

**DEVIL'S GATE SEDIMENT REMOVAL AND MANAGEMENT PROJECT  
HABITAT MITIGATION AND MONITORING PLAN**

**PASADENA, CALIFORNIA**

**(LOS ANGELES COUNTY)**

U.S. Army Corps of Engineers Permit No. SPL-2014-00591-BLR

*Prepared for:*

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**Comment [BLR1]:** Figure 1-7 and Figure 4-1 are the same. Why provided twice?

To figure, add in the location of the proposed trails.

## 1.0 INTRODUCTION

The Devil's Gate Reservoir Sediment Removal and Management Project (Project) is located in the City of Pasadena (City) in Los Angeles County (Figure 1-1). More specifically, the Project is located within the upper portion of the Arroyo Seco Watershed within the City's Hahamongna Watershed Park (Figure 1-2). The Project, which includes an initial comprehensive removal of 2.4 million cubic yards (cy) of sediment to establish a permanent maintenance area, will restore flood capacity and establish a reservoir management system to maintain the flood control capacity of the reservoir. Subsequently, annual maintenance will be conducted in an established permanent maintenance area to remove accumulated sediment and to ensure continued flood control capacity. Removal of sediment will not occur outside of the boundaries of the permanent maintenance area.

The primary objectives of the Project include:

- 1) Reducing flood risk to the communities downstream of the reservoir adjacent to the Arroyo Seco by restoring reservoir capacity for flood control and future sediment inflow events;
- 2) Supporting sustainability by establishing a reservoir configuration more suitable for routine maintenance activities including reservoir management;
- 3) Removing sediment in front of the dam to facilitate an operational reservoir pool to reduce the possibility of plugging the outlet works with sediment or debris during subsequent storm events;
- 4) Removing sediment placed at Johnson Field during the Devil's Gate Reservoir Interim Measures Project (IMP);
- 5) Supporting dam safety by removing sediment accumulated in the reservoir in a timely manner to ensure the ability to empty the reservoir in the event of a dam safety concern; and,
- 6) Delivering the sediment to placement or reuse facilities that are already prepared and designated to accept such material without native vegetation and habitat removal.

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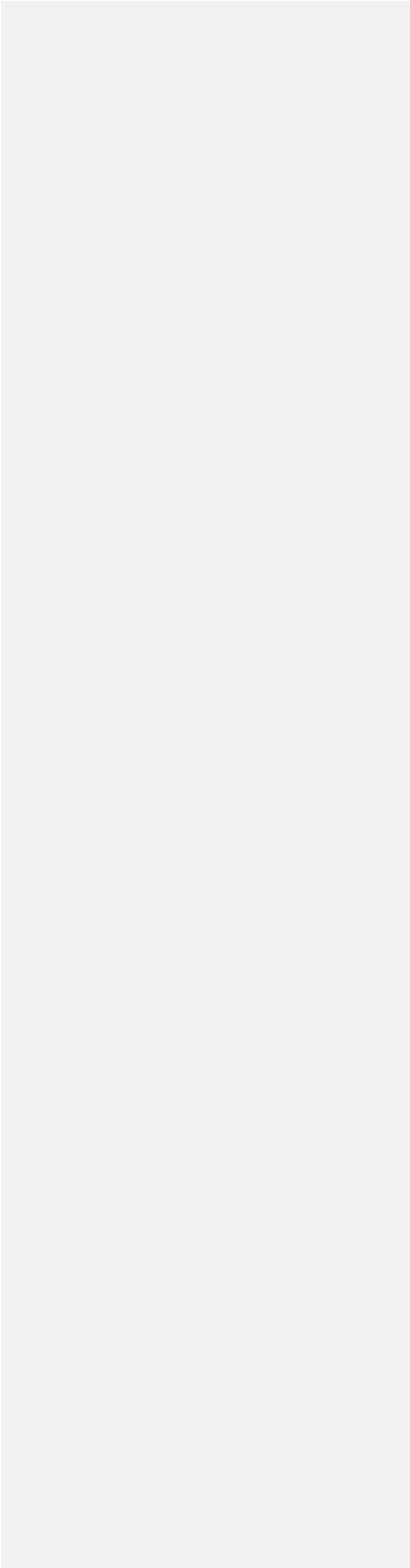
The Los Angeles County Flood Control District (LACFCD) completed an Environmental Impact Report (EIR) for the Project, which was certified by the County of Los Angeles Board of Supervisors on November 12, 2014.

This Draft Habitat Mitigation and Monitoring Plan (HMMP) for U.S. Army Corps of Engineers (USACE) Jurisdictional Waters was prepared by ECORP Consulting, Inc. (ECORP) on behalf of the LACFCD. A HMMP describes the concepts and activities required to implement and maintain the mitigation required to compensate for permanent and temporary impacts to areas regulated by the USACE under the Federal Clean Water Act (CWA). This HMMP is based on the impacts and potential mitigation for the footprint of the approved Alternative 3, Configuration D, Option 2, which was identified as the Environmentally Superior Alternative in the Project EIR. However, slight modifications to the configuration of the upstream boundary of the Project footprint were made in July 2016 to provide additional avoidance of sensitive habitat areas. The revised configuration of the proposed Project is shown on Figure 1-3.

**Figure 1-1 Project Vicinity**

**Figure 1-2 Project Location**

**Figure 1-3 Proposed Project**



The primary objective of this Draft HMMP is to offset impacts to USACE jurisdictional features during Project implementation and to achieve functional lift through the establishment, reestablishment, rehabilitation, and enhancement of the mitigation sites. In addition, the HMMP provides guidance for the long-term monitoring, adaptive management, and protection of the sites. The potential onsite mitigation sites described in the HMMP were selected because they are located in the Arroyo Seco Watershed, which is the same watershed where the impacts will occur, and because providing a functional lift within the Arroyo Seco Watershed satisfies the watershed approach set forth in the Final Rule on Compensatory Mitigation for Losses of Aquatic Resources. The location of the mitigation sites is within Devil's Gate Reservoir, where adequate hydrology is available to sustain the mitigation areas for the long-term. Also, siting the compensatory mitigation in Devil's Gate Reservoir provides for the long-term conservation of lands containing aquatic resources that are adjacent to designated open space and in close proximity to lands owned by the U.S. Forest Service (USFS).

**Comment [BLR2]:** Not sure where there may be any establishment opportunities. The entire area is river and floodplain so there have always been aquatic resources. Let's discuss.

A final HMMP will be provided under separate cover after approval of the conceptual HMMP by the USACE and following the completion of the final design that will incorporate comments provided by the USACE. Additional information that will be incorporated into the final HMMP may include specific engineering to develop the grading plans to establish or re-establish wetlands and non-wetland Waters of the U.S. (WOUS). In addition, specifics related to water needs, site access, and trails closure will be identified and included in subsequent documentation. The refinement of the plans for the compensatory mitigation, including refining specific mitigation ratios and performance standards, will take place in consultation between the LACFCD, as the applicant for the CWA permit, and the USACE.

**Comment [BLR3]:** Submit grading/recontouring engineered plans and methods as part of this HMMP. Provide a figure that clearly shows the grading limits overlaid onto existing WOUS. Provide map showing proposed outcome of grading with new WOUS.

This HMMP provides the necessary information in support of acquiring a permit from the Regional Water Quality Control Board (RWQCB). The RWQCB regulates activities within state and federal Waters under Section 401 of the Clean Water Act (CWA) and the Porter-Cologne Water Quality Control Act (Porter-Cologne Act). Section 401 of the CWA requires that "any applicant for a Federal permit for activities that involve a discharge to WOUS, shall provide the Federal permitting agency a certification from the State in which the discharge is proposed that states that the discharge will comply with the applicable provisions under the Federal Clean Water Act." Therefore, in California, before the USACE will issue a Section 404 permit, applicants must apply for and receive a Section 401 Water Quality Certification or waiver from the RWQCB. Although the Water Quality Certification must be sought for the same effects to WOUS as indicated in a Section 404 permit, certification can also cover effects to water bodies that are not USACE jurisdictional (i.e., isolated wetlands).

**Comment [MC4]:** Because the specifics related to water needs and disruption associated with access are important for our understanding of the long-term consequences of the project on both remaining habitat and restored habitat for the vireo and other riparian dependent species, we cannot determine if the project will have adverse effects on vireo without having this information in hand.

**Comment [BLR5]:** Submit mitigation ratio to show required ratio and acreages.

This HMMP also provides the necessary information in support of acquiring a Lake or Streambed Alteration Agreement from the California Department of Fish and Wildlife (CDFW). Under current California Fish and Game Code Sections 1600–1616, the CDFW regulates projects that propose to (1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake designated by the CDFW in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit, (2) use material from the streambeds designated by the CDFW, or (3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake designated by the CDFW. This regulation takes the form of a requirement for a Lake or Streambed Alteration Agreement and is applicable to all projects involving state or local government discretionary approvals.

**Comment [BLR6]:** Are all proposed mitigation areas to cover impacts for all agencies, or are there areas that only cover impacts for CDFW. What mitigation is CDFW requiring? Add a sentence or two describing.

## 1.1 Brief Description of the Proposed Compensatory Mitigation Project

The Project will initially remove vegetation and 2.4 million cy of sediment from a 68.55-acre area within the reservoir behind Devil's Gate Dam for the purposes of establishing an approximately 51.72 acre permanent maintenance area where sediment will subsequently be removed on an annual basis. Approximately 16.83 acres of temporary impact areas will be restored to native vegetation as part of the compensatory mitigation plan for the Project. The impacts of the project will include direct impacts to wetlands (1.91 acres) and non-wetland WOUS (34.24 acres) under the jurisdiction of the USACE.

The compensatory mitigation for the Project includes the establishment, re-establishment, and rehabilitation of 6.19 acres of wetlands and re-establishment, rehabilitation, and enhancement of 19.65 acres of non-wetlands WOUS. In addition, the compensatory mitigation also includes revegetation and enhancement of 50.87 acres of riparian and upland buffer habitat within and adjacent to Devil's Gate Reservoir and the sites that will provide mitigation for impacts to wetlands and non-wetland WOUS. The compensatory mitigation sites and adjacent buffer habitats will be protected for the long-term and will be maintained and monitored to ensure the established performance standards are met.

The side slopes of the annual maintenance footprint area (10.89 acres), which are considered part of the permanent impact area, will be replanted with native vegetation, including shrub and annual species associated with riparian scrub and alluvial scrub vegetation communities. Allowing the side slopes of the annual maintenance area to re-establish with native vegetation following the initial sediment removal will provide additional buffer habitat between the areas that are actively managed in the annual maintenance area and the compensatory mitigation sites. The side slopes may be periodically affected by recontouring if large sediment deposits bury portions of the side slopes. In this case, the sediment will be removed and the side slopes will be recontoured and allowed to naturally revegetate.

The proposed USACE compensatory mitigation for the Project is onsite within Devil's Gate Reservoir and Hahamongna Watershed Park. Besides the establishment, reestablishment, rehabilitation, and enhancement of wetlands and non-wetlands WOUS and buffer habitats, the overall mitigation plan also includes trails closures, narrowing of permanent trails, trash removal, buffer plantings between sensitive habitat and trails, fencing of some trails, public education and outreach, long-term protection of mitigation sites, focused surveys for sensitive and listed species, and maintenance and monitoring of the mitigation sites to ensure the performance standards are met. In addition adaptive management measures and monitoring are included to ensure the mitigation sites continue to function as planned for the long-term.

## 1.2 Objectives

Compensatory mitigation for permanent and temporary impacts and temporal loss of functions and values over time as a result of the time necessary for habitat to become established in mitigation areas will be achieved in accordance with the USACE and U.S. Environmental Protection Agency (EPA) Final Rule (33 Code of Federal Regulations [CFR] parts 325 and 332 and 40 CFR part 230, respectively) on Compensatory Mitigation for Losses of Aquatic Resources. In accordance with the guidance provided in the Final Rule, the compensatory mitigation will be based on a watershed approach. This approach emphasizes the improvement

### Comment [BLR7]:

Provide a short bullet list of discrete Objectives using the below guidance language from our HMMP Guidelines:

Generally, this takes place in six stages: (1) determination of the amount and type of proposed impacts, to jurisdictional waters and wetlands, (2) manner in which the resource functions of the compensatory mitigation project will offset impacts to aquatic resources and address the needs of the watershed, (3) determination of the priority resource types preferred for mitigation activities (including whether the mitigation type(s) will be in-kind or out-of-kind), (4) determination of the method(s) of compensatory mitigation (establishment, rehabilitation, re-establishment, enhancement, and/or preservation), and (5) determination of the amount of compensatory mitigation to be provided (for each method proposed).

For example:

Offset XX acres of impacts through mitigation on XX acres.

Recontour, grade, plant vegetation, monitor mitigation sites while incorporating multi-use recreation in accordance with XX plan, XX agreement.

Increase the following aquatic resource functions: wetlands/WOUS, habitat connectivity, etc.

Develop mitigation areas that provide suitable habitat for ESA species (list).

ETC.

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or sustainability of aquatic resources in the watershed affected by the Project, which includes the Arroyo Seco Watershed, which is a sub-watershed of the Los Angeles River Watershed.

### 1.3 Impacts to USACE Jurisdictional Areas

The aquatic resources have been described in *Jurisdictional Delineation Report, Devil's Gate Reservoir Sediment Removal and Management Project in the City of Pasadena, Los Angeles County, California* (Chambers Group 2013a) and *Jurisdictional Delineation Update for the Devil's Gate Reservoir Sediment Removal and Management Project, Los Angeles County, California* (ECORP 2016a). According to the 2013 jurisdictional delineation, the USACE wetland boundary was identified as the 1,020 feet contour Ordinary High Water Mark (OHWM), which is the level at which water is released from the dam. In addition, the delineation report defined the limits of USACE jurisdiction by the riparian habitat within the 1,070 feet contour High Water Mark (HWM).

ECORP completed a revised delineation of the areas below the 1,020 feet elevation and in the western portion of the reservoir in August of 2016 (ECORP 2016a). The combined jurisdictional delineation map, which includes Chambers Group's delineation for the areas between the 1020 feet and 1,070 feet elevations and ECORP's delineation for the areas below the 1,020 feet elevation and in the western portion of the reservoir, is shown on Figure 1-4. Table 1.1 lists the total acres of wetlands and non-wetland WOUS in the area encompassed by the HWM. The total acreage of wetlands within the portion of Devil's Gate Reservoir where the jurisdictional delineation was conducted is 3.62 acres. The total acreage of non-wetland WOUS within the same area is 43.81 acres. Table 1.1 also lists the acres and linear feet of permanent and temporary impacts to non-wetland WOUS and the acres of permanent and temporary impacts to wetlands under the jurisdiction of the USACE. A total of approximately 1.91 acres of wetlands and 34.24 acres of non-wetland WOUS will be impacted by the Project. The impacts to wetlands include approximately 1.81 acres of permanent and 0.10 acre of temporary impacts. Impacts to non-wetland WOUS include approximately 21.64 acres of permanent and 12.60 acres of temporary impacts. Approximately 1.71 acres of wetlands and 9.57 acres of non-wetland WOUS will be avoided by the Project.

**Table 1.1 Total Acres and Permanent and Temporary Impacts to USACE Jurisdictional Areas**

Features	Permanent Impact	Temporary Impact	Side Slopes (Permanent)	Total Impacts	Avoided	Total
Non-wetland Waters	17.88	12.60	3.76	34.24	9.57	43.81
Linear Feet	4,909	1,127	263	6,299	13,727	20,026
Wetlands	1.02	0.10	0.79	1.91	1.71	3.62
<b>TOTAL*</b>	<b>18.90</b>	<b>12.70</b>	<b>4.55</b>	<b>36.15</b>	<b>11.28</b>	<b>47.43</b>

\*Total does not include linear feet.

Table 1.2 summarizes the impacts to wetlands and non-wetland WOUS subject to USACE jurisdiction, the impact site description for the areas, the total acres of the vegetation communities within the boundaries of the USACE jurisdictional areas, and the acres that will be subject to permanent and temporary impacts from the Project. A map showing the distribution of these vegetation communities in the USACE jurisdictional areas is included as Figure 1-5. The total acreage of the permanent and temporary impacts to wetlands and WOUS resulting from the Project is 36.15 acres.

