SECTION 10 ALTERNATIVES ANALYSIS AND RECOMMENDATION FOR DEBRIS BASINS

This section discusses the analysis of sediment management alternatives and recommendations for the debris basins maintained by the Los Angeles County Flood Control District (Flood Control District).

Discussion of the sediment management alternatives for the debris basins follow a similar approach as to how alternatives were discussed in Section 6. The discussion of the alternatives is organized based on the different phases of the cleanout process, specifically:

1. Sediment Removal Alternatives
2. Transportation Alternatives
3. Placement Alternatives

After the alternatives are discussed, combined alternatives are presented. Combined alternatives were developed by grouping a removal alternative with a transportation alternative and a placement alternative. The total cost of implementing the combined alternative is presented along with a review of the impacts.

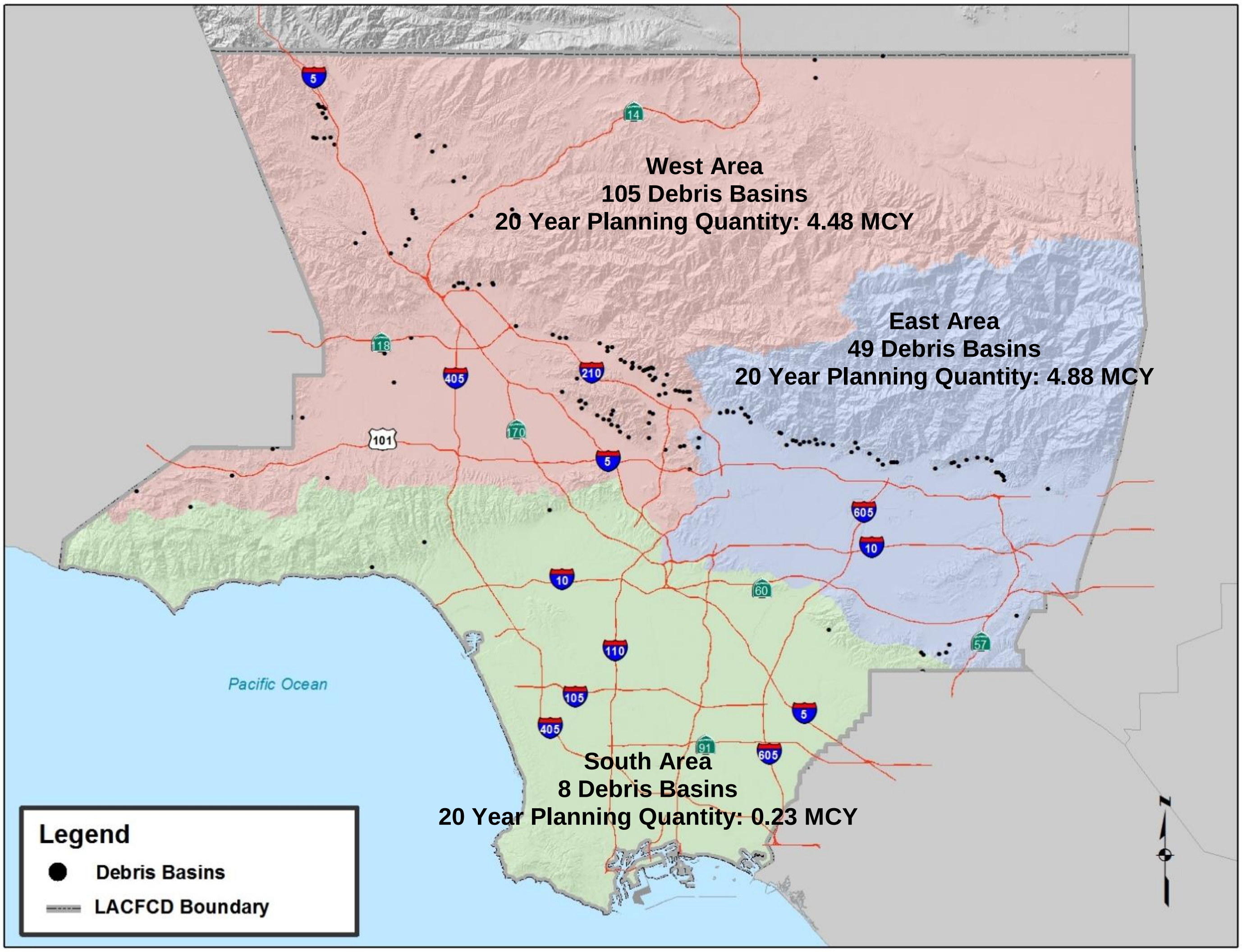
10.1 DEBRIS BASINS REVIEW

Debris basins range in size. The smallest debris basin, Bracemar Debris Basin in Burbank, has a capacity of only 700 CY. The largest debris basin, Little Dalton Debris Basin in Glendora, has a capacity of 661,000 CY. However, most debris basins have a capacity in the range of 20,000 to 70,000 CY. Unlike dams, which are designed for flood risk mitigation, water conservation, and debris retention, a debris basin's sole purpose is for debris flow flood risk mitigation. The debris basins capture sediment and other debris and allow the decanted water to flow into the downstream storm drains or channel system. If sediment and other debris were permitted to enter the downstream conveyance system, blockage could occur, possibly causing flooding and property damage. Increased sediment loads in storm flows also increase the volume of discharged water and accelerate surface wear in the downstream system of drains and channels and thus shorten their service life, causing large-scale, multi-million dollar re-construction projects.

For operation and maintenance purposes, the Flood Control District has three separately managed Flood Maintenance Areas – East, West, and South. Figure 10-1 shows the three regions and the debris basins located in each region along with the planned sediment cleanout quantities. In all, there are 162 debris basins managed by the Flood Control District with a planned cleanout requirement of about 10 MCY over 20 years.

As discussed in Section 5, in unburned watersheds, debris basins are cleaned out when they are at least 25 percent full of sediment. In burned watersheds, where the potential for debris flows is higher, debris basins are cleaned out when they are at least 5 percent full of sediment. For some debris basins in burned watersheds, multiple cleanouts within a year may be required, as occurred during the 2009-10 storm season in the aftermath of the 2009 Station Fire.

Figure 10-1 Debris Basin Locations and Expected 20-Year Cleanout Quantities



10.2 REMOVAL

