjacent		In Channel		Adjacent			
	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.
1			5	6	1		3	5			4	5			1	2	2	10
2	2	6	42	46	4	18	34	50	3	3	34	50		2	6	11	7	29
3	4	6	23	42	13	16	34	39	1	5	10	38	1	3	3	15	42	85
4				2	1	2	2	2				2				2	1	3
5			2	2			1	1			1	1						

*Others: Bird/wildlife watching, Dog walking, Picnicking, Clean-up Activities, Maintenance, Photography, Sunbathing, Cultural Activities, Educational Activities, Camping, Horseback Riding, Sports, Clothes washing, Playing

FIGURE 5.-1.3 LOS ANGELES RIVER RECREATIONAL ZONE – JULY 2013

River Access Point for non-motorized boating


Canoeing in the REC zone

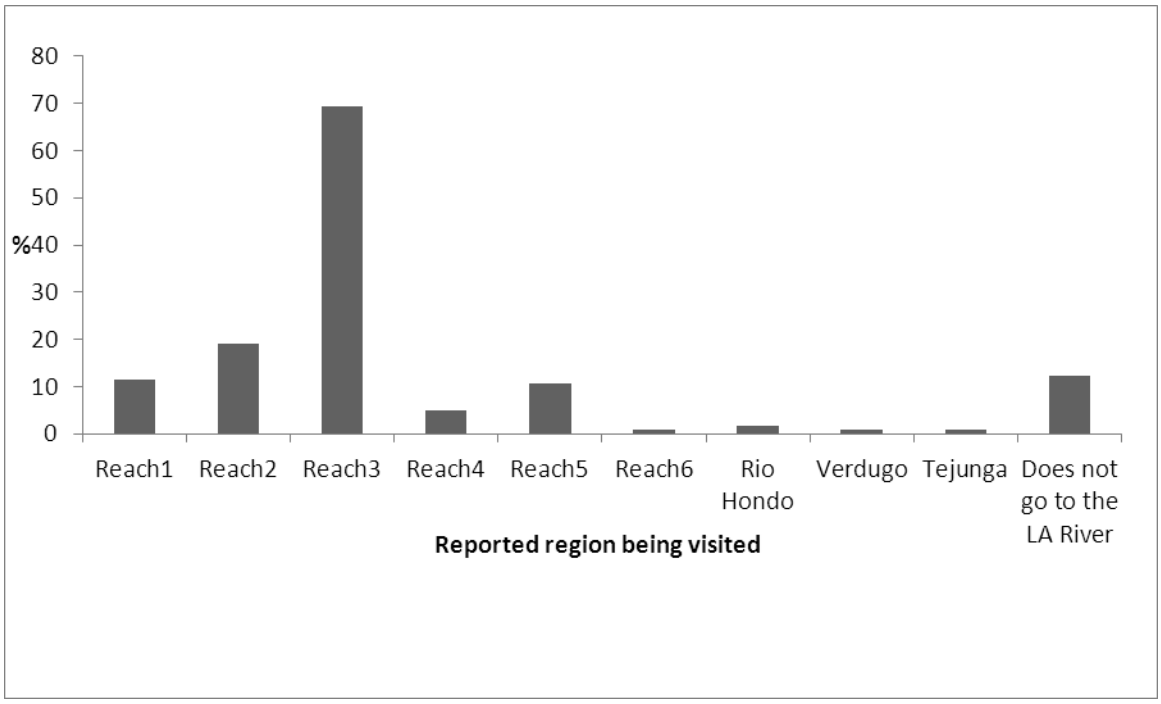

River Exit Point for non-motorized boating

Web-Based Recreational Use Survey

From April 2011 through April 2013, there were 142 respondents to the web-based recreational use survey. Their responses were compiled and the results are provided in Figure 5-1.4 and Table 5-1.6.

Most respondents indicated that they visited the Los Angeles River at least once a month (68%). The most frequently visited region was Reach 3, with 69% of respondents indicating that they had visited this area of the LA River for recreational purposes (see Figure 5-1.4).

FIGURE 5-1.4: REACHES OF THE LA RIVER WATERSHED FREQUENTED BY WEB SURVEY RESPONDENTS



Among the recreational activities reported, the most frequently listed activities in which respondents reported taking part in were biking (74%), walking (74%) and sightseeing (51%). Though few instances of REC-1 activities were reported in these reaches (including swimming (8%), wading (12%), kayaking (17%), canoeing (9%), and boating (7%)), several of the respondents indicated that they would also be interested participating in such activities if the integrity of the water quality could be assured.

The questionnaire gave respondents the opportunity to express their opinions on using the river. Many responses expressed concerns about homeless populations that have taken up residence by the river, loss of natural wildlife due to increasing human use, and concern about the quality of water in the river.

TABLE 5-1.6: DISTRIBUTION OF RESPONSES TO THE SURVEY "HOW DO YOU USE THE LA RIVER?" OFFERED ONLINE VIA THE DEPARTURES PROGRAM OF KCET (N = 142) 2011-2013

Characteristic	Total*	
	n	%
All Subjects	142	100
How often subjects visited the LA river:		
About once week	49	36
About once a month	44	32
About twice a year	23	17
About once a year	5	4
Never	17	12
Reported participating in (Free Response)**†:		
Swimming	10	8
Wading	14	12
Water-Skiing	1	1
Kayaking	20	17
Canoeing	11	9
Fishing	16	13
Walking	89	74
Biking	90	74
Picnicking	32	26
Sunbathing	18	15
Camping	10	8
Boating	9	7
Sightseeing	62	51

*May not add to 100%, because of missing values, or because a subject could have multiple responses

**Includes only individuals who visited the LA River

† May be an over estimate, because some people were unsure if the question was referring only to the LA River.

Additional Recreational Considerations

A number of waterside community activities have developed along the Los Angeles River mainstem over time, including recreational, educational, clean-up, and cultural activities. Table 5-1.7 presents some of such activities along with the organizing agencies. Some of the newer developments have occurred on the heels of USEPA's 2010 declaration that the mainstem of the Los Angeles River is a Traditional Navigable Waterway.

In 2011 a "Paddle the River " program was initiated in Reach 5 of the LA river for six weeks in 2011, and 2012 but was cancelled in 2013 due to permitting issues. However, in 2013, a new program, the pilot LA River Rec Zone, was initiated in the Glendale Narrows section of Reach 3 in direct response to SB1201 that was discussed in Section 4.

In 2011, the Los Angeles River was selected as one of seven urban rivers to participate in the Urban Rivers Federal Partnership which improves coordination among federal agencies and collaboration with community-led revitalization efforts to foster reconnection of urban communities with their waterways.

TABLE 5-1.7: LOS ANGELES RIVER COMMUNITY ACTIVITIES

Activity	Location	Agency/Group	Dates
LA River REC Zone - Kayaking, Canoeing, Fishing	Reach 3 (Pilot LA River REC Zone)	MCRA	Memorial Day to Labor Day 2013
Paddle the River Canoeing Program	Reach 5	LA Conservation Corps	Summer 2011, 2012, 2013
LA River Ride	Reach 3 (Griffith Park) to the Estuary	Los Angeles County Bicycle Coalition	Annually in June since 2001
LA River Fun Run	Reach 3 (Griffith Park)	Councilman LeBonge	May 2012, 2013
LA River Clean Up	Reach 5 to the Estuary	Friends of the Los Angeles River	Annually in May since 1989
Down by the River (Celebration of the high Holidays)	Reach 3 (Marsh Park)	Eastside Jews	September 2011, 2012, 2013
LA River Tours	Various locations	FOLAR, The River Project	By reservation
Education Programs	Various locations	FOLAR, The River Project	Continuous

Plans for Future Recreational Use of the main Los Angeles River Channel

Two major plans address the development of recreational opportunities along the Los Angeles River – the Los Angeles River Master Plan, and the Los Angeles River Revitalization Master Plan.

The Los Angeles River Master Plan was prepared by the Los Angeles County Departments of Public Works, Parks and Recreation and Regional Planning, and the National Parks Service, and completed in 1996. The intent of the plan was *to identify*

ways to revitalize the publicly owned rights of way along the Los Angeles River and Tujunga Wash (LACDPW, 1996).The Master Plan goals include:

- Ensure flood control and public safety needs are met
- Improve the appearance of the river
- Promote the river as an economic asset to the surrounding communities
- Preserve, enhance and restore environmental resources in and along the river
- Consider stormwater management alternatives
- Ensure public involvement
- Provide a safe environment and a variety of recreational opportunities along the river
- Ensure safe access to and compatibility between the river and other activity centers

The plan's proposed projects which support of increased recreational opportunities include development of a regional trail system to join existing trails and enhance potential trail opportunities, provision of pedestrian vista points at bridges crossing the Los Angeles River, development of local parks near or adjacent to the river, and demonstration projects for the purpose of public education, public access, and habitat enhancement. Some of these projects have been implemented.

The Los Angeles River Revitalization Master Plan was developed by the City of Los Angeles and completed in 2007. The intent of the plan was to address opportunities for river revitalization and restoration in the 32 mile stretch of the Los Angeles River flowing through the City of Los Angeles. The goals of the LARRMP are to:

- Revitalize the River
- Green the Neighborhoods
- Capture Community Opportunities
- Create Value

These goals are further expanded in Table 5-1.8

TABLE 5-1.8: GOALS OF THE LOS ANGELES RIVER REVITALIZATION MASTER PLAN

Revitalize the River	Green the Neighborhoods	Capture Community Opportunities	Create Value
• Enhance Flood Storage • Enhance Water Quality • Enable Safe Public Access • Restore a Functional Ecosystem	• Create a Continuous River Greenway • Connect Neighborhoods to the River • Extend Open Space, Recreation, and Water Quality Features into Neighborhoods	• Make the River the Focus of Activity • Foster Civic Pride • Engage Residents in the Community Planning Process and Consensus Building • Provide Opportunities for Educational and	• Improve the Quality of Life • Increase Employment, Housing, and Retail Space Opportunities • Create Environmentally-Sensitive Urban Design and Land Use Opportunities

Revitalize the River	Green the Neighborhoods	Capture Community Opportunities	Create Value
	• Enhance River Identity • Incorporate Public Art Along the River	Public Facilities • Celebrate the Cultural Heritage of the River	and Guidelines • Focus Attention on Underused Areas and Disadvantaged Communities

Renditions of the vision for a revitalized river – such as the one shown in Figure 5-1.5 – are included in the LARRMP.

FIGURE 5-1.5: AN ACTIVE AND REVITALIZED LOS ANGELES RIVER (LARRMP, 2007)

The LARRMP identifies twenty "opportunity areas" along the river's mainstem for possible demonstration projects and developed conceptual proposals for the five considered to have the greatest potential for demonstrating revitalization possibilities. These concepts are summarized in Table 5-1.9. The plan also proposes 240 specific projects along the river channel that align with the goals of the LARRMP.

TABLE 5-1.9: REVITALIZATION CONCEPTS FOR LOS ANGELES RIVER MAINSTEM (LARRMP, 2007)

Opportunity Area	Specific Location	Revitalization Opportunity
Downtown Industrial Area (Reach 2)	Downtown between the Hollywood and Santa Monica Freeway crossings.	Relocation of rail lands farther inland from the bank, Creation of green corridor with neighborhood parks with access to river's edge, Creation of water quality treatment terraces, Installation of rubber dam
China Town Cornfields (Reach 2)	Chinatown bounded by the Union Station and Gold Lines	Creation of secondary diversion channel providing

Opportunity Area	Specific Location	Revitalization Opportunity
		opportunities for water-based recreation, Expansion of riparian habitat ,Creation of community park
Taylor Yard (Reach 3)	From Fletcher Dr. to confluence with Arroyo Seco	Restoration of hydro-geologic functions, Removal of concrete channel walls, Creation of water quality treatment wetland
River Glen (Reach 3)	Confluence with Verdugo Wash	Creation of riparian terraces/wetlands for stormwater treatment, Restoration of ecological Reintroduction of native vegetation
Canoga Park (Reach 6)	Confluence of Arroyo Calabasas and Bell Creek	Acquisition of additional right of way, Restoration of river to more natural condition, Creation of community park, continuous river greenway, and safe access to river's edge

The Los Angeles River Ecosystem Restoration Integrated Feasibility Report

In 2006, the City of Los Angeles partnered with the US Army Corps of Engineers to conduct the Los Angeles River Ecosystem Restoration Integrated Feasibility Study also known as the ARBOR (Alternative with Restoration Benefits and Opportunities for Revitalization) Study. The intent of the study was to determine what areas along the river had the greatest potential for ecosystem restoration, and to select a restoration project from a series of alternatives (identified in the LARRMP) for implementation. Through this effort, a list of potential alternatives for funding and implementation has been developed. As of October 2013 four alternatives are being considered:

Alternative 10 is the smallest alternative and would cost $346 million. It would result in a 93 percent increase in habitat. Projects would include a widening of Taylor Yard by 80 feet with a small terraced area by the Bowtie parcel, and restoration at Piggyback Yard.

Alternative 13 is a $453-million project that would include all the features of Alternative 10, and would increase habitat by 104 percent. Additional projects would include adding a side channel behind Ferraro Fields, widening of over 300 feet in Taylor Yard, and tributary restoration on the east side of the Arroyo Seco watershed. As of October 2013, the Army Corps of Engineers supports this alternative.

Alternative 16 is a $757-million project that includes the features of both Alternative 10 and 13 with additional work on the Piggyback Yard. It would increase habitat by 114 percent.

Alternative 20 includes all the elements of previous alternatives with the restoration of the Verdugo Wash and the wetlands of the Los Angeles State Historic Park. Habitat would increase by 119 percent at the cost of $1.04 billion.

Water Quality

Water quality assessments conducted in 1996, 1998, 2002, and 2006 indicated that the recreational beneficial uses of the Los Angeles River and many of its major tributaries was impaired due to trash, and high levels of coliform indicator bacteria. In 2007 a total maximum daily load (TMDL) for trash in the Los Angeles River Watershed was adopted to address the trash issue. Full compliance with the final target of zero trash discharge is expected by September 2016. Also, a TMDL for bacteria was adopted by the Regional Board in July 2010 to address the high levels of indicator bacteria in the Los Angeles River and many of its tributaries. Compliance with the final goal of bringing these water bodies into compliance with the water quality objectives will be achieved through phased implementation of water quality control measures over a period of up to 25 years.

5.2 TRIBUTARIES OF LOWER LOS ANGELES RIVER (REACHES 1 AND 2)

For the purpose of reporting results, the tributaries of thee Lower Los Angeles River include Compton creek at the boundary of Reach 1, and Arroyo Seco and Rio Hondo in Reach 2 of the river.

5.2.1 Compton Creek

Compton Creek is a major tributary of the Los Angeles River. It is the first tributary of the river, joining it upstream of the Estuary in Reach 1. Compton Creek is about 8.5 miles long and is concrete lined for most of its length. It flows through the City of Los Angeles, City of Compton, and some unincorporated parts of Los Angeles County. The Basin Plan designates existing water contact and non-contact recreation as beneficial uses of the creek.

Physical Conditions

The creek daylights at Main Street – between 107th and 108th Streets- in the City of Los Angeles as a concrete channel with vertical walls (box channel) and a concrete bottom. It continues in this form until just northwest of Alameda Boulevard and the 91 Freeway in the City of Compton, where the channel slides become sloped (trapezoidal) with rip-rap, and the channel bottom becomes earthen, all the way to the confluence of the Los Angeles River at the borders of the cities of Carson and Long Beach.

Accessibility

A segmented bike path runs adjacent to Compton Creek on the east side. The first segment begins at El Segundo Boulevard and continues for 3.3 miles, along the box channel, to just upstream of the crossing with Alameda Boulevard. In this segment, fencing separates the path from the channel. The second segment begins below the Artesia freeway, running along the trapezoidal soft-bottom segment, and ends just upstream of the confluence with the Los Angeles River. In this section, the creek is directly accessible from the bike path as there is no fencing between them. There is an equestrian trail adjacent to the creek on its west side. Compton Creek runs adjacent to Gonzales Park and Raymond Street Park – both in the City of Compton. Access to the bike path is possible from the parking lot of Gonzales Park .

FIGURE 5-2.1: BIKE PATH ALONG COMPTON CREEK

(a) Upper segment at Reeve St/ Oleander Ave.

(b) Lower segment at Del Amo Blvd.

Flow Depth in Compton Creek

The Los Angeles County Flood Control District collects flow and water depth data from flow gauges located in Compton Creek at Station No. F37B-R – which is just north of Greenleaf Boulevard. Daily and monthly flow depth data from 2000 through 2012 was analyzed.

Table 5-2.1 presents the statistics of the daily flow depth data over a 12-year period from January 2000 through December 2012. The average daily depth of flow for this period was 5.26 inches. The minimum and maximum flow depths were 0 inch and 133.8 inches (11.2 ft) respectively. During this period, flow depth was less than 5-inches 50% of the time, and the 90th percentile of flow was 6.82 inches. Figures 5-2.2a and 5-2.2b illustrate daily flow depths during 2012, and monthly average flow depth from October 2000 through December 2012. Further detail of the flow depth conditions is provided in Table 5-2.2 which contains the maximum and minimum average daily flows for each month from January 2000 through December 2012.

TABLE 5-3.1: DAILY AVERAGE FLOW DEPTH STATISTICS FOR THE TRIBUTARIES OF THE LOWER LOS ANGELES RIVER 2000-2012 (IN INCHES)

Station Location	Mean Depth	Min Depth	Depth Percentile					Max Depth	% Non-zero Depth
			10%	25%	50%	75%	90%		
Compton Creek	5.28	0	4.14	4.44	4.79	5.18	6.82	133.8	99.6%
Arroyo Seco	5.36	0	1.30	1.93	3.41	6.05	13.06	80.4	99.8%
Rio Hondo Wash*	2.08	0	0.79	1.04	1.49	1.72	2.52	169.3	97.9%

*Rio Hondo data is from 2003-2012

FIGURE 5-2.2a DAILY AVERAGE FLOW IN COMPTON CREEK FOR THE YEAR 2012

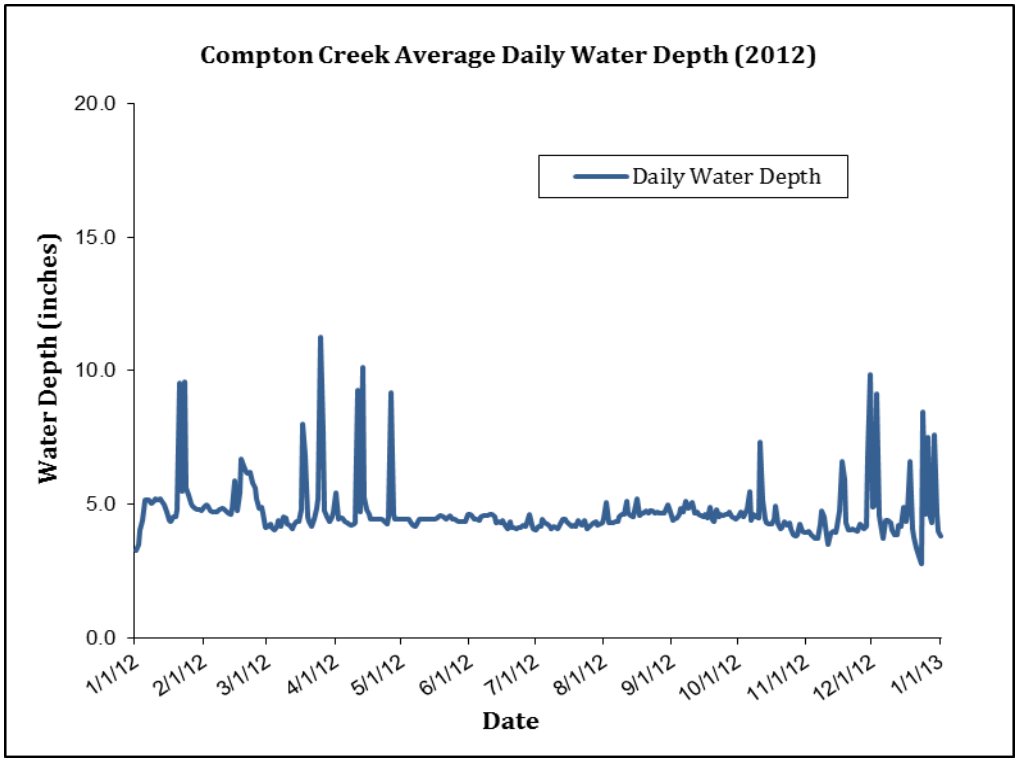


FIGURE 5-2.2b MONTHLY AVERAGE FLOW IN COMPTON CREEK FROM 2001 TO 2012

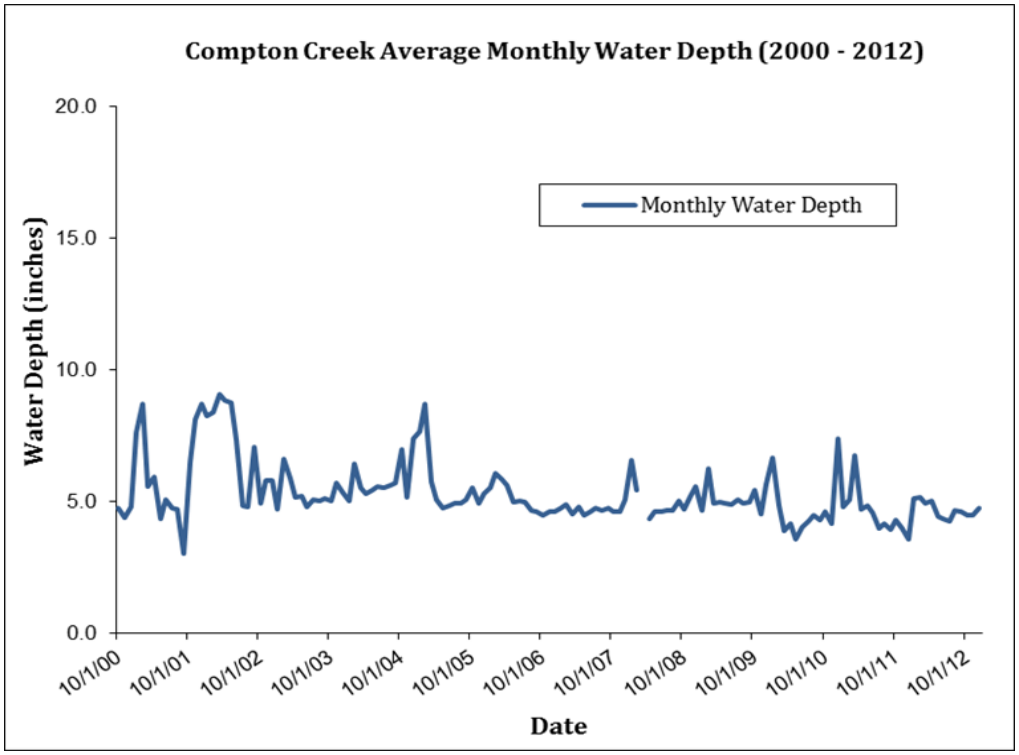


TABLE 5-2.2: AVERAGE MONTHLY MINIMUM AND MAXIMUM FLOWS IN COMPTON CREEK (2000-2012)

	January		February		March		April		May		June	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	4.80	10.21	4.82	18.41	4.40	22.00	4.20	12.94	3.60	4.80	3.60	4.56
2001	4.68	21.72	5.09	23.11	4.30	11.29	4.92	11.93	3.24	5.02	4.68	5.38
2002	7.30	12.06	7.56	10.27	8.40	10.36	8.52	9.73	8.12	10.00	6.24	8.64
2003	4.57	4.88	4.48	28.39	4.48	31.15	4.51	13.81	4.45	16.49	4.67	5.23
2004	4.44	10.67	4.50	18.82	4.61	14.17	5.03	5.69	5.14	5.77	5.27	6.11
2005	3.90	27.29	3.82	32.74	5.02	12.95	4.48	13.04	4.22	7.63	4.52	5.02
2006	4.69	17.86	5.10	15.44	4.70	17.53	4.45	13.70	4.55	11.21	4.67	5.32
2007	4.03	5.81	4.38	8.78	4.30	5.45	4.24	9.36	4.19	4.75	4.36	5.10
2008	4.08	16.87	4.28	13.25	4.13	5.14	4.14	4.75	4.19	5.24	4.27	5.17
2009	4.20	7.10	4.26	16.51	4.64	6.19	4.69	5.50	4.70	5.52	4.69	5.47
2010	4.60	18.48	3.53	12.44	3.37	7.54	3.37	11.14	3.38	4.09	3.61	4.42
2011	2.59	4.02	2.89	6.78	2.89	16.90	2.78	3.73	2.81	4.28	2.60	3.35
2012	1.42	3.88	1.43	2.21	0.92	6.60	0.59	4.51	1.01	1.81	1.14	1.98

	July		August		September		October		November		December	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	4.20	4.44	4.42	5.82	4.44	27.24	3.60	9.95	3.72	5.48	3.60	5.04
2001	4.44	4.80	4.44	5.05	0.00	7.08	6.47	6.50	6.36	12.95	7.80	12.20
2002	4.20	6.24	4.44	5.16	4.44	24.38	4.72	5.56	4.22	21.17	4.48	16.30
2003	4.84	5.90	4.79	5.34	4.86	5.72	4.79	5.94	4.20	23.66	4.44	15.14
2004	5.23	6.04	5.42	6.10	5.39	6.06	5.20	22.86	4.51	8.56	4.69	39.20
2005	4.75	5.32	4.73	5.30	4.67	9.96	4.61	13.86	4.66	6.77	4.07	11.32
2006	4.60	5.53	4.50	4.94	4.40	4.98	4.27	5.35	4.13	6.79	3.91	8.39
2007	4.55	5.17	4.45	4.97	4.30	9.58	4.20	10.86	3.82	13.32	3.64	12.50
2008	4.31	5.03	4.34	4.99	4.66	5.54	4.25	5.27	4.31	15.34	4.01	18.68
2009	4.67	6.06	4.72	5.41	4.73	5.22	4.56	18.80	4.20	5.26	4.26	16.37
2010	3.90	4.84	4.14	5.28	3.86	4.94	3.76	8.88	3.53	6.85	3.70	31.13
2011	1.18	1.50	1.12	1.42	1.26	1.49	1.27	4.20	1.48	4.86	1.51	4.50
2012	0.72	1.86	0.62	1.73	1.08	2.66	1.01	2.56	1.37	3.04	1.72	3.66

Recreational Activities

A total of ten site visits were made along Compton Creek from July 2010 through December 2012. Monitoring was conducted at two sites along the creek (i) a bike path just upstream from the Raymond Park (upper part of the creek) which itself did not have direct access to the creek, and (ii) bike path along Del Amo Boulevard in the lower part of the creek. A summary of the observed recreational activity is provided in Table 5-2.3. Most of the activity observed occurred along the upper segment of the creek with running/walking (41), followed by biking,(21) then horseback riding (8). Along the lower portion of the creek a few bikers (7) and runner/walkers (3) were observed. During the period of study, no recreational activity was observed in the creek itself.

FIGURE 5-2.3: HORSEBACK RIDING ALONG COMPTON CREEK

RECUR volunteers had difficulty finding willing respondents to the recreational use questionnaire, despite numerous attempts at solicitation. These attempts yielded a single respondent whose responses are provided in Table 5-2.4. This lone respondent was 65 years of age and had been visiting the creek for four years. He had observed biking, running, and walking, and had himself engaged in horseback riding and clean-up activities.

Additional Creek side Activities

A few waterside community activities have developed along Compton Creek There are different creek clean-up events organized by environmental organizations such as Friends of the Los Angeles River and Heal the Bay, as well as those organized by the City of Compton. There also appears to be a growing interest in the Compton Creek Bike Path among cycling groups such as the Long Beach Cyclists and the Eastside Riders who have organized rides along this path to Long Beach.

TABLE 5-2.3: RECREATIONAL ACTIVITY OBSERVED IN AND ALONG THE MAJOR TRIBUTARIES OF LOWER LOS ANGELES RIVER DURING FIELD MONITORING

	# of site visits	Swimming	Wading	Fishing	Biking	Running/Walking	Skateboarding	Other
Compton Creek	10				28	44		9
Arroyo Seco	21				121	157		183
Rio Hondo Wash	16		7		521	204	12	49
Rubio Wash	2							20
Eaton Wash	4					3		
Santa Anita Wash	5				23	21		13

*Others: Horseback Riding, Sports, Maintenance, Bird/Wildlife watching, Walking Pets, Picnicking, Sunbathing, Sightseeing, Educational Activities, Photoshoot, Reading, Illegal Dumping

TABLE 5-2.4: RECREATIONAL ACTIVITY REPORTED BY SURVEY RESPONDENTS ALONG THE MAJOR TRIBUTARIES OF LOWER LOS ANGELES RIVER

#	Water body	# of Surveys	Age	Frequency of visits	Historical Use	Swimming		Fishing		Wading		Kayaking	
						Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.
1	Compton Creek	1	65	4/wk	4yrs								
2	Arroyo Seco	52	12-68	1/mo-7/wk	1day-61yrs	2	5	1	8	2	8		2
3	Rio Hondo Wash	55	16-65	3/yr-12/wk	1day-40yrs		3	1	3	1	12		

#	Biking				Walking				Running				Skateboarding				Others	
	In Channel		Adjacent		In Channel		Adjacent		In Channel		Adjacent		In Channel		Adjacent			
	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.
1				1				1				1					2	
2	14	24	7	13	29	28	18	22	18	28	8	21	2	11	1	8	31	86
3	5	5	30	45	8	15	38	46	1	5	29	48		2	3	22	13	46

*Others: Bird/wildlife watching, Dog walking, Picnicking, Clean-up Activities, Maintenance, Educational Activities, Horseback Riding, Sports, Painting, Camping, Gang Activity, Cultural Activities

Plans for Future Recreational Use of Compton Creek

The Compton Creek Watershed Management Plan was prepared by the Los Angeles and San Gabriel Rivers Watershed Council (now Council for Watershed Health) in 2005. Some of the goals of the plan, with respect to increased recreational opportunities along the creek, are presented in Table 5-2.5. The plan also identifies projects that could be implemented in support of these goals; including transforming the segmented bike path to a continuous path from where the creek daylights on 108th street until it meets the Los Angeles River bike path at the confluence with the river, and creek restoration by concrete removal and the development of riparian habitat.