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**Comment [MC8]:** According to the hydrology report, water was held above 1020' in all but three years since 2000. Since the Station Fire, the max pool elevation has averaged 1032'. What is the basis for using the 1,020 and 1,070 feet contours to delineate WOUS? Will operations change after the project so that water will not be held above 1,020?

**Comment [BLR9]:** OHWM? Revise throughout.

**Comment [BLR10]:** Revise figure Title since all the vegetative communities are not within WOUS. Maybe in parentheses add "within black boundary as shown" or the like.

**Figure 1-4 Jurisdictional Delineation 2016**

**Table 1.2 Impact Site Description**

IMPACT SITE DESCRIPTION											
Pre-Construction Site Conditions							Post-Construction Site Conditions				
Site Description	Habitat Types	Vegetation Communities*	Cowardin	HGM	Hydrology	CRAM	Activity	Permanent Loss	Temporary Loss	Linear Feet	
<b>Wetland Waters of the US</b>											
Project Area	Reservoir	<i>Conium maculatum</i> Herbaceous Semi-Natural Alliance 30% <i>Lepidium latifolium</i>	Palustrine	Riverine	Seasonally Flooded	Riverine	Sediment Removal	0.00	0.00	N/A	
	Reservoir	Disturbed	Palustrine	Riverine	Seasonally Flooded	Riverine	Sediment Removal	0.50	0.04	N/A	
	Reservoir	<i>Salix gooddingii</i> Woodland Alliance	Palustrine	Riverine	Seasonally Flooded	Riverine	Sediment Removal	0.06	0.00	N/A	
	Reservoir	<i>Salix gooddingii</i> Woodland Alliance Understory: 20% <i>Lepidium latifolium</i> / <i>Xanthium strumarium</i>	Palustrine	Riverine	Seasonally Flooded	Riverine	Sediment Removal	0.58	0.06	N/A	
	Reservoir	<i>Xanthium strumarium</i> Herbaceous Alliance (unofficial alliance)	Palustrine	Riverine	Seasonally Flooded	Riverine	Sediment Removal	0.67	0.00	N/A	
							<b>TOTAL</b>	<b>1.81</b>	<b>0.10</b>		
<b>Non-Wetland Waters of the US</b>											
Project Area	Reservoir	<i>Artemisia californica</i> - <i>Eriogonum fasciculatum</i> Shrubland Alliance Understory: 20% <i>Lepidium latifolium</i>	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.00	0.00	5,895	
	Reservoir	<i>Baccharis salicifolia</i> Shrubland Alliance No understory	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.25	0.25		
	Reservoir	<i>Baccharis salicifolia</i> Shrubland Alliance Understory: 20% <i>Conium maculatum</i> / <i>Lepidium latifolium</i>	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.01	0.15		
	Reservoir	<i>Baccharis salicifolia</i> Shrubland Alliance Understory: 30% <i>Conium maculatum</i> / <i>Lepidium latifolium</i>	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.12	0.00		

IMPACT SITE DESCRIPTION											
Pre-Construction Site Conditions							Post-Construction Site Conditions				
Site Description	Habitat Types	Vegetation Communities*	Cowardin	HGM	Hydrology	CRAM	Activity	Permanent Loss	Temporary Loss	Linear Feet	
	Reservoir	Baccharis salicifolia Shrubland Alliance Understory: 40% Conium maculatum/Lepidium latifolium	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	1.37	0.00		
	Reservoir	Conium maculatum Herbaceous Semi-Natural Alliance 30% Lepidium latifolium	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.67	0.00		
	Reservoir	Lepidium latifolium-Conium maculatum Herbaceous Semi-Natural Alliance	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	1.09	0.00		
	Reservoir	Lepidospartum squamatum Shrubland Alliance - Sparse	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	1.68	11.70		
	Reservoir	Lepidospartum squamatum Shrubland Alliance	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.00	0.02		
	Reservoir	Quercus agrifolia Woodland Alliance	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.02	0.00		
	Reservoir	Salix gooddingii Woodland Alliance	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	2.28	0.20		
	Reservoir	Salix gooddingii Woodland Alliance - Sparse	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	4.02	0.01		
	Reservoir	Salix gooddingii Woodland Alliance Understory: 20% Lepidium latifolium/Xanthium strumarium	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	7.06	0.03		
	Reservoir	Salix gooddingii Woodland Alliance Understory: 30% Lepidium latifolium/Conium maculatum	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	1.26	0.16		
	Reservoir	Disturbed	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.98	0.08		
	Reservoir	Xanthium strumarium Herbaceous Alliance (unofficial alliance)	Riverine	Intermittent	Intermittent	Riverine	Sediment Removal	0.83	0.00		
							<b>TOTAL</b>	<b>21.64</b>	<b>12.60</b>	<b>5,895</b>	

**Figure 1-5 Vegetation Communities within USACE Jurisdictional Areas**

#### 4.1.1 Impacts to Disturbed Habitats

As noted in Table 1.2, the impacts to areas classified as wetlands that support disturbed habitats includes 1.21 acres of areas that support weedy and nonnative plant species and 0.64 acre of areas that support disturbed riparian woodland. The remaining 0.06 acre of impacts to wetlands is in areas that support undisturbed riparian woodland. Approximately 97 percent (1.85 acres) of the total impacts to wetlands is comprised of nonnative, weedy, and disturbed habitats. The impacts to areas classified as non-wetland WOUS that support disturbed habitat areas includes 3.65 acres of areas that support weedy and nonnative plant species. In addition, impacts to non-wetland WOUS also include 1.65 acres of areas that support disturbed riparian scrub and 8.51 acres of disturbed riparian woodland. Impacts to undisturbed habitat areas within non-wetland WOUS include 0.50 acre of riparian scrub, 6.51 acres of riparian woodland, 13.40 acres of Riversidean alluvial fan sage scrub (RAFSS), and 0.02 acre of oak woodland. Approximately 40 percent (13.81 acres) of the total impacts to non-wetland WOUS is comprised of nonnative, weedy, and disturbed habitat areas. Over 43 percent of the total impacts to wetlands and non-wetland WOUS is comprised of the weedy, nonnative, and disturbed habitat areas, which are low functioning wetlands and non-wetland WOUS due to the presence of nonnative and weedy plants and the lack of suitable vegetative structure for wildlife.

#### 1.4 Total Impacts to Vegetation Communities

Table 1.3 lists the vegetation communities that will be subject to permanent and temporary impacts from the Project. A map showing the distribution of these vegetation communities is included as Figure 1-6. Approximately 68.55 acres of vegetation communities and disturbed areas will be impacted within the initial sediment removal area, which includes the areas that will be permanently and temporarily affected by the Project. Permanent impacts vegetation communities and disturbed areas will occur within the permanent maintenance area, which encompasses approximately 51.72 acres and includes the 40.83-acre routine annual maintenance area and the 10.89-acre episodic maintenance area (or side slopes). Approximately 16.83 of vegetation communities and disturbed areas will be temporarily affected by the Project as these areas will be restored to native plant communities following the initial sediment removal.

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**Table 1.3 Total Project Impacts to Vegetation Communities**

Vegetation Community	Total Acreage	Perm. Impacts	Temp. Impacts	Side Slopes (Perm. Impacts)	Total Impacts	Avoided Acreage
<b>RIPARIAN</b>						
<i>Salix gooddingii</i> Woodland Alliance	7.45	2.45	0.36	0.53	3.34	4.11
<i>Salix gooddingii</i> Woodland Alliance - Sparse	4.20	3.50	0.01	0.64	4.15	0.05
<i>Salix gooddingii</i> Woodland Alliance- Understory 20% <i>Lepidium latifolium</i> - <i>Xanthium strumarium</i>	15.88	7.96	0.12	2.56	10.64	5.24
<i>Salix gooddingii</i> Woodland Alliance- Understory 30% <i>Lepidium latifolium</i> - <i>Conium maculatum</i>	15.12	2.36	0.60	1.02	3.98	11.14

<b>Vegetation Community</b>	<b>Total Acreage</b>	<b>Perm. Impacts</b>	<b>Temp. Impacts</b>	<b>Side Slopes (Perm. Impacts)</b>	<b>Total Impacts</b>	<b>Avoided Acreage</b>
<b><i>Salix gooddingii</i> Woodland Alliance TOTAL</b>	<b>42.65</b>	<b>16.27</b>	<b>1.09</b>	<b>4.75</b>	<b>22.11</b>	<b>20.54</b>
<i>Baccharis salicifolia</i> Shrubland Alliance-No Understory	2.17	0.37	0.39	0.00	0.76	1.41
<i>Baccharis salicifolia</i> Shrubland Alliance-20% <i>Conium maculatum</i> - <i>Lepidium latifolium</i>	2.04	0.01	0.31	0.00	0.32	1.72
<i>Baccharis salicifolia</i> Shrubland Alliance-30% <i>Conium maculatum</i> - <i>Lepidium latifolium</i>	6.84	0.49	0.00	0.19	0.68	6.16
<i>Baccharis salicifolia</i> Shrubland Alliance-40% <i>Conium maculatum</i> - <i>Lepidium latifolium</i>	14.18	7.16	0.00	2.49	9.65	4.53
<b><i>Baccharis salicifolia</i> Shrubland Alliance TOTAL</b>	<b>25.23</b>	<b>8.03</b>	<b>0.70</b>	<b>2.68</b>	<b>11.41</b>	<b>13.82</b>
<b>TOTAL RIPARIAN</b>	<b>67.88</b>	<b>24.30</b>	<b>1.79</b>	<b>7.43</b>	<b>33.52</b>	<b>34.36</b>
<b>FLOODPLAIN</b>						
<i>Lepidospartum squamatum</i> Shrubland Alliance	5.08	0.00	0.18	0.00	0.18	4.90
<i>Lepidospartum squamatum</i> Shrubland Alliance (Sparse)	22.19	1.82	12.50	0.00	14.32	7.87
<b>TOTAL FLOODPLAIN</b>	<b>27.27</b>	<b>1.82</b>	<b>12.68</b>	<b>0.00</b>	<b>14.50</b>	<b>12.76</b>
<b>TOTAL RIPARIAN/ FLOODPLAIN</b>	<b>95.15</b>	<b>26.12</b>	<b>14.47</b>	<b>7.43</b>	<b>48.02</b>	<b>47.13</b>
<b>NATIVE UPLAND</b>						
<i>Artemisia californica</i> – <i>Eriogonum fasciculatum</i> Shrubland Alliance	1.88	0.00	0.00	0.00	0.00	1.88
<i>Artemisia californica</i> – <i>Eriogonum fasciculatum</i> Shrubland Alliance-20% <i>Lepidium latifolium</i>	4.38	0.00	0.00	0.00	0.00	4.38
<i>Artemisia californica</i> – <i>Eriogonum fasciculatum</i> Shrubland Alliance-30% <i>Lepidium latifolium</i>	2.08	0.02	0.08	0.00	0.10	1.98
<i>Quercus agrifolia</i> Alliance	22.80	0.03	0.27	0.00	0.30	22.50
<i>Platanus racemosa</i> Woodland Alliance - Disturbed	1.58	0.00	0.00	0.00	0.00	1.58
<b>TOTAL NATIVE UPLAND</b>	<b>32.72</b>	<b>0.05</b>	<b>0.35</b>	<b>0.00</b>	<b>0.40</b>	<b>32.32</b>

Vegetation Community	Total Acreage	Perm. Impacts	Temp. Impacts	Side Slopes (Perm. Impacts)	Total Impacts	Avoided Acreage
<b>NONNATIVE/OTHER</b>						
<i>Brassica nigra</i> and other mustards Herbaceous Semi-Natural Alliance	23.09	0.00	0.00	0.00	0.00	23.09
<i>Conium maculatum</i> Herbaceous Semi-Natural Alliance -30% <i>Lepidium latifolium</i>	6.23	2.45	0.37	1.33	4.15	2.08
<i>Lepidium latifolium</i> – <i>Conium maculatum</i> Herbaceous Semi-Natural Alliance	13.28	9.88	0.00	1.24	11.12	2.16
<i>Lepidium latifolium</i> Herbaceous Semi-Natural Alliance	1.80	0.00	0.00	0.00	0.00	1.80
<i>Rumex crispus</i> Herbaceous Semi-Natural Alliance (Unofficial Alliance)	0.30	0.00	0.00	0.00	0.00	0.30
<i>Xanthium strumarium</i> Herbaceous Alliance (Unofficial Alliance)	1.50	1.00	0.00	0.50	1.50	0.00
<i>Eucalyptus (globulus, camaldulensis)</i> Woodland Semi-Natural Alliance	0.27	0.00	0.07	0.00	0.07	0.20
<i>Fraxinus velutina</i> Forest Alliance (Unofficial Alliance)	0.46	0.00	0.00	0.00	0.00	0.46
Landscaped	0.15	0.00	0.00	0.00	0.00	0.15
Depression/Bare Ground (Associated with Seasonally Wet Area)	0.39	0.00	0.00	0.00	0.00	0.39
Disturbed (Barren/Trails/IMP Area)	16.08	1.33	1.57	0.39	3.29	12.79
<b>TOTAL OTHER</b>	<b>63.55</b>	<b>14.66</b>	<b>2.01</b>	<b>3.46</b>	<b>20.13</b>	<b>43.42</b>
<b>TOTAL</b>	<b>191.42</b>	<b>40.83</b>	<b>16.83</b>	<b>10.89</b>	<b>68.55</b>	<b>122.87</b>

**Comment [BLR11]:** The total vegetation impacted acreage is 65 acres, so how can these communities total to 191 acres? Confusing. Let's discuss.

**Comment [MC12]:** Does this include mitigation areas?

**Figure 1-6 Vegetation Communities**

#### **\*1.4.1 Permanent Impacts**

The vegetation communities with the new Permanent Maintenance Area will be removed during the initial sediment removal phase of the Project and will be subject to ongoing disturbance for the duration of the Project resulting in permanent loss of aquatic resource functions and services. Approximately 40.83 acres of permanent impacts to vegetation communities will occur within the Routine Annual Maintenance area where sediment may be removed on an annual basis. The remaining acres of permanent impact areas (10.89 acres) consist of the side slopes of the Permanent Maintenance Area which will be created following the initial sediment removal. The side slopes, which are referred to as the Episodic Maintenance Areas, will be allowed to revegetate with native vegetation to create a buffer between the Routine Annual Maintenance Area and adjacent mitigation areas. However, the vegetation that is allowed to grow on the side slopes may be periodically affected if the side slopes need to be reconstructed following sediment removal efforts. Therefore, the impacts associated with the areas on the side slopes are considered permanent impacts.

The permanent impacts of the Project include the removal of approximately 18.12 acres of areas that are either disturbed, devoid of vegetation, or are dominated by nonnative, invasive, and weedy plant species. In addition, approximately 1.82 acres of RAFSS and 0.05 acre of native upland vegetation communities (0.02 acre of disturbed coastal sage scrub [CSS] and 0.03 acre of oak woodland) will also be affected by the Project. Approximately 21.02 acres of riparian woodland and 10.71 acres of riparian scrub will also be permanently affected by the Project. However, an evaluation of the riparian vegetation communities in spring of 2016 determined that the understory in most of the riparian woodland and riparian scrub throughout the reservoir is dominated by nonnative and invasive plant species, such as perennial pepper weed, poison hemlock, and mustards. In addition, monotypic patches of perennial pepper weed and mustard are scattered throughout the riparian habitats in the reservoir. As a result, the quality of the riparian habitats is degraded and the diversity of wildlife is not what would be expected in riparian habitat where the understory is dominated by native plant species. Approximately 13.90 acres (66 percent) of the riparian woodland and 10.34 acres (96 percent) of the riparian scrub communities that will be permanently impacted are considered disturbed due to the presence of nonnative and invasive plant species in the understory. Approximately 7.12 acres of relatively undisturbed riparian woodland and 0.37 acre of relatively undisturbed riparian scrub will be permanently affected by the Project. The total acreage of permanent impacts to areas that support relatively undisturbed native vegetation communities (riparian, floodplain, and upland) is approximately 9.34 acres, which comprises approximately 18 percent of the vegetation communities within the permanent maintenance area. The permanent impact to areas that support disturbed native vegetation communities includes approximately 24.26 acres, which comprises approximately 46 percent of the Permanent Maintenance Area. Approximately 18.12 acres (36 percent) of the Permanent Maintenance Area is currently composed of nonnative vegetation and disturbed areas.