As discussed in Section 6, because debris basins are not designed to retain water and the small watersheds do not produce dry season runoff, wet removal methods such as sluicing or dredging are not possible. Without water, the only feasible alternative for removing sediment from debris basins is excavation.

The following section discusses the impacts and costs of sediment removal at debris basins by means of excavation. Discussion of the transportation and placement alternatives is presented in Sections 10.3 and 10.4, respectively. Combined alternatives that address all phases of the sediment management process are presented and discussed in Section 10.5.

10.2.1 EXCAVATION

Excavation – Environmental Impacts

Sediment removal and other maintenance activities at the 162 existing Flood Control District debris basins are authorized under Section 1605, Long-term Streambed Alteration Agreement, from California Department of Fish and Game for continued implementation of the Flood Control District's Debris Basin Maintenance Program. The Section 1605 Agreement includes requirements for avoiding and/or mitigating detrimental environmental effects of sediment removal from the debris basins and transport of excavated sediment.

Excavation – Social Impacts

Residential areas are often located in proximity to Flood Control District debris basins as debris basins are designed to reduce flood risk for downstream communities. Noise generated from motorized equipment used in sediment removal activities and from the transfer of sediment to dump trucks may be temporarily bothersome to nearby residents and recreational users of nearby trails.

The length of time it takes to clean sediment out of a debris basin depends on its size, the amount of sediment accumulated in the basin, and the distance between the basin and the sediment placement site. Smaller debris basins typically can be cleaned out in 1 to 3 days, while medium, and larger basins can require from 1 to 6 weeks to be cleaned out.

Excavation – Implementability

Excavation of sediment from debris basins can be performed with conventional earthmoving equipment and techniques. Some of the equipment used for this purpose also has the ability to transport the excavated sediment for short to moderate distances. Excavation has been used to remove sediment from debris basins throughout the County since their original construction.

Excavation – Performance

The Flood Control District has effectively used excavation to remove sediment from debris basis in the past. While there may be other issues, the effectiveness of dry excavation is not a concern for future cleanouts.

Bulldozers, loaders, and excavators used for dry excavation are among the most commonly used earthmoving machines. It is expected that excavation operations would be able to match the efficiency of any mode of transportation being considered.

Excavation – Cost

The estimated cost of excavation at a debris basin is $7.50 per cubic yard. In emergency situations, the cost of excavation at debris basins could potentially reach up to $65 per cubic yard. However, for the cost analysis in Section 10.5, a value of $7.50 per cubic yard will be used for planning purposes.