TABLE 5-2.5: GOALS AND OBJECTIVES OF THE COMPTON CREEK WATERSHED MANAGEMENT PLAN

Goal	Objective
Improve Wetland and Riparian Habitat Quality and Quantity	• Improve wetland habitat in the natural bottom portions of Compton Creek • Create wetland and riparian habitat wherever feasible • Daylight tributary streams and restore riparian habitat where feasible
Maintain Flood Protection	• Limit modifications of the storm drain network to locations where flood protection can be preserved or enhanced • Encourage onsite stormwater detention to reduce runoff volume • Implement nonstructural runoff management methods to the maximum extent feasible
Improve Access to Open Space and Recreation for All Communities	• Increase public open space and gathering places by targeted, prioritized programs of land acquisition from willing sellers • Improve public access to Compton Creek • Connect open spaces to bike paths and transit access points • Provide for maintenance of parks, open space, and trails

The Compton Creek Regional Garden Park Master Plan was developed by the City of Compton and the Rivers and Mountains Conservancy, and completed in 2006. This plan recognizes the creek as an important natural resource and identifies the expansion and enhancement of the creek corridor as one of its goals and objectives (see Table 5-2.6). Improving physical access to the creek, and increasing and improving open space and recreational opportunities, are included as a subset of this goal.

TABLE 5-2.6: GOALS AND OBJECTIVES OF THE COMPTON CREEK REGIONAL GARDEN MASTER PLAN

Promote Ecology and Environment	Expand and Enhance the Creek Corridor	Improve Community and City
• Improve Riparian Habitat Quality and Quantity • Integrate and Recommend Watershed Best Management Practices • Improve Water Quality • Instill Stewardship Principles • Create a Native Plant Landscape • Maintain and Improve Flood Protection • Utilize Sustainable Practices and Materials to Conserve Materials and Energy	• Reestablish Creek Identity within the City • Create adjacent Open Spaces and Development that Enhance the Natural Qualities of the Creek • Increase and Improve Open Space and Recreation Opportunities • Connect Open Space to the Creek • Improve Pedestrian, Bicycle, and Equestrian Access and Safety • Improve Physical Access to the Creek • Reinforce Visual Connections to the Creek	• Implement Multi-Objective Planning Projects • Provide a Framework for Public Recreation and Non-Motorized Transportation • Improve Environmental Awareness and Stewardship • Improve Public Health • Enhance Public Safety • Extend and Relate the Fabric of the City to the Creek • Link Natural Systems to Economic Development • Improve Access to Public Amenities • Reinforce and Improve East-West connections to and across the Creek • Connect Creek-adjacent schools to the Creek

The plan proposes channel modification scenarios including terracing the banks to allow access to the channel floor while slowing and cleaning urban run-off, as well as the complete restoration of the more natural portion of the channel

The Compton Creek Earthen Bottom Enhancement Feasibility Study (2010) also prepared by the Los Angeles and San Gabriel Watershed Council echoes the three principal goals and objectives of the Garden Master Plan but focuses on restoration potential of the earthen bottom section of Compton Creek.

5.2.2 Rio Hondo

Rio Hondo is the first of two major tributaries of Reach 2 of the Los Angeles River, moving upstream from the estuary. The river has its headwaters where Sawpit Wash and Santa Anita Wash meet, and it flows southwest to the Los Angeles River through the cities of Irwindale, El Monte, South El Monte, Montebello, Pico Rivera, Bell Gardens, Downey, and South Gate. The Rio Hondo has six major tributaries – Alhambra Wash, Rubio Wash, Eaton Wash, Arcadia Wash, Santa Anita Wash, and Sawpit Wash - which will be discussed in the next section. Reach 1 of the Rio Hondo begins at the confluence with the Los Angeles River and extends to the Santa Ana Freeway. Reach 2 flows from this freeway to the Whittier Narrows dam. Reach 3 of the river is above the Whittier Narrows dam. Per the Basin Plan, Reach 1 of Rio Hondo has a designated potential water contact recreation use, while Reach 2 and 3 have designated intermittent water-contact recreation uses. These recreational uses are suspended in all three reaches during periods of high flow during and immediately following certain storm events.

Physical Conditions

The Rio Hondo is concrete-lined for almost its entire length with unlined segments in the Whittier Narrows Dam Area, and where it ends in Peck Road Park Lake at the confluences of both Santa Anita Wash and Sawpit Wash. The channel walls are sloped, resulting in a trapezoidal configuration

Accessibility

A bike path runs the length of the Rio Hondo on its east bank, from its start to its confluence with the Los Angeles River where it joins the Los Angeles River bike path. The Rio Hondo runs adjacent to a number of parks including John Anson Ford, Rio Hondo, Grant Rea, and Treasure Island Parks and the bike path can be accessed from all these locations providing visual access to the river. In addition, the breaks in the fencing and nature of the fencing separating the bike path from the channel in some areas, making direct access to the channel possible.

FIGURE 5-2.4: ACCESS TO RIO HONDO

(a) Bike path at Ford Park (Bell Gardens) (b) Bike path at Grant Rea Park (Montebello)

Flow Depth in the Rio Hondo

The Los Angeles County Flood Control District collects flow and water depth data from flow gauges located in the Rio Hondo at Station No. F45B -0.6 mile upstream from the confluence with the Los Angeles River. Daily and monthly flow depth data from 2003 through 2012 was analyzed. Table 5-2.1 presents the statistics of the daily flow depth data over the 10-year period from January 2004 through December 2012. The average daily flow depth for this period was 2.08 inches. The minimum and maximum flow depths were 0 inch and 169.3 inches (14.1 ft.) respectively. During this period, flow depth was less than 1.5-inches 50% of the time, and the 90th percentile of flow was 2.52 inches. Figures 5-2.5a and 5-2.5b illustrate daily flow depths during 2012, and monthly average flow depth from October 2003 through December 2012. Further detail of the flow depth conditions is provided in Table 5-2.7 which contains the maximum and minimum average daily flows for each month in 2001 and from January 2003 through December 2012.

FIGURE 5-2.5a DAILY AVERAGE FLOW IN RIO HONDO FOR THE YEAR 2012

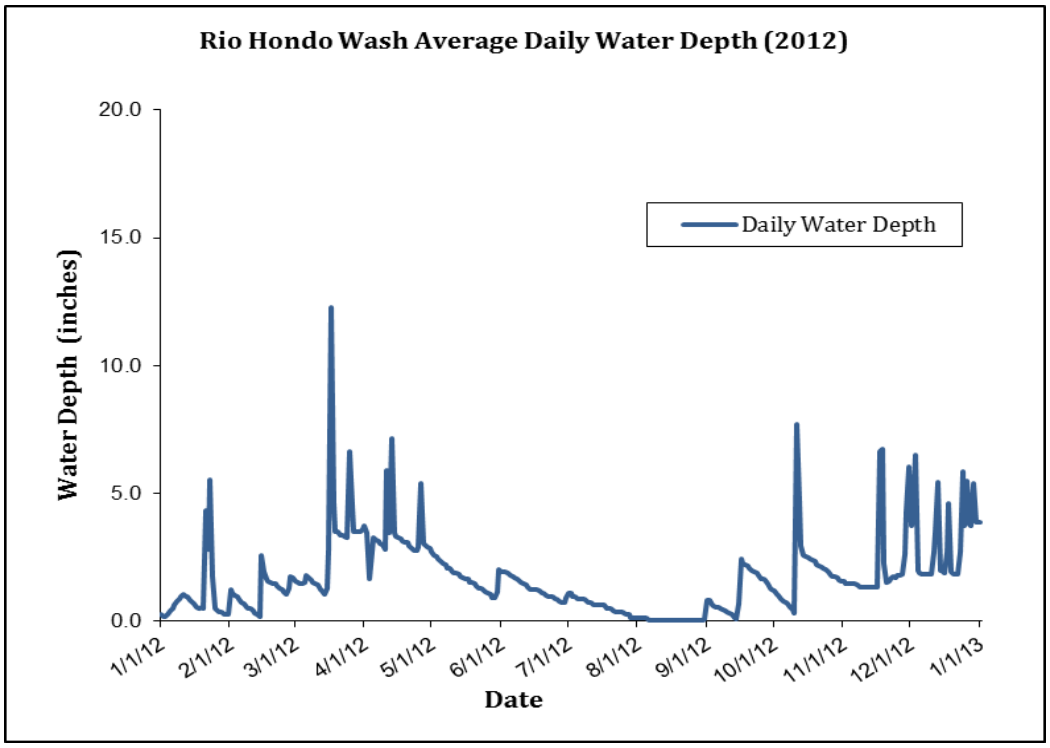


FIGURE 5-2.5b MONTHLY AVERAGE FLOW IN RIO HONDO FROM 2003 TO 2012

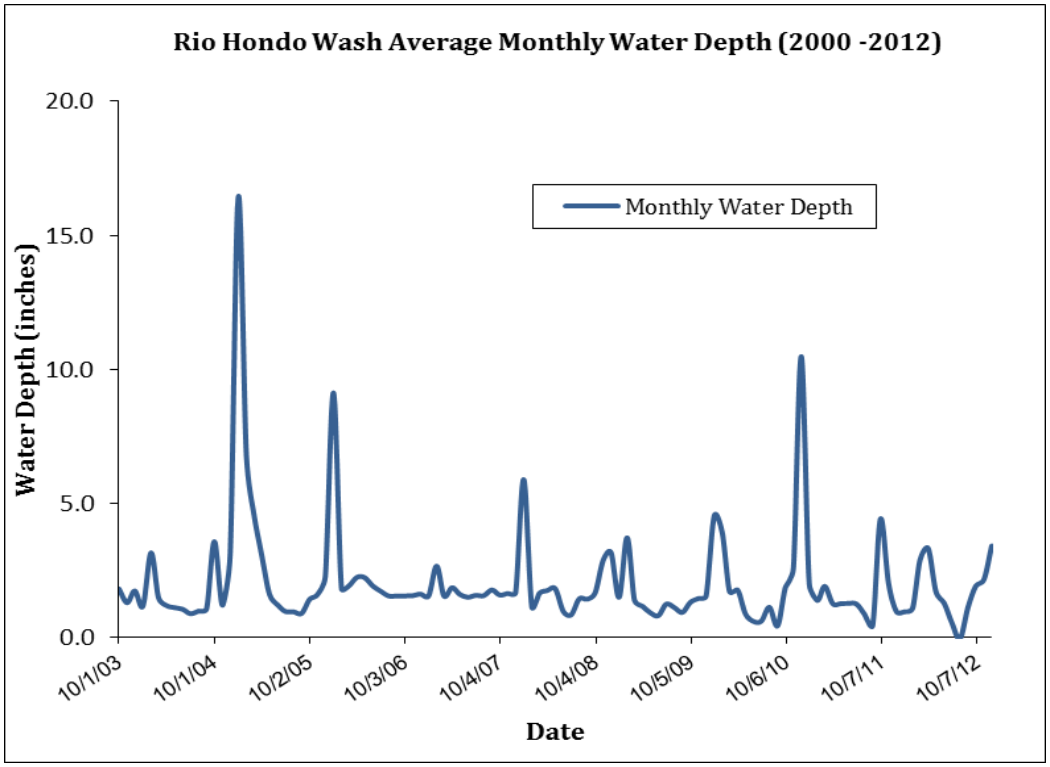


TABLE 5-2.7: AVERAGE MONTHLY MINIMUM AND MAXIMUM FLOWS IN RIO HONDO (2000-2012)

	January		February		March		April		May		June	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	4.80	10.21	4.82	18.41	4.40	22.00	4.20	12.94	3.60	4.80	3.60	4.56
2001	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2002	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2003	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2004	0.46	4.66	0.60	33.70	0.78	7.46	0.78	2.60	0.83	1.52	0.85	1.34
2005	0.00	118.27	0.00	85.21	0.00	20.98	2.41	10.86	1.08	3.65	0.98	1.66
2006	1.25	24.61	1.56	5.00	1.49	3.65	1.63	4.97	2.04	6.50	1.58	2.03
2007	1.56	1.62	1.56	6.43	1.56	1.68	0.79	7.43	1.56	1.80	1.44	1.56
2008	0.86	34.98	0.83	2.32	1.19	1.85	1.68	1.84	1.68	2.16	0.84	1.92
2009	1.32	1.76	1.32	14.71	1.32	1.62	0.96	1.32	0.84	0.96	0.72	0.98
2010	1.56	37.84	1.56	38.90	0.84	3.82	0.64	5.14	0.05	1.68	0.00	1.08
2011	0.72	2.48	0.16	5.65	0.84	9.64	0.40	1.68	0.84	2.70	0.98	1.44
2012	0.14	5.51	0.16	2.54	1.04	12.26	1.64	7.15	12.00	2.71	0.72	1.92

	July		August		September		October		November		December	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	4.20	4.44	4.42	5.82	4.44	27.24	3.60	9.95	3.72	5.48	3.60	5.04
2001	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2002	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2003	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2004	0.74	1.19	0.80	1.30	0.88	1.43	1.02	32.82	0.54	4.87	0.36	26.80
2005	0.85	1.14	0.82	1.42	0.64	3.20	0.76	7.49	1.32	3.00	1.18	14.09
2006	1.56	2.04	1.56	1.56	1.56	1.56	1.56	1.62	1.56	1.75	1.44	3.48
2007	1.56	1.68	1.56	1.62	1.56	7.25	1.46	2.56	1.44	4.33	1.44	2.94
2008	0.60	1.03	0.96	1.66	1.32	1.56	1.32	1.91	1.68	10.43	1.68	16.58
2009	1.01	1.32	0.96	1.32	0.72	1.32	0.60	3.72	1.25	1.79	1.56	7.56
2010	0.48	1.32	0.84	1.26	0.07	0.84	0.84	4.27	1.99	4.43	1.56	58.08
2011	1.04	1.43	0.24	1.10	-0.44	1.27	1.08	24.41	0.96	4.88	-0.01	4.48
2012	0.12	1.08	-0.24	0.12	0.07	2.40	0.31	7.69	1.32	6.72	1.80	6.50

Recreational Activities

Sixteen site visits were conducted in total along the Rio Hondo from July 2010 through December 2012 at the Grant Rea Park, Ford Park and Treasure Island Park monitoring sites. A summary of the observed recreational activity is provided in Table 5-2.3.The most common recreational activities observed were biking (521) and walking/running (204). The only water contact activity observed in the channel was wading (3) at the Grant Rea Park site (see Figure 5-2.6).

FIGURE 5-2.6: WADING IN RIO HONDO

RECUR volunteers were able to obtain fifty-five (55) surveys from respondents of the Recreational Use questionnaire. The majority of these respondents were from the Ford Park and Grant Rea Park monitoring sites. These respondents ranged in age from 16-65 years, and had been recreating in the area for up to forty years. Table 5-2.4 provides a breakdown of the recreational activities engaged in or observed by the respondents. The most commonly observed activities were running, walking and biking which were the same activities that most of the respondents engaged in. In terms of water contact activity, wading was the most frequent activity observed (12) followed by fishing (3) and swimming (3).

Plans for Future Recreational Use of the Rio Hondo

The Rio Hondo Watershed Management Plan was developed by the San Gabriel and Lower Los Angeles River and Mountains Conservancy and completed in 2003. The plan cites the following goals to articulate the vision for the watershed:

- Improve in-stream water quality to meet or exceed Regional Water Quality Control Board standards and NPDES permitting requirements. Implement a wide array of Stormwater Best Management Practices (BMPs) to optimize local water resources and reduce dependence on imported water while increasing beneficial water uses available to the public.

- Create, enhance, and protect open space through active acquisition of parcels that serve multiple-purpose uses, including; conservation, improvement of aesthetics, community development and connectivity.
- Improve habitat quality, quantity and connectivity with watershed management and restoration of stream channels. Combine existing habitat and creation of new habitat where possible to strengthen habitat migration corridors. Establish habitat areas for use by wild creatures, and other habitat areas with the addition of public access and education as appropriate.
- Improve recreational opportunities as a function of watershed management. Use interpretative opportunities afforded by recreation to enhance watershed awareness and identity.
- Ensure that public health and safety are integrated into all aspects of watershed enhancement.
- Maintain current minimum flood protection levels and develop new flood protection strategies to meet the multiple goals required for watershed improvement.
- Develop priority projects that address multiple goals simultaneously.

The plan also includes proposed projects in support of these goals, notable among which are feasibility studies for stream naturalization in portions of the channel below the Whittier Narrows Dam, and along John Anson Ford Park in the City of Downey. The plan also proposes multi-objective projects at Peck Road Water Conservation Park, and Whittier Narrows Area to benefit the entire watershed.

5.2.3 Arroyo Seco

The Arroyo Seco is the second major tributary of Reach 2 of the Los Angeles River, moving upstream from the estuary. The Arroyo Seco flows for 22 miles from its headwaters in the San Gabriel Mountains through the cities of La Canada Flintridge, Pasadena, and South Pasadena, to its confluence with the Los Angeles River near downtown Los Angeles (ASWMRP, 2006). The upper half of the Arroyo Seco flows within the Angeles National Forest . Devils Gate Dam is located where the Arroyo Seco exits the forest. (ASWMRP, 2006) The Basin Plan recognizes three reaches of the Arroyo Seco: Reach 1 is from its confluence with the Los Angeles River to Holly Street in the City of Pasadena; Reach 2 is from Holly Street to Devils Gate Dam; and Reach 3 is above Devils Gate Dam. All three reaches of the Arroyo Seco are designated for intermittent water contact recreation.

Physical Conditions

The Arroyo Seco flows in a natural state above Devils Gate Dam (Reach 3) and is concrete lined the entire length below the dam (Reaches 1 and 2). The concrete walls of the engineered section have a trapezoidal configuration just upstream of the confluence with the Los Angeles River for about 3 miles then transitions to a vertical configuration where the 110 Freeway intersects Pasadena Avenue. It continues in this form until the Rose Bowl where it

transitions back to a trapezoidal channel. For most of its length, the creek flows through and adjacent to parks.

Accessibility

The Arroyo Seco bike path runs adjacent to the creek for about 2-miles starting at East Avenue 43 - about a mile upstream of its confluence with the Los Angeles River. A major portion of this path descends into the creek bed and runs adjacent to the low-flow channel– allowing direct access to the creek (see Figure 5-2.7). For the rest of its length, direct access to the Arroyo is mostly limited by fencing on both sides of the channel, but the creek is visually accessible - flowing through parks until it reaches Devils Gate Dam. An unpaved multi-use trail runs adjacent to the creek for about two miles through Lower Arroyo Park. However, as it flows through the Brookside Golf Course no fencing is present and direct access to the creek is possible.

FIGURE 5-2.7: CHANNEL ACCESS ALONG THE ARROYO SECO

(a) Bike path along channel bottom at Hermon Park

(b) Multi-use trail at Lower Arroyo Park

(c) Open Access at Brookside Golf Course

Flow Depth in Arroyo Seco

The Los Angeles County Flood Control District collects flow and water depth data from flow gauges located in the Arroyo Seco at Station No. F277-R, about 0.5-mile downstream of Devil's Gate Dam. The data represents flow at the upstream end of the concrete channel. Flow in the Arroyo Seco is regulated by the dam and the Pasadena Water Department's diversion into the creek upstream of the gauge. Daily and monthly flow depth data from 2000 through 2012 was analyzed.

Table 5-2.1 presents the statistics of the daily flow depth data over a 13-year period from January 2000 through December 2012. The average daily flow depth for this period was 5.36 inches. The minimum and maximum flow depths were 0-inch and 80.4 inches (6.7 ft.) respectively. During this period, flow depth was less than 4-inches 50% of the time, and the 90^{th} percentile of flow was 13.1 inches. Figures 5-2.5a and 5-2.8b illustrate daily flow depths during 2012, and monthly average flow depth from October 2000 through December 2012. Further detail of the flow depth conditions is provided in Table 5-2.8 which contains the maximum and minimum average daily flows for each month from January 2000 through December 2012.

FIGURE 5-2.8a DAILY AVERAGE FLOW IN ARROYO SECO FOR THE YEAR 2012

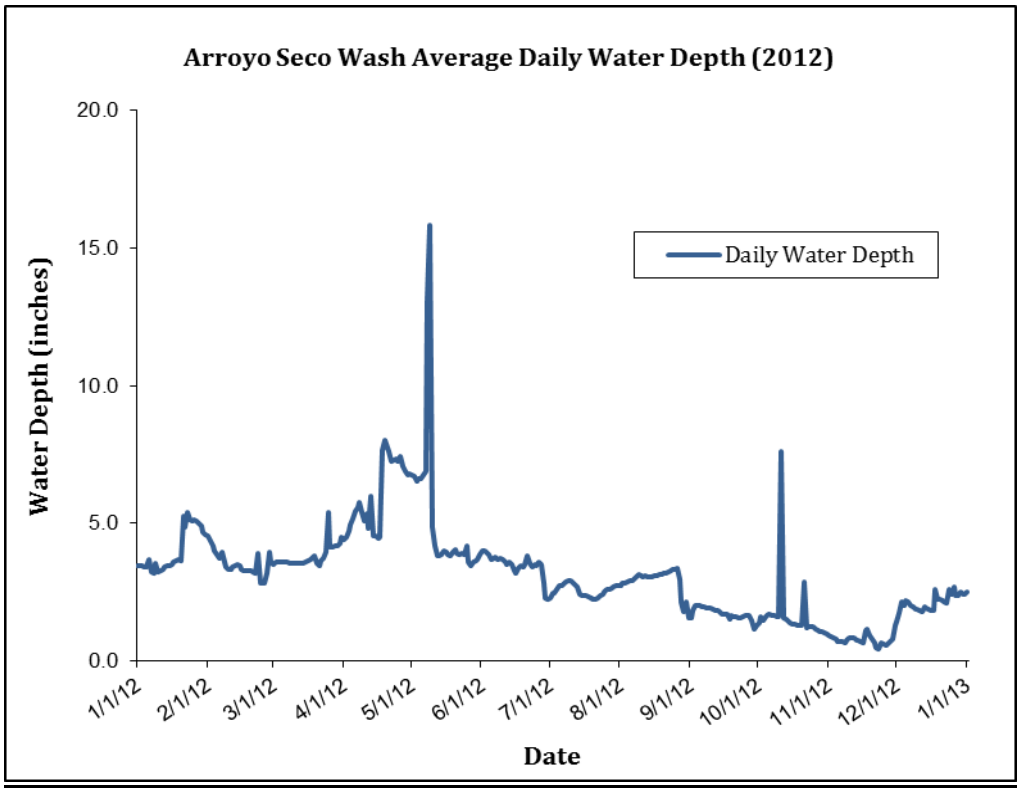


FIGURE 5-2.8b MONTHLY AVERAGE FLOW IN ARROYO SECO FROM 2000 TO 2012

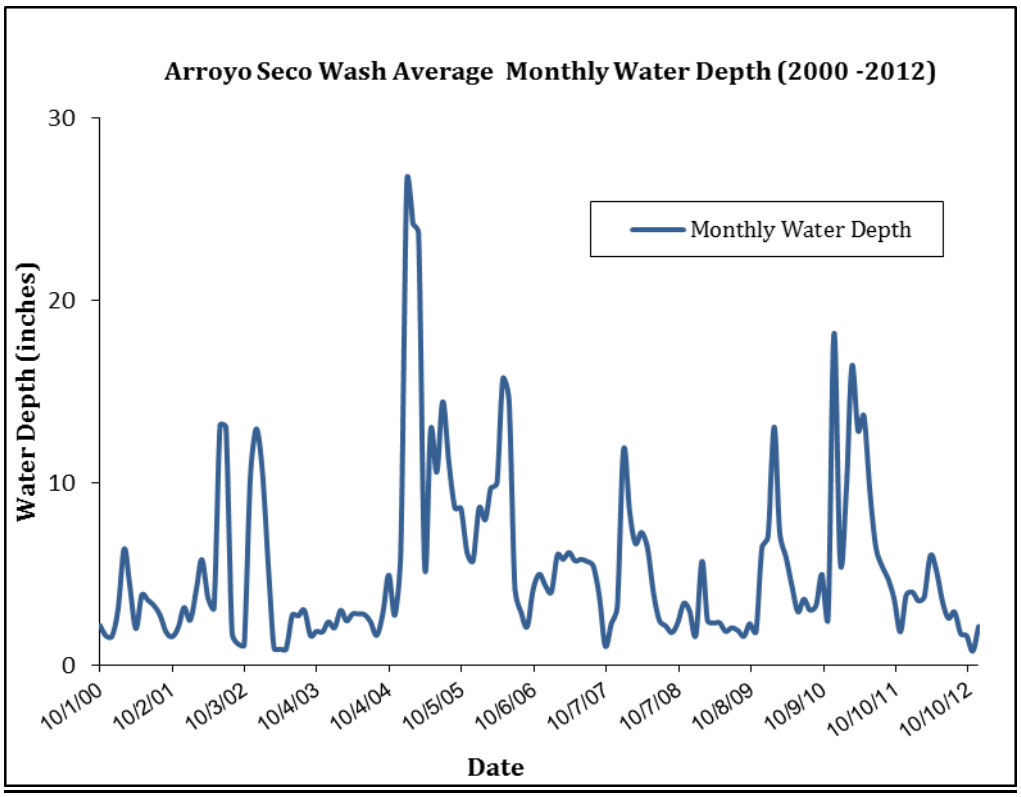


TABLE 5-2.8: AVERAGE MONTHLY MINIMUM AND MAXIMUM FLOWS IN ARROYO SECO (2000-2012)

	January		February		March		April		May		June	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	2.15	7.08	2.15	22.43	2.23	19.78	2.22	19.69	3.00	3.28	2.14	3.00
2001	1.50	20.05	1.48	25.58	1.31	19.85	1.27	13.63	2.89	3.91	3.36	3.64
2002	0.00	9.68	0.20	5.83	5.20	6.18	1.38	5.94	1.28	10.72	11.60	13.26
2003	2.60	12.98	0.94	12.96	0.90	0.94	0.85	0.89	0.82	1.79	0.78	5.93
2004	1.72	2.95	0.49	6.31	0.56	2.87	0.66	3.94	2.77	2.81	2.74	2.77
2005	18.46	58.72	10.12	41.35	15.19	29.78	1.92	18.66	8.66	18.00	5.62	16.10
2006	4.97	26.74	5.89	28.91	4.01	23.12	5.70	16.54	12.67	23.62	5.26	17.05
2007	2.98	9.17	4.82	14.24	5.29	6.44	5.39	14.09	5.45	6.14	5.45	6.13
2008	0.00	28.93	5.74	17.33	5.46	8.26	6.91	7.73	3.50	11.34	3.22	5.03
2009	0.66	7.24	0.12	17.84	1.87	4.22	1.76	2.88	1.75	2.93	1.30	3.37
2010	0.00	22.93	0.00	31.02	1.03	13.14	1.21	12.36	3.37	6.59	1.03	5.63
2011	3.59	13.26	3.56	23.38	5.89	26.12	4.30	21.92	9.18	17.33	5.48	12.62
2012	3.18	5.38	2.80	4.51	3.44	5.41	4.42	8.03	3.46	15.85	2.22	4.01

	July		August		September		October		November		December	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	1.97	2.24	1.92	1.96	1.90	4.16	1.61	7.16	1.57	1.61	1.54	1.57
2001	3.12	3.35	2.20	3.11	1.56	2.16	1.52	1.56	1.06	4.80	2.10	5.23
2002	9.55	13.22	1.15	7.84	1.12	1.15	1.08	1.12	1.08	13.07	11.27	13.04
2003	0.76	4.38	2.05	3.14	0.73	1.92	1.84	1.87	1.80	1.84	1.79	2.98
2004	1.56	2.74	0.29	2.94	2.24	3.34	2.00	29.51	1.93	3.50	2.80	36.42
2005	12.73	16.74	9.71	12.94	7.69	12.96	5.28	16.20	4.78	8.53	4.28	13.25
2006	3.59	5.33	2.09	3.71	1.13	2.68	3.71	4.81	4.20	5.66	3.42	7.18
2007	5.39	6.20	5.09	6.06	0.23	11.58	0.44	5.11	1.48	9.11	1.00	12.12
2008	1.34	3.58	1.67	2.92	1.19	2.88	1.51	3.05	1.50	19.21	1.06	15.52
2009	0.06	3.88	1.14	2.63	0.24	2.72	0.84	12.20	1.14	6.44	1.61	30.64
2010	2.58	5.03	1.76	6.40	3.01	4.26	2.42	12.01	1.27	9.01	2.70	40.67
2011	5.76	6.48	4.84	6.48	3.60	4.70	3.60	10.40	3.60	13.68	2.99	4.76
2012	2.24	2.92	1.55	3.35	1.16	2.02	0.98	7.60	0.43	1.30	1.43	2.68

Flow and water depth measurements for the lower portion of the Arroyo Seco, just upstream of its confluence with the Los Angeles River were manually collected by the Los Angeles County Flood Control District from September 2011 through August 2012. The data are presented in Table 5-2.9

TABLE 5-2.9: FLOW DEPTH IN DOWNSTREAM PORTION OF THE ARROYO SECO

Date	Max Depth (in)	Min Depth (in)	Vel (fps)	Water Width (ft)	Flow Rate (cfs)
September 26, 2011	3.12	0	4.5	6.5	6.30
November 30, 2011	5.04	0	7.9	6.6	18.3
February 22, 2012	2.64	0	4.4	6.25	5.15
May 07, 2012	6.00	0	4.8	6.25	12.78
July 10, 2012	2.16	0	4.5	6.25	4.31
August 20, 2012	1.92	0	4.1	6.1	3.44

Recreational Activities

Twenty-one site visits were made in total along the Arroyo Seco from July 2010 through December 2012 at the Lower Arroyo Park, Hermon Park, and Montecito Heights monitoring sites. A summary of the observed recreational activity is provided in Table 5-2.3.The most common recreational activities observed were biking (121) and walking/running (157). There was a lot of pet-walking in the area where the bike bath ran along the channel bottom (see Figure 5-2.9) Although a number of pets walked in the water alongside their owners on the adjacent path, no water contact recreation by humans was observed.