#### **\*1.4.2 Temporary Impacts**

Approximately 16.83 acres of vegetation communities and disturbed areas will be temporarily affected by the Project. This includes the areas located within the Initial Sediment Removal Area but outside of the boundary of the Permanent Maintenance Area. The initial removal of sediment will temporarily impact approximately 0.37 acre of undisturbed riparian woodland and

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0.39 acre of undisturbed riparian scrub. As noted in the discussion of permanent impacts, much of the area covered by riparian woodland and scrub communities contains a high percentage of nonnative and invasive plants and as a result, these areas represent relatively low quality habitat. Approximately 0.72 acre of disturbed riparian woodland and 0.31 acre of disturbed riparian scrub will also be temporarily removed during the initial sediment removal. Non-riparian native plant communities and floodplain vegetation that will be temporarily affected by the Project also include approximately 0.08 acre of disturbed CSS, 0.27 acre of oak woodland, and 12.68 acres of RAFSS. An additional 2.01 acres of areas that are either disturbed or are dominated by weedy, invasive, and nonnative vegetation will also be temporarily impacted by the Project. The total temporary impact to areas that support relatively undisturbed native vegetation communities is approximately 13.71 acres, which comprises approximately 81 percent of the temporary impact area. The total temporary impact to areas that support disturbed native vegetation communities is approximately 3.12 acres, which comprises approximately 19 percent of the temporary impact area.

### 1.5 USACE Compensatory Mitigation

Onsite establishment, rehabilitation, and re-establishment of wetlands and re-establishment, rehabilitation, and enhancement of non-wetlands WOUS will be the methods used to provide compensatory mitigation for permanent and temporary impacts of the Project. In addition, the compensatory mitigation methods on a portion of the mitigation sites will be implemented prior to the Project implementation to offset temporal loss of habitat associated with establishment in the mitigation sites. The on-site mitigation sites are all located within the HWM established for the Project. Table 1.4 summarizes the acres of compensatory mitigation and the mitigation methods that will be used to offset the impacts to wetlands and non-wetland WOUS. Each of the mitigation sites are shown in Figure 1-7. Approximately 6.19 acres of wetlands in three different areas will be established, re-established, and rehabilitated and approximately 19.65 acres of non-wetland WOUS will be re-established, rehabilitated, and enhanced in multiple areas outside of the Permanent Maintenance Area. The proposed compensatory mitigation also includes revegetation and enhancement of approximately 51.17 acres of riparian and upland WOUS buffer habitat and 10.89 acres of side slope buffer habitat (Table 1.5). Additional measures that will be implemented to reduce impacts and increase function in the mitigation areas will be closure of unnecessary trails, planting of undesirable plants in buffers adjacent to permanent trails, and placement of woody debris to increase structural diversity and to provide additional refugia for wildlife and catchment sites for plant seeds. Table 1.6 provides the details about the mitigation site descriptions.

**Table 1.4 Acres of Compensatory Mitigation and Mitigation Methods**

WOUS Type	Establishment	Re-Establishment	Rehabilitation	Enhancement	Total
Wetlands	3.44	0.62	2.13	0.00	6.19
Non-Wetland WOUS	0.00	16.62	0.03	3.00	19.65
<b>Total WOUS</b>	<b>3.44</b>	<b>17.24</b>	<b>2.16</b>	<b>3.00</b>	<b>25.84</b>

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**Comment [BLR13]:** Check if really establishment? Or revise.

**Comment [BLR14]:** Define. Do you mean poison oak?

**Comment [BLR15]:** See above comment.



**Figure 1-7 Proposed Mitigation Areas**

**Table 1.5 Acres of Onsite Revegetation and Enhancement to WOUS Buffer Areas**

Buffer Type	Revegetation	Enhancement	Total
Riparian Buffer Sites	7.32	34.65	41.97
Upland Buffer Sites	3.78	5.42	9.20
Side Slope Buffers	10.89	0.00	10.89
<b>Total Buffer Sites</b>	<b>21.99</b>	<b>40.07</b>	<b>62.06</b>

**1.5.1 Measures Designed to Create a Beneficial Impact**

The total compensatory mitigation package (87.90 acres) proposed to offset the impacts of the Project includes habitat restoration of approximately 77.01 acres located outside of the Permanent Maintenance Area and 10.89 acres on the side slopes in the Episodic Maintenance Area. The compensatory mitigation project will establish 3.44 acres of wetland habitat where none existed before and will improve the function of 2.75 acres of existing wetlands through reestablishment and rehabilitation. In addition, the functions in approximately 19.65 acres of non-wetland WOUS will be greatly improved through the re-establishment of channels and riparian vegetation (16.62 acres), rehabilitation of 0.03 acres, and enhancement of 3.00 acres. Approximately 62.06 acres of buffer areas around the wetland and non-wetland WOUS compensatory mitigation sites will also be greatly improved. Improvements will result from the removal of nonnative and invasive plant species, closing of trails and actively managing human access through the use of trail designations and public outreach, and restoration of a multi-structured riparian canopy and understory. At present, very little of the habitat in the reservoir is suitable for listed species of birds because of the abundance of invasive and nonnative plants present and a lack of structural diversity that is preferred by the species. Improving the habitat and restoration additional habitat will provide higher quality habitat that can support an abundant population of least Bell's vireos (*Vireo bellii pusillus*), southwestern willow flycatchers (*Empidonax traillii extimus*), western yellow-billed cuckoos (*Coccyzus americanus*), and other sensitive species while also providing an important migration stopover and wildlife movement corridor in a highly urbanized area. An ongoing weed and invasive plant management program will ensure the habitat won't become degraded and will remain a functional habitat area for the long-term.

The Project area and the associated mitigation areas are encompassed by the Hahamongna Watershed Park, which is heavily used for recreational types of activities, such as hiking, bird watching, horseback riding, and other assorted outdoor activities. As a result, the area is crossed by numerous trails and exhibits evidence of human use (trash, structures, and damage to natural resources). The mitigation strategy for the Project includes a number of measures designed to reduce the impacts of human presence on the mitigation sites and to protect the wildlife that reside in the habitats, including listed species. The measures include closures of unnecessary trails, narrowing of some of the permanent trails, planting of undesirable plants along trails to buffer sensitive habitat areas, placing woody debris at strategic locations in mitigation areas to increase functional value, removing trash, and conducting educational outreach. These measures in combination with the habitat restoration activities will greatly increase the function and the amount of suitable habitat for sensitive and listed species of wildlife.

**Comment [MC16]:** Please include another table that compares total acreage pre- and post- project with net change for each vegetation community identified in Table 1.3 within the total acreage area (i.e., 191.42 acres)

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**Comment [BLR17]:** See above comment.

**Comment [MC18]:** Such as cactus?

**Table 1.6 On-Site Mitigation Site Descriptions**

ON-SITE MITIGATION SITE DESCRIPTION										
Site #	Pre-Construction Site Conditions	Post-Construction Site Conditions								
	Habitat Types	Habitat Types	Vegetation	Hydrology	Mitigation Method	Acres	Lin. Ft	Cowardin	HGM	CRAM
<b>Wetland Waters of the US</b>										
<b>DG-W-1</b>	Disturbed NN Grassland	Wetlands/Riparian Woodland/Scrub	Bulrush/Cattail/Willow/Mulefat	Seasonally Flooded	Establishment	3.44		Palustrine	Riverine	Riverine
<b>DG-W-2</b>	Riparian Woodland/Herbaceous/NN	Wetlands/Riparian Woodland/Scrub	Bulrush/Cattail/Willow/Mulefat	Seasonally Flooded	Rehabilitation	2.13		Palustrine	Riverine	Riverine
<b>DG-3B</b>	Disturbed Riparian and Wetlands	Wetlands/Riparian Woodland/Scrub	Bulrush/Cattail/Willow/Mulefat	Seasonally Flooded	Re-Establishment	0.62		Palustrine	Riverine	Riverine
<b>TOTAL WETLANDS</b>						<b>6.19</b>				
<b>Non-Wetland Waters of the US</b>										
<b>DG-W-2 (Outlet)</b>	Riparian Woodland/Scrub/NN	Riparian Woodland/Scrub	Willow/Mulefat Thickets	Intermittent	Re-Establishment	0.13		Riverine	Riverine	Riverine
<b>DG-SF-1</b>	Riparian Woodland/Scrub/NN	Riparian Woodland/Scrub	Willow/Mulefat Thickets	Intermittent	Re-Establishment	0.03		Riverine	Riverine	Riverine
<b>DG-SF-2</b>	Riparian Woodland/Scrub/NN	Riparian Woodland/Scrub	Willow/Mulefat Thickets	Intermittent	Re-Establishment	0.06		Riverine	Riverine	Riverine
<b>DG-7</b>	Unveg Channel/Riparian Scrub	Riparian Woodland/Scrub	Willow/Mulefat Thickets	Intermittent	Re-Establishment	1.41		Riverine	Riverine	Riverine
<b>DG-8</b>	Unveg Channel/Riparian Scrub	Riparian Woodland/Scrub	Willow/Mulefat Thickets	Intermittent	Re-Establishment	0.87		Riverine	Riverine	Riverine
<b>DG-9</b>	Disturbed/Unveg Channel/RAFSS	Unveg Channel/RAFSS/Riparian Scrub	Unveg Channel/RAFSS/Riparian Scrub	Intermittent	Re-Establishment	14.12		Riverine	Riverine	Riverine
<b>DG-PARK-Drainage</b>	Disturbed Riparian/Oak Woodland	Riparian/Oak Woodland	Willow/Mulefat Thickets	Intermittent	Rehabilitation	0.03		Riverine	Riverine	Riverine
<b>DG-4-Drainage</b>	Riparian Woodland/Scrub/NN	Riparian Woodland/Scrub	Willow/Mulefat Thickets	Intermittent	Enhancement	0.22		Riverine	Riverine	Riverine
<b>DG-4-Sheet Flow</b>	Riparian Woodland/Scrub/NN	Riparian Woodland/Scrub	Willow/Mulefat Thickets	Intermittent	Enhancement	0.42		Riverine	Riverine	Riverine
<b>DG-4-WOUS</b>	Riparian Woodland/Scrub/NN	Riparian Woodland/Scrub	Willow/Mulefat Thickets	Intermittent	Enhancement	1.88		Riverine	Riverine	Riverine
<b>DG-1-WOUS</b>	Unveg Channel/Riparian Woodland	Riparian Woodland/Scrub	Willow/Mulefat Thickets	Intermittent	Enhancement	0.48		Riverine	Riverine	Riverine
<b>TOTAL NON-WETLAND WOUS</b>						<b>19.65</b>				
<b>Riparian Buffers</b>										

**Comment [BLR19]:** But used to be part of the flood plain. See above comment.

**Comment [BLR20]:** If currently wetlands, then not 're-establishment'. The mitigation type refers to WOUS (not what plants are on it).

ON-SITE MITIGATION SITE DESCRIPTION										
Site #	Pre-Construction Site Conditions	Post-Construction Site Conditions								
	Habitat Types	Habitat Types	Vegetation	Hydrology	Mitigation Method	Acres	Lin. Ft	Cowardin	HGM	CRAM
DG-2	Riparian Woodland/Scrub/Herb/NN	Riparian Woodland/Scrub	Willow/Mulefat Thickets	Intermittent	Enhancement	5.15	N/A	Riverine	Riverine	Riverine
DG-3A	Disturbed Riparian Scrub/NN	Riparian Scrub	Willow/Mulefat Thickets	Intermittent	Enhancement	1.13	N/A	Riverine	Riverine	Riverine
DG-4	Disturbed Riparian Woodland/Scrub	Riparian Scrub	Willow/Mulefat Thickets	Intermittent	Enhancement	28.37	N/A	Riverine	Riverine	Riverine
DG-2A	Disturbed NN Grassland	Riparian Scrub	Willow/Mulefat Thickets	Intermittent	Revegetation	0.10	N/A	Riverine	Riverine	Riverine
DG-2B	Disturbed NN Grassland	Riparian Scrub	Willow/Mulefat Thickets	Intermittent	Revegetation	0.38	N/A	Riverine	Riverine	Riverine
DG-4A	Lepidium	Riparian Scrub	Willow/Mulefat Thickets	Intermittent	Revegetation	5.59	N/A	Riverine	Riverine	Riverine
DG-4B	Disturbed Riparian Scrub	Riparian Scrub	Willow/Mulefat Thickets	Intermittent	Revegetation	0.54	N/A	Riverine	Riverine	Riverine
DG-4C	Disturbed Riparian Scrub/Bare	Riparian Scrub	Willow/Mulefat Thickets	Intermittent	Revegetation	0.45	N/A	Riverine	Riverine	Riverine
DG-5	Disturbed/Riparian Scrub	Riparian Scrub	Willow/Mulefat Thickets	Intermittent	Revegetation	0.26	N/A	Riverine	Riverine	Riverine
<b>TOTAL RIPARIAN BUFFERS</b>						<b>41.97</b>				
<b>Non-Aquatic Buffers</b>										
DG-1	Sage Scrub/RAFSS/Riparian Scrub/NN	Sage Scrub/RAFSS	CA Buckwheat Scrub/RAFSS	N/A	Enhancement	5.42	N/A	N/A	N/A	N/A
DG-4D	Disturbed/Barren	Sage Scrub	CA Buckwheat Scrub	N/A	Revegetation	2.32	N/A	N/A	N/A	N/A
DG-6	Disturbed Sage Scrub/Riparian Scrub	Sage Scrub	CA Buckwheat Scrub	N/A	Revegetation	1.46	N/A	N/A	N/A	N/A
<b>TOTAL NON-AQUATIC BUFFERS</b>						<b>9.20</b>				
<b>Side Slope Buffers</b>										
Side Slopes	Various Vegetation Communities Disturbed Areas	Riparian Scrub/RAFSS	Mulefat Thickets/RAFSS	N/A	Revegetation	10.89	N/A	N/A	N/A	N/A
<b>TOTAL SIDE SLOPE BUFFERS</b>						<b>10.89</b>				

Comment [BLR21]: Why different terminology than Mitigation Type for these?

## 1.6 Aquatic Resource Concerns in the Watershed

### 1.6.1 Devil's Gate CRAM Assessment

The CRAM scoring represents a baseline condition for 2015 for each of the Assessment Areas (AAs) that were assessed. The AAs within Devil's Gate, DG-TEMP, DG-PERM, DG-4, DG-5, and DG-Wetland, which are shown on Figure 1-8, were all categorized as the "riverine: confined" wetland sub-type. The apparent hydrologic flow regime for these areas was considered to be "intermittent." The AAs within impact areas include DG-TEMP, DG-PERM, and DG-Wetland. AAs within the proposed mitigation areas include DG-4 and DG-5, both located west of the Arroyo Seco. A summary of the AAs follows:

#### DG-TEMP

This AA is located within the area being proposed to be temporarily impacted by the sediment removal project. It encompasses a wide section of largely unvegetated streambed along Arroyo Seco. Aside from some scattered floodplain debris within the streambed (logs, rocks, etc.) the stream bottom is composed of coarse sand. The AA is about 200 meters long and wide. The stream boundaries are vegetated with a mixture of riparian vegetation and drier chaparral vegetation.

#### DG-PERM

Located downstream of DG-TEMP, this AA encompasses a portion of the area being proposed for permanent impact by the sediment removal project. The AA is about 200 meters in length and averages about 60 meters in width. The stream segment is narrower than that found in DG-TEMP, but supports more vegetation within the stream channel. The gradient of the stream is slightly higher in this section and the riparian vegetation is denser than for DG-TEMP.

#### DG-Wetland

The wetland areas just north of Devil's Gate Dam correspond to the lowest point within the Hahamongna Watershed Park. This AA was chosen because it is located within the permanent impact area for the sediment removal project and is within mapped jurisdictional wetlands. The AA is about 100 meters long and 30 meters wide, located within a deep channel that conveys flows from Berkshire Creek and other surrounding urban creeks to the dam. Vegetation within the channel has been scoured, but the sides support a mixture of riparian herbaceous vegetation and bare ground.

#### DG-4

This AA is located west of the Arroyo Seco within more upland portions of the park that support dense riparian vegetation. The AA is about 150 meters long and 70 meters wide. It corresponds to areas being proposed for use in mitigation for the sediment removal project. There is a small unvegetated streambed that traverses this section, but does not provide substantial contribution to the hydrogeomorphology. The AA supports a mixture of native riparian vegetation along with patches of nonnative vegetation, such as perennial pepper weed.