10.3 TRANSPORTATION

The following section discusses the impacts and costs of transporting sediment removed from debris basins by means trucking. Discussion of the removal alternatives was presented in Section 10.2. The placement alternatives are presented in 10.4. Combined alternatives that address all phases of the sediment management process are presented and discussed in Section 10.5.

10.3.1 TRUCKING

Trucking is the conventional mode of transport that has been used for movement of sediment from debris basins to placement sites. Trucking from debris basins requires excavating the basin using standard heavy construction equipment.

Trucking – Environmental Impacts

Historically, sediment removal from debris basins has been accomplished by excavating accumulated sediment and transferring it to dump trucks for transport to designated sediment placement sites. Truck traffic, noise, and emissions generated from ongoing sediment removal and transport activities would occur at approximately the same levels as historically generated for each debris basin.

The use of low emission trucks would result in lower air quality impacts than if standard trucks were used. The Flood Control District will consider opportunities to employ low emission trucks.

Because established roadways would be used by trucks traveling to and from debris basins and designated placement sites, adverse effects on native vegetation or wildlife resources are not anticipated.

Trucking – Social Impacts

Truck trips to and from the debris basins during sediment removal activities occur for short periods of time at individual debris basins undergoing cleanout operations. Truck operations impact traffic, air quality, noise, and dust for residents along the haul route from the debris basin to the placement location. Under certain circumstances, proposed haul routes are presented to affected cities, and information flyers are distributed to properties along the route prior to the initiation of hauling activities.

Trucking – Implementability

Trucking is a proven method to remove the sediment from debris basins and has been the primary transportation method since their original construction. Trucks are hired with an as-needed service work contract and are available at any time. The Flood Control District also owns a few trucks, which can be used for debris basin cleanouts.

Once sediment has been excavated, it can be loaded in trucks for transport offsite and placement. Single-load and double-load trucks are available, but access limitations at the most of the debris basins only allow for single-load trucks which have a capacity of 8 CY.

Trucking – Performance

An average debris basin can be cleaned in less than 2 weeks, and many smaller debris basins can be a cleaned in a day. However, in emergency circumstances following a fire or a major storm, the number of truck trips per cleanout could double or triple compared to those discussed above, and the number of trips per hour would likely be increased. In emergency circumstances, the debris basins could be cleared in a day or two depending on the size of the basin, in order to create capacity for the next possible storm. During the 2009-10 storm season, approximate 1.2 MCY of sediment was removed from debris basin cleanouts.

Trucking – Cost

For debris basin cleanouts, a cost of $0.65 per CY per mile (one-way) will be used in this study. Surveys of trucking suppliers have indicated that if the low emission trucks are used, there could be an estimated 15 percent increase in trucking costs.

10.4 PLACEMENT

This section discusses potential placement alternatives for sediment removed from debris basins.

10.4.1 EXISTING SPSS

Although Flood Control District SPSs are located in proximity to many debris basins, most of the current SPSs are already at or near their design capacities and, therefore, are not available for meeting the 20-year planning goals for sediment removal from debris basins. However, active SPS's that have remaining capacity will continue to be used until other alternatives are identified and developed for use.

10.4.2 LANDFILLS

Sediment from debris basin cleanouts during dry months will be suitable for landfill cover. Typically, material cleaned out during storm events is too wet to be used as cover at a landfill. Material taken to landfills will be subject to inspection by the landfill operators. Table 10-1 below shows the landfills that are available to collect sediment from debris basin cleanouts.

Table 10-1 Daily cover needs, location, and tipping fees of landfills considered

Landfill	Estimated Daily Cover Need (CY)	Location	Tipping Fee (per CY)
Scholl Canyon	300	Eagle Rock	$5.00
Sunshine Canyon	2,000	Sylmar	$7.50

10.4.3 EXISTING PITS

There are existing pits operations (quarries and inert fill sites) in the Irwindale, Sun Valley, and Claremont area that could accept material from all the debris basins. The Flood Control District is currently working with various pit operators to streamline our working arrangement. One or more of these pits could also be acquired by the Flood Control District.