FIGURE 5-2.9: WALKING PETS ALONG THE CHANNEL BOTTOM IN THE ARROYO SECO

RECUR volunteers obtained fifty-two (52) surveys from respondents of the Recreational Use questionnaire at the Arroyo Seco monitoring sites. These respondents ranged in age from 12-68 years, and had been recreating in the area for up to sixty one years. Table 5-2.4 provides a breakdown of the recreational activities engaged in or observed by the respondents. . While

running, walking and biking were the most frequently reported activities, the most commonly observed REC-1 activities were wading (8) and fishing (8).

Plans for Future Recreational Use of the Arroyo Seco

The Arroyo Seco Watershed Management and Restoration Plan was developed in 2006 by North East Trees, an environmental organization. The objectives identified in the plan are:

- Improving water quality for beneficial uses, including public health, and
- Restoring habitat for terrestrial and aquatic species.

The plan recommends a number of implementation strategies towards this goal including naturalization of the channel a segment through the Arroyo Seco Golf Course, and another between the York Street Bridge and the Arroyo Seco Parkway Bridge.

In addition, **the Los Angeles River Revitalization Master Plan** identifies the Arroyo Seco's confluence with the Los Angeles River as an "opportunity area" with the potential for "…meaningful habitat and stream restoration, water quality treatment, and flood management…" (LARRMP, 2007).

The draft **Arroyo Seco Watershed Assessment** (2010) developed by the Arroyo Seco Foundation, includes the goal of improving recreational opportunities and enhancing natural space. Recommended projects include the naturalization of the channel segment flowing through the Annandale golf course, and a multi-use confluence project.

Building on the concept of revitalizing the confluence, a report titled "**Re-Transforming Landscape at the Confluence of Arroyo Seco and the Los Angeles River**" (Hu, 2006) was developed as a thesis project by a student at the University of Southern California's School of Architecture. In this report, the author outlines a detailed road map for the proposed transformation including renditions of the finished project – one of which is shown in Figure 5-2.10.

FIGURE 5-2.10 RENDITION DEPICTING ARROYO SECO BEFORE AND AFTER TRANSFORMATION (HU, 2012)

5.3 SECONDARY TRIBUTARIES OF LOWER LOS ANGELES RIVER (REACHES 1 AND 2)

Rio Hondo has six major tributaries that flow as engineered channels to their confluences with the river - Alhambra Wash, Rubio Wash, Eaton Wash, Arcadia Wash, Santa Anita Wash, and Sawpit Wash.

5.3.1 Santa Anita Wash

The Santa Anita Wash begins as an engineered channel immediately downstream of the Santa Anita Dam, and flows for the majority of its 5-mile length through the City of Arcadia. Midway along its length it flows for about a half-mile through the City of Monrovia. It is a concrete-lined box channel (with vertical walls) from its upstream end until less than half a mile before its confluence with Rio Hondo at Peck Road Lake where it transitions to a trapezoidal channel (sloped sides). Santa Anita Wash has a designated potential REC-1 use (see Figure 5-3.1a and b).

FIGURE 5-3.1: SANTA ANITA WASH AT CONFLUENCE WITH RIO HONDO

(a) Looking downstream toward confluence – trapezoidal channel with no separating fence

(b) Looking upstream away from confluence- transition to vertical walls and fencing

Accessibility

A bike path runs adjacent to the Santa Anita Wash from its confluence with Peck Road Lake and ends under the Foothill Freeway (I 210) at Colorado Boulevard and 2nd Avenue in Arcadia as an unpaved multi use trail. There is fencing between the channel and path for most of its length with a break in the fencing right before the confluence (see Figure 5-3.1b). Two recreational facilities provide some measure of visual access along its length – Eisenhower Park, at its midpoint at Colorado Boulevard and 2nd Avenue (see Figure 5-3.2), and the bike path adjacent to the Arcadia Golf Course at the downstream end (see Figure 5-3.1).

FIGURE 5-3.2: SANTA ANITA WASH FLOWS THROUGH EISENHOWER PARK IN THE CITY OF ARCADIA

Depth of Flows in Santa Anita Wash

The Los Angeles County Flood Control District collects flow and water depth data from flow gauges located in Santa Anita Wash at Station No. F193B-R – just above Longden Avenue. Daily and monthly flow depth data from 2000 through 2012 was analyzed.

Table 5-3.1 presents the daily flow depth data over a 13-year period from January 2000 through December 2012. The average daily flow depth for this period was 1.14 inches. The minimum and maximum flow depths were 0.0 inch and 40.3 inches (3.4 ft.), respectively. During this period, flow depth was less than 0.3 inches 50% of the time, and the 90th percentile of flow was 3.2 inches. Figures 5-3.2a and 5-3.2b illustrate daily flow depths during 2012, and monthly average flow depth from October 2000 through December 2012. Further detail of the flow depth conditions is provided in Table 5-3.2 which contains the maximum and minimum average daily flows for each month from January 2000 through December 2012.

TABLE 5-3.1: DAILY AVERAGE FLOW DEPTH STATISTICS FOR THE SECONDARY TRIBUTARIES OF THE LOWER LOS ANGELES RIVER 2000-2012 (IN INCHES)

Station Location	Mean Depth	Min Depth	Depth Percentile					Max Depth	% Non-zero Depth
			10%	25%	50%	75%	90%		
Santa Anita Wash	1.14	0	0.00	0.11	0.31	0.98	3.22	40.3	89.6%
Eaton Wash	1.01	0	0.31	0.43	0.60	0.95	1.65	52.7	99.98%
Rubio Wash	0.53	0	0.12	0.20	0.30	0.48	1.16	40.2	98.9%
Alhambra Wash	2.68	0	1.66	1.92	2.29	2.87	3.72	82.6	99.95%
Arcadia Wash	1.23	0	0.50	0.77	1.03	1.26	1.71	50.9	99.9%
Sawpit Wash	1.98	0	0.28	0.52	1.08	1.78	4.48	59.9	99.5%

FIGURE 5-3.3a DAILY AVERAGE FLOW IN SANTA ANITA WASH FOR THE YEAR 2012

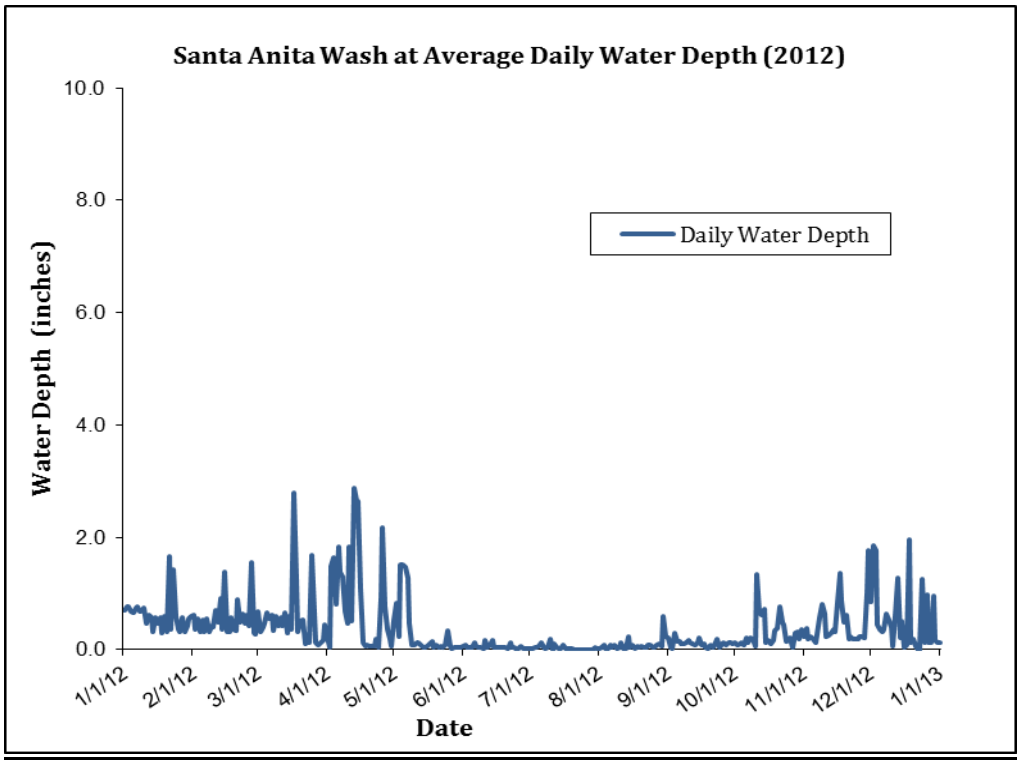


FIGURE 5-3.3b MONTHLY AVERAGE FLOW IN SANTA ANITA WASH FROM 2000 TO 2012

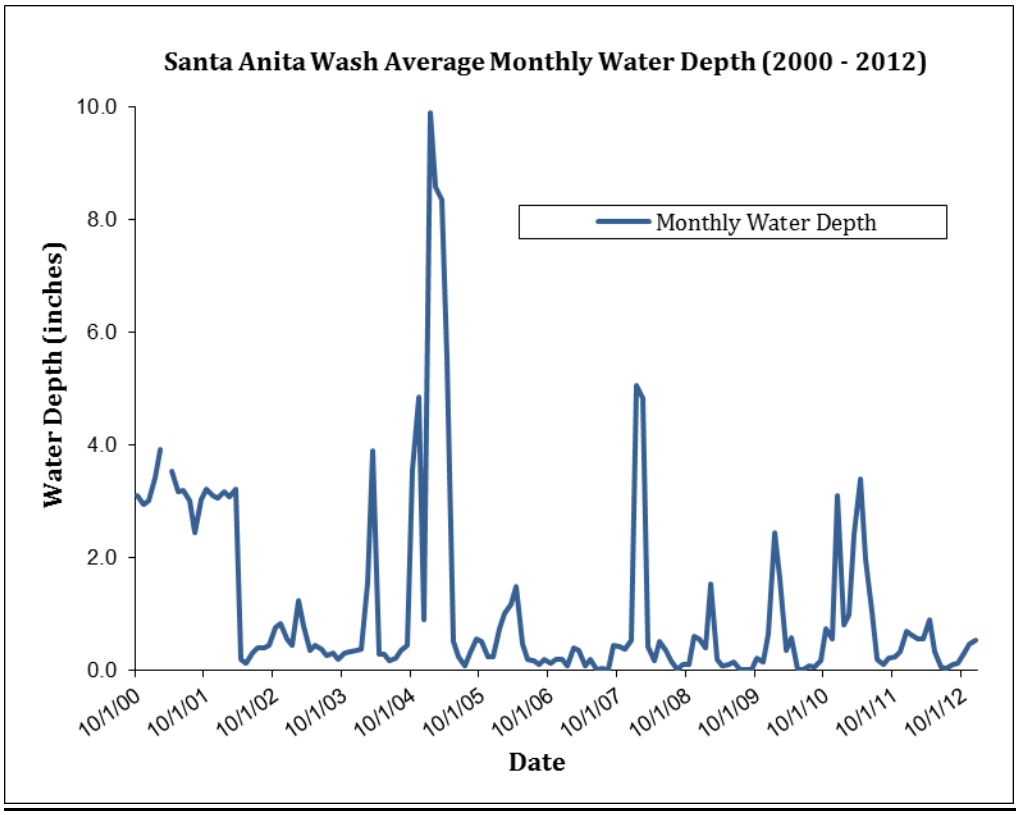


TABLE 5-3.2: AVERAGE MONTHLY MINIMUM AND MAXIMUM FLOWS IN SANTA ANITA WASH (2000-2012)

	January		February		March		April		May		June	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	0.02	2.28	0.12	9.01	7.80	8.40	5.52	7.80	5.40	5.52	2.84	5.40
2001	2.86	7.19	2.86	8.20	3.07	7.82	2.76	5.23	2.81	3.79	2.75	7.38
2002	2.87	4.96	2.92	3.90	2.89	3.74	0.01	0.97	0.00	0.54	0.02	0.76
2003	0.22	0.85	0.11	5.96	0.02	5.86	0.00	3.66	0.00	3.19	0.19	1.28
2004	0.22	1.15	0.32	7.42	0.00	5.52	0.00	1.34	0.00	1.03	0.00	0.55
2005	3.76	30.18	3.43	13.24	6.53	8.64	0.56	8.59	0.07	1.36	0.00	0.66
2006	0.13	5.60	0.12	9.35	0.30	6.25	0.00	5.52	0.00	1.94	0.05	0.34
2007	0.00	1.14	0.00	2.06	0.00	0.92	0.00	2.18	0.05	0.53	0.00	0.55
2008	0.24	9.35	0.82	8.74	0.02	1.04	0.00	0.56	0.00	4.01	0.07	1.50
2009	0.00	2.06	0.01	4.75	0.00	1.73	0.00	0.52	0.00	0.34	0.00	0.76
2010	0.00	8.40	0.00	5.64	0.00	2.48	0.00	3.19	0.00	0.26	0.00	0.34
2011	0.02	4.10	0.11	4.93	0.12	6.04	1.50	4.15	0.29	4.00	0.24	2.59
2012	0.30	1.67	0.28	1.56	0.07	2.78	0.04	2.87	0.02	1.50	0.00	0.17

	July		August		September		October		November		December	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	2.78	3.55	3.29	3.56	0.02	0.89	2.81	4.15	2.71	3.14	2.92	3.12
2001	2.86	3.55	0.00	3.19	2.98	3.20	2.95	3.42	2.74	5.06	2.76	3.95
2002	0.25	0.53	0.23	0.56	0.26	0.74	0.56	1.01	0.28	4.08	0.18	2.35
2003	0.08	0.59	0.00	0.65	0.01	0.55	0.00	0.91	0.05	1.28	0.02	3.60
2004	0.07	0.36	0.13	0.54	0.22	0.71	0.32	9.05	0.00	8.40	0.00	6.76
2005	0.00	1.76	0.00	0.72	0.12	1.62	0.10	3.42	0.00	0.67	0.00	1.96
2006	0.00	0.36	0.00	0.36	0.02	0.41	0.00	0.32	0.00	0.50	0.00	0.98
2007	0.00	0.26	0.00	0.37	0.13	2.88	0.17	1.36	0.02	2.38	0.05	2.57
2008	0.00	0.66	0.00	0.23	0.00	0.28	0.00	0.97	0.13	3.78	0.02	4.04
2009	0.00	0.16	0.00	0.17	0.00	0.22	0.00	1.86	0.00	0.48	0.00	5.51
2010	0.00	0.23	0.00	0.29	0.00	0.55	0.11	2.04	0.02	1.80	0.02	12.44
2011	0.04	0.44	0.04	0.31	0.02	1.43	0.06	2.36	0.07	1.86	0.18	2.21
2012	0.00	0.19	0.01	0.60	0.01	0.30	0.05	1.34	0.13	1.76	0.00	1.97

Recreational Activities

Five site visits were made in total along the Santa Anita Wash from July 2010 through December 2012 at the Arcadia Golf Course and Eisenhower Park monitoring sites. A summary of the observed recreational activity is provided in Table 5-3.3. The most common recreational activities observed were biking (23) and walking/running (21). The majority of the recreational activity was observed on the bike path adjacent to the wash at the golf course monitoring site. No water contact recreation was observed although there was an instance of a person walking across the channel bottom.

RECUR volunteers obtained four (4) surveys from respondents of the Recreational Use questionnaire at Santa Anita Wash monitoring sites. These respondents ranged in age from 18 to 46 years, and had been recreating in the area for up to twenty years. Table 5-3.4 provides a breakdown of the recreational activities engaged in or observed by the respondents. Running, walking and biking were the most frequently reported activities. The only REC-1 activity observed by the respondents was fishing.

Planned Future Recreational Opportunities

The Rio Hondo Watershed Management Plan was developed by the San Gabriel Valley Council of Governments in 2004 and includes a proposed project to naturalize a portion of the Santa Anita Wash below the spreading grounds in support of the plan's goals of water quality improvement and habitat restoration.

TABLE 5-3.3: RECREATIONAL ACTIVITY OBSERVED IN AND ALONG THE SECONDARY TRIBUTARIES OF LOWER LOS ANGELES RIVER DURING FIELD MONITORING

	# of site visits	Swimming	Wading	Fishing	Biking	Running/Walking	Skateboarding	Other
Santa Anita Wash	5	-	-	-	23	21	-	13
Eaton Wash	4	-	-	-	-	3	-	-
Rubio Wash	2	-	-	-	-	-	-	20

*Others: Horseback Riding, Sports, Maintenance, Bird/Wildlife watching, Walking Pets, Picnicking, Sunbathing, Sightseeing, Educational Activities, Photoshoot, Reading, Illegal Dumping, Golfing

TABLE 5-3.4: RECREATIONAL ACTIVITY REPORTED BY SURVEY RESPONDENTS ALONG THE SECONDARY TRIBUTARIES OF LOWER LOS ANGELES RIVER

#	Water body	# of Surveys	Age	Frequency of visits	Historical Use	Swimming		Fishing		Wading		Kayaking	
						Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.
1	Santa Anita Wash	4	18-46	1/wk-7/wk	2yrs-20yrs	-	-	-	1	-	-	-	-
2	Eaton Wash	3	39-65	1/wk	3yrs-21yrs	-	-	-	-	-	-	-	-
2	Rubio Wash	-	-	-	-	-	-	-	-	-	-	-	-

#	Biking				Walking				Running				Skateboarding				Others	
	In Channel		Adjacent		In Channel		Adjacent		In Channel		Adjacent		In Channel		Adjacent			
	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.
1	-	-	3	3	-	-	3	3	-	-	2	3	-	-	-	-	1	1
2	1	-	-	2	1	-	2	3	-	-	2	3	-	-	-	1	-	3
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Others: Bird/wildlife watching, Dog walking, Picnicking, Clean-up Activities, Maintenance, Educational Activities, Horseback Riding, Sports, Painting, Camping, Gang Activity, Cultural Activities

5.3.2 Eaton Wash

Eaton Wash begins as an engineered channel immediately downstream of Eaton Dam in the City of Pasadena. From there, it flows for just under eight miles through unincorporated areas of Los Angeles County, Temple City, and Rosemead, and then joins the Rio Hondo at its confluence in the City of El Monte. It is a concrete-lined box channel (with vertical walls) from its upstream end to its confluence with Rio Hondo. Eaton Wash has a designated intermittent REC-1 use.

Accessibility

There is no bike path or multi-use trail adjacent to any segment of Eaton Wash. The channel is fenced throughout its length as it flows through commercial, industrial, and residential areas. The wash is flanked by Gwinn Park (see Figure 5-3.3) and Eaton Wash Park, which are both about three-quarters of a mile downstream of the dam. Neither park provides more than visual access to the wash. The wash flows adjacent to a third park, Eaton Blanche Park, which is about one mile further downstream of the other two. This park also provides visual access only.

FIGURE 5-3.3: EATON WASH FLOWS ADJACENT TO GWINN PARK IN PASADENA

(a) Eaton Wash at the boundary of Gwinn Park (b) Visual access to Eaton Wash

Flow Depths in Eaton Wash

The Los Angeles County Flood Control District collects flow and water depth data from flow gauges located in Eaton Wash at Station No. F318-R, at Loftus Drive. Flow in the wash is partly regulated by Eaton Dam. Daily and monthly flow depth data from 2000 through 2012 was analyzed. Table 5-3.1 presents the daily flow depth data over a 13-year period from January 2000 through December 2012. The average daily flow depth for this period was 1.01 inches. The minimum and maximum flow depths were 0.0 inch and 52.7 inches (4.4 ft.), respectively. During this period, flow depth was less than 0.6 inches 50% of the time, and the 90^{th} percentile of flow was 1.65 inches. Figures 5-3.4a and 5-3.4b illustrate daily flow depths during 2012, and monthly average flow depth from October 2000 through December 2012. Further detail of the flow depth conditions is provided in Table 5-3.5 which contains the maximum and minimum average daily flows for each month from January 2000 through December 2012.

FIGURE 5-3.4a DAILY AVERAGE FLOW IN EATON WASH FOR THE YEAR 2012

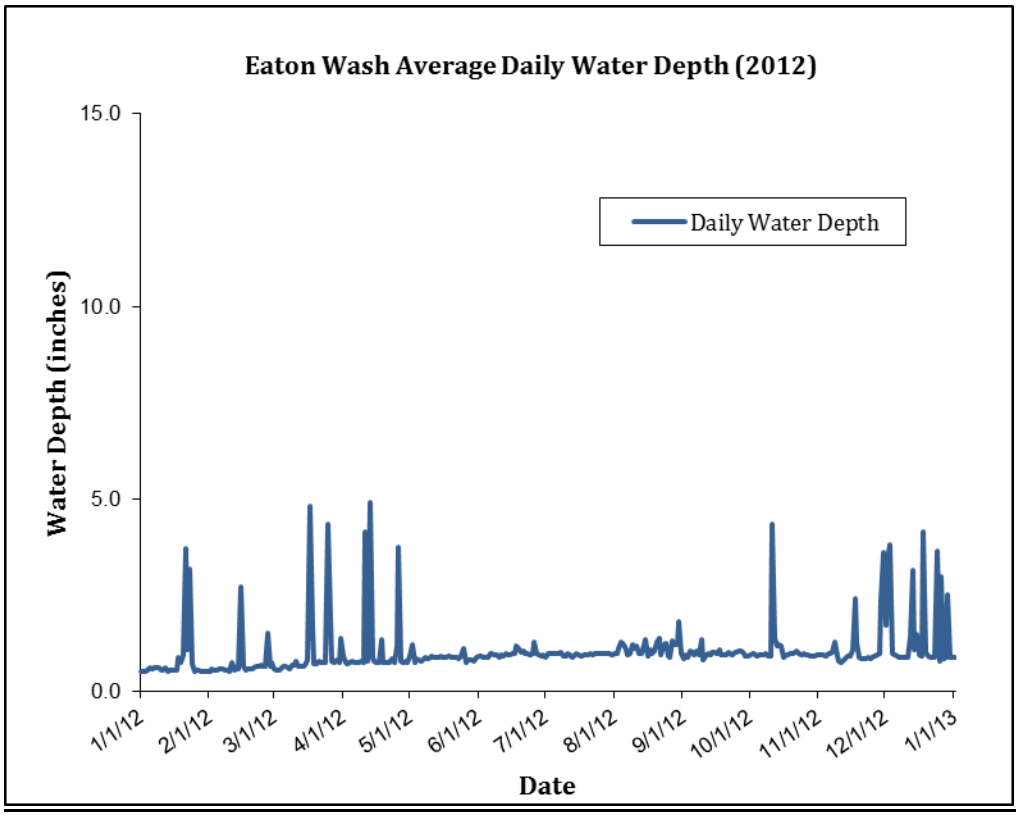


FIGURE 5-3.4b MONTHLY AVERAGE FLOW IN EATON WASH FROM 2000 TO 2012

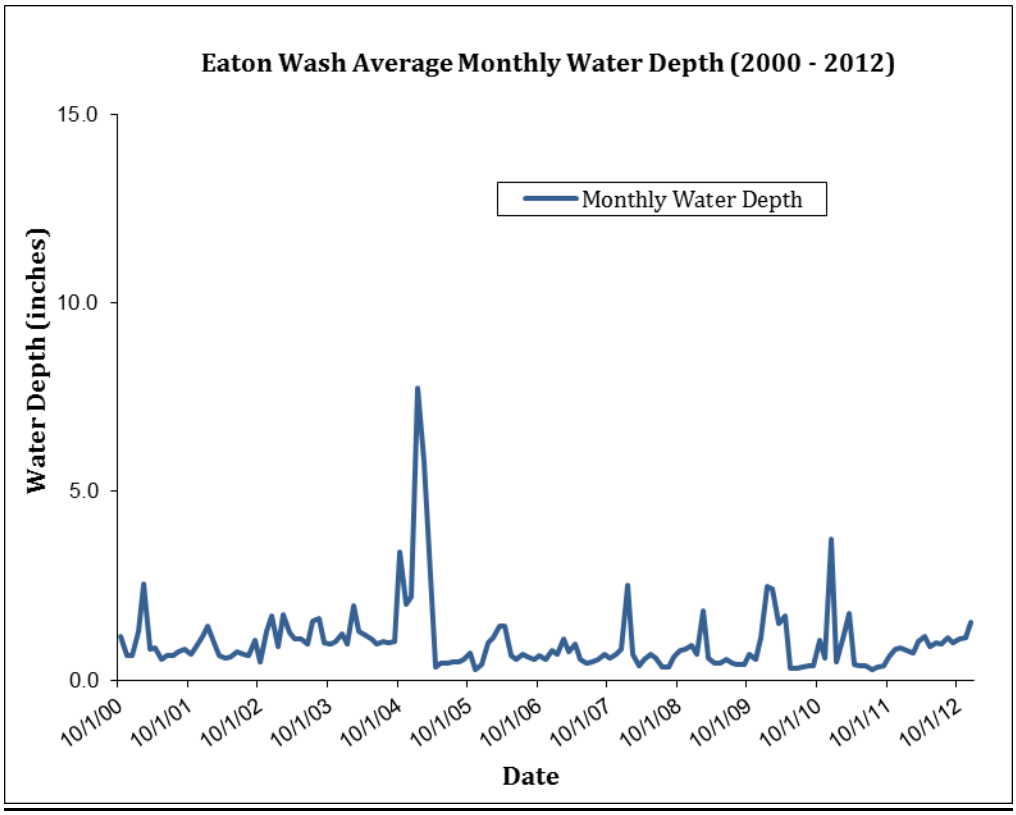


TABLE 5-3.5: AVERAGE MONTHLY MINIMUM AND MAXIMUM FLOWS IN EATON WASH (2000-2012)

	January		February		March		April		May		June	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000												
2001												
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												
2010												
2011												
2012												

	July		August		September		October		November		December	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000												
2001												
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												
2010												
2011												
2012												

Flow data will be provided in final report.

Recreational Activities

Four site visits were made in total along the Eaton Wash from July 2010 through December 2012 at the Gwinn Park and Eaton Blanche Park monitoring sites. A summary of the observed recreational activity is provided in Table 5-3.3. Recreational activity related to the wash was very limited. Walking and running (3) was observed adjacent to the wash at Gwinn Park. There were no channel-related recreational activities observed at the Eaton Blanche Park monitoring site.

Three (3) surveys from respondents of the Recreational Use questionnaire were obtained at the Eaton Wash monitoring sites. These respondents ranged in age from 39-65 years, and had been recreating in the area for up to twenty-one years. Table 5-3.4 provides a breakdown of the recreational activities engaged in or observed by the respondents. No REC-1 activity had been observed by the respondents. Running/walking and biking were the most frequently reported activities.

Planned Future Recreational Opportunities

The Rio Hondo Watershed Management Plan, developed by the San Gabriel Valley Council of Governments in 2004, includes a proposed project involving stream and habitat restoration along a tributary of Eaton Wash that flows through the Eaton Canyon Golf Course. This would involve either full or partial removal of the concrete in the tributary to Eaton Wash.

5.3.3 Rubio Wash

Rubio Wash begins as an engineered channel as it daylights from an underground channel at Robles Avenue and Winston Avenue in the City of San Marino. From here it flows for approximately five miles through the cities of San Gabriel and Rosemead, and meets the Rio Hondo at its confluence in the City of El Monte. It is a concrete-lined box channel (with vertical walls) from its upstream end until its confluence with Rio Hondo. Rubio Wash has a designated intermittent REC-1 use.

Accessibility

There are no bike paths or multi-use trails along Rubio Wash. The channel is fenced throughout its length. It flows through mostly residential and commercial areas. It also flows through the San Gabriel Country Club in the City of San Gabriel where the lack of fencing allows for direct access to the wash, and adjacent to Sally Tanner Park in the City of Rosemead where only visual access is possible (see Figure 5-3.5).