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**Figure 1-8 CRAM Assessment Areas**

DG-5

This AA is located slightly north of DG-5 and supports similar habitat conditions. The location was chosen because it corresponds to areas being proposed for use in mitigation for Project. There is a former mine pit located on the northern edge of the AA, but otherwise the hydrology is similar to DG-4. The AA is about 150 meters long and 80 meters wide.

**\*1.6.2 CRAM Scoring**

CRAM scores are present in accordance with summarized results for each major category on the data sheets. These scores summarize submetric values for buffer and landscape context, hydrology, physical structure, and biotic structure. Summarized Attribute Scores and Overall AA Scores for each of the AAs are displayed in Table 1.7 below.

**Table 1.7 Existing Attribute Scores and Overall AA Scores**

Assessment Area	Final Attribute Score				Overall AA Score
	Buffer and Landscape	Hydrology	Physical Structure	Biotic Structure	
<b>Impact Areas</b>					
DG Wetland	48.9	75	50	63.9	59
DG Permanent Impacts	80.9	91.7	25	69.5	67
DG Temporary Impacts	49	83.4	50	41.7	57
<b>Mitigation Areas</b>					
DG 4	49	91.7	62.5	61.2	67
DG 5	55.8	83.3	62.5	61.2	65

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**Comment [MC22]:** How do these scores relate to suitable habitat for the vireo?

**\*1.6.3 Analysis of CRAM Areas Post-Mitigation**

After mitigation activities have been completed within the mitigation areas described (DG-4 and DG-5), both the physical structure and biotic structure attributes are expected to improve. Sediment removal activities will result in vegetation removal, temporarily for temporary impact areas and permanently in permanent impact areas. Mitigation activities will result in clearing out of nonnative weeds and planting of native species within the mitigation sites. During mitigation activities, the physical structure of these areas is expected to change due to additional placement of physical habitats and microhabitats (logs, rocks, snags, etc.) to improve the diversity and distribution of these habitat types.

The CRAM scores for both the Buffer and Landscape attribute and Hydrology attribute are not expected to change for either the impacts or mitigation AAs, because impacts would not change these attributes and no changes to the existing hydrology or surrounding landscape are being proposed as part of the mitigation. Changes outside of the scope of the mitigation may occur over time, however, if there are land use changes or hydrologic changes that occur (unrelated to this project).

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**Comment [MC23]:** How will mitigation sites that are not currently mapped as WOUS be re-established without changing the hydrology?

## 2.0 SITE SELECTION CRITERIA

Mitigation sites were selected within the Project area to offset impacts to CDFW and USACE jurisdictional features during project implementation. Potential mitigation sites were selected based on the following criteria:

- Potential to locate compensatory mitigation sites in the appropriate parts of the Arroyo Seco Watershed to achieve a functional lift through the ~~creation, establishment, re-establishment~~, rehabilitation, revegetation, or enhancement of aquatic resources and habitat in important buffer areas;
- Potential to fulfill the watershed approach set forth in the Final Rule on Compensatory Mitigation for Losses of Aquatic Resources;
- Availability of adequate hydrology (both surface and subsurface) to sustain the mitigation areas for the long-term; and,
- Opportunity to conserve lands containing aquatic resources that are located in close proximity to existing preserved lands or open space.

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**Comment [BLR24]:** See above comment.

### 2.1 Watershed Overview

#### ~~2.1.1~~ **Mitigation Site Location**

All of the sites that are proposed as mitigation for the Project are on-site within Devil's Gate Reservoir and Hahamongna Watershed Park. The sites all fall within the 1,070 feet elevation contour HWM that has been identified for the Project. Numerous opportunities for improving the existing habitat in and adjacent to the reservoir were identified. Opportunities include establishment/creation of wetlands, re-establishment and rehabilitation of wetlands, and re-establishment, rehabilitation, and enhancement of non-wetland WOUS. In addition, most of the habitats within the HWM are considered buffer habitat for the wetlands and non-wetland WOUS mitigation sites. The buffer habitats will be restored and enhanced to not only provide protection for the USACE mitigation sites but also to improve the overall function in the Arroyo Seco Watershed. Major components of the activities planned for mitigation sites and buffers include re-establishing former non-wetland WOUS areas that have been impacted by human disturbances and removal of an extensive infestation of invasive and nonnative plant species. In addition, establishment of additional wetlands areas will provide both a water quality improvement function in the watershed and will provide additional important habitat that is limited in the area behind the dam. Improvement of the riparian area as a whole will also provide a significant increase in suitable habitat for federal and state listed species, which is limited in the watershed. Focusing the habitat restoration activities on the reservoir as a whole and managing the human activities that are occurring there will also greatly improve the quality and increase the quantity of riparian habitat in areas under the jurisdiction of the CDFW.

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**Comment [MC25]:** Clarify the basis for the 1070' project area – flood control easement area limit?

#### **2.1.2 General Watershed Condition**

The Arroyo Seco Watershed is a sub-watershed of the Los Angeles River watershed, which is a coastal watershed partly within the coastal zone. The watershed drains 47 square miles, approximately two-thirds of which are in the San Gabriel Mountains within the Angeles National Forest. The stream runs 22 miles in a deeply incised canyon, beginning under Strawberry Peak in the San Gabriel Mountains and draining into the Los Angeles River near downtown Los

Angeles. Roughly half of this length is contained within the boundaries of the Angeles National Forest.

Major obstacles within the watershed that impede flow between the headwaters and the confluence with the Los Angeles River include Brown Mountain Debris Dam, located seven miles below the Arroyo Seco headwaters, and Devil's Gate Dam, a large flood control facility bisecting the Arroyo Seco five miles downstream of Brown Mountain Dam at the southern end of Hahamongna Watershed Park. Below Devil's Gate Dam, most of the stream has been channelized to increase its capacity to carry floodwaters during winter storms.

Over its 22-mile course, the Arroyo Seco drops from an elevation of nearly 6,100 feet at its headwaters on Strawberry Peak to 320 feet at its confluence with the Los Angeles River. This drop over such a short distance, coupled with heavy rainfalls caused by Pacific storms dropping rain as they hit the San Gabriel Mountains, has produced catastrophic floods in the past. Since 1920, Devil's Gate Dam has served as a critical flood control facility that provides protection for the downstream portion of the Arroyo Seco Watershed.

The Arroyo Seco north of Devil's Gate Dam remains an important contributor to the local water supply as water infiltrating from the Arroyo Seco north of South Pasadena infiltrates to the Raymond Basin Aquifer. This aquifer is a 40-square mile groundwater basin that is one water supply source for the City of Pasadena (City) and other local communities. It also contributes to flows in the Arroyo Seco.

Aside from the Brown Mountain Dam, the character of the upper watershed remains relatively natural. The vegetation of the upper watershed is characterized by Bigcone Spruce Canyon Oak Forest, Southern Sycamore-alder Riparian Woodlands, and Southern Mixed Chaparral. In this area, the Arroyo Seco and some major tributaries such as Millard Canyon generally flow year-round, fed by numerous small springs and groundwater discharge. Just upstream of Devil's Gate Dam, the Arroyo Seco travels through an area that supports Riversidean Alluvial Fan Sage Scrub, which is considered a sensitive habitat in southern California. Devil's Gate Reservoir, which was created as a result of the dam operations, supports a large area vegetated with riparian that survives because of the periodic water impoundment behind the dam. The large influx of sediment into the riparian habitat in the reservoir following the Station Fire in 2011 resulted in mortality of many of the trees and understory vegetation. This disturbance created ample opportunities for invasive and nonnative plants to compete with recovering native vegetation. As a result, much of the riparian habitat has either been replaced by invasive and nonnative plants or the understory below the willows and cottonwoods has become heavily infested with these undesirable plant species.

Downstream of Devil's Gate Dam, most of the Arroyo Seco's natural character has been replaced by concrete-lined channels surrounded by urbanization. Surface waters of the Arroyo Seco are contaminated by urban runoff and the Arroyo Seco is listed on California's Clean Water Act 303(d) list of impaired waterways for three contaminants: nutrients/algae, high coliform counts, and trash (State Water Resources Control Board 2002). The high coliform and trash are direct results of nonpoint source pollution running into the Arroyo Seco via storm drains from urbanized portions of the watershed.

**Comment [BLR26]:** Same word used but now in reference to non-natives instead of beneficial undesirable plants (see above). Revise throughout for clarity in terminology.

**Comment [MC27]:** Likely directly related to the increase in inundation days due to the reduction in capacity behind the dam since 2010/2011. We are seeing the same change in vegetation composition within the Prado Basin inundation area.

## **1.2.2 Landscape Setting and Position**

### **1.2.2.1 Landscape Position**

The reservoir behind Devil's Gate Dam serves an important flood control function because, during storm events, it captures stormwater, sediment, and debris from the upper portion of the watershed and from storm drains and runoff that enter from surrounding areas. Devil's Gate Dam allows for retention of stormwater, thus preventing high flows from overwhelming the downstream flood control channel. The San Gabriel Mountains are located to the north of the Project site and are characterized by steep slopes and foothills. The elevations in Devil's Gate Reservoir range between approximately 1,000 and 1,300 feet above mean sea level (amsl) and the lands within the reservoir slope from north to south. The topography in the areas adjacent to the Reservoir is generally flat with a slight incline to the north.

### **1.2.2.2 Policies and Surrounding Land Uses**

The proposed mitigation sites are located within Devil's Gate Reservoir and the City's Hahamongna Watershed Park (HWP). All of the sites are within existing natural areas in the reservoir, along the banks of the Arroyo Seco, to the north of the Project, and on the eastern edge of the Oak Grove Area of HWP. The area to the north of the mitigation sites includes the natural vegetation in the Arroyo Seco channel. To the west of the mitigation sites is the Oak Grove Park Area of HWP. The City has future improvement plans for portions of HWP, including upgrading portions of the Oak Grove Area, relocation of portions of the disc golf course, and drainage improvements at Berkshire Creek but in general, the existing character and uses of the Oak Grove Area will remain the same as they are currently. Hiking and equestrian trails do currently traverse through some of the proposed mitigation sites but plans for trails closures and redirection of trails will eliminate impacts associated with the trails in sensitive habitats. The areas to the east and northwest of the mitigation sites are urbanized with residential communities and the Jet Propulsion Laboratory facility. Areas downstream of Devil's Gate Dam are mostly urbanized, however some patches of native vegetation do occur adjacent to the channel in a few areas within the Central and Lower Arroyo Seco. A soft bottom channel is present immediately downstream of the dam.

#### **Hahamongna Watershed Master Plan and Amendment**

In 2003, the City prepared and adopted a Master Plan for the Hahamongna Watershed Park (HWP), which established a 300-acre park area that encompasses Devil's Gate Reservoir and portions of the surrounding areas. In 2010, an addendum to the Master Plan was prepared by the City that covered the addition of a 30-acre upland parcel, referred to as the HWP Annex, located in the northwest portion of HWP. The proposed development in the HWP Master Plan included new west and east side spreading basins, multi-use play fields and relocated disc golf course, additional parking areas, widening the stream channel, and habitat restoration activities. The Master Plan also identified a Trail Plan that identified a system of recreational trails through HWP. LACFCD approached the City about planned developments in HWP and potential conflicts with the proposed mitigation for the Devil's Gate Project. Staff from the City stated that the west side basins and the multi-use play fields have been eliminated from the proposed developments in the Master Plan. These development projects would have conflicted with the location of the proposed mitigation sites. In addition, LACFCD discussed the Trail Plan

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**Comment [MC28]:** Seems to dismiss the value of existing habitats downstream from the dam. Restoration sites completed by the City of Pasadena include a minimum of 22.4 acres of riparian woodland and 4.2 acres of wetland mitigation sites according to information provided for the Pasadena Non-Potable Water Project.

with the City staff and expressed concerns about planned trails through proposed locations for the mitigation sites. City staff stated that LACFCD could, as part of their mitigation plan, close trails through the reservoir and through the proposed locations of mitigation sites. The City requested that the Perimeter Trail remain open, which does not conflict with the proposed locations of the mitigation sites. With the exception of mitigation site DG-4D, which is an upland buffer site, and mitigation site DG-Park-Drainage, which is located adjacent to the lower Oak Grove parking lot, all of the proposed mitigation sites are located within the Perimeter Trail. LACFCD also discussed the relocation of some of the disc golf holes to areas outside of the riparian habitat and the proposed mitigation sites to eliminate human disturbances associated with players searching for the discs. The City staff agreed that the disc golf holes will be relocated out of areas within or adjacent to sensitive habitat areas. Mitigation site DG-4D is the only exception and in that area, native upland scrub will be planted around the trails and throwing areas associated with the disc golf holes that will be relocated to this area. The orientation of all disc golf holes in this mitigation site will be such that the players are throwing away from the adjacent sensitive habitat areas.

**Comment [MC29]:** Please provide a figure that identifies trails relative to the location of proposed mitigation sites.

**Comment [MC30]:** Due to the high potential for disturbance of wildlife associated with co-locating active recreational uses and restored habitat, no golf holes should be located within mitigation sites.

#### General Plan Draft Open Space & Conservation Element

In 2012, the City prepared an update to the General Plan called the Draft Open Space & Conservation Element. The Open Space & Conservation Element established the Arroyo Seco as the City's largest natural open space that extends eight miles from the San Gabriel Mountains to the Los Angeles River. The Arroyo Seco includes three distinct geographic areas, which are also designated as City parks, including HWP, Central Arroyo, and Lower Arroyo. HWA is comprised of the lower 320 acres of the total 1,330 acres of the Upper Arroyo Seco. Other than the 90-acre Oak Grove Area, which is dedicated as parkland, the remainder of HWA is largely natural open space that provides passive recreational uses that coexist with the flood management operations of LACFCD in Devil's Gate Reservoir. The goals and objectives of the Open Space & Conservation Element include preserving, restoring, and maintaining the natural character of the Arroyo Seco as a self-sustaining healthy ecosystem of plants and animals. In addition, the goals and objectives also include promoting responsible human interfaces with these unique natural environments in open space planning. The Arroyo Seco is zoned as Open Space (OS) in the Open Space Zoning District. The OS category is for a variety of active and passive public recreational facilities and for City-owned open space facilities. This category also includes natural open space and areas, which have been designated as environmentally and ecologically significant. This designation only applies to lands owned by the City. The Open Space & Conservation Element designates the City's Planning Department as the oversight group for assessing impacts of proposed developments on open space parcels, sensitive species, and habitat areas. In addition, the City's Public Works Department provides ongoing oversight for continuing to preserve and restore the Arroyo Seco. The proposed mitigation sites for the Devil's Gate Project are located entirely within the areas the City has zoned as OS.

**Comment [MC31]:** Does the City control the long term uses of the mitigation sites? If so we will need a land use agreement with the City that ensures the mitigation sites will be maintained for the purpose of preserving the functions and values established (including habitat for the vireo) for the life of the project.

#### City Municipal Code – Chapter 3.32.100

In addition to the Open Space & Conservation Element, the City's Municipal Code (Chapter 3.32.100) establishes Natural Preservation Areas in the following locations: on the slope banks of the Arroyo Seco, the Lower Arroyo from the south City limit to Holly Street bridge, the flood control channel area west and south of Brookside Park, and the area north of Brookside Golf Course to Devil's Gate Dam (City of Pasadena 2003a). The Municipal Code sets forth the

permitted uses and special regulations related to limiting activities within the Natural Preservation Areas. The permitted uses and special regulations apply to the area that includes Devil's Gate Reservoir and the proposed mitigation sites. However, the proposed mitigation sites will be subjected to the more stringent protections and requirements in the permits issued by the USACE, RWQCB, and CDFW.

### **3.2.2.3 Connectivity of Proposed Compensatory Mitigation Sites**

The habitat restoration activities conducted at the proposed mitigation sites will improve the function and values in Devil's Gate Reservoir and the Arroyo Seco Watershed and will result in much higher quality habitat than currently exists. Improvement of habitat in the preserved portions of the reservoir will increase the value of the area as a critical linkage, it will buffer the USACE jurisdictional areas, it will improve the quality and increase the quantity of riparian habitat under the jurisdiction of the CDFW, and will provide for additional opportunities for wildlife. The reservoir area provides essential habitat connectivity between Flint Wash and the Arroyo Seco located downstream of the dam, Hahamongna Watershed Park, and areas located upstream in the Angeles National Forest. The habitats in the reservoir area and the adjacent Hahamongna Watershed Park function as a critical linkage in a highly developed area. Not only do wildlife species reside in the area but they also use the area for juvenile dispersal, seasonal migration, and home range connectivity. Improving the habitat will greatly increase the quality and quantity of available habitat for least Bell's vireo and southwestern willow flycatcher and potentially for the western yellow-billed cuckoo.