10.5 ALTERNATIVES ANALYSIS

10.5.1 BACKGROUND

East Area

The East Flood Maintenance Area covers approximately 659 square miles, the northern half of which is comprised of undeveloped areas of the San Gabriel Mountains in the Angeles National Forest and the San Gabriel River watershed above Whittier Narrows, and the Upper Los Angeles River watershed including and east of Devils Gate Reservoir. The San Gabriel Mountains are the most active sediment generation area in the Flood Control District. The southern half of the East Area contains a portion of the Puente Hills, The East Area contains 49 debris basins (30 percent of the Flood Control District total of 162), including 5 of the 6 largest debris basins (Little Dalton, Sawpit, Big Dalton, Sierra Madre Villa, and Santa Anita). The 20-year planning goal for sediment removal from debris basins in the East Area is 4.88 MCY.

West Area

The West Flood Maintenance Area covers 1,381 square miles and is by far the largest of the three Flood Control District flood management areas. The West Area includes a large portion of the upper Los Angeles River watershed (West of Devil's Gate Reservoir), the Santa Clara River watershed, and portions of the San Gabriel, Santa Susana, Verdugo, and Santa Monica mountains. The West Area contains 105 debris basins, 65 percent of the Flood Control District's total. The 20-year planning goal for sediment removal from debris basins in the West Area is 4.48 MCY.

South Area

The South Flood Maintenance Area covers 713 square miles, most of which is heavily developed (e.g., Santa Monica, Los Angeles, and Long Beach). It contains only eight debris basins, 5 percent of the Flood Control District total. The 20-year planning goal for sediment removal from debris basins in the South Area is 0.23 MCY.

10.5.2 COST

For this analysis, it will be assumed that the sediment will be placed at either the pits in the Sun Valley area for the West and South Areas or the pits in the Irwindale area for the East Area. Table 10-2 below shows the tipping fees for the pits in the Irwindale and Sun Valley area along with the excavation and trucking fees.

Table 10-2 Debris Basin Analysis Unit Costs

Description	Rate	Unit
Excavation	$7.50	/CY
Trucking	$0.65	/MI - CY
Irwindale Tipping Fee	$9.70	/CY
Sun Valley Tipping Fee	$15.00	/CY

A summary for the three areas of the estimated cost to excavate and truck the sediment from the debris basin cleanouts to a placement location for the next 20 years is shown below in Table 10-3.

Table 10-3 Cost Summary for Debris Basin Cleanouts

Area	Planned Removal Amount (MCY)	Placement	Cost (Millions)
East	4.88	Irwindale Pits	$127
West	4.48	Sun Valley Pits	$143
South	0.23	Sun Valley Pits	$9
Total	**9.59**		**$279**

10.6 SUMMARY AND RECOMMENDATIONS

Over the next 20 years, close to 10 MCY of sediment are planned to be removed from the 162 debris basins managed by the Flood Control District.

Sediment Management Alternatives

Every removal, transport, and placement alternative was analyzed for the debris basins. However, many of the alternatives are not implementable due to the following reasons:

- Debris basins have smaller watersheds compared to dams thus there are no base flows, which make wet removal and transport methods such as dredging, sluicing, and slurry pipeline infeasible.
- Debris basins need to be cleaned out during the storm season in order to provide capacity for the next potential storm, thus the excavated material is very wet which makes conveyor transport and landfill placement infeasible.
- The distributed nature of the debris basins makes cable bucket and conveyor systems impractical. In addition, most of the debris basins are located in residential areas and do not have the right-of-way or a downstream site to receive the sediment.
- Debris basins do not provide a water conservation need so water quality and groundwater recharge impacts were not included in the summary table.

The only alternative for managing the sediment that accumulates at the debris basins is to excavate it and truck it. Table 10-4 shows the impacts of doing so, in addition, to the impacts of placing the sediment at pits, sediment placement sites, and landfills.

Recommendation

It is recommended that excavation and trucking continue as the removal and transport method for debris basins.

Table 10-4 Debris Basins Summary Table

Alternative	Environmental		Social			Implementability	Performance	Unit Cost	
	Habitat	Air Quality[a]	Traffic	Visual	Noise	Special Permit Required[b]	Previous Experience	Dollars	Unit
Excavate	○	◑		◑	●		YES	7.5	CY
Trucking		●	●	●	●		YES	0.65	MI-CY
Pits				○			YES	5-15	CY
Sediment Placement Sites	○	○		●	◑		YES	2	CY
Landfills							YES	varies	CY

Legend:

●	significant impact
○	possible impact
◑	some impact
	no impact

Notes: (a) Use of low-emission trucks would reduce air quality impacts from significant impact (●) to some impact (◑).
(b) All options require environmental regulatory permits.