FIGURE 5-3.5: ACCESS TO RUBIO WASH

(a) San Gabriel Country Club (b) Sally Tanner Park

Flow Depths in Rubio Wash

The Los Angeles County Flood Control District collects flow and water depth data from flow gauges located in Rubio Wash at Station No. F82C-R at Glendon Way in Rosemead. Flow in the wash is partly regulated by the Las Flores and Rubio debris basins. Daily and monthly flow depth data from 2000 through 2012 was analyzed. Table 5-3.6 presents the statistics of the daily flow depth data over a 13-year period from January 2000 through December 2012. The average daily flow depth for this period was 0.53 inches. The minimum and maximum flow depths were 0.0 inch and 40.2 inches (3.35 ft.), respectively. During this period, flow depth was 0.3 inches or less 50% of the time, and the 90^{th} percentile of flow was 1.6 inches. Figures 5-3.6a and 5-3.6b illustrate daily flow depths during 2012, and monthly average flow depth from October 2000 through December 2012. Further detail of the flow depth conditions is provided in Table 5-3.6, which contains the maximum and minimum average daily flows for each month from January 2000 through December 2012.

FIGURE 5-3.6a: DAILY AVERAGE FLOW IN RUBIO WASH FOR THE YEAR 2012

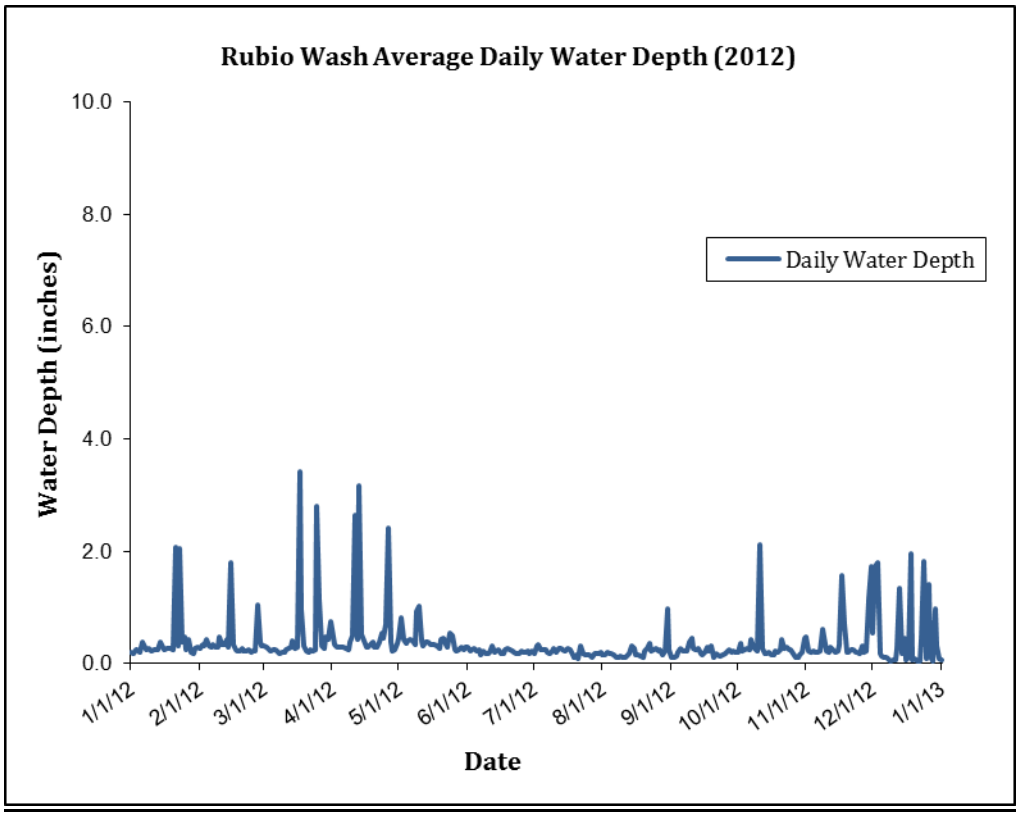


FIGURE 5-3.6: MONTHLY AVERAGE FLOW IN RUBIO WASH FROM 2000 TO 2012

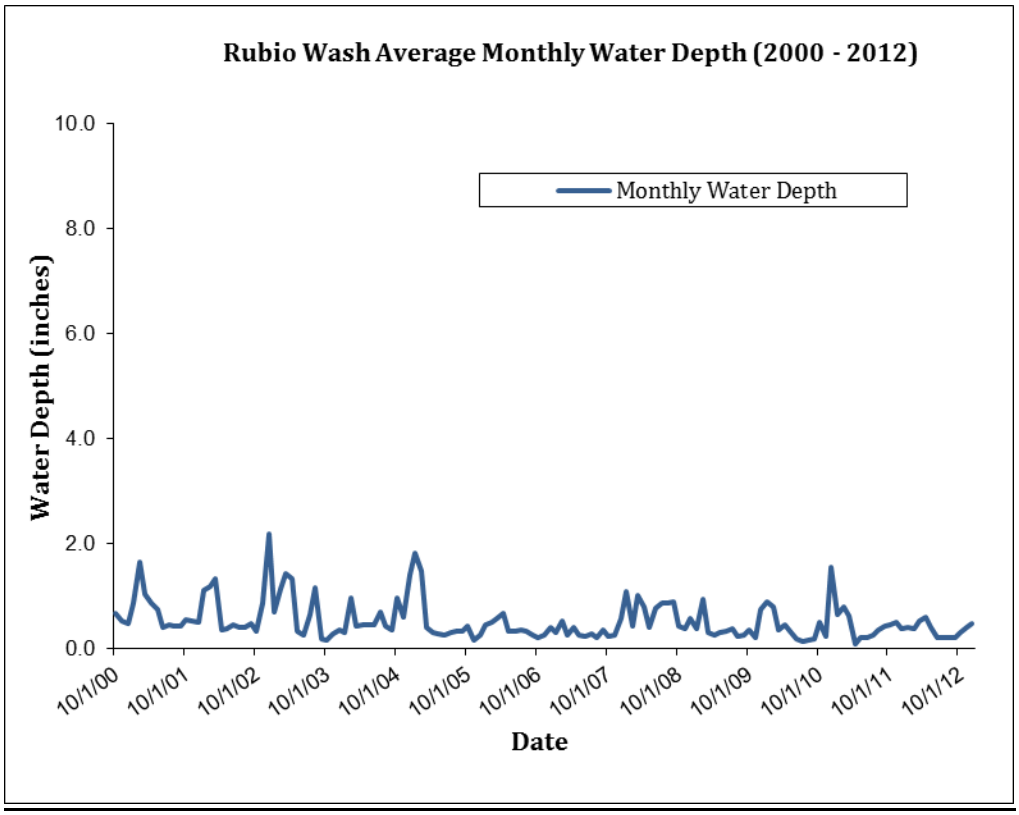


TABLE 5-3.6: AVERAGE MONTHLY MINIMUM AND MAXIMUM FLOWS IN RUBIO WASH (2000-2012)

	January		February		March		April		May		June	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2001	0.312	6.036	0.276	6.84	0.264	2.58	0.324	3.852	0.3	1.776	0.3	0.528
2002	0.216	3.492	0.228	2.364	0	2.148	0	0.96	0.24	1.02	0.288	0.612
2003	0.24	1.92	0.36	9.756	0.36	6.048	0.108	3.672	0.024	3.564	0.12	0.732
2004	0	1.104	0.192	5.952	0.18	3.444	0.24	1.32	0.264	0.912	0.276	0.732
2005	0.06	10.728	0.072	7.824	0.036	2.436	0.084	2.196	0.144	0.924	0.216	0.372
2006	0.084	6.816	0.12	4.176	0.06	5.052	0.096	4.776	0.144	3.108	0.216	0.42
2007	0.12	1.224	0.096	2.988	0.096	0.768	0.12	3.048	0.12	0.372	0.12	0.372
2008	0.024	5.928	0.072	1.812	0.12	1.656	0.18	1.224	0.24	1.872	0.24	1.68
2009	0.144	3.012	0.096	6.444	0.108	1.44	0.156	0.372	0.228	0.612	0.216	0.648
2010	0.024	5.94	0.132	6.252	0.18	2.4	0.096	2.112	0.108	0.492	0.06	0.384
2011	-0.084	1.872	-0.012	3.252	0	7.464	-0.012	0.36	0.012	1.02	0.12	0.444
2012	0.18	2.064	0.204	1.8	0.18	3.408	0.216	3.156	0.216	1.032	0.156	0.324

	July		August		September		October		November		December	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.456	2.376	0.396	1.056	0.36	0.888
2001	0.336	0.78	0.36	0.516	0.312	0.72	0.444	0.828	0.18	3.672	0.228	1.488
2002	0.276	0.48	0.288	0.54	0.324	1.368	0.24	0.444	0.204	4.644	1.92	4.632
2003	0.12	1.32	0.684	1.284	0.048	0.636	0	0.852	0	1.68	0	4.392
2004	0.3	1.236	0.312	0.684	0.252	0.456	0.108	6.708	0.12	1.848	0.732	8.196
2005	0.216	0.372	0.228	0.468	0.12	1.452	0.12	5.352	0.024	0.648	0.12	2.772
2006	0.204	1.164	0.228	0.384	0.156	0.372	0.12	0.456	0.12	0.696	0.12	2.232
2007	0.18	0.396	0.144	0.336	0.048	3.312	0.072	1.932	0.12	3.108	0.084	3.432
2008	0.72	1.764	0.72	1.092	0.408	1.212	0.24	0.888	0	5.088	0.096	5.724
2009	0.24	0.768	0.048	0.408	0.132	0.612	0	2.82	0	0.456	0.036	6.876
2010	0.06	0.264	0	0.396	0.084	0.348	0.06	1.992	0.036	1.8	0	10.98
2011	0.12	0.468	0.24	0.6	0.252	0.768	0.132	4.716	0.156	2.94	0.132	3.072
2012	0.084	0.348	0.108	0.972	0.12	0.456	0.12	2.112	0.168	1.74	0.036	1.968

Recreational Activities

Two site visits were made in total along the Rubio Wash from July 2010 through December 2012 at the San Gabriel Country Club and Eisenhower Park monitoring sites. A summary of the observed recreational activity is provided in Table 5-3.3. No channel-related recreational activity was observed at the Eisenhower Park site. While there were maintenance workers in the channel itself at the San Gabriel Country Club site, the only recreational activity observed was golfing on the greens adjacent to the channel (see Figure 5-3.7). There were no willing respondents for the recreational use questionnaire at these sites.

FIGURE 5-3.7: ACTIVITIES IN AND ALONG RUBIO WASH

(a) golfing

(b) maintenance

Planned Future Recreational Opportunities

The Rio Hondo Watershed Plan includes projects for improvements in a tributary of the Rio Hondo. Staff did not find any other plans for potential development of recreational opportunities along Rubio Wash.

5.3.4 Alhambra Wash

Alhambra Wash is an engineered channel flowing for approximately seven miles from the City of Alhambra through the City of Rosemead until it meets the Rio Hondo in Whittier Narrows, an unincorporated area of Los Angeles County. It is a concrete-lined box channel (with vertical walls) throughout its length and has a designated potential REC-1 use.

Accessibility

There were no bike paths or multi-use trails along Alhambra Wash until late August 2012 when a 0.5-mile trail was opened adjacent to the wash at the border of Vincent Lugo Park in the City of Alhambra. The channel is fenced throughout its length. It flows adjacent to the Alhambra Municipal Golf Course and the Vincent Lugo Park, and through the Whittier Narrows County Golf Course just upstream of its confluence with Rio Hondo, providing visual access to the channel.

FIGURE 5-3.8: ACCESS TO ALHAMBRA WASH AT WHITTIER NARROWS COUNTY GOLF COURSE

Flow Depth in Alhambra Wash

The Los Angeles County Flood Control District collects flow and water depth data from flow gauges located in Alhambra Wash at Station No. F81D-R just above Klingerman Street in Rosemead. Daily and monthly flow depth data from 2000 through 2012 was analyzed. Table 5-3.1 presents the daily flow depth data over a 13-year period from January 2000 through December 2012. The average daily flow depth for this period was 2.68 inches. The minimum and maximum flow depths were 0.0 inch and 82.6 inches (6.88 ft.), respectively. During this period, flow depth was below 2.3 inches 50% of the time, and the 90^{th} percentile of flow was 3.72 inches. Figures 5-3.9a and 5-3.9b illustrate daily flow depths during 2012, and monthly average flow depth from October 2001 through December 2011. Further detail of the flow depth conditions is provided in Table 5-3.7, which contains the maximum and minimum average daily flows for each month from January 2000 through December 2012.

FIGURE 5-3.9a DAILY AVERAGE FLOW IN ALHAMBRA WASH FOR THE YEAR 2012

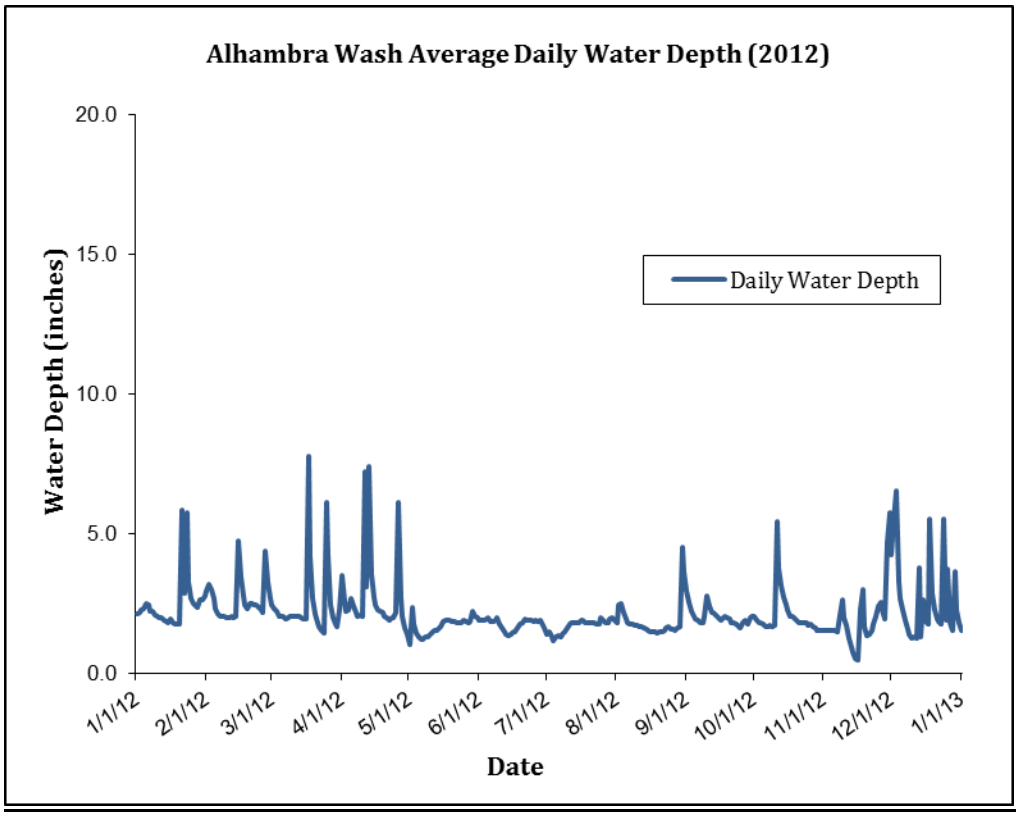


FIGURE 5-3.9b MONTHLY AVERAGE FLOW IN ALHAMBRA WASH FROM 2000 TO 2012

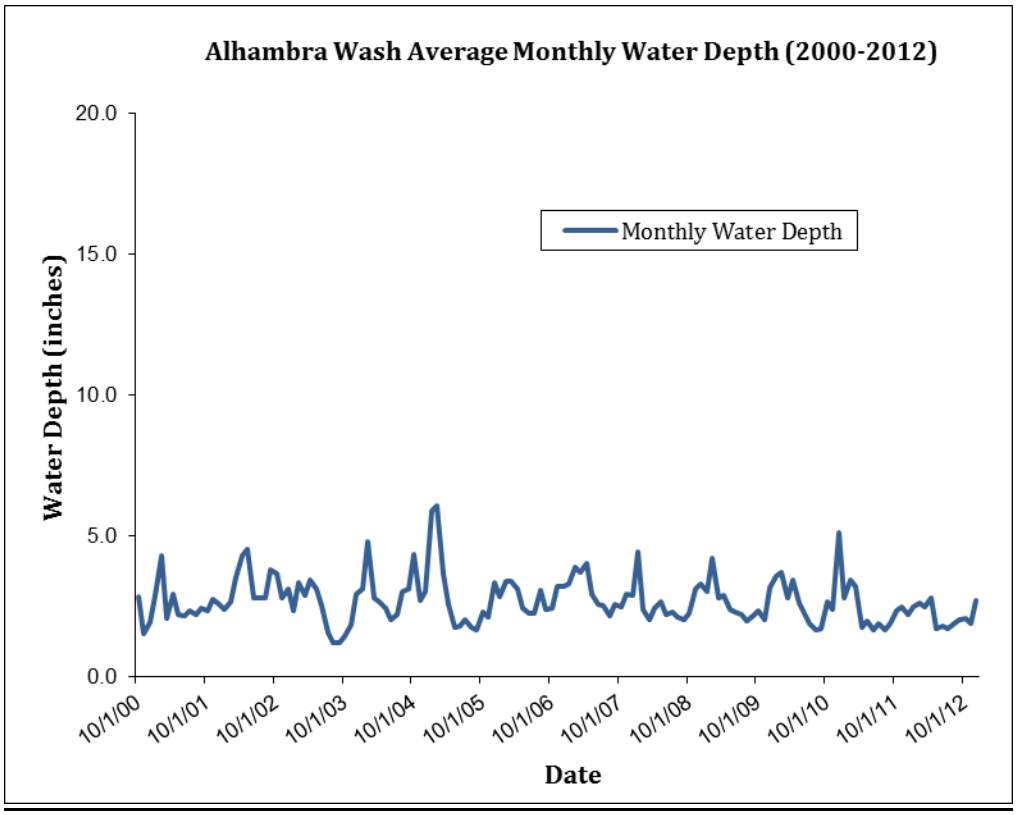


TABLE 5-3.7: AVERAGE MONTHLY MINIMUM AND MAXIMUM FLOWS IN ALHAMBRA WASH (2001-2011)

	January		February		March		April		May		June	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000												
2001	1.54	13.52	1.60	14.65	1.63	5.94	1.56	9.02	2.04	2.63	1.92	2.33
2002	1.92	7.25	2.00	5.18	2.66	5.21	2.86	5.59	2.64	5.77	2.64	3.38
2003	1.30	3.84	1.31	22.38	1.44	18.50	2.71	11.53	2.16	10.13	2.10	3.34
2004	1.56	4.60	1.58	16.73	2.03	7.12	1.80	5.62	2.06	2.75	1.61	2.58
2005	2.54	24.94	2.68	20.59	2.66	9.25	1.45	6.94	1.44	3.40	1.67	2.20
2006	1.92	15.12	2.22	11.02	2.04	12.14	1.92	11.75	1.92	8.47	2.11	2.92
2007	2.50	3.91	2.76	8.92	2.64	4.58	2.65	8.18	2.52	3.68	2.47	2.75
2008	2.04	13.42	0.00	6.49	1.80	2.59	2.17	2.69	1.96	4.42	1.99	2.51
2009	2.04	6.60	2.24	14.05	2.28	4.88	2.52	3.52	1.72	3.37	1.92	3.66
2010	1.13	12.95	1.90	16.18	2.29	7.31	2.40	7.44	2.18	3.34	1.87	2.95
2011	1.88	6.11	2.02	8.57	1.80	14.71	1.56	2.00	1.61	4.57	1.49	1.80

	July		August		September		October		November		December	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000												
2001	1.92	3.41	1.96	2.40	2.11	2.72	2.16	2.64	1.96	9.13	1.92	4.99
2002	2.40	3.74	2.41	3.62	3.10	5.00	2.87	4.13	1.79	12.42	2.06	9.82
2003	1.07	2.35	1.03	1.44	0.98	1.49	0.88	3.18	1.01	4.40	1.78	12.08
2004	1.32	3.20	2.64	3.44	2.88	3.42	2.23	15.98	2.40	5.58	0.08	20.65
2005	1.58	2.42	1.50	2.08	0.96	4.66	1.80	11.76	1.80	3.31	2.77	8.44
2006	1.48	3.10	2.64	3.46	1.91	2.76	2.04	3.42	2.22	4.31	2.05	4.99
2007	1.96	2.82	1.99	2.46	2.08	8.87	2.00	5.95	2.33	8.41	1.75	8.03
2008	2.04	2.51	1.88	2.83	1.82	2.22	1.97	2.78	2.06	11.57	2.04	12.70
2009	2.04	2.70	1.92	2.04	1.80	3.00	1.80	8.08	1.69	2.38	1.81	13.74
2010	1.56	2.64	1.44	1.92	1.50	2.03	1.63	5.08	1.01	6.00	1.80	21.55
2011	1.27	2.20	1.16	2.51	1.69	2.48	1.56	10.39	1.56	6.85	1.56	7.16

Recreational Activities

No sites with public access were available along Alhambra Wash for recreational use monitoring. Vincent Lugo Park was closed during for construction for most of the monitoring period. The only recreational facility where the creek could be accessed visually was the Whittier Narrows County Golf Course, which staff visited during the field reconnaissance phase of the study, but which had restrictions to later visits. Therefore this assessment relies on the information on the physical characteristics of the channel and recreational potential that was collected from four sites along Alhambra Wash during the field reconnaissance effort (from November 2010 to November 2011). Golfing on the greens adjacent to the wash was the only activity observed at that time.

Planned Future Recreational Opportunities

The Rio Hondo Watershed Management Plan includes proposed projects to investigate the feasibility of channel naturalization along certain segments of Alhambra Wash – at Vincent Lugo Park, and behind Whittier Narrows Dam.

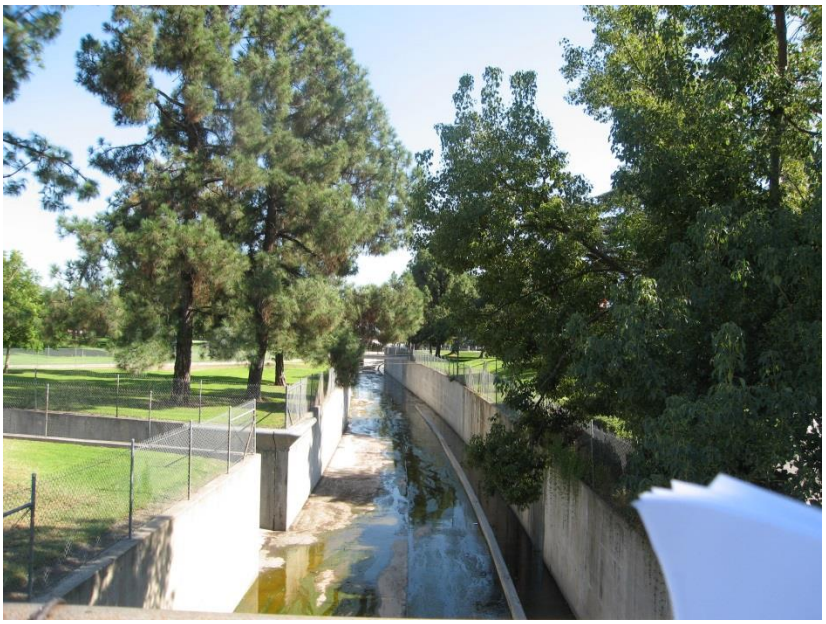
5.3.5 Arcadia Wash

Arcadia Wash begins as an engineered channel where it daylights from an underground channel in the City of San Marino, just south of Orange Grove Avenue at the border of the cities of Sierra Madre and Arcadia. It flows through the City of Arcadia for most of its five-mile length, then through the City of Temple City, and finally has its confluence with the Rio Hondo in the City of El Monte. It is a concrete-lined box channel (with vertical walls) throughout its course. Arcadia Wash has a designated potential REC-1 use.

Accessibility

There are no bike paths or multi-use trails along Arcadia Wash. The channel is fenced throughout its length. It flows through the Arboretum of Los Angeles County and the south eastern corner of the Santa Anita County Golf Course – both in the City of Arcadia. Visual access to the creek would be available to patrons of the facilities at both locations.

FIGURE 5-3.10: ARCADIA WASH AT THE SANTA ANITA GOLF COURSE



Flow Depth in Arcadia Wash

The Los Angeles County Flood Control District collects flow and water depth data from flow gauges located in Arcadia Wash at Station No. F317-R just below Grand Avenue in Temple City. Flow is regulated by several debris basins upstream of the wash. Daily and monthly flow depth data from 2000 through 2012 was analyzed.

Table 5-3.1 presents the daily flow depth data over a 13-year period from January 2000 through December 2012. The average daily flow depth for this period was 1.23 inches. The minimum and maximum flow depths were 0.0 inch and 50.9 inches (4.24 ft.), respectively. During this period, flow depth was below 1.0 inch 50% of the time, and the 90th percentile of flow was 1.71 inches. Figures

5-3.11a and 5-3.11b illustrate daily flow depths during 2012, and monthly average flow depth from October 2000 through December 2012. Further detail of the flow depth conditions is provided in Table 5-3.8 which contains the maximum and minimum average daily flows for each month from January 2000 through December 2012.