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### **4.2.2.4 Open Space Areas Abutting Compensatory Mitigation Sites**

The LACFCD holds perpetual property rights over the reservoir and all proposed mitigation sites as recorded through easements granted in May of 1919 and March of 1965. The City, in collaboration with the LACFCD, recognizes the value of the mitigation sites to the Hahamongna Watershed Park and intends to conserve and protect these sites. The City has adopted numerous policy documents relevant to the Hahamongna Watershed Park, such as the Hahamongna Watershed Park Master Plan (2003b), Hahamongna Watershed Park Master Plan Addendum for the Hahamongna Annex (2010), and Open Space & Conservation Element of the General Plan (2012). These documents commit the City to protect native habitats and conserve and protect the natural resources of the Arroyo Seco. The adoption in 2003 of the Hahamongna Watershed Park Master Plan (HWPMP) was the culmination of a five-year community planning process with extensive participation from the LACFCD. The HWPMP is the central guiding document for the City's planning for this area. The proposed compensatory Mitigation Sites have a General Land Use designation of Open Space and are zoned Open Space under the City of Pasadena Open Space & Conservation Element of the General Plan.

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**Comment [BLR32]:** Does this plan include to the planned multi-use play fields no longer considered, and the moving of the disc golf? Will it be revised or amended? When?

### **5.2.2.5 Existing and Proposed Buffer Width**

The existing and proposed buffer for the proposed mitigation sites includes all of the habitats within Devil's Gate Reservoir that are located outside of the Permanent Maintenance Area and adjacent to the mitigation sites. The proposed buffer width ranges from approximately 25 to 425 feet. The narrowest portion of the proposed buffer is approximately 25 feet on one side of an ephemeral drainage that will be rehabilitated and the buffer will be revegetated with upland vegetation. The buffers adjacent to the proposed mitigation sites are generally on the larger

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side because the mitigation sites are mostly located within the existing riparian habitat in the reservoir.

### **2.2.3 Site-specific Information**

#### **2.2.3.1 Ownership Information**

The City is the owner of the underlying lands within Devil's Gate Reservoir where the proposed mitigation sites are located. The LACFCD holds a perpetual flood control easement from the City to operate the Devil's Gate Dam and the associated reservoir. The City contact information is as follows:

City of Pasadena  
100 North Garfield Avenue  
Pasadena, California 91109  
(626) 744-4000

#### **2.2.3.2 Existing and Anticipated Sources of Hydrology**

The existing sources of water for Devil's Gate Reservoir are inputs from the natural and urbanized areas within the Arroyo Seco Watershed. Water from the natural areas upstream is conveyed into the reservoir through the Arroyo Seco wash and surface flows from areas adjacent to the Arroyo Seco. According to the HWPMP, 23 storm drains also convey flow to the reservoir. Most of these storm drains divert run-off from neighborhoods and businesses into the reservoir. During larger storm events, water is impounded behind the dam for a period of time to allow sediment to drop out of the water column and to provide flood control for downstream areas. In addition to water provided by precipitation and available groundwater, the inundation of the reservoir by the impoundment of water and water flowing through the established natural channels throughout the reservoir provide the necessary moisture for the survival of the riparian habitats in the reservoir.

Water from the Arroyo Seco and storm drains continues to flow to the southernmost point in the reservoir and leaves the reservoir from the outlet structures of the dam. Water flows south of the dam for approximately 8.5 river miles to the Los Angeles (LA) River in Los Angeles near the State Route (SR) 110 and Interstate 5 (I-5) freeway interchange. The LA River continues to flow south for approximately 23.5 river miles to its terminus at the Pacific Ocean in Long Beach.

The anticipated water sources for the proposed mitigation sites, which are located within Devil's Gate Reservoir will primarily continue to be input from precipitation, surface flows from surrounding areas, and periodic inundation. Groundwater may provide additional support to the mitigation sites but to a far lesser degree. Artificial sources of water (such as a water truck or irrigation system hooked up to a City water source) in the form of irrigation will be used at some of the mitigation sites in order to help the plants become established. Once the plants are established, the irrigation will be removed. Sources of water for the wetland mitigation sites will include groundwater, natural runoff during storm events, inundation when water is held behind the dam, the West Altadena Stormdrain, and potentially overflow from upstream percolation basins.

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**Comment [BLR33]:** Is this the terminology? How many years is it good for, or does it get renewed every x # years.

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**Comment [MC34]:** Clarify existing dam operations. How long will the habitat be inundated? What measures will be implemented to ensure damage to mitigation sites from prolonged inundation will be avoided?

**Comment [MC35]:** Based on anticipated elevation of the mitigation sites, what size storm events will be required to provide natural runoff to the mitigation sites (i.e., 1-year, 5-year, 10-year event)?

**Comment [MC36]:** How often is this expected to occur?

### **3.2.3.3 Soil Characteristics**

The soil characteristics at the proposed mitigation sites are suitable for the restoration of riparian habitats. The existing habitat type in and adjacent to the mitigation sites is riparian with a predominance of willows, cottonwoods, and mulefat. Those areas dominated by nonnative and invasive species, that likely supported native vegetation prior to the large influx of sediment following the Station Fire, are also located within the reservoir and would be expected to exhibit similar soil characteristics as the areas dominated by riparian plant species.

The two soil types that have been identified in the reservoir include Ramona Sandy Loam and Hanford Gravelly Loam. Ramona Gravelly Loam consists of fine, well-drained, sandy loam soil formed from the breakdown of granite rock. This type of soil has moderately slow permeability and is typically observed on terraces and in alluvial fans with flat to slightly sloped topography at elevations ranging from 250 feet amsl to 3,500 feet amsl. Hanford Gravelly Sandy Loam consists of well-drained soil typically found on stream bottoms, floodplains, and alluvial fans on slopes from 0 to 15 percent. This soil forms at elevations ranging from 150 feet amsl to 3,500 feet amsl and is primarily from granite and other quartz containing rock.

Because post-sediment removal compensatory mitigation is planned to take place where riparian vegetation communities currently exist, it is presumed that the existing soil type within the project site will be appropriate for the type of planned mitigation. Soils composition below sediment buildup is presumed to be supportive of riparian vegetation communities. Compensatory mitigation measures taking place at Johnson Field, consisting of removing sediment build up, will presumably expose native soil that can support riparian vegetation communities and reconnect the area to the existing channel.

### **4.2.3.4 Strahler Stream Order and Hydrologic Regime**

The Strahler Stream Order for the mitigation site is 4. The hydrologic regime of the main channel of Arroyo Seco is intermittent and the side channels entering Arroyo Seco are ephemeral.

### **5.2.3.5 Existing Habitat Types and Presence of Known Species or Habitats of Concern**

The proposed mitigation sites are located within Devil's Gate Reservoir and in a small ephemeral drainage located just east of the Oak Grove Area of Hahamongna Watershed Park. Table 2.1 lists the existing vegetation communities and land cover types within the mitigation sites and buffer areas. Several habitats of concern are existing in the reservoir, including *Salix gooddingii* Woodland Alliance, *Lepidospartum squamatum* Shrubland Alliance (equivalent of Riversidean Alluvial Fan Sage Scrub), and *Quercus agrifolia* Alliance (coast live oak woodland). These communities contain an abundance of invasive and nonnative plant species including perennial pepper weed, mustards, thistles, and other weedy species.

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**Comment [BLR37]:** What about prior to the drought? Was not there a perennial surface flow in this wash?

**Comment [MC38]:** Based on information collected by USGS at Station 11098000, Arroyo Seco is perennial during most years.

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**Table 2.1 Existing Vegetation Communities**

RIPARIAN/FLOODPLAIN
<b><i>Salix gooddingii</i> Woodland Alliance</b>
<i>Salix gooddingii</i> Woodland Alliance
<i>Salix gooddingii</i> Woodland Alliance - Sparse
<i>Salix gooddingii</i> Woodland Alliance-20% <i>Lepidium latifolium</i> / <i>Xanthium strumarium</i>
<i>Salix gooddingii</i> Woodland Alliance-30% <i>Lepidium latifolium</i> / <i>Xanthium strumarium</i>
<b><i>Baccharis salicifolia</i> Shrubland Alliance</b>
<i>Baccharis salicifolia</i> Shrubland Alliance-No Understory
<i>Baccharis salicifolia</i> Shrubland Alliance-20% <i>Conium maculatum</i> / <i>Lepidium latifolium</i>
<i>Baccharis salicifolia</i> Shrubland Alliance-30% <i>Conium maculatum</i> / <i>Lepidium latifolium</i>
<i>Baccharis salicifolia</i> Shrubland Alliance-40% <i>Conium maculatum</i> / <i>Lepidium latifolium</i>
FLOODPLAIN
<b><i>Lepidospartum squamatum</i> Shrubland Alliance</b>
<i>Lepidospartum squamatum</i> Shrubland Alliance
<i>Lepidospartum squamatum</i> Shrubland Alliance (Sparse)
NATIVE UPLAND
<i>Artemisia californica</i> – <i>Eriogonum fasciculatum</i> Shrubland Alliance
<i>Artemisia californica</i> – <i>Eriogonum fasciculatum</i> Shrubland Alliance-20% <i>Lepidium latifolium</i>
<i>Artemisia californica</i> – <i>Eriogonum fasciculatum</i> Shrubland Alliance-30% <i>Lepidium latifolium</i>
<i>Quercus agrifolia</i> Alliance
<i>Platanus racemosa</i> Woodland Alliance - Disturbed
NONNATIVE/OTHER
<i>Brassica nigra</i> and other mustards Herbaceous Semi-Natural Alliance
<i>Conium maculatum</i> Herbaceous Semi-Natural Alliance
<i>Lepidium latifolium</i> – <i>Conium maculatum</i> Herbaceous Semi-Natural Alliance
<i>Lepidium latifolium</i> Herbaceous Semi-Natural Alliance
<i>Rumex crispus</i> Herbaceous Semi-Natural Alliance (Unofficial Alliance)
<i>Xanthium strumarium</i> Herbaceous Alliance (Unofficial Alliance)
<i>Eucalyptus (globulus, camaldulensis)</i> Woodland Semi-Natural Alliance
<i>Fraxinus velutina</i> Forest Alliance (Unofficial Alliance)
Landscaped
Depression/Bare Ground (Associated with Seasonally Wet Area)
Disturbed (Barren/Trails/IMP Area)

Past biological surveys in Devil’s Gate Reservoir, where the mitigation sites area located, have documented the presence of migratory least Bell’s vireo and southwestern willow flycatcher. Both of these species are federally and state-listed endangered species. Two separate observations of least Bell’s vireos and one observation of southwestern willow flycatchers were documented in the western portion of the reservoir during focused surveys for western yellow-billed cuckoo that were conducted in 2015 (Chambers Group 2015a). The focused survey report is included as Appendix A. The locations where the birds were observed are within the areas where habitat will be enhanced through the removal of invasive and nonnative plants. Focused surveys for least Bell’s vireo, southwestern willow flycatcher, western yellow-billed cuckoo, and coastal California gnatcatcher were also completed by ECORP (ECORP 2016b; ECORP 2016c) and Leatherman BioConsulting (Leatherman 2016) in 2016. An additional survey for western yellow-billed cuckoo was also conducted by Chambers Group in 2016 (Chambers Group 2016).

Migratory vireos were observed early and late in the 2016 season by ECORP but no evidence of nesting was observed. This species was not present in the reservoir between May 4 and August 1, which is the period when nesting occurs. Chambers Group did not observe least Bell's vireos, western yellow-billed cuckoos, or willow flycatchers during their 2016 surveys. The focused survey reports prepared in 2016 are included in Appendix B. Flycatchers, cuckoos, and California gnatcatchers were not observed during any of the focused surveys conducted in 2016. Devil's Gate Reservoir is not within Designated Critical Habitat for least Bell's vireo, southwestern willow flycatcher, or coastal California gnatcatcher but does contain limited suitable habitat for the species.

### 2.3.6 Discussion of Water Rights

At Devils Gate Reservoir, the State Water Resources Control Board (SWRCB) shows two water rights, both owned by the City of Pasadena Department of Water and Power.

5.0. The City of Pasadena Department of Water and Power owns a pre-1914 right to divert up to 25 cubic feet per second (cfs) of surface water from the Arroyo Seco stream to recharge groundwater; however, the existing diversion structure is not capable of diverting 25 cfs. The listed use is for 164,000 domestic hookups. The point of diversion is from a City-owned diversion structure located approximately 1.6 miles upstream of Devil's Gate Dam.

6.0. The City of Pasadena Department of Water and Power also holds an appropriate right from 1919 to divert up to 1.8 cfs and a maximum of 238 Acre-Feet (AF) per year for irrigation use. The point of diversion is from the existing Devil's Gate Tunnel which collects percolated water from Devil's Gate Reservoir.

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**Comment [MC39]:** Given the proposed substantial increase in the height of the diversion structure, it is not clear that the existing infrastructure was ever capable of diverting 25 cfs

### 3.2.4 Summary of Identified Risks

The following sections summarize the risks that have been identified in relation to locating the mitigation sites within a flood control facility.

#### 1.2.4.1 Proposing Mitigation on Lands not Owned by the Applicant

3. The land within the Devil's Gate Reservoir where both the sediment removal and maintenance project and the mitigation for project impacts are proposed is government property, owned by the City.

4. The Proposed Project site has a General Plan Land Use designation of Open Space and is zoned as Open Space under the City of Pasadena General Plan (City of Pasadena 2012).

5. The City has granted a perpetual easement to the LACFCD with the right to construct, reconstruct, inspect, maintain, repair, and operate Devil's Gate Dam, its spillway, reservoir, bypasses, tunnels, and other support facilities as may be necessary for the construction and maintenance of a reservoir capable of impounding waters of the Arroyo Seco for the purposes of storage and control, and to control such waters as may be necessary in the prevention of damage by flood (City of Pasadena 1919/1965).

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**Comment [BLR40]:** See above.

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6. The HWPMP, which was adopted in 2003, encompasses approximately 300 acres and includes Devil's Gate Dam and Reservoir. The HWPMP establishes a visionary framework for recreation, water resources, flood management, habitat restoration, and cultural resources in Hahamongna Watershed Park.

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7. The City is in agreement with implementation of the proposed mitigation within the reservoir and the Hahamongna Watershed Park. The City has stated they will not be implementing development of any facilities within the areas proposed for mitigation by LACFCD.

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### 2.2.4.2 Long-Term Protection (Legal Agreement)

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- Flood Control Easement – As mentioned previously, LACFCD has a perpetual flood control easement and they are granted the right to conduct activities within the boundaries of the easement. The sediment removal and management project and the associated mitigation are both consistent with the easement.

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**Comment [BLR41]:** Not sure I follow.

- As mandated by the State of California Legislature, LACFCD is perpetually required to maintain the Devil's Gate Dam and Reservoir for flood protection. As such, LACFCD will perpetually be required to obtain and comply with USACE regulations of WOUS at this site.

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**Comment [BLR42]:** List examples (Big Tujunga Mitigation, what else?).

- LACFCD has worked cooperatively and closely with the USACE on numerous programs and projects for over 100 years. LACFCD is a proven reliable partner.

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**Comment [MC43]:** To ensure habitat for the vireo will be maintained for the life of the project, USFWS requests third party status in the land use agreement with the ability to approve changes in use of the mitigation sites, should future changes be proposed by the City

- Open Space Designation in the Master Plan – As mentioned previously, the area encompassing the proposed mitigation area is designated as Open Space under the City's General Plan.

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- Agreement from City – The City has agreed to provide a letter stating that the City will consider the lands as permanent mitigation areas.

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- LACFCD anticipates the City will initiate the lengthy process to revise the HWP Master Plan following the implementation of the Project to formally include the preservation of the mitigation areas and remove any mention of outdated conflicting recreational facility plans that have already been eliminated by City Council.

**Comment [BLR44]:** This needs to be initiated asap (with a draft submitted prior to the anticipated permit). Let's discuss.

- LACFCD is committed to replace any failed mitigation whether in the same location or a different location.

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**Comment [BLR45]:** Need contingency discussion. For example, what if the mitigation does not get enough subsurface water to support it?