FIGURE 5-3.11a DAILY AVERAGE FLOW IN ARCADIA WASH FOR THE YEAR 2012

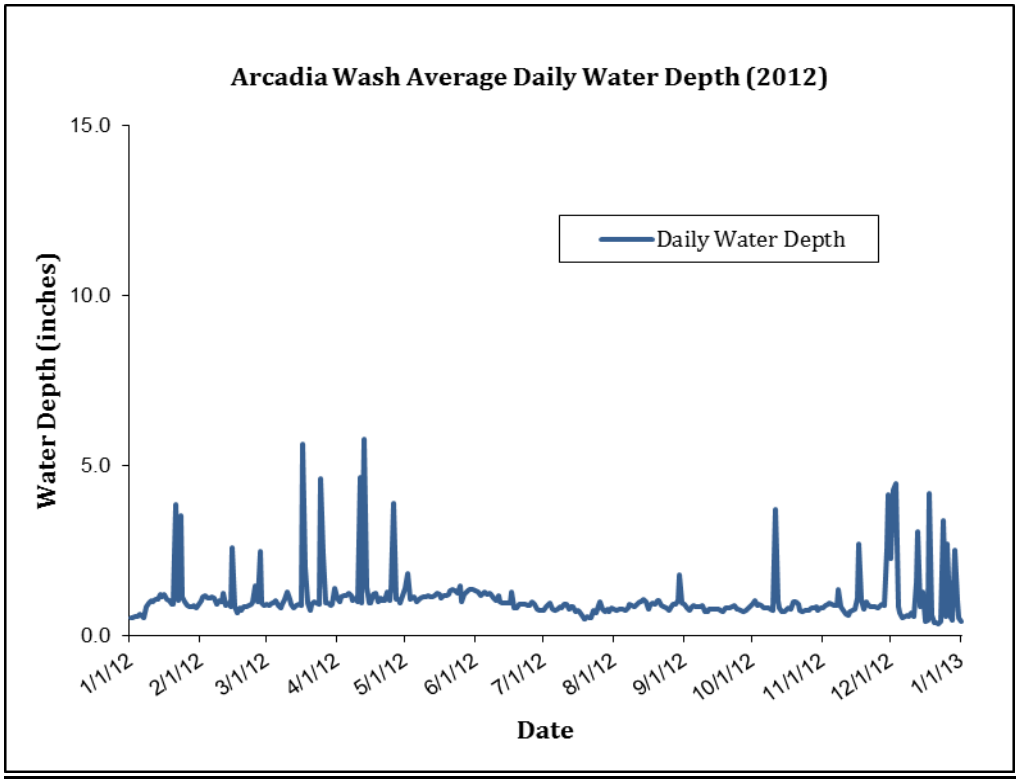


FIGURE 5-3.11b MONTHLY AVERAGE FLOW IN ARCADIA WASH FROM 2000 TO 2012

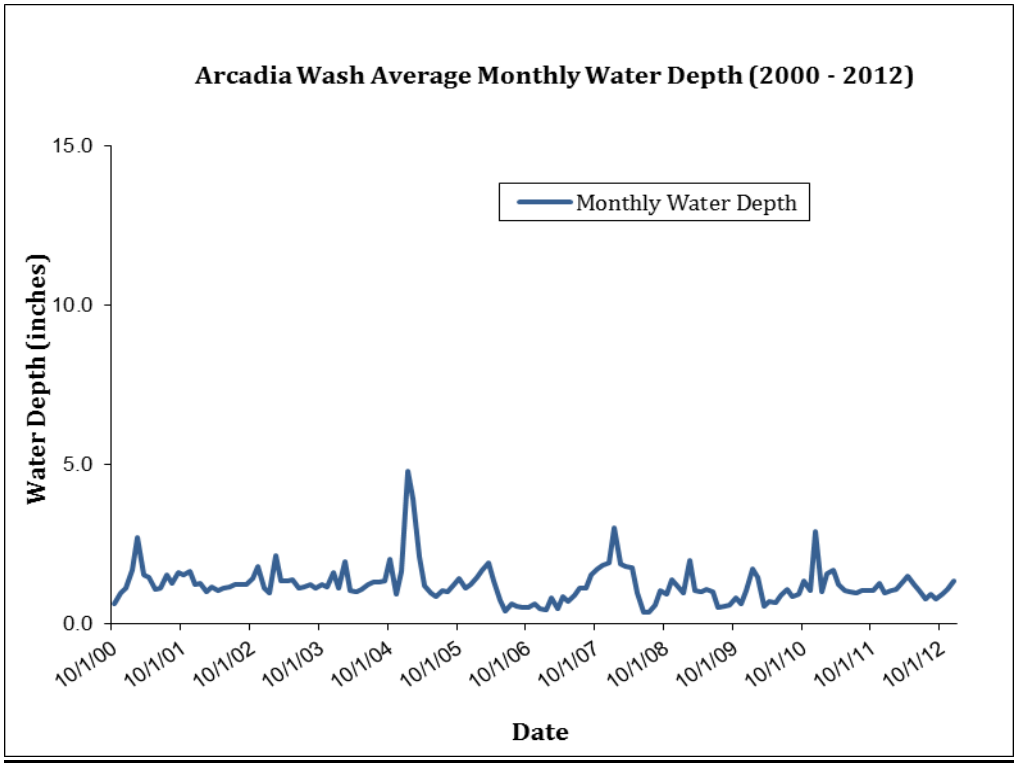


TABLE 5-3.8: AVERAGE MONTHLY MINIMUM AND MAXIMUM FLOWS IN ARCADIA WASH (2000-2012)

	January		February		March		April		May		June	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2001	0.936	9.084	0.912	10.044	1.068	4.632	0.948	5.712	0.828	1.356	0.984	1.236
2002	0.78	5.148	0.816	2.784	0.732	2.7	0.792	1.308	0.876	2.136	1.02	1.38
2003	0.372	1.668	0.828	12.672	0.66	9.804	0.732	8.688	0.912	7.02	0.84	2.712
2004	0.816	3.168	0.756	8.712	0.696	4.728	0.768	1.944	0.924	1.26	0.996	1.392
2005	0.9	16.032	1.104	11.724	1.128	5.796	0.888	4.392	0.828	2.664	0.756	1.008
2006	0.936	9.456	1.056	6.9	0.6	7.716	0.18	6.612	0.408	4.38	0.204	0.708
2007	0.06	1.728	0.192	3.696	0.216	0.708	0.336	4.968	0.468	1.092	0.624	1.092
2008	1.308	9.708	1.332	5.292	1.32	2.952	0.936	2.952	0.192	4.668	0.24	0.552
2009	0.492	4.224	0.672	9.168	0.816	3.372	0.708	1.62	1.008	1.224	0.708	1.812
2010	0.288	9.192	0.264	9.216	0.228	3.216	0.276	3.552	0.42	0.84	0.66	1.128
2011	0.576	4.152	0.624	5.724	0.84	8.976	1.092	1.392	0.66	2.508	0.768	1.668
2012	0.516	3.864	0.672	2.592	0.756	5.628	0.948	5.784	0.996	1.848	0.744	1.344

	July		August		September		October		November		December	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.24	3.336	0.252	1.332	1.02	1.272
2001	1.116	2.04	0	1.608	1.416	1.908	1.224	1.836	1.032	5.604	0.744	3.096
2002	1.08	1.728	1.092	1.356	0.972	1.968	1.26	1.764	1.044	9.06	0.564	5.292
2003	0.924	1.476	1.08	1.368	1.08	1.392	1.056	2.784	0.972	3.264	0.936	7.788
2004	1.2	1.86	1.212	1.524	1.188	1.656	0.444	10.02	0.384	3.588	0.408	10.356
2005	0.768	1.284	0.732	1.26	1.008	3.288	0.912	7.872	0.864	1.464	0.936	4.452
2006	0.432	0.936	0.432	0.684	0.336	0.744	0.18	0.888	0.24	2.7	0.096	2.376
2007	0.948	1.404	0.972	1.404	0.96	6.768	1.524	3.816	1.572	6.216	1.272	5.892
2008	0.276	0.648	0.3	1.164	0.912	1.32	0.552	1.2	0.852	7.596	0.468	8.544
2009	0.276	0.768	0.3	0.804	0.492	0.876	0.42	4.8	0.408	0.864	0.156	9.504
2010	0.732	2.268	0.708	1.152	0.732	1.44	0.528	4.296	0.624	4.104	0.648	13.14
2011	0.672	1.152	0.864	1.344	0.852	1.404	0.708	5.928	0.744	4.188	0.468	5.364
2012	0.504	0.996	0.756	1.812	0.696	0.912	0.708	3.732	0.588	4.152	0.36	4.464

Recreational Activities

No sites with public access were available along Arcadia Wash for recreational use monitoring during the assessment. Vincent Lugo Park was closed for construction and the Santa Anita County Golf Course, which staff visited during the field reconnaissance phase of the study, had access restrictions. Information on the physical characteristics of the channel and recreational potential was collected from six sites along Arcadia Wash during the field reconnaissance effort (from November 2010 to November 2011). No recreational activity was observed at that time.

Planned Future Recreational Opportunities

The Rio Hondo Watershed Management Plan includes proposed projects to investigate the feasibility of channel naturalization in the segment of Arcadia Wash that flows through the Santa Anita County Golf Course.

5.3.6 Sawpit Wash

Sawpit Wash begins as an engineered channel immediately downstream of Sawpit Dam in the City of Monrovia. It flows for more than half its 5.5-mile length through this city and then through an unincorporated area of Los Angeles County to its confluence with the Rio Hondo. It is a concrete-lined box channel (with vertical walls) throughout its course. Sawpit Wash has a designated intermittent REC-1 use.

FIGURE 5-3.12: SAWPIT WASH FLOWS INTO PECK ROAD PARK LAKE

Accessibility

There are no bike paths or multi-use trails along Sawpit Wash. The channel is fenced throughout its length. It does not flow through any parks or other recreational facilities. It drains into Peck Road Park Lake at its confluence with Rio Hondo but is not directly accessible from the Park. It also flows adjacent to Pamela County Park, in the unincorporated area of Los Angeles County, but there are no means of physical access and only limited visual access.

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FIGURE 5-3.13: SAWPIT WASH SEPARATED FROM PAMELA COUNTY PARK BY TWO LEVELS OF FENCING

Flow Depth in Sawpit Wash

The Los Angeles County Flood Control District collects flow and water depth data from flow gauges located in Arcadia Wash at Station No. F194-BR below Live Oak Avenue. Flow is partially regulated by the Sawpit and Santa Fe Dams and several debris basins upstream of the wash. Daily and monthly flow depth data from 2000 through 2012 was analyzed.

Table 5-3.1 presents the daily flow depth data over a 13-year period from January 2000 through December 2012. The average daily flow depth for this period was 1.98 inches. The minimum and maximum flow depths were 0.0 inch and 59.9 inches (4.99 ft.), respectively. During this period, flow depth was below 1.1 inches 50% of the time, and the 90^{th} percentile of flow was 4.48 inches. Figures 5-3.14a and 5-3.14b illustrate daily flow depths during 2012, and monthly average flow depth from October 2000 through December 2012. Further detail of the flow depth conditions is provided in Table 5-3.9 which contains the maximum and minimum average daily flows for each month from January 2000 through December 2012.

FIGURE 5-3.14a DAILY AVERAGE FLOW IN SAWPIT WASH FOR THE YEAR 2012

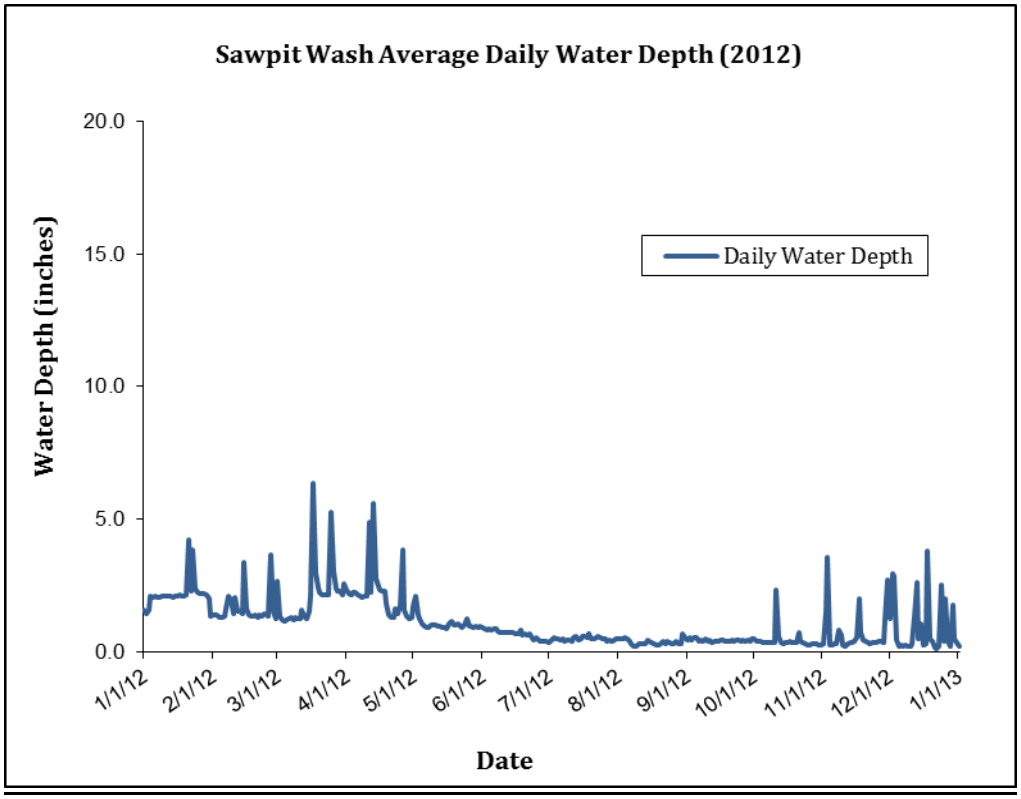


FIGURE 5-3.14b MONTHLY AVERAGE FLOW IN SAWPIT WASH FROM 2000 TO 2012

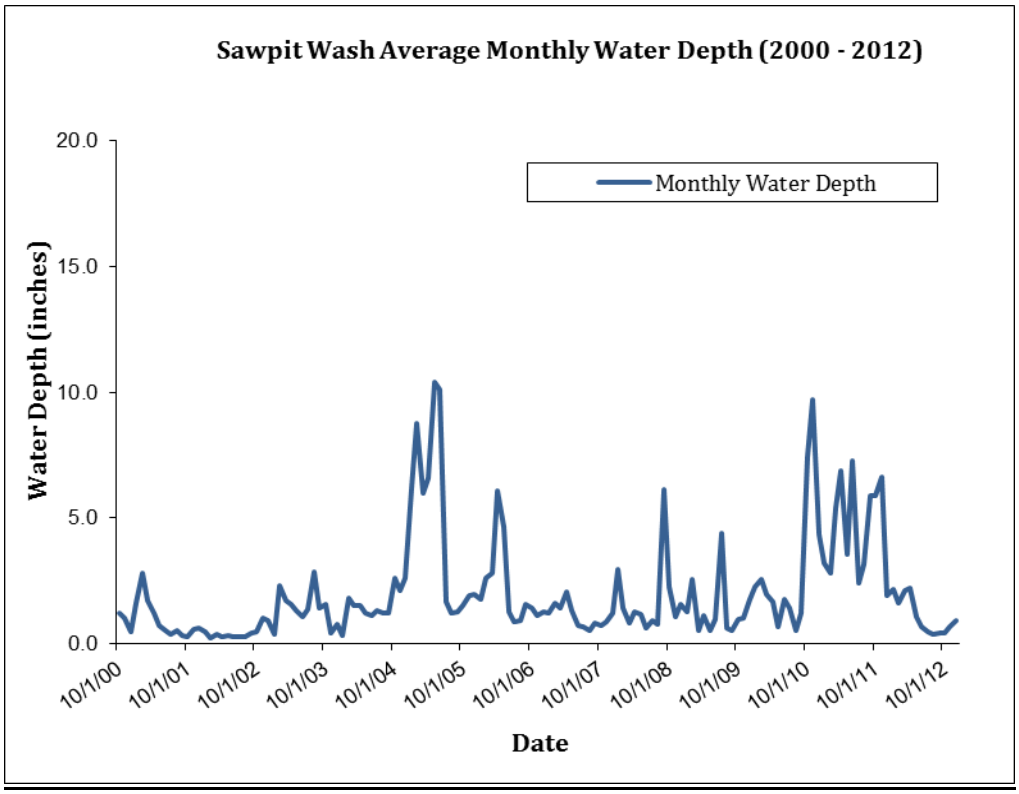


TABLE 5-3.9: AVERAGE MONTHLY MINIMUM AND MAXIMUM FLOWS IN SAWPIT WASH (2000-2012)

	January		February		March		April		May		June	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2001	0.324	12.084	0.168	11.376	0.384	6.096	0.636	5.232	0.468	1.272	0.42	1.248
2002	0.036	4.452	0.06	1.86	0.084	2.052	0.18	1.14	0.168	1.896	0.192	0.516
2003	0.252	0.444	0.384	14.808	0.696	11.448	0.708	8.952	0.948	7.068	0.912	2.496
2004	0	2.016	0.228	11.616	1.08	4.944	1.2	2.376	1.08	1.344	0.612	1.452
2005	3.336	15.78	2.796	15.948	0	21.204	0.672	14.376	4.176	14.832	3.504	15.972
2006	1.02	9.432	1.716	8.88	1.104	8.4	0.792	13.992	0.06	14.496	1.116	1.344
2007	1.092	2.088	0.852	4.356	0.42	2.376	1.836	6.036	0.636	1.92	0.648	0.804
2008	0.252	9.768	0.444	3.564	0.42	1.992	0.456	1.512	0.468	5.028	0.456	1.08
2009	0.636	3.528	1.38	8.076	0.06	2.352	0.42	1.428	0.3	1.116	0.42	1.356
2010	0.492	8.94	1.524	8.652	1.62	4.824	0.516	4.812	0.48	2.088	0.504	9.252
2011	2.412	6.468	0.696	9.264	2.088	11.784	1.296	18.048	0.288	14.34	0.408	14.496
2012	1.344	4.224	1.248	3.66	1.152	6.36	1.224	5.616	0.84	2.112	0.384	0.912

	July		August		September		October		November		December	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.828	3.804	0.588	1.68	0.312	0.612
2001	0.252	1.128	0.252	1.728	0.216	0.72	0.216	0.492	0.108	5.916	0.06	2.712
2002	0.216	0.348	0.204	0.348	0.216	0.744	0.288	0.912	0.204	8.988	0.18	5.484
2003	0.972	3.624	0.948	14.112	0.936	7.164	0	7.068	0.264	1.956	0.24	7.824
2004	1.152	1.452	1.128	1.416	1.128	1.656	1.14	12.972	1.752	4.044	1.104	11.016
2005	0.06	3.66	1.116	1.5	1.08	3.432	1.092	8.94	1.128	2.388	1.104	5.4
2006	0.432	1.248	0.66	1.452	1.356	1.872	1.032	1.812	1.08	1.62	1.08	2.592
2007	0.492	0.852	0.396	0.804	0.204	6.516	0.216	2.472	0.372	4.608	0.216	4.464
2008	0.696	1.152	0.444	0.948	0.468	15.156	0.384	15.852	0.708	5.808	0.864	7.296
2009	0.06	17.616	0.468	1.788	0.396	0.744	0.372	3.684	0.96	1.056	1.032	9.528
2010	0.408	10.74	0.372	0.816	0.672	4.092	1.236	14.448	1.668	13.476	1.56	14.928
2011	1.8	5.976	1.608	11.16	1.632	11.46	1.608	14.172	1.56	17.784	1.464	3.768
2012	0.348	0.66	0.192	0.66	0.348	0.54	0.24	2.34	0.192	3.54	0.12	3.792

Recreational Activities

No sites with public access were available along Sawpit Wash for recreational use monitoring. Information on the physical characteristics of the channel and recreational potential was collected from seven sites along Arcadia Wash during the field reconnaissance effort (from November 2010 to November 2011). No recreational activity was observed during that time.

Planned Future Recreational Opportunities

The Rio Hondo Watershed Management Plan does not contain any proposed projects to increase the recreation potential in or along Sawpit Wash.

5.4 TRIBUTARIES OF MIDDLE LOS ANGELES RIVER (REACHES 3 AND 4)

For the purpose of reporting results, the tributaries of the middle Los Angeles River include Verdugo Wash and Burbank Western Channel in Reach 3 and Tujunga Wash and Pacoima Wash in Reach 4 of the Los Angeles River.

5.4.1 Verdugo Wash

Verdugo Wash is the first of two major tributaries of the Los Angeles River in Reach 3 – moving upstream from the estuary. It is approximately 9.56 miles in length and most of its entire course is within the City of Glendale - from the uppermost engineered section just upstream of Dunsmore Avenue and Honolulu Avenue in Crescenta Valley to its confluence with the Los Angeles River. The entire wash is concrete-lined with vertical walls. The Basin Plan designates potential water contact recreation and intermittent non-contact recreation as beneficial uses of the wash.

Accessibility.

There are no bike paths or multi-use trails along Verdugo Wash. The channel is fenced throughout its length. It flows along the edge of the Crescenta Valley County Park, and through the Oakmont Country Club and Glorietta Park, providing visual access to the wash.

FIGURE 5-4.1: VISUAL ACCESS TO VERDUGO WASH

(a) Crescenta Valley Park

(b) Glorietta Park

Flow Depth in Verdugo Wash

The Los Angeles County Flood Control District collects flow and water depth data from flow gauges located in Verdugo Wash at Station No.F252-R at Estelle Avenue. Flow is partially regulated by several debris basins. Daily and monthly flow depth data from 2000 through 2012 was analyzed. Table 5-4.1 presents the statistics of the daily flow depth data over a 13-year period from January 2000 through December 2012.

TABLE 5-4.1: DAILY AVERAGE FLOW DEPTH STATISTICS FOR THE MAJOR TRIBUTARIES OF THE MIDDLE LOS ANGELES RIVER 2000-2012 (IN INCHES)

Station Location	Mean Depth	Min Depth	Depth Percentile					Max Depth	% Non-zero Depth
			10%	25%	50%	75%	90%		
Verdugo Wash	1.73	0.00	0.77	1.02	1.32	1.99	2.59	46.3	99.95%
Burbank Western Channel	1.92	0.59	1.14	1.37	1.67	2.12	2.90	53.5	99.95%
Pacoima Wash*	1.72	1.56	0	0	0	0.48	5.40	87.7	34.3%

*Based on manual measurements taken from August 2011 through May 2012 by the City of Los Angeles.

The average daily flow depth for this period was 1.73 inches. The minimum and maximum flow depths were 0-inch and 46.3 inches (3.90 ft.) respectively. During this period, flow depth was 1.32-inches or less 50% of the time, and the 90th percentile of flow was 2.59 inches. Figures 5-4.2a and 5-4.2b illustrate daily flow depths during 2012, and monthly average flow depth from October 2000 through December 2012. Further detail of the flow depth conditions is provided in Table 5-4.2 which contains the maximum and minimum average daily flows for each month from January 2000 through December 2012.

FIGURE 5-4.2a DAILY AVERAGE FLOW IN VERDUGO WASH FOR THE YEAR 2012

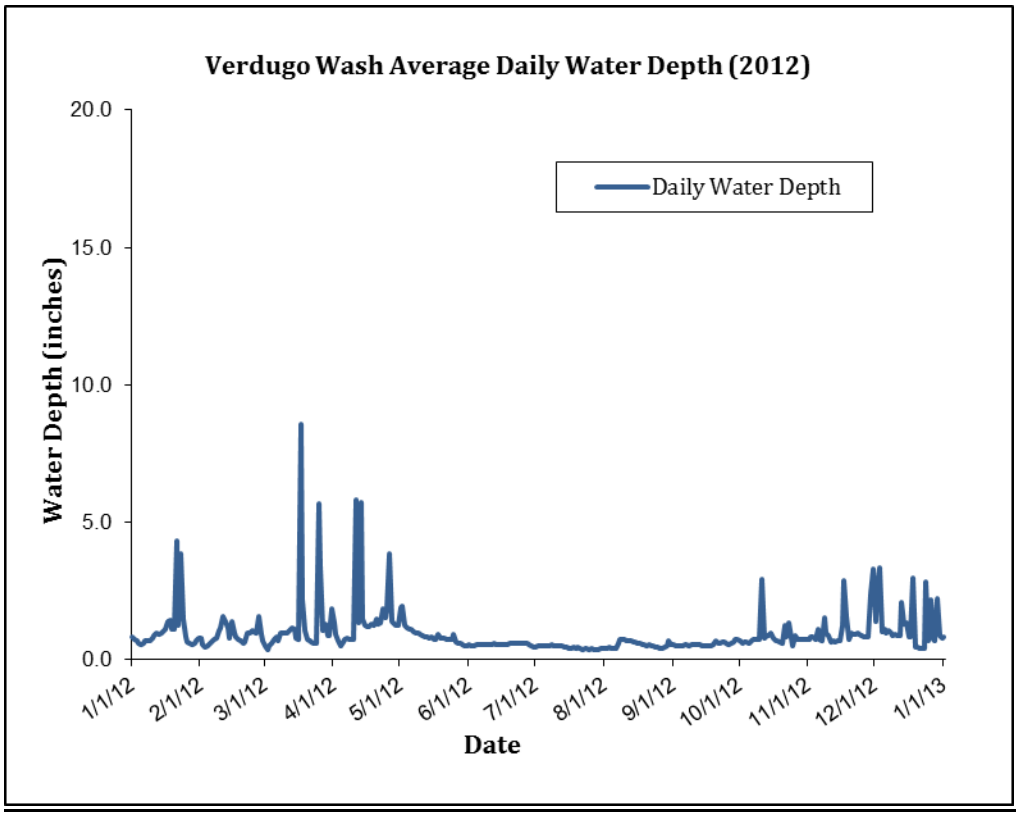


FIGURE 5-4.2b MONTHLY AVERAGE FLOW IN VERDUGO WASH FROM 2000 TO 2012

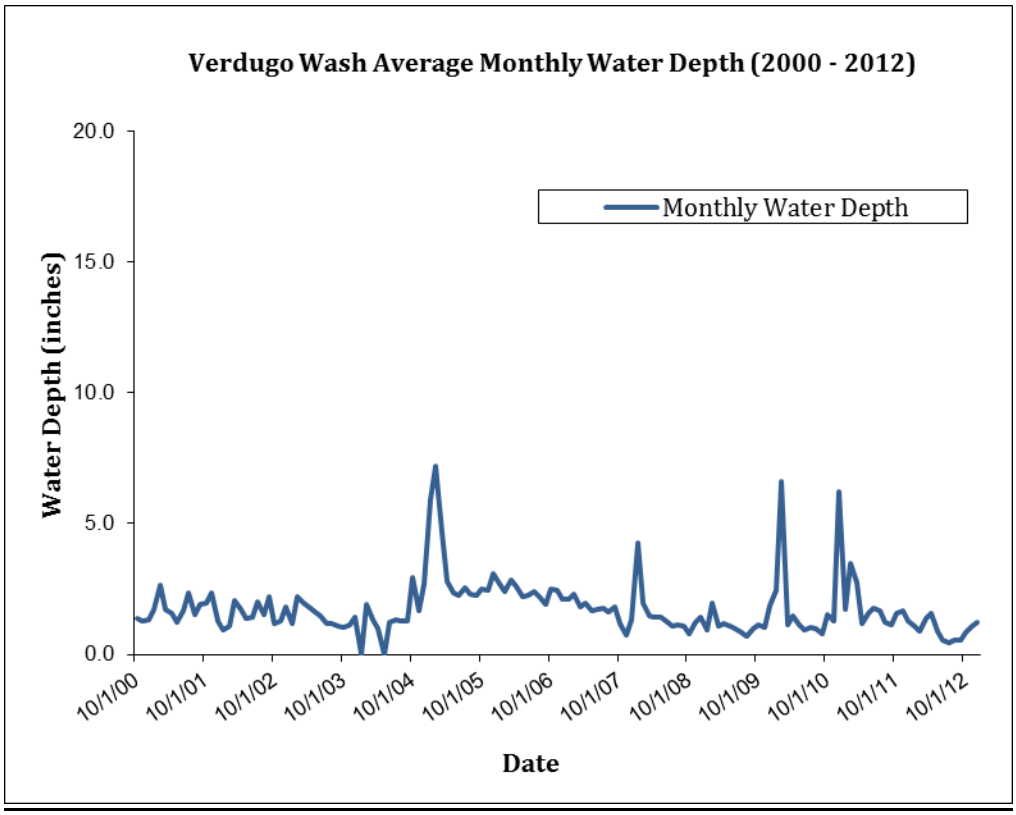


TABLE 5-4.2: AVERAGE MONTHLY MINIMUM AND MAXIMUM FLOWS IN VERDUGO WASH (2000-2012)

	January		February		March		April		May		June	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	1.21	4.40	1.36	10.40	1.68	9.25	1.68	6.97	1.18	2.26	1.02	1.28
2001	0.96	8.36	0.94	9.47	1.32	4.85	1.22	5.75	0.96	1.38	1.08	2.52
2002	0.41	4.61	0.35	2.33	1.44	3.13	1.07	2.33	1.01	1.93	0.92	1.92
2003	1.08	1.45	1.15	13.25	1.28	10.61	1.38	9.01	1.22	7.09	1.22	1.79
2004	0.96	2.52	0.94	7.80	0.82	4.57	0.80	2.00	0.59	1.03	1.08	1.32
2005	2.68	21.41	2.28	19.37	3.12	11.84	2.52	5.36	2.00	3.74	2.04	2.65
2006	1.92	12.83	1.70	8.05	1.84	9.50	1.69	9.02	1.94	5.83	2.11	2.46
2007	1.92	2.50	1.92	5.57	1.68	2.02	1.68	2.94	1.56	1.80	1.56	1.80
2008	1.02	14.45	1.56	3.10	1.44	1.62	1.32	1.56	1.22	2.12	1.08	1.44
2009	0.49	2.16	0.84	8.33	0.79	2.00	0.97	1.48	0.92	1.33	0.83	1.81
2010	0.00	9.86	0.00	21.62	0.13	5.24	0.96	5.57	1.03	1.37	0.55	1.19
2011	0.79	6.31	0.01	12.08	-1.94	10.91	0.64	2.80	0.48	2.10	1.46	1.96
2012	0.54	4.31	0.46	1.57	0.35	8.54	0.48	5.78	0.49	1.92	0.46	0.59

	July		August		September		October		November		December	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	0.96	1.80	0.92	1.84	0.90	1.98	0.92	4.21	1.15	1.33	1.20	1.38
2001	2.16	2.75	0.60	3.98	1.20	4.09	1.44	3.10	1.08	7.08	0.48	7.18
2002	1.32	2.30	0.84	3.12	1.33	3.00	0.89	1.61	0.14	6.04	0.84	6.65
2003	1.02	1.38	0.96	1.48	0.96	1.32	0.72	1.85	0.90	2.48	0.96	7.50
2004	1.20	1.42	1.20	1.32	1.20	1.32	1.32	14.86	1.43	2.75	1.43	15.05
2005	2.26	2.72	2.12	2.62	1.94	4.19	2.03	9.04	2.16	2.81	2.40	7.13
2006	2.26	2.66	1.88	2.56	1.80	2.16	1.92	3.00	2.02	3.12	1.80	3.53
2007	1.68	1.92	1.32	2.09	1.36	7.40	0.84	1.46	0.44	0.84	0.84	2.24
2008	1.08	1.20	1.08	1.33	0.96	1.38	0.60	1.30	0.60	8.47	0.80	7.00
2009	0.80	0.90	0.06	1.10	0.74	1.14	0.60	2.22	0.55	1.75	0.72	10.74
2010	0.82	1.20	0.72	1.21	0.72	0.97	0.96	2.89	0.40	7.28	0.84	17.17
2011	1.32	1.91	1.08	1.32	0.98	1.32	0.72	5.35	1.08	4.94	0.82	4.31
2012	0.36	0.52	0.38	0.73	0.48	0.71	0.49	2.90	0.62	3.26	0.40	3.34

Recreational Activities

Twelve site visits were made in total along Verdugo Wash from July 2010 through December 2012 at Glorietta Park, Crescenta Valley Park and an in-stream monitoring site. A summary of the observed recreational activity is provided in Table 5-4.3a. The most common recreational activities observed were walking/running (47), walking pets (28) and picnicking (22). These activities were observed to take place along the grassy areas adjacent to the fenced in channel. No water contact recreation was observed at any of the monitoring sites.

Fifteen surveys were obtained from respondents of the Recreational Use questionnaire at the Verdugo Wash monitoring sites. These respondents ranged in age from 16-86 years, and had been recreating in the area for up to forty years. Table 5-4.4 provides a breakdown of the recreational activities engaged in or observed by the respondents. No REC-1 activity was reported. The most common activity engaged in and observed by respondents were walking (13) and picnicking (8).

FIGURE 5-4.3(a) PET-WALKING ALONG VERDUGO WASH

Future Planned Recreational Opportunities

While no watershed management plan currently exists for the Verdugo Wash, its confluence with the Los Angeles River has been recognized as an “Opportunity Area” for potential development of recreational opportunities in the City of Los Angeles’ Los Angeles River Revitalization Master Plan (LARRMP). Restoration of this confluence area also features as part of the Los Angeles River Ecosystem Restoration Integrated Feasibility Report, alternative 20 (see figure 5-4.3b).

FIGURE 5-4.3B: ILLUSTRATIONS OF THE VERDUGO WASH LOS ANGELES RIVER CONFLUENCE BEFORE AND AFTER RESTORATION (SOURCE Los Angeles River Ecosystem Restoration Integrated Feasibility Report (ACOE, 2013))

TABLE 5-4.3: RECREATIONAL ACTIVITY OBSERVED IN AND ALONG THE MAJOR TRIBUTARIES OF MIDDLE LOS ANGELES RIVER DURING FIELD MONITORING

	# of site visits	Swimming	Wading	Fishing	Biking	Running/Walking	Skateboarding	Other
Verdugo Wash	12				3	47	1	55
Burbank Western Channel	7				5	18	1	14
Tujunga Wash	12				10	66	1	14
Pacoima Wash	5				10	67	3	7

*Others: Horseback Riding, Sports, Maintenance, Bird/Wildlife watching, Walking Pets, Picnicking, Sunbathing, Sightseeing, Educational Activities, Photoshoot, Reading, Illegal Dumping

TABLE 5-4.4: RECREATIONAL ACTIVITY REPORTED BY SURVEY RESPONDENTS ALONG THE MAJOR TRIBUTARIES OF MIDDLE LOS ANGELES RIVER

#	Water body	# of Surveys	Age	Frequency of visits	Historical Use	Swimming		Fishing		Wading		Kayaking	
						Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.
1	Verdugo Wash	15	16-86	1/mo-7/wk	2wks-40yrs								
2	Burbank Western Channel	3	42-67	3/wk-7/wk	2mo-30yrs						2		
3	Tujunga Wash	7	19-50	2/wk-2/day	2mo-5yrs				1				
4	Pacoima Wash	10	20-75	2/mo-5/wk	1day-12yrs								

#	Biking				Walking				Running				Skateboarding				Others	
	In Channel		Adjacent		In Channel		Adjacent		In Channel		Adjacent		In Channel		Adjacent			
	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.
1	1			3	9	1	1	13	10			2	8			2	3	17
2		1		1		1	3	1		1				1				2
3			2	4			4	5			3	6				2	2	12
4				3			6	10			5	10					2	18

5.4.2 Burbank Western Channel

Burbank Western Channel is the second of two major tributaries of the Los Angeles River in Reach 3, moving upstream from the estuary. It is an engineered channel with its upstream end in the Sun Valley area of the City of Los Angeles, and the majority of its 6-mile length flowing through the City of Burbank. It eventually meets the Los Angeles River in the City of Los Angeles, just south of the borders of the cities of Burbank and Glendale. The Burbank Western Channel runs adjacent to the Santa Ana (5) Freeway for a significant portion of its length. The entire channel is concrete-lined with vertical walls. The Basin Plan designates potential water contact recreation and intermittent non-contact recreation as beneficial uses of the channel

Accessibility

Burbank Western Channel runs through the south-eastern corner of the Los Angeles Equestrian Center at its confluence with the Los Angeles River and an equestrian trail runs adjacent to the channel for about a quarter of a mile in this segment. There are also segmented bike paths along the channel, which is fenced on both sides, providing only visual access to it. Aside from a small pocket park -- Compass Park at Lake Street in Burbank which abuts the channel -- there are no other recreational facilities along the channel.

FIGURE 5-4.4 ACCESS TO BURBANK WESTERN CHANNEL

(a) LA Equestrian Center

(b) Bike path at Jackson St./Morgan Ave in Burbank

Flow Depth in Burbank Western Channel

The Los Angeles County Flood Control District collects flow and water depth data from flow gauges located in Burbank Western Channel at Station No. E285-R at Riverside Drive. Flow is regulated by several debris basins on its tributaries and is significantly influenced by discharges from the Burbank Water Reclamation Plant. Daily and monthly flow depth data from 2000 through 2012 was analyzed.

Table 5-4.1 presents the daily flow depth data over a 13-year period from January 2000 through December 2012. The average daily flow depth for this period was 1.92 inches. The minimum and maximum flow depths were 0.0 inch and 53.5 inches (4.46 ft.), respectively. During this period, flow depth was less than 1.7 inches 50% of the time, and the 90^{th} percentile of flow was 2.90 inches. Figures 5-4.5a and 5-4.5b illustrate daily flow depths during 2012, and monthly average flow depth from October 2000 through December 2012. Further detail of the flow depth conditions is provided in Table 5-4.5 which contains the maximum and minimum average daily flows for each month from January 2000 through December 2012.

FIGURE 5-4.5a DAILY AVERAGE FLOW IN BURBANK WESTERN CHANNEL FOR THE YEAR 2012

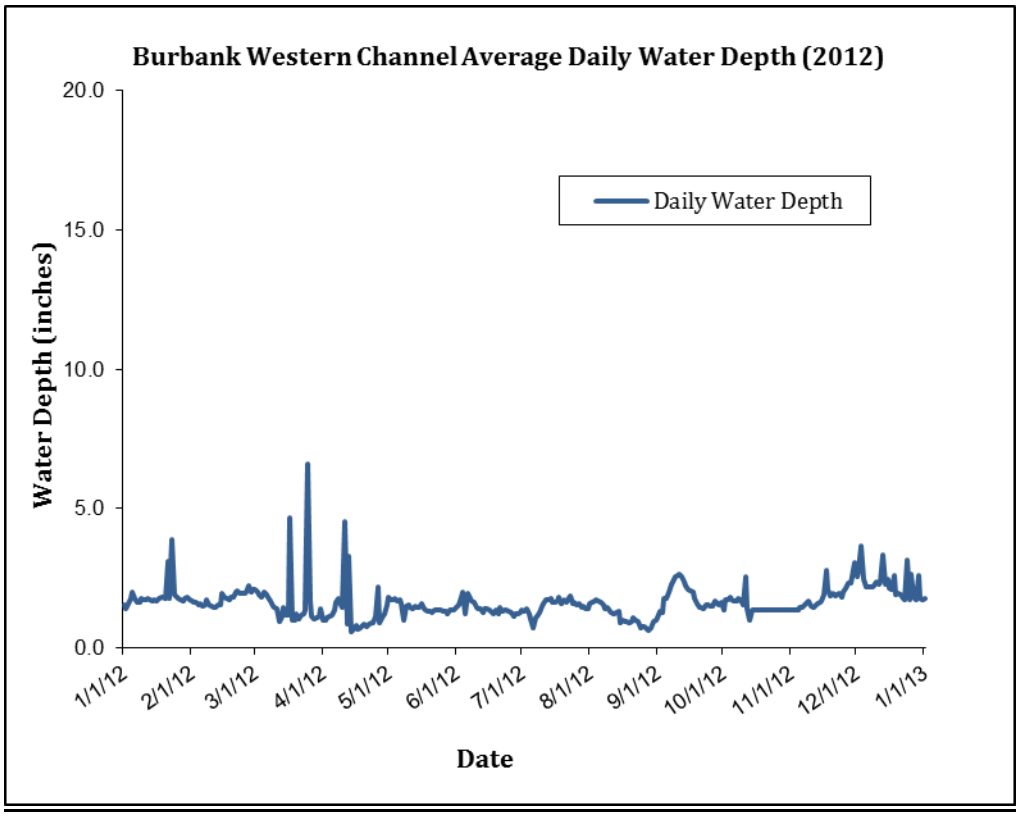


FIGURE 5-4.5b MONTHLY AVERAGE FLOW IN BURBANK WESTERN CHANNEL FROM 2000 TO 2012

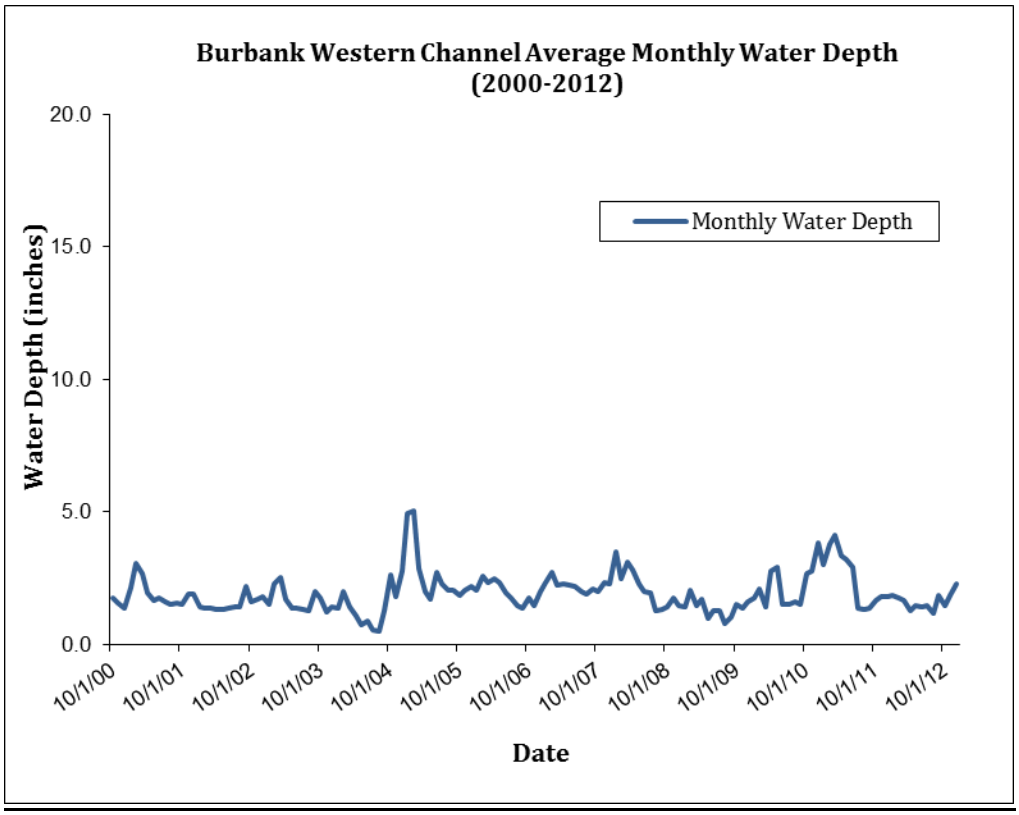


TABLE 5-4.5: AVERAGE MONTHLY MINIMUM AND MAXIMUM FLOWS IN BURBANK WESTERN CHANNEL (2000-2012)

	January		February		March		April		May		June	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	1.30	3.53	0.96	7.14	1.16	7.13	0.90	5.86	1.42	1.74	1.50	1.76
2001	1.40	8.05	1.60	9.83	1.50	7.25	1.62	4.99	1.33	1.79	1.60	2.14
2002	0.61	3.72	1.25	1.85	1.15	1.69	1.20	1.46	1.20	2.23	1.28	1.50
2003	1.37	1.63	1.43	13.63	1.44	7.60	1.03	6.76	1.12	4.49	1.26	1.55
2004	1.25	1.70	1.13	7.68	1.12	4.60	0.58	2.81	0.60	0.96	0.84	0.96
2005	2.64	13.84	2.16	12.26	1.80	5.99	1.66	4.66	1.57	2.36	2.10	3.24
2006	1.34	9.72	1.92	7.25	1.73	7.30	1.96	7.54	2.00	4.27	1.72	2.24
2007	1.96	3.37	1.96	4.62	1.88	2.76	2.08	3.65	1.98	2.36	1.86	2.62
2008	1.96	10.37	2.08	4.86	2.42	3.67	2.50	3.40	1.76	2.82	1.86	2.12
2009	1.15	3.05	0.94	8.33	0.89	2.15	1.37	2.02	0.68	1.36	0.83	1.68
2010	0.23	7.37	1.27	9.16	1.07	3.88	2.30	4.43	2.66	3.28	1.32	2.11
2011	2.59	4.02	2.89	6.78	2.89	16.90	2.78	3.73	2.81	4.28	2.60	3.35
2012	1.42	3.88	1.43	2.21	0.92	6.60	0.59	4.51	1.01	1.81	1.14	1.98

	July		August		September		October		November		December	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	1.31	1.91	1.44	2.06	1.50	2.15	1.54	3.44	1.37	1.72	0.97	1.57
2001	1.39	1.82	1.40	1.63	1.37	1.68	0.79	1.93	1.25	4.91	1.13	4.62
2002	1.28	1.56	1.33	1.57	1.33	2.38	1.33	1.76	1.36	4.49	1.37	5.09
2003	1.16	1.51	0.70	1.44	0.68	2.12	1.02	2.08	0.88	2.09	1.08	4.62
2004	0.13	0.80	0.00	1.28	0.12	2.82	1.70	8.69	1.16	4.46	1.52	13.69
2005	1.70	3.31	1.74	2.51	1.66	1.87	1.50	6.52	1.61	2.42	1.92	3.52
2006	1.56	1.96	1.09	1.81	1.08	5.71	1.27	2.18	1.30	1.74	1.56	3.10
2007	1.82	2.18	1.75	2.08	1.76	1.52	1.19	3.04	2.16	4.76	1.98	3.88
2008	1.64	2.12	0.85	1.52	1.06	1.57	0.82	2.53	0.97	6.48	1.02	6.07
2009	0.79	1.78	0.61	0.92	0.83	1.85	0.83	3.13	1.14	1.64	0.74	6.36
2010	1.26	1.74	1.49	1.79	1.31	1.85	2.21	4.20	1.99	4.12	2.44	10.96
2011	1.18	1.50	1.12	1.42	1.26	1.49	1.27	3.95	1.48	4.86	1.51	4.50
2012	0.72	1.86	0.62	1.73	1.08	2.66	1.01	2.56	1.37	3.04	1.72	3.66

Recreational Activities

Five site visits were made in total along Burbank Western Channel from July 2010 through December 2012 at the Los Angeles Equestrian Center and the bike paths (at Jackson St/Morgan Ave. and Tulare Ave/Naomi St.). A summary of the observed recreational activity is provided in Table 5-4.3. The most common recreational activities observed were walking/running (15), and horseback riding (11). No water contact recreation was observed at these monitoring sites.

A total of three surveys were obtained from respondents of the Recreational Use questionnaire at Burbank Western Channel monitoring sites. Two of the respondents were 42 years of age and the third was 67 years old. They had been recreating in the area for 2 months, 15 years, and 30 years, respectively. Table 5-4.4 provides a breakdown of the recreational activities engaged in or observed by the respondents. Wading was the only REC-1 activity reported by two of the three respondents. Walking was the most common activity engaged in and observed by respondents.

FIGURE 5-4.6 ACTIVITY ALONG BURBANK WESTERN CHANNEL

Future Planned Recreational Opportunities

No watershed management plan currently exists for the Burbank Western Channel. However, the City of Burbank has studied the feasibility of constructing a continuous bike path and parkway along the Burbank Western Channel, which would expand recreational opportunities (Snyder and Horn, 2005). Also, **the Los Angeles River Revitalization Master Plan** proposes a non-motorized bridge linking this path to a proposed Los Angeles River path in this segment.

5.4.3 Tujunga Wash

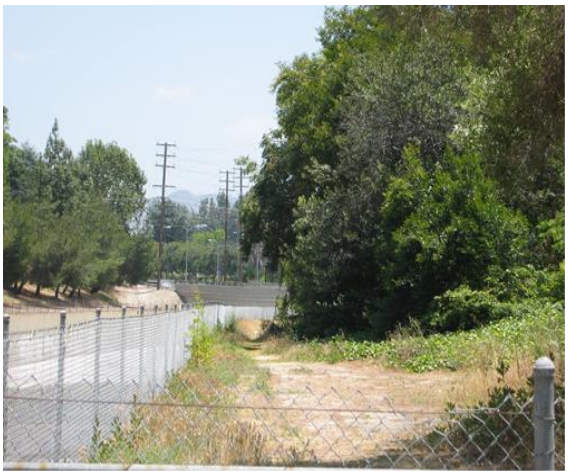
Tujunga Wash is one of two major tributaries of the Los Angeles River in Reach 4, moving upstream from the estuary. The engineered section flows as a concrete-lined channel with vertical walls for 12.7 miles from its upstream end, below Hansen Dam, to its confluence with the Los Angeles River in the Studio City area of the City of Los Angeles. The Basin Plan designates potential water contact recreation and intermittent non-contact recreation as beneficial uses of the channel.

Accessibility

The Tujunga Wash Greenway which includes a multi-use trail and a man-made stream run along both sides of Tujunga Wash for one-mile from Vanowen Street to Oxnard Street in the Valley Glen area of the City of Los Angeles. This provides visual access to the wash in this segment. However, the nature of the fencing prevents direct access to the wash. Also, just upstream of its confluence with the Los Angeles River, Tujunga Wash flows adjacent to Moorpark Park in Studio City, providing visual access.

FIGURE 5-4.7: ACCESS TO TUJUNGA WASH

(a) Greenway to the left of fenced-off channel



(b) Wash runs along the edge of Moorpark Park

Depth of Flows in Tujunga Wash

The Los Angeles County Flood Control District (LACFCD) does not maintain a flow gauge in Tujunga Wash, therefore historical flow depth data was not available for this water body. However, as part of the RECUR effort, LACFCD manually collected flow and water depth measurements in Tujunga Wash from September 2011 through August 2012. These results are provided in Table 5-4.6. The range of flow depths for these monitoring events was 0.72 – 5.76 inches.

TABLE 5-4.6: FLOW DEPTHS IN TUJUNGA WASH

Date	Max Depth (in)	Min Depth (in)	Vel (fps)	Water Width (ft)	Flow Rate (cfs)
September 26, 2011	0.72	0	0.6	2.33	0.04
November 30, 2011	2.16	0	1.8	4.5	0.73
February 22, 2012	5.76	0	4.4	16.5	12.67
May 07, 2012	1.80	0	2.6	4.0	0.78
July 10, 2012	1.20	0	0.5	1.9	0.05
August 20, 2012	1.20	0	0.8	2.2	0.09

Recreational Activities

Twelve site visits were made in total along Tujunga Wash at the Tujunga Wash Greenway, Moorpark Park, an at an in-stream monitoring site from July 2010 to December 2012. A summary of the observed recreational activity is provided in Table 5-4.3. The most common recreational activities observed were walking/running (66), and biking (10). The majority of these activities occurred along the Tujunga Wash Greenway. No water contact recreation was observed at these monitoring sites.

A total of seven surveys were obtained from respondents of the Recreational Use questionnaire at the Tujunga Wash monitoring sites. These respondents ranged in age from 17 to 50 years of age, and had been recreating in the area for up to five years. Table 5-4.4 provides a breakdown of the recreational activities engaged in or observed by the respondents. Fishing was the only REC-1 activity reported by the respondents. Walking/running and biking were the most common activity engaged in and observed by respondents.

Future Planned Recreational Opportunities

The Tujunga Pacoima Watershed Plan was developed by The River Project, an environmental organization, in 2008. The plan includes the following goals

- Optimize Local Water Resources to Reduce Dependence on Imported Water
- Improve Surface and Groundwater Quality
- Restore Hydrologic Function to the Watershed While Maintaining Public Safety (including restoration of natural/bioengineered streambanks, daylighting/re-establishing tributary streams)
- Enhance Quality and Connectivity of Native Terrestrial and Riparian Habitats (including creation of habitat corridors along Tujunga and Pacoima Washes)
- Improve and Increase a network of Public Open Space (incudes improving connectivity and access to Tujunga and Pacoima Washes and the Angeles National Forest)
- Create Green Transit Linkages and Recreational Access (includes enhancement and expansion of recreational opportunities to meet needs of local communities)

- Promote Watershed Awareness and Increase Stewardship through Public Outreach and Education

Proposed projects within the plan include construction of continuous and separate bicycle and pedestrian paths along the wash, as well as adjacent parks and greenways to increase access.

The Los Angeles River Revitalization Master Plan identifies the confluence of Tujunga Wash and the Los Angeles River as an opportunity area for development of a river greenway and for constructed wetlands for regional water quality treatment.

5.4.4 Pacoima Wash

Pacoima Wash is the second of the two major tributaries of the Los Angeles River in Reach 4, moving upstream from the estuary. The engineered channel begins immediately downstream of Lopez Dam, and flows through San Fernando, Pacoima, and Panorama City, before going underground and flowing through a covered channel to join Tujunga Wash in Van Nuys. The wash flows as a relatively shallow, gently sloping, trapezoidal channel throughout its 8.3-mile length.The Basin Plan designates potential water contact recreation and intermittent non-contact recreation as beneficial uses of the wash.

Accessibility

There are no bike paths or multi-use trails along Pacoima Wash. The channel is fenced throughout its length. However, direct access does not appear to be an uncommon event as the wash has been the site of several swiftwater rescues over the years. This may be due in part to the gently sloping sides and relatively low depth of the wash. Pacoima Wash flows adjacent to Sepulveda Recreational Center in Panorama City and Paxton Park in Pacoima where it is visually accessible.

FIGURE 5-4.8: VISUAL ACCESS TO PACOIMA WASH

(a) adjacent to the Sepulveda Rec Center

(b) adjacent to Paxton Park (at upper left corner)

Flow Depth in Pacoima Wash

The Los Angeles County Flood Control District collects flow and water depth data from flow gauges located in Pacoima Wash at Station No.E285-R at Riverside Drive. Flow is regulated by several debris basins on its tributaries and is significantly influenced by discharges from the Burbank Water Reclamation Plant. Daily and monthly flow depth data from 2000 through 2012 was analyzed.

Table 5-4.1 presents the daily flow depth data over a 13-year period from January 2000 through December 2012. The average daily flow depth for this period was 1.92 inches. The minimum and maximum flow depths were 0-inch and 53.5 inches (4.46 ft.) respectively. During this period, flow depth was less than 1.7-inches 50% of the time, and the 90th percentile of flow was 2.90 inches. Figures 5-4.5a and 5-4.5b illustrate daily flow depths during 2012, and monthly

average flow depth from October 2000 through December 2012. Further detail of the flow depth conditions is provided in Table 5-4.5 which contains the maximum and minimum average daily flows for each month from January 2000 through December 2012.

FIGURE 5-4.4a DAILY AVERAGE FLOW IN PACOIMA WASH FOR THE YEAR 2012

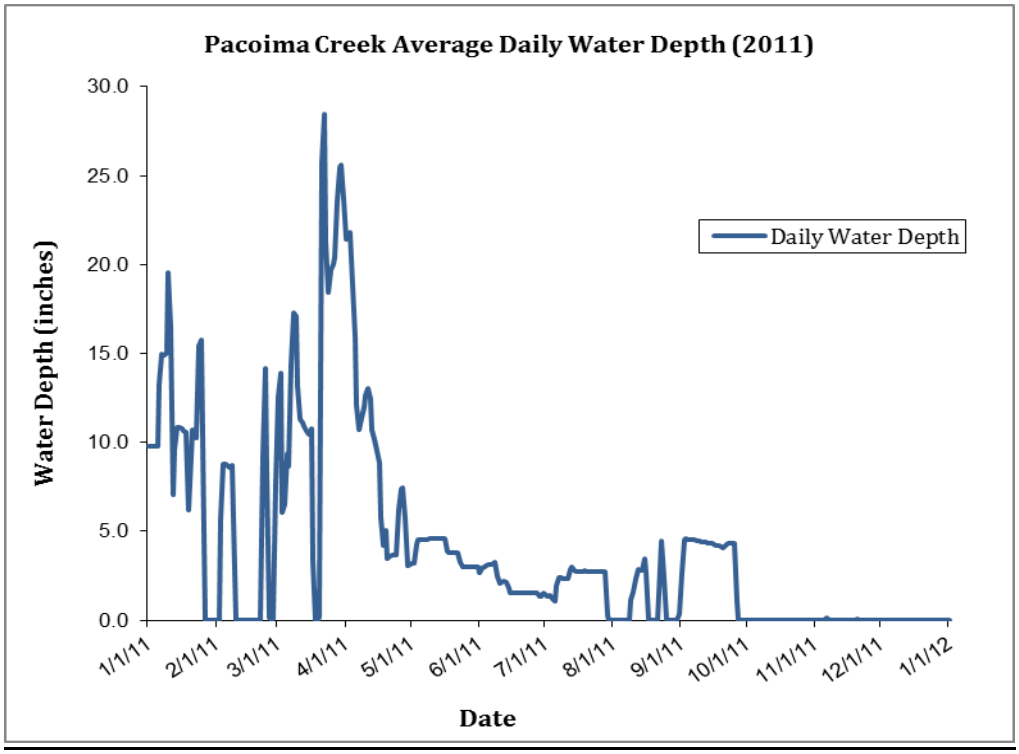


FIGURE 5-4.4b MONTHLY AVERAGE FLOW IN PACOIMA WASH FROM 2000 TO 2012

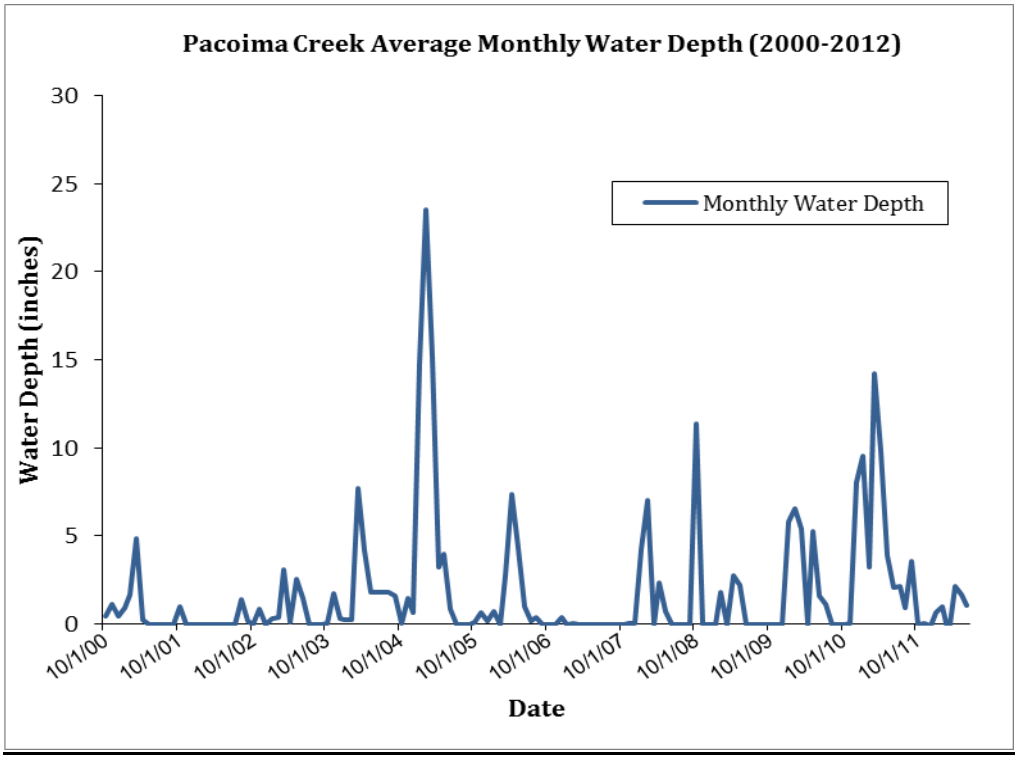


TABLE 5-4.5: AVERAGE MONTHLY MINIMUM AND MAXIMUM FLOWS IN PACOIMA WASH (2000-2012)

	January		February		March		April		May		June	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	0	0.48	0	5.16	0.12	3.252	-0.48	4.452	-0.48	4.332	0.588	0.84
2001	0.48	5.064	0.48	8.592	0.6	8.4	0	3.504	0	0.072	0	0.18
2002	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	3.612	0	4.512	0	9.852	0.12	0.204	0.12	7.368	1.224	1.788
2004	0.24	0.852	0.24	0.336	0.24	38.532	1.8	10.368	1.8	1.8	1.8	2.064
2005	0	62.04	0	65.148	12.048	22.188	0	18.072	0	30.048	0	20.724
2006	0	22.956	0	0	0	25.56	0	20.04	0	21.504	0	4.68
2007	0	0	0	0.192	0	0	0	0.204	0	0	0	0
2008	0	35.004	0	32.268	0	0	0	18.984	0	13.332	0	0
2009	0	0	0	16.704	0	0	0	8.676	0	8.28	0	0
2010	0	25.056	0	13.572	0	17.004	0	0	0	11.064	0	9.228
2011	0	19.56	-0.396	14.184	0	28.488	3.072	21.78	3	4.608	1.332	3.276
2012	-0.228	5.568	-0.18	11.46	-0.66	0	-0.084	9.228	0	6.588	0	9.576

	July		August		September		October		November		December	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2000	0.48	0.6	0.48	0.624	0.48	0.48	0.48	0.48	0.48	7.224	0.48	0.48
2001	0	0	0	0	0	0	0	9.72	0	0	0	0
2002	0	0.6	0.6	1.68	0	1.68	0	0	0	11.688	0	0
2003	0	0	0	0	0	0	0	0.672	0	21.216	0.24	1.524
2004	1.8	1.8	1.8	1.8	0	1.8	0	0.3	0	5.496	0	11.652
2005	0	21.696	0	0	0	0	0	0.9	0	4.728	0	4.356
2006	0	3.72	0	4.836	0	0	0	0	0	0	0	5.64
2007	0	0	0	0	0	0	0	0.096	0	0.204	0	0.48
2008	0	0	0	0	0	0	0	16.668	0	0	0	0
2009	0	0	0	0	0	0	0	0.048	0	0	0	7.644
2010	0	11.508	0	0	0	0	0	0.048	0	0.276	0	32.76
2011	-0.468	3.012	-0.384	4.44	-0.996	4.572	0	0	0	0.168	-0.144	0
2012												

Recreational Activities

Five site visits were made in total along Pacoima Creek at the Paxton Park and Sepulveda Recreation Center monitoring sites from July 2010 to December 2012. A summary of the observed recreational activity is provided in Table 5-4.3. The most common recreational activities observed were walking/running (67), and biking (10). The majority of these activities occurred at the Paxton Park monitoring site. No water contact recreation was observed at these monitoring sites.