### 2.2.4.3 Financial Assurances

1.0. LACFCD has the financial resources to undertake the mitigation and sustained long-term management of the mitigation areas. The LACFCD's primary sources of funding are the ad valorem property tax for the Flood Control District and the Flood Control Benefit Assessment. LACFCD has an average annual budget of approximately \$240 million and a Bond Rating of AAA+. LACFCD has the ability and is committed to

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**Comment [BLR46]:** What types of projects has this \$ primarily been used for?

making a discrete line item in its annual budgets for the required mitigation and long-term management of the mitigation areas for the Project.

**Comment [BLR47]:** Need a copy of the line item budget for DG with amount.

2.0. LACFCD has demonstrated success in implementing and managing mitigation projects. A notable mitigation site is the Big Tujunga Wash Mitigation Area, which was established in 2000 and has met the established success criteria. LACFCD continues to provide the long-term maintenance and management of the Mitigation Area. The monies required to fund the long-term maintenance and management of the Big Tujunga Wash Mitigation Area are budgeted and dedicated on an annual basis. Another notable mitigation site, is the recently created and very successful Oak Woodland habitat mitigation area at the Santa Anita Sediment Placement Site.

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3.0. LACFCD has the ability to fund a new mitigation site and acquire property necessary, or to provide adaptive management of the proposed mitigation in case the proposed mitigation site fails.

**Comment [MC48]:** Where is this?

**Comment [BLR49]:** Was this related to a Corps approval/permit?

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#### 4.2.4.4 Hydrology and Flood Control

3.0. Natural Input from the Watershed – Hydrology information shows that sub-watersheds on both the western and eastern sides of the reservoir drain directly into the mitigation areas. The volume of water entering the western portion of the reservoir from these sub-watersheds ranges from approximately 33 acre-feet during a two-year storm event to approximately 89 acre-feet during a 50-year storm event. The volume of water entering the eastern portion of the reservoir from these sub-watersheds ranges from approximately 159 acre-feet during a two-year storm event to approximately 450 acre-feet during a 50-year storm event. Precipitation falling directly on the mitigation areas during storm events will also provide water to the habitats in the mitigation areas.

**Comment [MC50]:** Additional mitigation should be required to offset the temporal loss in the event of mitigation site failure. As part of the contingency section, identify the timeline and triggers that will be used to determine when a new mitigation site will be required.

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**Comment [MC51]:** Reference figures that identify the location of inputs discussed in this section.

5.0. Inundation – LACFCD will continue to operate Devil’s Gate Dam in the same manner that it has been operated in the past. Impounded flows in the reservoir reach the mitigation areas at elevation 1,020 feet. Modeling of the peak storage and flow of a 2 to 5 year frequency storm event that occurred in January of 2007/2008 shows that with the approved configuration for the Project, the peak storage would have been approximately 1,660.20 acre-feet and the elevation within the reservoir would have reached 1,032.50 feet. The elevation modeled for this design storm shows that much of the mitigation areas in the western and eastern portions of the reservoir could potentially be inundated on a periodic basis during the storm season. LACFCD has the ability to regulate the length of time that the mitigation areas would be inundated. LACFCD will ensure that mitigation areas are successful.

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**Comment [MC52]:** How will the dam be operated to ensure the mitigation sites are successful?

**Comment [BLR53]:** See next comment.

4.0. Other Projects in the Watershed – All of the projects mentioned here are completely separate projects and have independent utility from the sediment removal and management project. The City’s Arroyo Seco Canyon Project consists of improving the City’s water intake structure in the canyon portion of Arroyo Seco and expanding the existing spreading basins. The purpose of the project is to allow the City to take its full entitlement of 25 cfs from the Arroyo Seco. Successful implementation of the City’s project will only increase diversion during the storm season in which the amount of flows that will be diverted is minimal relative to inflows into the reservoir. The LACFCD’s

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**Comment [BLR54]:** What is the County and City’s relationship with the water managers? What would be the remaining water available if they utilize their full water rights?

Have you discussed with them?  
Is an agreement in place?

Devil's Gate to Eaton Water Conservation project will divert water that would normally be released downstream of Devil's Gate Dam east to Eaton Basin for the purpose of groundwater recharge. The diverted water will be discharged into the same groundwater basin that is present under Devil's Gate Reservoir. LACFCD will have the ability to ensure water diversion from the reservoir is consistent with the success of the onsite mitigation areas. The City's Non-Potable Water Project involves construction and operation of a new non-potable water distribution system to deliver water from three local supply sources: (1) recycled water produced by the Los Angeles/Glendale Water Reclamation Plant, (2) surface water inflows from two existing tunnels (Devil's Gate and Richardson Springs), and (3) water from the Arroyo Seco stream downstream of Devil's Gate Dam, to customers within the service areas of Pasadena Water and Power, Lincoln Avenue Water Company, Foothill Municipal Water District, and California American Water Company, for landscape irrigation, industrial cooling, and other non-potable uses. The Devil's Gate tunnels that will be utilized by the project are existing tunnels and their use will not have any new impacts to the reservoir.

- 5.0• **Management of Water Availability for the Mitigation Areas** – LACFCD has the ability and is committed to ensuring adequate water resources are available to sustain the mitigation areas. Supplemental water will be provided to container plantings and pole cuttings during the establishment period. LACFCD will monitor inundation in the mitigation areas to ensure mitigation success. In the event of an extended period of inundation where riparian vegetation is damaged or lost, a damage assessment and adaptive management measures will be implemented to ensure the mitigation areas survive for the long-term. Similarly, in the event of a prolonged drought, LACFCD will continue to monitor the status of the mitigation areas to determine losses or damage caused by lack of precipitation. A damage assessment will be completed and adaptive management measures will be determined and implemented when rainfall events do occur.

**Comment [MC55]:** Specify the triggers that will be used to determine when changes in water management will be implemented. Proactive measures should be implemented as part of a long-term management plan for the mitigation sites to ensure from prolonged inundation is avoided.

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**5.2.4.5 Damage Caused by Natural Events**

- 3• Should a natural event occur, such as catastrophic flooding of the mitigation areas or fire, that may damage all or a portion of the mitigation areas, LACFCD will conduct a damage assessment to determine if adaptive management measures are necessary to assist in the recovery of the mitigation areas. The adaptive management measures may include maintenance to keep nonnative and invasive plants from out-competing the recovery of the native vegetation and potentially planting and/or seeding if areas are having difficulty recovering from the damage caused by the natural event. LACFCD has the ability to fund the adaptive management measures to assist the mitigation areas in returning to the intended habitat types.

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**Comment [MC56]:** We recommend implementation of cowbird trapping in areas that are damaged to offset the increase in predation/parasitism pressure associated with the reduction in understory and reduction in the overall quality of vegetation for nesting birds. Cowbird trapping should be implemented until the damaged habitat is restored to conditions specified in the success criteria for the mitigation sites

**6.2.4.6 Damage Caused by LACFCD Activities**

- 3• In the event that it becomes necessary for LACFCD to operate the dam in a manner that results in catastrophic or partial damage to the mitigation areas, LACFCD will conduct a damage assessment to determine the adaptive management measures necessary to return the mitigation areas to the intended habitat types. The adaptive management measures may include planting, seeding, watering, maintenance, and monitoring until

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the mitigation areas achieve the established success criteria. In such situations, any temporal loss would be considered and incorporated appropriately. LACFCD has the ability to fund the adaptive management measures necessary to ensure the mitigation areas return to the intended habitat types and achieve the established success criteria.

**7.2.4.7 Monitoring during Initial Sediment Removal and Annual Maintenance**

4. Biological monitoring will be conducted during the initial sediment removal phase of the project and during the annual maintenance period to ensure that the contractors stay within the limits of grading and they do not venture into the mitigation areas. If a contractor were to damage any portion of the mitigation areas, then a damage assessment would be conducted and adaptive management measures would be developed and implemented to ensure the damaged mitigation area achieves the established success criteria.

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**8.2.4.8 Mitigation Site Compatibility with Onsite Multiple Uses**

5. The mitigation areas are currently traversed by trails used by hikers, equestrians, bird-watchers, joggers, nature lovers, and people walking their dogs. In general, these passive recreation activities do not create a lot of disturbance. Also, it appears that most of the activities are confined to the existing trails and due to the density of the vegetation in most areas, people generally don't venture far into the vegetation adjacent to the trails. However, loose dogs are present on a relatively frequent basis and they do cause additional disturbances when they venture off the trails and into the adjacent habitat. As part of the mitigation plan, LACFCD intends to close or control the use of the trails that cross through the mitigation areas to decrease the disturbances to the conserved habitat areas. The perimeter trail around the reservoir will remain open. The City has agreed that any trails through the reservoir can be closed as long as the perimeter trail remains open. The mitigation plan for the Project also includes narrowing portions of permanent trails, planting undesirable plants along trails to buffer sensitive habitat areas, placing woody debris at strategic locations in mitigation areas to increase functional value, removing trash, posting signs to identify the mitigation areas, and conducting educational outreach. Initially, closing trails will be a challenge but education and outreach will be conducted concurrently to promote awareness of the sensitivity of wildlife to the presence of people and dogs and the importance of conserving the habitat. LACFCD has had great success with educational outreach at the Big Tujunga Wash Mitigation Area.

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**Comment [MC57]:** Such as cactus?

**Comment [BLR58]:** What actions would be taken should encampments or homeless persons establish or damage areas? Does the County have a policy?

**9.2.4.9 Survival of the Habitats in the Mitigation Areas**

6. Devil's Gate Reservoir historically and currently supports riparian habitat throughout most of the reservoir. The areas where mitigation is planned to occur currently support or did historically support riparian vegetation. The soils present in the mitigation areas are suitable and able to support the vegetation that will be planted in the mitigation areas. Water to support the vegetation in the mitigation areas will be available through a combination of precipitation, surface runoff, and inundation. LACFCD has the ability to manage the amount of water provided to the mitigation areas by controlling the levels of water in the reservoir and the duration of inundation. Initially, container plants and cuttings will be provided with supplemental water until they become established. Once established, they will be able to survive and thrive with the existing water provided from reservoir management and natural sources, such as runoff from areas surrounding the mitigation areas. In the event that a prolonged drought occurs or a catastrophic flood washes out the mitigation areas or inundates the mitigation areas for a prolonged

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period, a damage assessment will be conducted. Adaptive management measures will be developed and implemented to ensure the mitigation areas meet the established success criteria. Trails will be closed in the mitigation areas to eliminate disturbances caused by the presence of humans and dogs and public outreach and education will be provided to the site users. Regular biological monitoring will be conducted to ensure the contractors don't go outside of the approved grading limits and into the mitigation areas. In addition, the biological monitoring will identify problems within the mitigation areas that will then be rectified by LACFCD. Restoration activities will include the initial removal of nonnative and invasive plants and planting and seeding with native species. Ongoing maintenance will be conducted for the long-term to ensure the nonnative and invasive plants do not out-compete the native plants. Quantitative and qualitative monitoring will be conducted to determine the status and success of the restoration areas. CRAM monitoring will be conducted to compare the mitigation sites to the baseline CRAM values and to ensure the mitigation areas are on a trajectory to meet the projected CRAM values for the post-project condition. Adaptive management will be an ongoing task to ensure the mitigation areas achieve the success criteria and continue to provide habitat for an abundance of wildlife, including the least Bell's vireo, for the long-term.

**Comment [MC59]:** Does CRAM monitoring include an assessment of the species and cover in the understory, and canopy layers of vegetation that are necessary components of habitat for vireo?

## **8.03.0 BASELINE INFORMATION FOR PROJECT SITE**

### **8.13.1 Topography and Elevation**

South of the San Gabriel Mountains, the project site is located in the upper portion of the Arroyo Seco watershed. The project site is located along an approximately 4,754-foot linear section of the Arroyo Seco drainage and alluvial fan, which is an area subject to change and disturbance due to erosion, runoff, and sediment movement. Devil's Gate Dam was built in 1920, following the floods of 1914 and 1916, for the purposes of flood control and water conservation. Once the dam was complete, sediment accumulation behind the dam from mountain runoff raised the ground surface, creating a broad plain between the walls of the Arroyo Seco Canyon. This floodplain slopes gently from the San Gabriel Mountains at approximately 1,100-feet amsl in the northern portion of the project site to approximately 985-feet amsl at the dam. Topography within the reservoir has been affected by erosion, sediment accumulation, and historical excavation, resulting in irregular patterns. Few areas have level or nearly level terrain. Shallow ridge crests, alluvial fan slopes, and riparian areas can be found within the floodplain.

The 2009 Station Fire burned more than 160,000 acres of the Angeles National Forest. During the fire, approximately 68 percent of the Arroyo Seco watershed (100 percent of the undeveloped watershed) tributary to Devil's Gate Dam and Reservoir was burned, resulting in large amounts of sediment deposition into the reservoir during subsequent storm events. This deposited sediment not only buried vegetation and raised the elevation of the reservoir invert, but has made the reservoir susceptible to scouring and instability during major storm events. Attachment 1 of Appendix C shows Devil's Gate Reservoir Profile before the Station Fire (2009), after the Station Fire (2011, 2012, and 2014), and after the proposed project. The vertical scale has been exaggerated in relation to the horizontal scale to view the profiles. The unevenness of the 2009 sediment profile is the result of long-term deposition of sediment and erosion from periodic storm flows. The 2011 sediment profile shows the large influx of sediment resulting from the Station Fire and, other than the interim cleanout of sediment directly upstream of the dam, the large amount of sediment that has continued to persist into 2014. This large sediment inflow impacts operations of the dam. The project proposes to lower the elevation of the sediment within the project boundary, but the slope will still remain gradual, with an average slope of approximately 1.7 percent. Mitigation areas are proposed outside of the established OHWM, at or above the 1,020.0-foot contour.

### **8.23.2 Historic and Existing Hydrology**

The following explanation of the hydrology is supported by the attachments included in Appendix C.

#### **3.2.1 Water Resources**

##### Natural Drainage and Precipitation

Devil's Gate Reservoir is located in the upper portion of the Arroyo Seco watershed. The Arroyo Seco watershed extends approximately 16 miles in length along the centerline of the watershed and 24 miles along the Arroyo Seco from its origin in the Angeles National Forest to the Arroyo

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**Comment [MC60]:** The figure shows a dramatic increase in slope relative to the 2009 and 2014 topography, due to lowering of the elevation of the dam inlet and basin area. How will the increase in gradient affect the elevation of the low flow channel in Arroyo Seco, upstream from the proposed project? Will the increase in gradient cause a headcut upstream?

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Seco's confluence with the Los Angeles River. Approximately 20,400 acres of both residential and undeveloped land drain into Devil's Gate Reservoir. The Arroyo Seco flows freely through a natural creek upstream of the dam, and in an engineered concrete channel from the dam for nine miles downstream to its confluence with the Los Angeles River. Table 3.1 shows the annual rainfall data for this region. In an average season, this area can receive approximately 23 inches of rain per year. The majority of these rain events occur between November and April.

**Table 3.1 Total Yearly Rainfall at Devil's Gate Dam**

Water Year	Total Rainfall (in.)
1996/1997	16.99
1997/1998	36.46
1998/1999	9.57
1999/2000	15.67
2000/2001	16.31
2001/2002	6.01
2002/2003	18.09
2003/2004	15.1
2004/2005	64.05
2005/2006	25.66
2006/2007	9.35
2007/2008	18.61
2008/2009	12.84
2009/2010	20.1
2010/2011	25.07
2011/2012	9.19
2012/2013	11.96
2013/2014	7.75
2014/2015	15.92

### Surface Runoff

On the western side of the project site, water flows from west to east into the reservoir. These flows originate from the Oak Grove Area of Hahamongna Watershed Park and the surrounding communities to the west. Attachment 2 shows the tributary drainage areas west of Devil's Gate Reservoir that drain into the reservoir. This attachment also shows the calculated flow and volume from each area into the reservoir for various storm return intervals. A total of 33 acre-feet of storm flows enter the reservoir from the western tributaries during a 2-year frequency storm (Attachment 2). The volume of flows from the western tributaries can reach up to 89 acre-feet during a 50-year frequency storm.

On the eastern side of the project site, water flows from east to west into the reservoir. These flows originate from the surrounding Altadena communities to the east. Attachment 3 shows the tributary drainage areas east of Devil's Gate Reservoir that drain into the reservoir. A total of 159.33 acre-feet of storm flows enter the reservoir from the eastern tributaries during a 2-year frequency storm (Attachment 3). The volume of flows from the eastern tributaries can reach up to 450.67 acre-feet during a 50-year frequency storm.