A total of ten surveys were obtained from respondents of the Recreational Use questionnaire at Burbank Western Channel monitoring sites. These respondents ranged in age from 20 to 75 years of age, and had been recreating in the area for up to twelve years. A summary of the observed recreational activity is provided in Table 5-4.3. Fishing was the only REC-1 activity reported by the respondents. Walking/running and biking were the most common activity engaged in and observed by respondents.

Future Planned Recreational Opportunities

The Tujunga Pacoima Watershed Plan includes proposed continuous separate bicycle and pedestrian paths along the wash, as well as adjacent parks and greenways to increase access. The Pacoima Wash Vision Plan developed by Pacoima Beautiful (a non-profit organization) echoes the goals of the management plan – proposing a series of parks, bike paths, and multi-use trails along the Wash. Figure 5-4.5 depicts one of the visions for Pacoima Wash included in the vision plan.

FIGURE 5-4.5: RENDERING OF VISION FOR MULTI-USE TRAIL ALONG PACOIMA WASH

Source: (LA.Streetsblog.org “End Goal in Pacoima” –September 26, 2011 by Damien Newton)

5.5 Secondary Tributaries of Middle Los Angeles River (Reaches 3 and 4)

For the purpose of reporting, the tributaries of Verdugo Wash, Burbank Western Channel, Tujunga Wash, and Pacoima Wash are referred to as the secondary tributaries of the Middle Los Angeles River.

Verdugo Wash has four engineered tributaries, Dunsmore Canyon Channel, Snover Canyon Channel, Pickens Canyon Channel, and Halls Canyon Channel. It also has a secondary tributary, Snover Canyon Channel which is tributary to Halls Canyon Channel. Burbank Western Channel has one engineered tributary, Las Tunas Canyon Channel.

Tujunga Wash has two engineered tributaries, Haines Canyon Channel and Lopez Canyon Channel. Pacoima Wash also has two engineered channels, May Canyon Channel and Wilson Canyon Creek. These secondary tributaries all flow as concrete-lined vertical channels for varying portions of their lengths (see Table 5-5.1).

Table 5-5.1: Secondary Tributaries of Reach 3 and 4 of the Los Angeles River

Water body	Tributary to	Miles of Engineered Channel (% Engineered)	Channel-Adjacent REC Facilities	Designated REC-1 Use
Dunsmore Canyon Channel	Verdugo Wash	1.68 (49.2%)	Dunsmore Park & Crescenta Park	Intermittent
Snover Canyon Channel	Verdugo Wash	0.35 (43.4%)	none	Intermittent
Pickens Canyon Channel	Verdugo Wash	1.19 (28.3%)	none	Intermittent
Halls Canyon Channel	Verdugo Wash	1.60 (43.5%)	none	Intermittent
Shields Canyon Channel	Halls Canyon Channel	0.80 (75.9%)	none	Intermittent
Las Tunas Canyon Channel	Burbank Western Channel	2.26 (36.1%)	none	Intermittent
Haines Canyon Channel	Tujunga Wash	3.66 (51.5%)	none	Intermittent
Lopez Canyon Channel	Tujunga Wash	1.48 (27.8%)	Hansen Dam Park	Intermittent
May Canyon Channel	Pacoima Wash	0.34 (20.8%)	none	Intermittent
Wilson Canyon Creek	Pacoima Wash	1.34 (40.3%)	none	Existing

Accessibility

There are no bike paths or multi-use trails along the engineered sections of any of these water bodies. The engineered channels are fenced throughout their courses. Only two of these channels flow adjacent to recreational facilities where visual access is possible. Dunsmore Canyon Creek flows adjacent to Dunsmore Park in the City of Glendale. It also flows through Crescenta Valley County Park where it joins Verdugo Wash at their confluence in the City of Glendale. Lopez Canyon Creek Flows through the Hansen Dam Park in the Lake View Terrace area of the City of Los Angeles. (See Figure 5-5.1.)

FIGURE 5-5.1: VISUAL ACCESS TO SECONDARY TRIBUTARIES OF MIDDLE LOS ANGELES RIVER

(a) Dunsmore Channel at Dunsmore Park

(b) Lopez Channel at Hansen Dam Park

Depth of Flows in the Secondary Tributaries of Middle Los Angeles River

The Los Angeles County Flood Control District LACFCD) does not collect flow and water depth data for these tributaries. However, as part of the RECUR effort, the City of Los Angeles (Bureau of Sanitation) and LACFCD manually collected flow and water depth measurements in these channels from September 2011 through July 2012. These results and photo documentation of the flow conditions are provided in Figure 5-5.2 through 5-5.11. These channels are characterized by very low and sometimes non-existent flows.

FIGURE 5-5.2: WATER DEPTH AND FLOW CONDITIONS IN DUNSMORE CANYON WASH - SEPTEMBER 2011 THROUGH AUGUST 2012
(Photos and data provided by County of Los Angeles Department of Public Works)

September 26, 2011

November 30, 2011

February 22, 2012

May 07, 2012

July 10, 2012

August 20, 2012

Date	Max Depth (in)	Min Depth (in)	Vel (fps)	Water Width (ft)	Flow Rate (cfs)
September 26, 2011	0.48	0	1.9	4.0	0.91
November 30, 2011	0.48	0	1.9	4.2	0.32
February 22, 2012	1.2	0	0.9	4.5	0.41
May 07, 2012	0.96	0	0.9	4	0.29
July 10, 2012	0.36	0	0.9	3	0.08
August 20, 2012	0.60	0	0.9	3.5	0.16

FIGURE 5-5.3: WATER DEPTH AND FLOW CONDITIONS IN SNOVER CANYON WASH SEPTEMBER 2011 THROUGH MAY 2012
(Photos and data provided by County of Los Angeles Department of Public Works)

September 26, 2011

November 30, 2011

February 22, 2012

May 08, 2012

No Photo Taken due to Construction Activity

July 10, 2012

August 20, 2012

Date	Max Depth (in)	Min Depth (in)	Vel (fps)	Water Width (ft)	Flow Rate (cfs)
September 26, 2011	0.12	0	-	-	0.0005
November 30, 2011	0	0	0	0	0
February 22, 2012	-	0	-	-	0
May 08, 2012	-	-	-	-	-
July 10, 2012	-	-	-	-	-
August 20, 2012	-	-	-	-	-

FIGURE 5-5.4: WATER DEPTH AND FLOW CONDITIONS IN PICKENS CANYON WASH- SEPTEMBER 2011 THROUGH AUGUST 2012
(Photos and data provided by County of Los Angeles Department of Public Works)

September 26, 2011

November 30, 2011

February 22, 2012

May 07, 2012

July 10, 2012

August 20, 2012

Date	Max Depth (in)	Min Depth (in)	Vel (fps)	Water Width (ft)	Flow Rate (cfs)
September 26, 2011	<0.12	0	0	0	0
November 30, 2011	0.12	0	-	-	0.002
February 22, 2012	-	-	-	0.3	0.001
May 07, 2012	0.24	0	0.8	1.5	0.02
July 10, 2012	0.24	0	0.9	1.8	0.03
August 20, 2012	0.24	0	0.6	1.5	0.02

FIGURE 5-5.5: WATER DEPTH AND FLOW CONDITIONS IN HALLS CANYON WASH - SEPTEMBER 2011 THROUGH AUGUST 2012
(Photos and data provided by County of Los Angeles Department of Public Works)

September 26, 2011

November 30, 2011

February 22, 2012

May 07, 2012

July 10, 2012

August 20, 2012

Date	Max Depth (in)	Min Depth (in)	Vel (fps)	Water Width (ft)	Flow Rate (cfs)
September 26, 2011	0.36	0	-	-	0.009
November 30, 2011	0.12	0	-	-	0.002
February 22, 2012	-	-	-	0.4	0.01
May 07, 2012	1.08	0	-	0.33	0.004
July 10, 2012	1.32	-	-	0.33	0.006
August 20, 2012	0.72	0	0	0.33	0.001

FIGURE 5-5.6: WATER DEPTH AND FLOW CONDITIONS IN EAGLE (SHIELDS) CANYON WASH SEPTEMBER 2011 THROUGH AUGUST 2012
(Photos and data provided by County of Los Angeles Department of Public Works)

September 26, 2011

November 30, 2011

February 22, 2012

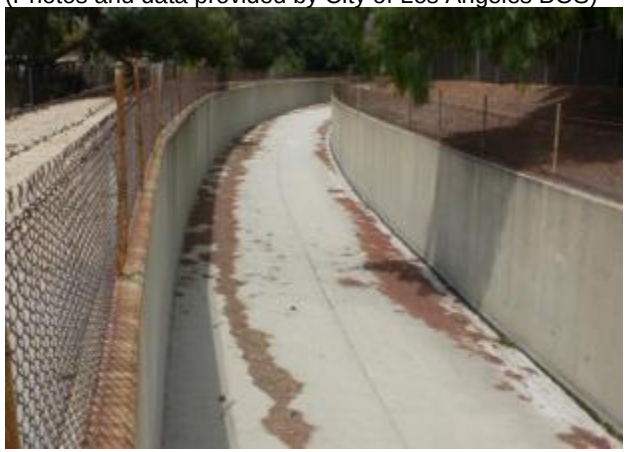
May 07, 2012

July 10, 2012

August 20, 2012

Date	Max Depth (in)	Min Depth (in)	Vel (fps)	Water Width (ft)	Flow Rate (cfs)
September 26, 2011	0.48	0	1.3	2.5	0.21
November 30, 2011	0.60	0	0.9	3.5	0.16
February 22, 2012	0.60	0	1.3	3.5	0.23
May 07, 2012	0.36	0	1.1	3.5	0.12
July 10, 2012	0.36	0	0.8	3	0.07
August 20, 2012	0.36	0	0.8	3	0.07

FIGURE 5-5.7: WATER DEPTH AND FLOW CONDITIONS IN LA TUNA CHANNEL AUGUST 2011 THROUGH MAY 2012
(Photos and data provided by City of Los Angeles BOS)



August 26, 2011

September 7, 2011

September 28, 2011

November 30, 2011

January 31, 2012

May 17, 2012

Date	Max Depth (in)	Min Depth (in)	Max Vel (fps)	Min Vel (fps)	Flow Rate (cfs)
August 26, 2011	0.00	0.00	0.00	0.00	0.00
September 7, 2011	0.00	0.00	0.00	0.00	0.00
September 28, 2011	0.00	0.00	0.00	0.00	0.00
November 30, 2011	0.00	0.00	0.00	0.00	0.00
January 31, 2012	0.00	0.00	0.00	0.00	0.00
May 17, 2012	0.00	0.00	0.00	0.00	0.00

FIGURE 5-5.8: WATER DEPTH AND FLOW CONDITIONS IN HAINES CANYON CHANNEL - AUGUST 2011 THROUGH MAY 2012
(Photos and data provided by City of Los Angeles BOS)

August 26, 2011

September 7, 2011

September 28, 2011

November 30, 2011

January 31, 2012

May 17, 2012

Date	Max Depth (in)	Min Depth (in)	Max Vel (fps)	Min Vel (fps)	Flow Rate (cfs)
August 26, 2011	1.125	0.125	2.85	1.77	2.53
September 7, 2011	0.5	0.0625	2.38	1.12	0.97
September 28, 2011	1	0.125	1.88	1.19	0.43
November 30, 2011	0.625	0.125	2.48	1.05	1.06
January 31, 2012	0.375	0.375	2.36	1.15	1.19
May 17, 2012	1	0.25	2.31	1.63	0.55

FIGURE 5-5.9: WATER DEPTH AND FLOW CONDITIONS IN LOPEZ CANYON CREEK - AUGUST 2011 THROUGH MAY 2012
(Photos and data provided by City of Los Angeles BOS)

August 26, 2011

September 7, 2011

September 28, 2011

November 30, 2011

January 31, 2012

May 17, 2012

Date	Max Depth (in)	Min Depth (in)	Max Vel (fps)	Min Vel (fps)	Flow Rate (cfs)
August 26, 2011	0.625	0.625	0.71	0.66	0.003
September 7, 2011	0.25	0.125	1.04	0.98	0.004
September 28, 2011	0.125	0.125	1.02	0.97	0.003
November 30, 2011	0.25	0.125	0.97	0.91	0.003
January 31, 2012	0.25	0.125	0.87	0.85	0.002
May 17, 2012	0.125	0.125	1.03	0.90	0.002

FIGURE 5-5.10: WATER DEPTH AND FLOW CONDITIONS IN MAY CANYON CREEK AUGUST 2011 THROUGH MAY 2012
(Photos and data provided by City of Los Angeles BOS)

August 26, 2011

September 7, 2011

September 28, 2011

November 30, 2011

January 31, 2012

May 17, 2012

Date	Max Depth (in)	Min Depth (in)	Max Vel (fps)	Min Vel (fps)	Flow Rate (cfs)
August 26, 2011	0.25	0.125	1.27	1.23	0.04
September 7, 2011	0.375	0.0625	1.32	1.28	0.06
September 28, 2011	0.125	0.125	1.02	0.95	0.02
November 30, 2011	0.25	0.125	1.83	1.65	0.07
January 31, 2012	0.5	0.125	2.12	1.95	0.16
May 17, 2012	0.25	0.25	1.75	1.52	0.07

FIGURE 5-5.11: WATER DEPTH AND FLOW CONDITIONS IN WILSON CANYON CHANNEL - AUGUST 2011 THROUGH MAY 2012
(Photos and data provided by City of Los Angeles BOS)

August 26, 2011

September 7, 2011

September 28, 2011

November 30, 2011

January 31, 2012

May 17, 2012

Date	Max Depth (in)	Min Depth (in)	Max Vel (fps)	Min Vel (fps)	Flow Rate (cfs)
August 26, 2011	1.875	0.625	1.99	1.88	0.38
September 7, 2011	1.75	1	3.00	2.93	0.69
September 28, 2011	1.875	0.5	1.87	1.82	0.36
November 30, 2011	2	0.75	3.09	2.86	0.40
January 31, 2012	2	0.5	1.61	1.54	0.33
May 17, 2012	2	0.5	1.47	1.37	0.27

Recreational Activities

Nine site visits were made in total along Dunsmore Canyon Creek at Dunsmore Park and in-stream monitoring sites from July 2010 to December 2012. A summary of the observed recreational activity is provided in Table 5-5.2. The most common recreational activities observed were pet-walking (10) and walking/running (9). All of these activities occurred at the Dunsmore Park monitoring site. No water contact recreation was observed at these monitoring sites. Three surveys were obtained from respondents of the Recreational Use questionnaire at the Dunsmore Park monitoring site. These respondents ranged in age from 19 to 62 years of age, and had been recreating in the area for up to twelve years. Table 5-5.3 provides a breakdown of the recreational activities engaged in or observed by the respondents. Wading (1) was the only REC-1 activity reported by the respondents. Walking/running, picnicking and skateboarding were the most common activity engaged in and observed by respondents.

Eight site visits were made along Lopez Canyon Creek at the Hansen Dam Park and instream monitoring sites. A summary of the observed recreational activity is provided in Table 5-5.2. The most common recreational activity observed was walking/running (8). All observed activity occurred at the Hansen Dam Park. No water contact recreation was observed at these monitoring sites. One survey was obtained from a respondent of the Recreational Use questionnaire at the Hansen Dam monitoring site. The respondent was 50 years of age, and had been recreating in the area for two years. Table 5-5.3 provides a breakdown of the recreational activities engaged in or observed by this respondent. No REC-1 activity was reported by the respondents. Walking/running was the most common activity engaged in and observed by the respondent.

In the absence of any adjacent recreational facility, only in-stream monitoring was conducted in Snover Canyon Channel, Pickens Canyon Channel, Halls Canyon Canyon, Shields Canyon Channel, Las Tunas Canyon Channel, Haines Canyon Channel, May Canyon Channel, and Wilson Canyon Creek. Six site visits were made to each of these channels, except in the case of Snover Canyon Channel where construction activities prevented monitoring and flow measurements on two occasions. Except for walking (2) in the wilderness area adjacent to Snover Canyon Channel, no recreational activity was observed. One survey was obtained from a respondent of the Recreational Use questionnaire close to the Snover Channel in-stream monitoring site. The respondent was 47 years of age, and was visiting the area for the first time. Table 5-5.3 provides a breakdown of the recreational activities engaged in or observed by this respondent. Walking was the only activity engaged in and observed by the respondent.

TABLE 5-5.2: RECREATIONAL ACTIVITY OBSERVED IN AND ALONG THE SECONDARY TRIBUTARIES OF MIDDLE LOS ANGELES RIVER DURING FIELD MONITORING

	# of site visits	Swimming	Wading	Fishing	Biking	Running/Walking	Skateboarding	Other
Dunsmore Canyon	9					9		11
Snover Canyon	6							
Pickens Canyon	6							
Halls Canyon	6							
Shields (Eagle) Cyn	6							
Las Tunas Cyn	6							
Haines Canyon Creek	6							
Lopez Cyn Creek	8				2	8		1
May Canyon Creek	6							
Wilson Canyon Creek	6							

*Others: Horseback Riding, Sports, Maintenance, Bird/Wildlife watching, Walking Pets, Picnicking, Sunbathing, Sightseeing, Educational Activities, Photoshoot, Reading, Illegal Dumping

TABLE 5-2.4: RECREATIONAL ACTIVITY REPORTED BY SURVEY RESPONDENTS ALONG THE SECONDARY TRIBUTARIES OF MIDDLE LOS ANGELES RIVER

#	Water body	# of Surveys	Age	Frequency of visits	Historical Use	Swimming		Fishing		Wading		Kayaking	
						Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.
1	Dunsmore Canyon	3	19-62	2/mo-4/wk	1day-12yrs						1		
2	Snover Canyon	1	47		1day								
3	Pickens Canyon												
4	Halls Canyon												
5	Shields (Eagle) Cyn												
6	Las Tunas Cyn												
7	Haines Cyn Creek												
8	Lopez Cyn Creek	1	50	1/wk	2yrs								
9	May Canyon Creek												
10	Wilson Cyn Creek												

#	Biking				Walking				Running				Skateboarding				Others	
	In Channel		Adjacent		In Channel		Adjacent		In Channel		Adjacent		In Channel		Adjacent			
	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.
1				1	1	1	2	1				1						4
2							1	1										
3																		
4																		
5																		
6																		
7																		
8							1				1	1						2
9																		
10																		

*Others: Bird/wildlife watching, Dog walking, Picnicking, Clean-up Activities, Maintenance, Educational Activities, Horseback Riding, Sports, Painting, Camping, Gang Activity, Cultural Activities

Planned Future Recreational Opportunities

No sub-watershed plan currently exists for any of the secondary tributaries of Middle Los Angeles River. Also, Staff did not find any plans for potential development of recreational opportunities along any of these channels.

5.6 Tributaries of Upper Los Angeles River (Reach 6)

For the purpose of reporting results, the tributaries of the Upper Los Angeles River include Browns Canyon Wash, Aliso Canyon Wash, Bell Creek, Dry Canyon Creek, Dayton Canyon Creek, Arroyo Calabasas, Caballero Creek, and Limekiln Canyon Creek.

5.6.1 Browns Canyon Wash

Browns Canyon Wash is the first tributary just downstream of the confluence of the Los Angeles Rivers Headwaters (Arroyo Calabasas and Bell Creek) in Reach 6. It begins as an engineered channel north of Rinaldi Street in the Chatsworth area of Los Angeles, downstream of the more natural Browns Canyon Creek which begins in the Santa Susana Mountains. From there, if flows for approximately 10.0 miles through Canoga Park to its confluence with the Los Angeles River in the Winnetka area of the City of Los Angeles. The entire wash is concrete-lined with vertical walls. The Basin Plan designates intermittent water contact recreation and non-contact recreation as beneficial uses of the wash.

Accessibility

The Browns Canyon Creek Bike Trail runs adjacent to the wash starting from Rinaldi Street in Chatsworth for a length of approximately 1.7 miles. There is fencing between the channel and path throughout its length allowing for visual but no direct access to the creek. There are no other recreational facilities along the wash.

Figure 5-9.1: Browns Canyon Wash Bike Trail

Flow Depth in Browns Canyon Wash

The Los Angeles County Flood Control District LACFCD) does not have a flow gauge in Browns Canyon Wash and therefore does not collect flow and water depth data from there. However, as part of the RECUR effort, the City of Los Angeles (Bureau of Sanitation) and LACFCD manually collected flow and water depth measurements in Browns Canyon Wash from September 2011 through July 2012. These results and

photo documentation of the flow conditions are provided in Figure 5-6.2. Flow depths ranged from 1to 2.25 inches during this period.

FIGURE 5-6.1: WATER DEPTH AND FLOW CONDITIONS IN BROWN CANYON CREEK AUGUST 2011 THROUGH MAY 2012
(Photos and data provided by City of Los Angeles BOS)

August 25, 2011

September 8, 2011

September 28, 2011

November 30, 2012

January 31, 2012

May 17, 2012

Date	Max Depth (in)	Min Depth (in)	Max Vel (fps)	Min Vel (fps)	Flow Rate (cfs)
August 25, 2011	1	0.125	1.27	1.11	0.76
September 8, 2011	2	0.25	1.06	0.54	1.27
September 28, 2011	1	0.25	1.86	1.47	0.89
November 30, 2011	1	0.25	2.00	1.68	0.86
January 31, 2012	2.25	0.5	2.11	1.97	2.31
May 17, 2012	1	0.25	1.02	0.89	0.60

Recreational Activities

Ten site visits were made in total along Browns Canyon Wash at the Browns Canyon Bike Trail and in-stream monitoring sites from July 2010 to December 2012. A summary of the observed recreational activity is provided in Table 5-6.1.The most common recreational activities observed were biking (8), walking/running (3), and horseback riding (3). All of these activities occurred at the Browns Canyon Bike Path monitoring site. No water contact recreation was observed at either monitoring site.

Two surveys were obtained from respondents of the Recreational Use questionnaire at Browns Canyon Wash monitoring sites. These respondents were both 17 years of age. One had been recreating in the area for six years and the other for twelve years. Table 5-6.2 provides a breakdown of the recreational activities engaged in or observed by the respondents. Biking (2) and fishing (2) were the most common activity reported. The REC-1 activities reported included fishing, swimming, wading and kayaking. These activities may have been observed in the natural channel just upstream of the monitoring site.

Planned Future Recreational Opportunities

No sub-watershed plan currently exists for Browns Canyon Wash. Also, Staff did not find any plans for potential development of recreational opportunities along the wash.

TABLE 5-6.1: RECREATIONAL ACTIVITY OBSERVED IN AND ALONG THE SECONDARY TRIBUTARIES OF UPPER LOS ANGELES RIVER DURING FIELD MONITORING

	# of site visits	Swimming	Wading	Fishing	Biking	Running/Walking	Skateboarding	Other
Brown Canyon Wash	10				8	3		7
Aliso Canyon Wash	10					5	1	3
Bell Creek	14							
Dry Canyon Creek	6							
Dayton Canyon Creek	6							
Arroyo Calabasas	6							
Caballero Creek	6							
Limekiln Canyon Creek	6							

*Others: Horseback Riding, Walking Pets, Cultural Activities, Smoking, Standing

TABLE 5-6.2: RECREATIONAL ACTIVITY REPORTED BY SURVEY RESPONDENTS ALONG THE SECONDARY TRIBUTARIES OF UPPER LOS ANGELES RIVER

#		# of Survey	Age	Frequency	Historical	Swimming		Fishing		Wading		Kayaking	
						Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.
1	**Brown Canyon Wash**	2	17	1/wk-4/wk	6yrs-12yrs		1		2		1		1
2	**Aliso Canyon Wash**	1	75	5/wk	1yr								
3	**Bell Creek**												
4	**Dry Canyon Creek**												
5	**Dayton Canyon Creek**												
6	**Arroyo Calabasas**												
7	**Caballero Creek**												
8	**Limekiln Canyon Creek**												

#	Biking				Walking				Running				Skateboarding				Others	
	In.		Adj		In.		Adj.		In.		Adj.		In.		Adj.			
	Eng.	Obs	Eng.	Obs	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng.	Obs.	Eng	Obs.
1			2	2			1	2			1	2			1	1	2	4
2							1	1										5
3																		
4																		
5																		
6																		
7																		
8																		

5.6.2 Aliso Canyon Wash

Aliso Canyon Wash is the second tributary of Reach 6, downstream of the confluence of the Los Angeles River's headwaters. It begins as an engineered channel exiting the Aliso Debris Basin just south of the Ronald Regan Freeway (SR 118) in Granada Hills, and flows through Northridge to its confluence with the Los Angeles River in Reseda. The wash is concrete-lined with vertical walls throughout its 6.4-mile length. The Basin Plan designates intermittent water contact recreation and non-contact recreation as beneficial uses of the wash. Limekiln Canyon Wash is its tributary.

Accessibility

Aliso Canyon Wash flows adjacent to Northridge Recreation Center and through Van Alden Park, both in the Northridge area of Los Angeles. The channel is fenced along both sides in these areas providing visual but no direct access to the creek.

FIGURE 5-6.3: VISUAL ACCESS TO ALISO CANYON CREEK

(a) At Northridge Recreational Center

(b) Adjacent to Van Alden Park

Flow Depth in Aliso Canyon Wash

The Los Angeles County Flood Control District LACFCD) does not have a flow gauge in Aliso Canyon Wash and therefore does not collect flow and water depth data from there. However, as part of the RECUR effort, the City of Los Angeles (Bureau of Sanitation) and LACFCD manually collected flow and water depth measurements in Aliso Canyon Wash from September 2011 through July 2012. These results and photo documentation of the flow conditions are provided in Figure 5-6.4. Flow depths ranged from 2 to 4-inches during this period.

FIGURE 5-6.4: WATER DEPTH AND FLOW CONDITIONS IN ALISO CANYON WASH AUGUST 2011 THROUGH MAY 2012
(Photos and data provided by City of Los Angeles BOS)

August 25, 2011

September 8, 2011

September 28, 2011

November 30, 2012

January 31, 2012

May 17, 2012

Date	Max Depth (in)	Min Depth (in)	Max Vel (fps)	Min Vel (fps)	Flow Rate (cfs)
August 25, 2011	2.75	1	1.61	0.43	0.90
September 8, 2011	2	0.75	3.50	2.01	1.77
September 28, 2011	2.375	0.375	3.40	2.12	2.00
November 30, 2011	3	0.75	3.45	0.55	2.09
January 31, 2012	2.5	0.25	5.10	3.55	2.58
May 17, 2012	4	1.5	3.01	1.56	1.16

Recreational Activities

Ten site visits were made in total along Aliso Canyon Wash at the Northridge Recreation Center, Van Alden Park and in-stream monitoring sites from July 2010 to December 2012. A summary of the observed recreational activity is provided in Table 5-6.1. The most common recreational activities observed were walking/running (5). The majority of the activity was observed at Van Alden Park. No water contact recreation was observed at either monitoring site.

One survey was obtained from respondents of the Recreational Use questionnaire at Aliso Canyon Wash monitoring sites. The respondent was 75 years of age, and had been recreating in the area five days a week for one year. Table 5-6.2 provides a breakdown of the recreational activities engaged in or observed by the respondent. Running, picnicking, and bird watching were some of the activities observed by the respondent.

Planned Future Recreational Opportunities

The Los Angeles River Revitalization Master Plan includes the development of the confluence of Aliso Canyon Creek and the Los Angeles River (Aliso Creek Confluence Park) as a proposed project. This area will provide opportunities for habitat restoration, greenways and bike trails as well as water quality treatment via restored wetlands.

5.6.3 Caballero Creek

Caballero Creek is the third of the three tributaries of the Reach 6 downstream of the confluence of the Los Angeles River's headwaters. The engineered section of the creek begins at Rosita Street in the Tarzana area of Los Angeles, and flows as a concrete-lined channel with vertical walls for approximately 4.5 miles before reaching its confluence with the Los Angeles River in Reseda. The Basin Plan designates intermittent water contact recreation and non-contact recreation as beneficial uses of the creek.

Accessibility

Caballero Creek flows adjacent to the El Caballero Country Club in the Tarzana area of the City of Los Angeles, and flows through the north- and south-eastern corners of the club. The channel is fenced along both sides in this area providing visual but no direct access to the creek (see Figure 5-6.5)

FIGURE 5-6.5: CABALLERO CREEK FLOWS ADJACENT TO THE EL CABALLERO COUNTRY CLUB

Flow Depth in Caballero Creek

The Los Angeles County Flood Control District LACFCD) does not have a flow gauge in Caballero Creek and therefore does not collect flow and water depth data from there. However, as part of the RECUR effort, the City of Los Angeles (Bureau of Sanitation) and LACFCD manually collected flow and water depth measurements in Caballero Creek from September 2011 through July 2012. These results and photo documentation of the flow conditions are provided in Figure 5-6.6. Flow depths ranged from 1 to 3-inches during this period.

Recreational Activities

In the absence of recreational facilities with public access along Caballero Creek, all site visits were to the instream monitoring site from July 2010 to December 2012. No recreation was observed at this monitoring site. Also, no surveys were obtained.

Planned Future Recreational Opportunities

No sub-watershed plan currently exists for Caballero Creek. However, plans do exist for the creation of a park on creek-adjacent land located at the confluence of Caballero Creek and the Los Angeles River (MRCA, 2012). This plan is an outgrowth of recognition of the proposed site as an opportunity area in **the Los Angeles River Revitalization Master Plan**.

FIGURE 5-6.6: WATER DEPTH AND FLOW CONDITIONS IN CABALLERO CREEK - AUGUST 2011 THROUGH MAY 2012
(Photos and data provided by City of Los Angeles BOS)

August 25, 2011

September 8, 2011

September 28, 2011

November 30, 2012

January 31, 2012

May 17, 2012

Date	Max Depth (in)	Min Depth (in)	Max Vel (fps)	Min Vel (fps)	Flow Rate (cfs)
August 25, 2011	1	0.375	1.25	1.09	0.14
September 8, 2011	3	0.75	2.63	2.52	1.57
September 28, 2011	2.25	0.375	2.78	2.47	1.07
November 30, 2011	1.875	0.375	1.20	1.06	0.39
January 31, 2012	2.25	1	1.58	0.93	0.66
May 17, 2012	2.625	0.75	2.97	1.76	3.56

5.6.4 Bell Creek

Bell Creek is one of two headwaters of the Los Angeles River. It originates in the Simi Hills in Ventura County and flows as a natural creek through Bell Canyon. It flows as an engineered channel starting from the Bell Canyon Debris Basin in the West Hills area of Los Angeles to its confluence with Arroyo Calabasas in Canoga Park where the Los Angeles River begins (see Figure 5-6.7). This engineered channel is approximately 3 miles in length starting from this confluence as a trapezoidal concrete-lined channel with sloping walls until just upstream of its confluence with Dayton Creek when it transitions to a vertical-walled concrete channel. The Basin Plan designates intermittent water contact recreation and non-contact recreation as beneficial uses of the creek.

FIGURE 5-6.7: CONFLUENCE OF BELL CREEK (RIGHT) AND ARROYO CALABASAS (LEFT)

Accessibility

There are no bike paths or recreational facilities adjacent to the engineered portion of Bell Creek and it is fenced throughout its length, therefore opportunities for direct or visual access are limited.

Flow Depth in Bell Creek

The Los Angeles County Flood Control District LACFCD) does not have a flow gauge in Bell Creek and therefore does not collect flow and water depth data from there. However, as part of the RECUR effort, the City of Los Angeles (Bureau of Sanitation) and LACFCD manually collected flow and water depth measurements in Bell Creek from September 2011 through July 2012. These results and photo documentation of the flow conditions are provided in Figure 5-6.8. Flow depths ranged from 0.875 to 1.5-inches during this period.

Recreational Activities

In the absence of recreational facilities with public access along Bell Creek, all site visits were to the in-stream monitoring site from July 2010 to December 2012. No recreation was observed at this monitoring site. Also no surveys were obtained.

Planned Future Recreational Opportunities

The Los Angeles River Revitalization Master Plan includes the downstream segment of Bell Creek - at the Los Angeles River's headwaters - as part of the Canoga Park "opportunity area" for which river restoration, greenway creation, and safe access to the river's edge is envisioned. Also, **the Upper Bell Creek Subwatershed Plan** includes a goal of rehabilitating the stream channel and floodplains to restore natural channel capacity where feasible.

FIGURE 5-6.8: WATER DEPTH AND FLOW CONDITIONS IN BELL CREEK AUGUST 2011 THROUGH MAY 2012
(Photos and data provided by City of Los Angeles BOS)


August 25, 2011


September 8, 2011


September 28, 2011


November 30, 2012


January 31, 2012


May 17, 2012

Date	Max Depth (in)	Min Depth (in)	Max Vel (fps)	Min Vel (fps)	Flow Rate (cfs)
August 25, 2011	1.5	0.5	1.22	1.05	1.13
September 8, 2011	1	0.188	1.34	1.01	0.76
September 28, 2011	1	0.25	0.71	0.45	0.67
November 30, 2011	0.875	0.125	1.36	0.78	1.54
January 31, 2012	1	0.25	1.13	0.58	1.55
May 17, 2012	1	0.25	1.32	0.48	1.43

5.6.5 Arroyo Calabasas

Arroyo Calabasas is the second headwater of the Los Angeles River. The engineered channel begins at Valley Circle Boulevard in the Woodland Hills area of Los Angeles, and flows for approximately 3 miles to its confluence will Bell Creek where the Los Angeles River begins (see Figure 5-6.7). It is a vertical concrete-lined channel throughout its length. The Basin Plan designates potential water contact recreation and intermittent non-contact recreation as beneficial uses of the creek.

Accessibility

There are no bike paths or recreational facilities adjacent to the engineered portion of Arroyo Calabasas and therefore limited opportunities for direct or visual access.

Flow Depth in Arroyo Calabasas

The Los Angeles County Flood Control District LACFCD) does not have a flow gauge in Arroyo Calabasas and therefore does not collect flow and water depth data from there. However, as part of the RECUR effort, the City of Los Angeles (Bureau of Sanitation) and LACFCD manually collected flow and water depth measurements in Arroyo Calabasas from September 2011 through July 2012. These results and photo documentation of the flow conditions are provided in Figure 5-6.9. Flow depths ranged from 0.875 to 3-inches during this period.

Recreational Activities

In the absence of recreational facilities with public access along Arroyo Calabasas, all site visits were to the in-stream monitoring site from July 2010 to December 2012. No recreation was observed at this monitoring site. Also no surveys were obtained.

Planned Future Recreational Opportunities

The Los Angeles River Revitalization Master Plan includes the downstream segment of Arroyo Calabasas - at the Los Angeles River's headwaters - as part of the Canoga Park "opportunity area" for which river restoration, greenway creation, and safe access to the river's edge is envisioned.

FIGURE 5-6.9: WATER DEPTH AND FLOW CONDITIONS IN ARROYO CALABASAS AUGUST 2011 THROUGH MAY 2012
(Photos and data provided by City of Los Angeles BOS)


August 25, 2011


September 8, 2011


September 28, 2011


November 30, 2012


January 31, 2012


May 17, 2012

Date	Max Depth (in)	Min Depth (in)	Max Vel (fps)	Min Vel (fps)	Flow Rate (cfs)
August 25, 2011	0.875	0.188	2.90	1.76	3.75
September 8, 2011	1.75	0.5	1.01	0.63	3.10
September 28, 2011	1.5	0.5	0.88	0.68	2.45
November 30, 2011	1.75	0.5	4.18	0.75	3.73
January 31, 2012	3	0.5	5.40	1.34	7.81
May 17, 2012	2.5	1	4.01	1.53	8.84

5.7 Secondary Tributaries of the Upper Los Angeles River

For the purpose of reporting, Dayton Canyon Wash (tributary of Bell Creek), Dry Canyon Creek (tributary of Arroyo Calabasas), and Limekiln Canyon Wash (tributary of Aliso Canyon Wash) are referred to as secondary tributaries of the Upper Los Angeles River. These secondary tributaries all flow as concrete-lined vertical channels for varying portions of their lengths (see Table 5-7.1).

Table 5-7.1: Secondary Tributaries of Reach 6 of the Los Angeles River

Water body	Tributary to	Miles of Engineered Channel (% Engineered)	Channel-Adjacent REC Facilities	Designated REC-1 Use
Dayton Canyon Wash	Bell Creek	2.52 (54.0%)	none	Intermittent
Dry Canyon Wash	Arroyo Calabasas	0.76 (19.5%)	none	Intermittent
Limekiln Canyon Wash	Aliso Canyon Wash	2.91 (37.06%)	none	Intermittent

Accessibility

There are no bike paths, multi-use trails or other recreational facilities along any of the engineered sections of these water bodies. The channels are fenced along their entire lengths, so access is limited.

Depth of Flows in the Secondary Tributaries of Upper Los Angeles River

The Los Angeles County Flood Control District LACFCD) does not maintain flow gauges in these channels. However, as part of the RECUR effort, the City of Los Angeles (Bureau of Sanitation) and LACFCD manually collected flow and water depth measurements in these channels from September 2011 through July 2012. These results and photo documentation of the flow conditions are provided in Figure 5-7.1 through 5-7.3. These channels are characterized by very low flows.

Figure 5-7.1: Water Depth and Flow Conditions in Dayton Canyon Creek August 2011 through May 2012
(Photos and data provided by City of Los Angeles BOS)

August 25, 2011

September 8, 2011

September 28, 2011

November 30, 2012

January 31, 2012

May 17, 2012

Date	Max Depth (in)	Min Depth (in)	Max Vel (fps)	Min Vel (fps)	Flow Rate (cfs)
August 25, 2011	0.75	0.5	1.32	0.62	0.26
September 8, 2011	1	0.25	0.99	0.57	0.21
September 28, 2011	0.25	0.25	1.97	1.79	0.23
November 30, 2011	0.5	0.25	1.04	0.54	0.20
January 31, 2012	0.625	0.125	1.02	0.52	0.32
May 17, 2012	0.75	0.25	1.03	0.44	0.18

FIGURE 5-7.2: WATER DEPTH AND FLOW CONDITIONS IN DRY CANYON CREEK AUGUST 2011 THROUGH MAY 2012
(Photos and data provided by City of Los Angeles BOS)

August 25, 2011

September 8, 2011

September 28, 2011

November 30, 2012

January 31, 2012

May 17, 2012

Date	Max Depth (in)	Min Depth (in)	Max Vel (fps)	Min Vel (fps)	Flow Rate (cfs)
August 25, 2011	1	0.375	2.45	2.37	0.73
September 8, 2011	2	0.625	1.84	1.78	1.85
September 28, 2011	1	0.25	2.31	2.09	0.72
November 30, 2011	1.25	0.125	1.75	1.59	0.74
January 31, 2012	1.25	0.25	1.01	0.94	0.90
May 17, 2012	0.75	0.25	1.63	1.57	0.47

FIGURE 5-7.3: WATER DEPTH AND FLOW CONDITIONS IN LIMEKILN CANYON WASH - AUGUST 2011 THROUGH MAY 2012
(Photos and data provided by City of Los Angeles BOS)

August 25, 2011

September 8, 2011

September 28, 2011

November 30, 2012

January 31, 2012

May 17, 2012

Date	Max Depth (in)	Min Depth (in)	Max Vel (fps)	Min Vel (fps)	Flow Rate (cfs)
August 25, 2011	1.5	0.5	1.75	1.56	0.55
September 8, 2011	0.75	0.25	1.33	1.19	0.34
September 28, 2011	1.5	0.375	2.39	2.15	1.61
November 30, 2011	1	0.5	2.17	1.87	0.60
January 31, 2012	1.625	0.25	2.48	2.24	1.59
May 17, 2012	1.625	0.5	1.68	1.53	0.99

Recreational Activities

In the absence of recreational facilities with public access along Dayton Canyon Creek, Dry Canyon Creek, and Limekiln Canyon Wash all site visits were to the in-stream monitoring sites from July 2010 to December 2012. No recreation was observed at these monitoring sites. Also no surveys were obtained.

Planned Future Recreational Opportunities

No sub-watershed plan currently exists for any of the secondary tributaries of Upper Los Angeles River. Also, Staff could not find/locate any plans for potential development of recreational opportunities along any of these channels.

5.8 Summary of Results of the Recreational Use Re-assessment

In its 2006 compilation of UAA case studies, USEPA stated that use assessments should not be limited to the current condition of a water body but should also include a prospective analysis of future attainability of designated uses. In this recreational use assessment, consideration was given to direct access to the channel bottom, configuration of channel walls, adjacent recreational facilities, documented current and historical recreational activity, downstream use designations and plans for increased recreational opportunities. Tables 5-8.1 through 5-8.7 contain a summary of these considerations.

TABLE 5-8.1: ASSESSMENT OF RECREATION OPPORTUNITIES IN THE MAIN STEM OF THE LOS ANGELES RIVER

Water body	Access to channel	Channel Walls	REC Facilities	Water Depth (in) Ave.	REC-1 Activity*	REC-2 Activity*	Water Quality	Downstream REC designation	Planned REC Opportunities
Reach 1	Direct	Sloped	Bike Path, Greenway	12.48	Fishing Wading Kayaking	Biking Walk/Run Skateboard	Bacteria, Trash	Estuary (REC-1)	LARMP, LARRMP
Reach 2	Direct	Sloped	Bike Path, Park	12.96	Wading Swimming Fishing Kayaking	Biking Walk/Run Skateboard	Bacteria Trash	Reach 1 (REC-1)	LARMP, LARRMP
Reach 3	Direct	Sloped	Bike Path, Park, Golf Course, Multi-use Trail	11.04	Wading Swimming Fishing Kayaking	Biking Walk/Run Skateboard	Trash	Reach 2 (REC-1)	LARMP, LARRMP
Reach 4	Visual	Vertical	Multi-use Trail, Park	16.6	None observed or reported	Biking Walk/Run Skateboard	Bacteria, Trash	Reach 3 (REC-1)	LARMP, LARRMP
Reach 6	Direct	Sloped	Park, Bike Path	(1.71-0.15)*	None observed or reported	Biking Walk/Run	Bacteria, Trash	Reach 5 (REC-1)	LARMP, LARRMP

LARMP Los Angeles River Master Plan, LARRMP Los Angeles River Revitalization Master Plan
"-" no activity observed or reported
*Min-max values provided

TABLE 5-8.2: ASSESSMENT OF RECREATIONAL OPPORTUNITIES IN THE MAJOR TRIBUTARIES OF LOWER LOS ANGELES RIVER (REACHES 1 AND 2)

Water body	Access to channel	Channel Walls	REC Facilities	Water Depth (in) Ave.	REC-1 Activity	REC-2 Activity	Water Quality	Downstream REC designation	Planned REC Opportunities
Compton Creek	Direct	Vertical/ sloped	Bike Path, Multi-use Trail	**5.0**	-	Biking Walk/Run	Bacteria Trash	LAR Reach 1 (REC-1)	CCWMP, CCRGMP
Rio Hondo	Direct	sloped	Park, Bike Path, Multi-use Trail	2.1	Wading Swim Fishing	Biking Walk/Run Skateboard	Bacteria Trash	LAR Reach 2 (REC-1)	RHWMP
Arroyo Seco	Direct	Vertical/ sloped	Bike Path, Park, Multi-use Trail, Overpass	3.5	Wading Swim Fishing Kayaking	Biking Walk/Run Skateboard	Bacteria, Trash	LAR Reach 2 (REC-1)	LARRMP. ASWMP

CCWMP Compton Creek Watershed Management Plan, CCRGMP Compton Creek Regional Garden Master Plan, RHWMP Rio Hondo Watershed Management Plan, LARRMP: Los Angeles River Revitalization Master Plan, ASWMP Arroyo Seco Watershed Management Plan
"-" no activity observed or reported

TABLE 5-8.3: ASSESSMENT OF RECREATIONAL OPPORTUNITIES IN THE SECONDARY TRIBUTARIES OF LOWER LOS ANGELES RIVER (REACHES 1 AND 2)

Water body	Access to channel	Channel Walls	REC Facilities	Water Depth (in) Ave.	REC-1 Activity	REC-2 Activity	Water Quality	Downstream REC designation	Planned REC Opportunities
Santa Anita Wash	Direct	Vertical/ sloped	Park, Bike Path, Multi-use Trail	1.1	Fishing	Biking Walk/Run	Trash	Rio Hondo (Potential REC-1)	RHWMP
Eaton Wash	Visual	Vertical	Park overpass	1.0	-	Biking Walk/Run Skateboarding	Trash	Rio Hondo (Potential REC-1)	RHWMP
Rubio Wash	Visual	Vertical	Country Club, Park	0.5	-	Golfing	Trash	Rio Hondo (Potential REC-1)	RHWMP
Alhambra Wash	Visual	Vertical	Golf Course; Bike Path (opened 2012)	2.7	-	Golfing	Trash	Rio Hondo (Potential REC-1)	RHWMP
Arcadia Wash	Visual	Vertical	Arboretum, Golf Course	1.2	-	Golfing	Trash	Rio Hondo (Potential REC-1)	RHWMP
Sawpit Wash	none	Vertical	none	2.0	-	-	Trash	Rio Hondo (Potential REC-1)	RHWMP

RHWMP Rio Hondo Watershed Management Plan
"-" no activity observed or reported

TABLE 5-8.4: ASSESSMENT OF RECREATIONAL OPPORTUNITIES IN THE MAJOR TRIBUTARIES OF MIDDLE LOS ANGELES RIVER (REACHES 3AND 4)

Water body	Access to channel	Channel Walls	REC Facilities	Water Depth (in) Ave.	REC-1 Activity	REC-2 Activity	Water Quality	Downstream REC designation	Planned REC Opportunities
Verdugo Wash	Visual	Vertical	Park, Overpass	1.7	-	Biking Walk/Run Skateboard	Bacteria, Trash	LAR Reach 3 (REC-1)	LARRMP
Burbank Western Channel	Visual	Vertical	Bike Path, Park, Multi use Trail,	2.2	Wading	Biking Walk/Run Skateboard	Bacteria, Trash	LAR Reach 3 (REC-1)	None known
Tujunga Wash	Visual	Vertical	Multi use Trial, Park, Bike Path	2.1	Fishing	Biking Walk/Run Skateboard	Bacteria, Trash	LAR Reach 4 (REC-1)	LARMP, TPWP
Pacoima Wash	Visual	Vertical/ sloped	Multi Use Trail, Park, Overpass	1.7	-	Biking Walk/Run	Trash	LAR Reach 4 (REC-1)	TPWP, PVP

LARMRMP Los Angeles River Revitalization Master Plan, LARMP Los Angeles River Master Plan, TPWP Tujunga Pacoima Watershed Plan, PVP Pacoima Vision Plan

"-" no activity observed or reported

TABLE 5-8.5: ASSESSMENT OF RECREATIONAL OPPORTUNITIES IN THE SECONDARY TRIBUTARIES OF MIDDLE LOS ANGELES RIVER (REACHES 3 &4)

Water body	Access to channel	Channel Walls	REC Facilities	Water Depth (in) (Min-Max)	REC-1 Activity	REC-2 Activity	Water Quality	Downstream REC designation	Planned REC Opportunities
Halls Canyon	none	Vertical	Overpass	(0-1.32)	-	-	n.a.	Verdugo Wash (Intermittent REC-1)	None known
Snover Canyon	none	Vertical	Park	(0-0.12)	-	Walk/Run	n.a.	Verdugo Wash (Intermittent REC-1)	None known
Eagle (Shields) Canyon	none	Vertical	none	(0-0.60)	-	-	n.a.	Verdugo Wash (Intermittent REC-1)	None known
Pickens Canyon	none	Vertical	none	(0-0.24)	-	-	n.a.	Verdugo Wash (Intermittent REC-1)	None known
Dunsmore Canyon	Visual	Vertical	Park	(0-1.0)	Wading	Biking Walk/Run	n.a.	Verdugo Wash (Intermittent REC-1)	None known
Las Tunas Channel	none	Vertical	none	0	-	-	n.a.	Burbank Western Channel (Potential REC-1)	None known
Lopez Canyon Creek	Visual	Vertical	Park	(0.1-0.6)	-	Walk/Run	n.a.	Tujunga Wash (Potential REC-1)	None known
Haines Canyon Creek	none	Vertical	none	(0.1-1.1)	-	-	n.a.	Tujunga Wash (Potential REC-1)	None known
May Canyon Creek	none	Vertical	none	(0.1-0.5)	-	-	n.a.	Tujunga Wash (Potential REC-1)	None known
Wilson Canyon Creek	none	Vertical	none	(0.5-1.9)	-	-	n.a.	Pacoima Wash (Potential REC-1)	None known

n.a. not available
"-" no activity observed or reported

TABLE 5-8.6: ASSESSMENT OF RECREATIONAL OPPORTUNITIES IN THE TRIBUTARIES OF UPPER LOS ANGELES RIVER (REACH 6)

Water body	Access to channel	Channel Walls	REC Facilities	Water Depth (in) (Min-Max)	REC-1 Activity	REC-2 Activity	Water Quality	Downstream REC designation	Planned REC Opportunities
Browns Canyon Wash	Visual	Vertical	Bike Path, Multi use Trail, Gate	(0.1-2.3)	Wading Swimming Fishing Kayaking	Biking Walk/Run Skateboarding	n.a.	LAR Reach 6 (REC-1)	None known
Aliso Canyon Wash	Visual	Vertical	Park	(0.3-4.0)	-	Walk/Run	Bacteria	LAR Reach 6 (REC-1)	None known
Bell Creek	Visual	Sloped/ Vertical	Park,	(0.1-1.5)	-	-	Bacteria	LAR Reach 6 (REC-1)	LARRMP
Arroyo Calabasas	Visual	Vertical	Gate	(0.2-3.0)	-	-	n.a.	LAR Reach 6 (REC-1)	LARRMP
Caballero Creek	Visual	Vertical	Gate, Ramp	(0.4-3.0)	-	-	n.a.	LAR Reach 6 (REC-1)	LARRMP

n.a. not available "-" no activity observed or reported

TABLE 5-8.7: ASSESSMENT OF RECREATIONAL OPPORTUNITIES IN THE SECONDARY TRIBUTARIES OF UPPER LOS ANGELES RIVER (REACH 6)

Water body	Access to channel	Channel Walls	REC Facilities	Water Depth (in) (Min-Max)	REC-1 Activity	REC-2 Activity	Water Quality	Downstream REC designation	Planned REC Opportunities
Dayton Canyon Creek	Visual	Vertical	Gate	(0.1-1.0)	-	-	n.a.	Bell Creek (Intermittent REC-1)	None known
Dry Canyon Creek	Visual	Vertical	Gate	(0.1-2.0)	-	-	Bacteria	Arroyo Calabasas (Potential REC-1)	None known
Limekiln Canyon Creek	Visual	Vertical	Gate	(0.3-1.6)	-	-	n.a.	Aliso Canyon Wash (Intermittent REC-1)	None known

n.a. not available "-" no activity observed or reported

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VOLUNTEERS FOR THE RECUR COORDINATED MONITORING EFFORT - 2011

WATER BODY	SITE/LOCATION	DATE	VOLUNTEER(S)	ORGANIZATION
JULY 2011				
Rio Hondo Wash	Ford Park	7/1/2011	Tom Siebels / Renee Purdy	LARWQCB
	Grant Rea Park	7/1/2011	Rui Wang / Gissell Lara	
	Grant Rea Park	7/1/2011	Tom Siebels / Renee Purdy	LARWQCB
	Treasure Island	7/1/2011	Tom Siebels / Renee Purdy	LARWQCB
	Rio Hondo Park	7/1/2011	Rui Wang / Gissell Lara	
Rio Hondo Wash Santa Anita Wash	Arcadia Golf Course	7/5/2011	Alejandro Vega / Salvador	Generation Water
LA River	Wrigley Greenbelt	7/1/2011	Michael Morales / Ginachi Amah	LARWQCB
	Cudahy River Park	7/1/2011	L.B. Nye / Luz Vargas / Loan Nguyen	LARWQCB
	Riverfront Park	7/1/2011	L.B. Nye / Luz Vargas / Loan Nguyen	LARWQCB
	De Forest Park	7/1/2011	L.B. Nye / Luz Vargas / Loan Nguyen	LARWQCB
	Reseda Park & Rec Center	7/1/2011	Alvin Cruz / David W.	City of Burbank
	Elysian Valley Park	7/4/2011	Alexia Mackey / Ellen Mackey	LASGRWC
	Los Feliz Golf Course	7/4/2011	Alexia Mackey / Ellen Mackey	LASGRWC
	Buena Vista Park	7/1/2011	Derek Lazo / Charles	LASGRWC
	Griffith Park (soccer field)	7/1/2011	Derek Lazo / Charles	LASGRWC
Compton Creek	Del Amo Blvd	7/1/2011	Michael Morales / Ginachi Amah	LARWQCB
	Raymond Street Park	7/1/2011	Michael Morales / Ginachi Amah	LARWQCB
Eaton Wash	Eaton Blanche Park	7/5/2011	David / Malcolm	Generation Water
	Guinn park	7/5/2011	David / Malcolm	Generation Water
Rubio Wash	Sally Tanner Park	7/5/2011	Alejandro Vega / Salvador	Generation Water

WATER BODY	SITE/LOCATION	DATE	VOLUNTEER(S)	ORGANIZATION
Arroyo Seco Wash	Hermon Park	7/1/2011	Toni Lee / Jelena Viskota	Cal Tech / FOLAR
	Montecito Heights Rec Center	7/1/2011	Toni Lee / Jelena Viskota	Cal Tech / FOLAR
	Lower Arroyo Park	7/1/2011	Toni Lee / Jelena Viskota	Cal Tech / FOLAR
Burbank Western Chnl	LA Equestrian Center	7/1/2011	Derek Lazo / Charles	LASGRWC
	Bike Path	7/1/2011	Alvin Cruz / Charles	City of Burbank
Verdugo Wash	Glorietta Park	7/5/2011	K. Morris / Derek Lazo	LASGRWC
Verdugo Wash Dunsmore Cyn Chnl	Crescenta Valley County Park	7/5/2011	Stephen Ortega / Seann Thomas	Generation Water
Dunsmore Cyn Creek	Dunsmore Park	7/5/2011	Stephen Ortega / Seann Thomas	Generation Water
Pacoima Wash	Paxton Park	7/5/2011	Dean / Allan	Generation Water
	Sepulveda Rec. Center	7/5/2011	Josh Rosa / Daniel Romo	Generation Water
Lopez Cyn Creek	Hansen Dam Park	7/5/2011	Dean / Allan	Generation Water
Tujunga Wash	Greenway & Stream Restoration	7/5/2011	Dean M. / Arsen D.	Generation Water
	Moorpark Park	7/5/2011	Dean M. / Arsen D.	Generation Water
Bell Creek	West Hills Rec Center	7/5/2011	Ryan / Dallana	Generation Water
	Mae Boyer Rec. Center	7/5/2011	Ryan / Dallana	Generation Water
Aliso Cyn Wash & Creek	Vanalden Park	7/1/2011	Sophia Wong / Fred Kaplan	FOLAR
	Northridge rec. Center	7/1/2011	Sophia Wong / Fred Kaplan	FOLAR

WATER BODY	SITE/LOCATION	DATE	VOLUNTEER(S)	ORGANIZATION
Browns Canyon Wash	Browns Creek Trails	7/1/2011	Sophia Wong / Fred Kaplan	FOLAR
SEPTEMBER 2011				
LA River	De Forest Park	9/3/2011	Jim Covin / Ivar Ridgeway	LARWQCB
	Riverfront Park	9/3/2011	Ginachi Amah	LARWQCB
	Los Feliz Golf Course	9/3/2011	Ginachi Amah	LARWQCB
Compton Creek	Del Amo Blvd	9/3/2011	Jim Covin / Ivar Ridgeway	LARWQCB
	Raymond Street Park	9/3/2011	Jim Covin / Ivar Ridgeway	LARWQCB
Burbank Western Chnl	Bike Path 1	9/3/2011	LB Nye / Renee Purdy	LARWQCB
	LA Equestrian Center	9/3/2011	LB Nye / Renee Purdy	LARWQCB
Rio Hondo Wash	Grant Rea Park	9/2/2011	Kenny Wang / Man Voong	LARWQCB
	Ford Park	9/2/2011	Kenny Wang / Man Voong	LARWQCB
Arroyo Seco	Hermon Park	9/2/2011	Michael Morales / Theresa Rodgers	LARWQCB
	Montecito Heights Rec Center	9/2/2011	Michael Morales / Theresa Rodgers	LARWQCB
	Lower Arroyo Park	9/2/2011	Michael Morales / Theresa Rodgers	LARWQCB
NOVEMBER 2011				
Tujunga Wash	Greenway & Stream Resttoration	11/18/2011	Tom Siebels / Luz Vargas	LARWQCB
	Moorpark park	11/18/2011	Tom Siebels / Luz Vargas	LARWQCB
Lopez Cyn Creek	Hansen Dam Park	11/18/2011	Jessie welcomer, Allison Shems, Ricky Russell	Council for Watershed Health

WATER BODY	SITE/LOCATION	DATE	VOLUNTEER(S)	ORGANIZATION
Pacoima Wash	Sepulveda Rec. Center	11/18/2011	Jessie welcomer, Allison Shems, Ricky Russell	Council for Watershed Health
	Richie Valens Park	11/18/2011	Jessie welcomer, Allison Shems, Ricky Russell	Council for Watershed Health
Compton Creek	Del Amo Blvd	11/18/2011	Jim Covin / Ivar Ridgeway	LARWQCB
	Raymond Street Park	11/18/2011	Jim Covin / Ivar Ridgeway	LARWQCB
Rio Hondo Wash Santa Anita Wash	Arcadia Golf Course	11/18/2011	Ginachi Amah / Manasi Chavran	LARWQCB
Santa Anita Wash	Eisenhower park	11/18/2011	Ginachi Amah / Manasi Chavran	LARWQCB
LA River	Wrigley Greenbelt	11/18/2011	Jim Covin / Ivar Ridgeway	LARWQCB
Burbank Western Chnl	Bike Path 1	11/18/2011	Tom Siebels / Luz Vargas	LARWQCB
Verdugo Wash	Glorietta Park	11/18/2011	Mike Morales / Rebecca Christmann	LARWQCB
Verdugo Wash Dunsmore Cyn Chnl	Crescenta Valley County Park	11/18/2011	Mike Morales / Rebecca Christmann	LARWQCB
Dunsmore Cyn Creek	Dunsmore Park	11/18/2011	Mike Morales / Rebecca Christmann	LARWQCB