**Comment [MC61]:** It appears a portion of the flows are captured within the existing spreading grounds. Clarify how much water makes it to the mitigation sites as surface runoff.

Surface flows from surrounding areas to the west and east of the reservoir remain the primary and most important source of water for the proposed mitigation areas. Various outlets along the western and eastern edges of the reservoir supply water to the reservoir and will continue to supply water directly to the mitigation sites.

Stream Flows

The Arroyo Seco is a perennial stream and is highly variable due to seasonal rains, with the majority of rain events occurring between November and April. During the dry summer months, the stream flows can drop below the surface in the deeper alluvial deposits within the reservoir. Attachment 4 shows the contours and estimated flow path of Devil’s Gate Reservoir in January 2009, which was prior to the Station Fire. Pre-Station Fire conditions show water flowing from the north end of the reservoir towards the face of the dam through channels that were cut by storm flows. The contours show several braided channels within the north end of the reservoir that converge into one main channel that flows toward the dam, all within the proposed project boundary. Subsequent to the project, flows will travel largely the same path through the reservoir. Table 3.2 shows the yearly inflow into Devil’s Gate Reservoir over the past 15 years. Excluding the water year 2004/2005, the average yearly inflow into Devil’s Gate Reservoir is approximately 8,400 acre-feet.

**Table 3.2 Total Yearly Inflow to Devil’s Gate Reservoir**

Water Year	Total Inflow (acre-ft.)
1999/2000	15,792
2000/2001	12,259
2001/2002	1,731
2002/2003	3,137
2003/2004	2,071
2004/2005	134,360
2005/2006	6,573
2006/2007	4,717
2007/2008	13,962
2008/2009	2,579
2009/2010	19,143
2010/2011	33,340
2011/2012	2,298
2012/2013	513

The City of Pasadena Department of Water and Power (PWP) holds a pre-1914 claim to divert up to 25 cfs of surface water from the Arroyo Seco. PWP exercises their right to divert this water every year. Water is captured from the stream at a diversion dam and intake structure approximately 0.4 miles upstream of the former JPL parking lot and piped to PWP’s Arroyo Seco Spreading Grounds on the east side of the reservoir. The diversion and intake structure were designed to accommodate up to 25 cfs of water. PWP’s water capture efficiency is limited by the amount of precipitation, the high sediment concentration during storm events, and the spreading capacity. Over time, and after the Station Fire, the diversion and intake structures were damaged due to debris flows. The PWP is proposing the Arroyo Seco Canyon Project to

**Comment [MC62]:** The existing infrastructure is not sufficient to capture 25 cfs, which is why they are proposing to increase the size of the spreading basins and the height of the diversion structure.

restore and improve the diversion and intake structures and expand their spreading basin capacity. Successful implementation of the PWP project will allow for capture of up to 25 cfs into the Arroyo Seco Spreading Grounds and the bypass of debris and sediment during high flows. Attachment 5 shows the pre- and post-project water diversion scheme for an average rain year. Typically, during the summer months, minimal stream flow reaches PWP's intake. If the level of sediment at the diversion allows for it, the majority of this stream water is diverted to the intake. However, flows that are not diverted and remain in the stream past the diversion structure, have generally been so minimal as to have little effect on the water collected in the reservoir. PWP's project will primarily increase diversion during the storm season in which the amount of flows that will be diverted is minimal relative to inflows into the reservoir. Due to these findings, PWP's Arroyo Seco Canyon Project is not anticipated to impact LACFCD's sediment removal project or the water availability for the proposed mitigation areas.

#### Water Impoundment behind Devil's Gate Dam

Table 3.3 shows information regarding the water held behind Devil's Gate Dam since 1997. The retrofit of Devil's Gate Dam in 1997 lowered the elevation of the spillway ports to 1040.50 feet, and thereby reduced the amount of reservoir storage capacity below the spillway. The table shows the total number of days that the water surface elevation (WSE) was at or above 995.00 feet (indicating a water pool was held behind the dam), the total number of days the WSE was at or above 1,020.00 feet (indicating water pool reached elevation of proposed mitigation areas), the maximum elevation that the water level reached each water year, the number of days at that maximum water elevation, and the reservoir debris storage capacity each year. The number of days when the water level was at or exceeded the 1,020 elevation contour varies depending upon the size and frequency of storms. As a result, the number of days at or above the 1,020-foot contour shown in Table 3.3 does not necessarily indicated consecutive days. Since 2010, a debris pool has been held at the dam after each storm to protect the dam outlets from becoming clogged with debris flows due to the Station Fire. The post-project dam operations will return to pre-2009 procedures for flood control.

**Table 3.3 Water Levels at Devil's Gate**

Water Year	Days WSE ≥ 995.0 ft	Days WSE ≥ 1,020.0 ft	Max. Water Elevation (ft amsl)	Days at Max. Water Elevation	Reservoir Capacity below Spillway (MCY)	Reservoir Capacity below Spillway (acre-ft)
1998/1999	35	0	1,009.10	3	2.3	1426
1999/2000	24	0	1,007.30	1	2.3	1426
2000/2001	28	0	1,007.00	1	2.3	1426
2001/2002	0	0	986.00 <sup>1</sup>	-	2.3	1426
2002/2003	115	100	1,029.60	2	2.3	1426
2003/2004	50	41	1,028.60	4	2.2	1364
2004/2005	201	131	1,045.40	10 <sup>2</sup>	2.2	1364
2005/2006	118	2	1,026.80	2	2.2	1364
2006/2007	0	0	986.00 <sup>1</sup>	-	2.2	1364
2007/2008	28	16	1,033.10	1	2.2	1364
2008/2009	7	0	1,000.00	3	2.2	1364

**Comment [BLR63]:** Can you explain the graph (what does 'with improvements' and without improvement mean). Let's discuss.

**Comment [MC64]:** Given that the water right is specified as cfs, can you provide data on the cfs diverted, relative to the total flow (instead of volume)?

**Comment [MC65]:** Disagree. If the proposed project was not going to substantially increase the amount of water diverted then it would not be worth constructing. While some of the flow that makes it past the existing diversion may go subsurface before it reaches the basin it still contributes to the water available for riparian vegetation. If a maximum of 1,508 af/month can be diverted then it appears the diversion could eliminate flows in all months except January and February during an average rain year. What circumstance allows flows to remain in the stream below the maximum monthly diversion?

**Comment [BLR66]:** You mean because during non-drought season, there is typically more water available than they use? We need to understand the water usages better.

**Comment [MC67]:** There are no mitigation sites at 1020 feet. They appear to be between 1030 and 1060, or is there an updated graphic that shows a different post-project topography?

Water Year	Days WSE ≥ 995.0 ft	Days WSE ≥ 1,020.0 ft	Max. Water Elevation (ft amsl)	Days at Max. Water Elevation	Reservoir Capacity below Spillway (MCY)	Reservoir Capacity below Spillway (acre-ft)
2009/2010	119	37	1,036.80	2	1.5	930
2010/2011	124	95	1,039.90	2	1.3	806
2011/2012	122	61	1,030.90	6	1.3	806
2012/2013	120	0	1,018.20	4	1.3	806
2013/2014	87	48	1,034.50	6	1.3	806
2014/2015	134	34	1,028.00	3	1.3	806

<sup>1</sup>Elevation of lowest outlet (no water held)

<sup>2</sup>Days above spillway elevation (1,040.5 ft)

Water impoundment in the reservoir can have significant benefits to vegetation in the proposed mitigation areas. At lower levels, water impounded behind the dam can permeate the side slopes and provide moisture to vegetation situated at higher elevations. After project implementation, there will be more capacity within the permanent maintenance area to hold water. This will increase the amount of water allowed to permeate the side slopes and provide soil moisture to the mitigation areas.

Periodic inundation during large storms will also provide soil moisture that will benefit the surrounding riparian vegetation. Most of the mitigation areas are located between the 1,020 and 1,040 -foot elevation contours. All mitigation areas below the 1,040-foot contour will be below spillway and subject to potential periodic inundation. As shown in Table 3.3, the number of days when the water level was at or exceeded the 1,020-foot elevation contour has varied each year and significantly increased following the influx of sediment resulting from the Station Fire. When inundation in the mitigation areas does occur, the duration will vary depending upon the elevation of the mitigation areas. The duration of inundation is not expected to be long enough to cause mortality of the riparian vegetation unless an exceptional storm season occurs. In the event that inundation does cause mortality of the vegetation in the mitigation areas, adaptive management measures will be implemented to ensure the mitigation areas meet their success standards and persist for the long term. Attachment 6 shows an aerial view of Devil's Gate Reservoir in June 2009, before the Station Fire. As shown in Table 3.3, stormwater was not held behind the dam at a high elevation for extended periods in the 2008/2009 Water Year. The aerial shows persistent vegetation established throughout the reservoir. Cross sections across the reservoir in 2009 are shown in Attachment 7. A comparison of the riparian vegetation in the aerial in Attachment 6 and the cross sections in Attachment 7 shows that the riparian vegetation is abundant above the 1,020-foot elevation. In addition, riparian vegetation has continued to persist within the reservoir, even after several drought years.

**Comment [MC68]:** Please provide updated topography figure

Attachments 8 and 9 show the results of a hydrological analysis of Devil's Gate Reservoir after project implementation. Attachment 8 models the storage and flow of the 2-year frequency design storm with the post-project conditions. From the summary results shown in Attachment 8, it can be seen that with the post-project conditions and operation plan, the peak storage and elevation within the reservoir would be 1,743.70 acre-feet and 1,033.80 feet, respectively. This model shows that under the 2-year frequency design storm, the reservoir would be temporarily

filled to a level that would inundate the west and east side of the reservoir, including the mitigation areas. Attachment 9 models the storage and flow of an actual storm-event that occurred in the watershed of Devil's Gate Reservoir in 2008 under post-project conditions. The 2007/2008 water year was chosen to model for being an average water year in terms of rainfall. The January 4<sup>th</sup> through January 8<sup>th</sup> storm represents a 2 to 5 year frequency storm that occurred during the 2007/2008 water year. From the summary results shown in Attachment 9, it can be seen that with the post-project conditions and operation plan, the peak storage and elevation within the reservoir would be 1,660.20 acre-feet and 1,032.50 feet, respectively. Any water held above the 1,020-foot contour would temporarily inundate the west and east side of the reservoir, as it currently does. The duration of the inundation would depend on how long water would need to be held to attenuate the flood flows and the flow rate of water released through the dam. From the two different scenarios modeled for the post-project conditions, it can be concluded that the western and eastern portions of the reservoir may be temporarily inundated during certain storm events. In the event that inundation causes mortality of the vegetation in the mitigation areas, adaptive management measures would be implemented.

### Groundwater

The project site overlies the Raymond Groundwater Basin (Raymond Basin), which is located within the Los Angeles-San Gabriel Hydrologic Unit. Stream flows that collect in Devil's Gate reservoir and also flows that are diverted to the adjacent City's Arroyo Seco Spreading Grounds contribute to groundwater recharge of the Raymond Basin.

Attachment 10 shows the locations of the Jet Propulsion Laboratory (JPL) monitoring wells adjacent to the reservoir on the west side of the basin and Attachment 11 shows the locations of LACFCD monitoring wells adjacent to the reservoir on the east side of the basin. According to available JPL monitoring well data, water level elevations measured at MW-3 in 2012 ranged from 973 feet to 1,004 feet amsl. Historic groundwater data from the LACFCD monitoring wells show groundwater levels typically stay within 900 to 1,000-foot amsl. Attachment 12 shows the historic groundwater elevations from a LACFCD monitoring well. The groundwater levels in Devil's Gate Reservoir have been fairly consistent over the life of the dam. Attachment 13 shows a comparison over the past 10 years of groundwater levels measured from two of JPL monitoring wells on the north and northwest side of Devil's Gate Reservoir. It can be seen from the graph that the groundwater is generally higher in elevation on the northwest side of the reservoir. This is supported by the groundwater elevation contours shown in Attachment 14. The groundwater elevation contours show a general trend of groundwater flow from the northwest to the southeast of the reservoir.

During a site investigation in 2011, groundwater was encountered during soil borings, shown in Attachment 15, at elevations of 1022, 1019, and 1010 feet, respectively (a depth of 22 to 25 feet below ground surface). The water encountered in the three borings indicates the presence of a perched aquifer at those locations, as depicted in Attachment 16.

The groundwater table is not expected to change as a result of this project. While the PWP is proposing a project to increase water conservation in the region, adjudication of the Raymond Groundwater Basin prevents the over pumping of groundwater by water users. Due to the depth of the groundwater table, groundwater is not expected to be a major source of water for

**Comment [BLR69]:** If long inundation occurs and the established channels disappear, what is the plan? Would you modify the channel topography or leave them as-is? Let's discuss.

**Comment [BLR70]:** What is this adjudication?

the mitigation areas. Any fluctuations in the groundwater table should not affect the survival of the mitigation sites.

**Comment [BLR71]:** Seems deep groundwater would be an important primary source for established cottonwood, willows, other trees.

**Comment [BLR72]:** Wouldn't it though?

### **3.2.2 Water Usage by Riparian Plants and Other Native Vegetation**

The dominant species of vegetation located on the project site include black willow (*Salix gooddingii*), Fremont's cottonwood (*Populus fremontii*), and white alder (*Alnus rhombifolia*) in the riparian communities; and scalebroom (*Lepidospartum squamatum*), California buckwheat (*Eriogonum fasciculatum*), California sagebrush (*Artemisia californica*), and coyote brush (*Baccharis pilularis*) in the upland and Riversidean alluvial fan sage scrub communities. All of the dominant species associated with the riparian communities are considered to be phreatophytes (Robinson 1958), meaning they obtain the majority of their water from the saturated water table. However, these plants will also maximize their root production in the capillary zone where they can draw in water from the anaerobic soil of the water table. Phreatophytes can grow in areas where the water table is out of reach if additional water sources are provided.

**Comment [BLR73]:** See above. Here you say the groundwater saturation depth is indeed a major source of water for the mitigation areas.

Black willows have a root system with both superficial roots and fibrous roots below the surface of the soil and they also grow deeper main root branches. The roots of black willows grow to relatively shallow depths, but have been documented growing up to between 7 and 17 feet below the surface of the soil in the arid southwest (Reed 1993). Willows can utilize water in saturated soils resulting from precipitation and surface runoff as well as in the groundwater that they access with the deeper main root branches.

Fremont's cottonwoods have an extensive fibrous root system that allows them to grow very rapidly when their roots are in contact with the water table. While this species usually grows in riparian areas with a high water table, it will also grow in areas removed from the water table if sufficient water is available during the growing season through precipitation or surface flows (Taylor 2000). A study conducted in Arizona showed that Fremont's cottonwoods obtained approximately 26 to 33 percent of their water from upper soil layers (Snyder and Williams 2000).

White alders are riparian tree species that have extensive fibrous root systems and require a shallow rooting depth to a year-round water source, typically on stream banks. A study in California found that white alders were typically rooted to a depth less than or equal to 1.3 feet above the low water line of stream banks (Fryer 2014). This species is not common in Devil's Gate Reservoir but is mentioned for comparison purposes.

Scalebroom is a deeply-rooted perennial of the Riversidean alluvial fan sage scrub community. This species has a deep taproot system which can withstand flooding, erosion, and scouring in wash habitats where periodic flooding occurs. California buckwheat and California sagebrush, which are upland plant species, both have fibrous, shallow root systems that extend out beyond their dripline to capture rainfall. California buckwheat has lateral roots that generally extend to three times beyond the dripline and typically reach to depths of less than 4.5 feet below ground surface (Hellmers et al. 1995). Coyote brush has a deep taproot system that typically grows to approximately 10.5 feet below the surface of the soil (Steinberg 2002). This species also has long lateral roots that extend beyond the plant's dripline to capture rainfall.

Based on the characteristics of the dominant plant species at the project site, the riparian vegetation at the project site would not be expected to depend solely on groundwater sources. While groundwater can provide a source of water for these plant species, precipitation, surface flows, and inundation are also substantial water sources used by these species, especially when available during the growing season. This is also evidenced in the historic lack of change in the riparian vegetation at the project site during years of varying rainfall amounts and water holding levels in the reservoir. Considering the historic persistence of riparian vegetation behind Devil's Gate dam and the continued availability of various water sources, including surface flows, precipitation, soil moisture from periodic inundation, and percolation of water through the soils to the groundwater table, riparian vegetation is expected to be able to establish and persist in the mitigation areas.

### 8.33.3 Soil Characteristics

The project site is located within an alluvial wash near the southern margin of the Transverse Ranges Geomorphic Province with the San Gabriel Mountains and Foothills to the north, the San Rafael Hills to the south, and the La Cañada Valley to the east and west. The project site lies over quaternary age alluvium consisting of silts, sands, and gravel. Soils found in the project site have been previously described in the *Jurisdictional Delineation Report, Devil's Gate Reservoir Sediment Removal and Management Project* (Chambers Group 2013a). As described in the report, soils throughout the project site consist of Ramona Sandy Loam, Hanford Gravelly Sandy Loam, and various problematic soils that are result of sediment entering the reservoir.

Ramona Sandy Loam soil consists of fine, well-drained, sandy loam soil formed from the breakdown of granite rock. This type of soil has moderately slow permeability and is typically observed on terraces and in alluvial fans with flat to slightly sloped topography at elevations ranging from 250 feet amsl to 3,500 feet amsl. Hanford Gravelly Sandy Loam consists of well-drained soil typically found on stream bottoms, floodplains, and alluvial fans on slopes from 0 to 15 percent. This soil forms at elevations ranging from 150 feet amsl to 3,500 feet amsl are primarily from granite and other quartz containing rock. Problematic soils consisted of soil profiles with gravel and or fill material such as the excess sediment built up in the Devil's Gate Reservoir.

Because post-sediment removal compensatory mitigation is planned to take place where riparian vegetation communities currently exist, it is presumed that the existing soil type within the project site will be appropriate for the type of planned mitigation. Soils composition below sediment buildup is presumed to be supportive of riparian vegetation communities. Compensatory mitigation measures taking place at Johnson Field, consisting of removing sediment build up, will presumably expose native soil that can support riparian vegetation communities and reconnect the area with the natural flow of the water system, leading to the creation of a wetlands and non-wetland WOUS.

**Comment [MC74]:** Disagree. Vegetation mapping conducted since 2010 has documented a reduction in the extent of riparian vegetation in response to changes in conditions (drought and increased inundation periods due to reduced capacity). Some fluctuations in conditions are natural in dynamic floodplains; however, changes related to operations of the dam and reductions in flows due to water diversion are known impediments to success of the mitigation sites and need to be accounted for in the long-term management plan.

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## 8.43.4 Existing Vegetation

Various vegetation mapping efforts have been conducted in Devil's Gate Reservoir to capture the changes that have occurred over time and as a result of sediment being transported into the reservoir. A brief discussion of each mapping effort is included in this section because the earlier efforts (2010, 2013, and 2014) were referenced in the Project EIR. The newest effort in 2016 is the version used as a reference for the permit negotiations with the USACE, CDFW, and RWQCB.

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### 8.4.13.4.1 Previous Vegetation Mapping Efforts

The vegetation communities were first mapped on the Project site in 2010 (Figure 3-1) and then again in 2013 (Figure 3-2). Nine vegetation communities and land cover types were mapped in 2010 and eight were mapped in 2013 (note that the areas that were mapped differed between the two years). The vegetation communities are listed below and detailed descriptions of the vegetation communities mapped at that time are included in the Project EIR (Chambers Group 2014a):

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- Riversidean Alluvial Fan Sage Scrub (2010, 2013)
- California Sagebrush – California Buckwheat Scrub (2010, 2013)
- Scoured (2010, 2013)
- Escaped Cultivars (2010, 2013)
- Riparian Woodland (2010, 2013)
- Mustard and Annual Brome Semi-Natural Herbaceous Stand (2010, 2013)
- Mulefat Thickets (2010, 2013)
- Disturbed (Barren/Trails) (2010, 2013)
- Coast Live Oak Woodland – Disturbed (2010)

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The vegetation map was updated again in 2014 to reflect changes in site conditions and a different vegetation community classification system was used for the 2014 mapping effort (Chambers Group 2014b). A total of 19 vegetation communities and land cover types were mapped within the Project site in 2014 (Table 3.4; Figure 3-3). Descriptions of each vegetation community and land cover types mapped in 2014 are included in Chambers Group's report, which is included in Appendix D.

**Table 3.4 Vegetation Communities Mapped in 2014**

<b>Vegetation Community/Land Cover Type</b>	<b>Acreage</b>
Riparian Woodland (Black Willow Series)	24.9
Mulefat Thickets	23.4
Disturbed Mulefat Thickets	0.6
Early Successional Riparian Woodland (Black Willow/Mulefat Association 3-10 years)	2.1
Riparian Herbaceous	8.8
Coyote Brush – Mulefat Association	0.1
Annual Bur-Sage and Mustard Patch with an Abundance of Dead Wood (Transitional from Disturbed Black Willow Series)	8.4
California Sagebrush – California Buckwheat Scrub	3.1
Disturbed California Sagebrush – California Buckwheat Scrub	3.1
Riversidean Alluvial Fan Sage Scrub	0.1
Coast Live Oak Woodland	-
Coast Live Oak Woodland – Disturbed	0.6
Mustard and Annual Brome Semi-Natural Herbaceous Stand	4.1
Escaped Cultivars	0.6
Disturbed/Barren	8.5
Scoured	30.6
Poison Hemlock Patches (Semi-Natural Stands)	2.5
Perennial Pepper Weed Patches (Semi-Natural Stands)	2
Developed (Structures, Paved Roads)	-
<b>TOTAL</b>	<b>123.5</b>

**Comment [BLR75]:** See previous comment on high acreage value.  
 Compare to previous table showing 191 acres. Reconcile. Let's discuss.

**Figure 3-1 Devil's Gate Vegetation Communities Map (2010)**

**Figure 3-2 Devil's Gate Vegetation Communities Map (2013)**

**Figure 3-3 Vegetation Communities Map (2014)**

### 3.4.1.1 2016 Vegetation Mapping Effort

In 2016, the vegetation communities were mapped by ECORP to capture the expanded infestation of nonnative and invasive plant species in the reservoir (ECORP 2016d). Remapping was requested by CDFW for the purposes of identifying the impacts to CDFW jurisdiction and to provide information to support the mitigation ratios. Infestations of nonnatives and invasive species were a focus of the mapping and are reflected in the acreage calculations. The areas occupied by the various percentages of nonnatives and invasives are not shown on the vegetation map to keep the map from becoming too complicated. The 2016 vegetation map (Figure 3-4) is used in the discussion of impacts to wetlands and non-wetland WOUS and in determining the areas where mitigation in the form of restoration can be conducted. Table 3.5 lists total acreage of each vegetation community within the areas that were mapped for the Project. Descriptions of the vegetation communities follow Table 3.5 and the vegetation mapping report is included as Appendix E.

#### ***Salix gooddingii* Woodland Alliance – Undisturbed and Disturbed Black Willow Thickets**

A total of approximately 42.65 acres of undisturbed and disturbed *Salix gooddingii* Woodland Alliance, which is also referred to as black willow thickets, is present in the Project area. The undisturbed forms of this alliance generally exhibit an understory comprised of native plant species or exhibit a very sparse and open understory with little or no plant species present. The areas considered undisturbed comprise approximately 11.65 acres or 27 percent of all of the *Salix gooddingii* Woodland Alliances in the Project area. The disturbed forms of this alliance support an understory of native plant species but also support varying percentages of nonnative and invasive plant species. The nonnative and invasive plants in the understory contribute to the degradation of the *Salix gooddingii* Woodland Alliance plant community because they easily out-compete the native plant species. The disturbed forms of this alliance comprise approximately 31.00 acres or 73 percent of all of the *Salix gooddingii* Woodland Alliances in the Project area.

**Comment [MC76]:** Please provide a figure that corresponds to the acreage in the table. Were all the areas mapped using the same mapping unit? It appears different categories of non-native cover and trees were broken out from the native areas. Did you also map individual natives trees/herbaceous cover within the non-native/other areas?

**Figure 3-4 Vegetation Communities (2016)**

**Table 3.5. Acreages of Existing Vegetation Communities 2016**

Vegetation Community	Total Acreage
<b>RIPARIAN/FLOODPLAIN</b>	
<i>Salix gooddingii</i> Woodland Alliance	7.45
<i>Salix gooddingii</i> Woodland Alliance - Sparse	4.20
<i>Salix gooddingii</i> Woodland Alliance-20% <i>Lepidium latifolium</i> - <i>Xanthium strumarium</i>	15.88
<i>Salix gooddingii</i> Woodland Alliance-30% <i>Lepidium latifolium</i> - <i>Xanthium strumarium</i>	15.12
<b><i>Salix gooddingii</i> Woodland Alliance</b>	<b>42.65</b>
<i>Baccharis salicifolia</i> Shrubland Alliance-No Understory	2.17
<i>Baccharis salicifolia</i> Shrubland Alliance-20% <i>Conium maculatum</i> - <i>Lepidium latifolium</i>	2.04
<i>Baccharis salicifolia</i> Shrubland Alliance-30% <i>Conium maculatum</i> - <i>Lepidium latifolium</i>	6.84
<i>Baccharis salicifolia</i> Shrubland Alliance-40% <i>Conium maculatum</i> - <i>Lepidium latifolium</i>	14.18
<b><i>Baccharis salicifolia</i> Shrubland Alliance</b>	<b>25.23</b>
<b>Total Riparian</b>	<b>67.88</b>
<b>FLOODPLAIN</b>	
<i>Lepidospartum squamatum</i> Shrubland Alliance	5.08
<i>Lepidospartum squamatum</i> Shrubland Alliance (Sparse)	22.19
<b><i>Lepidospartum squamatum</i> Shrubland Alliance</b>	<b>27.27</b>
<b>Total Floodplain</b>	<b>27.28</b>
<b>NATIVE UPLAND</b>	
<i>Artemisia californica</i> – <i>Eriogonum fasciculatum</i> Shrubland Alliance	1.88
<i>Artemisia californica</i> – <i>Eriogonum fasciculatum</i> Shrubland Alliance-20% <i>Lepidium latifolium</i>	4.38
<i>Artemisia californica</i> – <i>Eriogonum fasciculatum</i> Shrubland Alliance-30% <i>Lepidium latifolium</i>	2.08
<i>Quercus agrifolia</i> Alliance	22.80
<i>Platanus racemosa</i> Woodland Alliance - Disturbed	1.58
<b>Total Native Upland</b>	<b>32.72</b>
<b>NONNATIVE/OTHER</b>	
<i>Brassica nigra</i> and other mustards Herbaceous Semi-Natural Alliance	23.09
<i>Conium maculatum</i> Herbaceous Semi-Natural Alliance	6.23
<i>Lepidium latifolium</i> – <i>Conium maculatum</i> Herbaceous Semi-Natural Alliance	13.28
<i>Lepidium latifolium</i> Herbaceous Semi-Natural Alliance	1.80
<i>Rumex crispus</i> Herbaceous Semi-Natural Alliance (Unofficial Alliance)	0.30
<i>Xanthium strumarium</i> Herbaceous Alliance (Unofficial Alliance)	1.50
<i>Eucalyptus (globulus, camaldulensis)</i> Woodland Semi-Natural Alliance	0.27
<i>Fraxinus velutina</i> Forest Alliance (Unofficial Alliance)	0.46
Landscaped	0.15
Depression/Bare Ground (Associated with Seasonally Wet Area)	0.39
Disturbed (Barren/Trails/IMP Area)	16.08
<b>Total Other</b>	<b>63.55</b>
<b>TOTAL</b>	<b>191.42</b>

Comment [BLR77]: See comments above.

### ***Salix gooddingii* Woodland Alliance**

This alliance generally occurs between 0 and 500 meters (m) above mean sea level (amsl) on terraces along large rivers, in canyons, and along rocky floodplains of small, periodic streams, seeps and springs. In this alliance, black willow (*Salix gooddingii*) is dominant or co-dominant in the tree canopy with Fremont's cottonwood (*Populus fremontii*), arroyo willow (*Salix lasiolepis*), red willow (*S. laevigata*), black elderberry (*Sambucus nigra*), and other trees. The shrub layer includes mulefat (*Baccharis salicifolia*), coyote bush (*B. pilularis*), and American dogwood (*Cornus sericea*). This form of *Salix gooddingii* Woodland Alliance, which is considered undisturbed, is dominated by native plant species and the distribution of nonnative plant species in the understory is low. Trees in this alliance are typically smaller than 30 m in height and form an open to continuous canopy. The shrub layer is open to continuous and the herb layer is variable. Within the project area, this alliance also variously displays an understory/sub-shrub layer co-dominated by perennial pepperweed (*Lepidium latifolium*) and poison hemlock (*Conium maculatum*), an understory seasonally dominated by rough cocklebur (*Xanthium strumarium*), a bare-ground understory on the margins of the main channel, and/or an understory of native annuals. The U.S. Fish and Wildlife Service (USFWS) Wetland Inventory (1996) national list recognizes *Salix gooddingii* as a facultative wetland plant. This alliance occupies approximately 7.45 acres within the Project area. This alliance is primarily located along the central portion of the project area generally surrounding the areas of *Baccharis salicifolia* Shrubland Alliance and *Lepidium latifolium*-*Conium maculatum* Herbaceous Semi-Natural Alliance.

### **Sparse *Salix gooddingii* Woodland Alliance – Black willow Thickets**

This a variation of the *Salix gooddingii* Woodland Alliance in which the vegetation community exists as previously described in the unaltered description but at a greatly diminished cover value. Within the Project area, this alliance displays a sparse understory of native annuals on the borders and within the main channel. Approximately 4.20 acres within the Project area is covered by this alliance and it is generally present along the active channel that conveys water from areas upstream through the reservoir to the dam. This vegetation community is bordered by *Baccharis salicifolia* Shrubland Alliance and *Brassica nigra* and other mustards Herbaceous Semi-Natural Alliance.

### ***Salix gooddingii* Woodland Alliance – Understory 20% *Lepidium latifolium*-*Xanthium strumarium***

This form of *Salix gooddingii* Woodland Alliance is considered disturbed due to the presence of nonnative and invasive plant species in the understory. The native plant composition is similar to the description above for this alliance but the understory is dominated by approximately 20 percent cover of perennial pepper weed (*Lepidium latifolium*) and rough cocklebur (*Xanthium strumarium*). Approximately 15.88 acres of *Salix gooddingii* Woodland Alliance containing approximately 20 percent cover of *Lepidium latifolium* and *Xanthium strumarium* is present in the Project area.

### ***Salix gooddingii* Woodland Alliance – Understory 30% *Lepidium latifolium*-*Conium maculatum***

This form of *Salix gooddingii* Woodland Alliance is also considered disturbed due to the presence of nonnative and invasive plant species in the understory. The native plant composition is similar to the description above for the *Salix gooddingii* Woodland Alliance but the understory is dominated by approximately 30 percent cover of *Lepidium latifolium* and poison hemlock (*Conium maculatum*). Approximately 15.12 acres of *Salix gooddingii* Woodland Alliance containing approximately 30 percent cover of *Lepidium latifolium* and *Conium maculatum* is present in the Project area.

### ***Baccharis salicifolia* Shrubland Alliance – Undisturbed and Disturbed Mulefat Thickets**

A total of approximately 25.23 acres of undisturbed and disturbed *Baccharis salicifolia* Shrubland Alliance, which is also referred to as mulefat thickets, is present in the Project area. This alliance occurs in two general forms in the Project area, including one with little or no understory of other plant species and the other with varying percentages of nonnative and invasive plant species in the understory. The areas where the *Baccharis salicifolia* contains little to no understory comprise approximately 2.17 acres or 8 percent of all of the *Baccharis salicifolia* Shrubland Alliances in the Project area. The disturbed forms of this alliance exhibit a codominance of nonnative and invasive plant species. The nonnative and invasive plants in the understory contribute to the degradation of the *Baccharis salicifolia* Shrubland Alliance plant community because they easily out-compete the native plant species. The disturbed forms of this alliance comprise approximately 23.06 acres or 92 percent of all of the *Baccharis salicifolia* Shrubland Alliances in the Project area.

### ***Baccharis salicifolia* Shrubland Alliance – No Understory**

This alliance generally occurs between 0 and 1,250 m amsl in mixed alluvium soils in canyon bottoms, floodplains, irrigation ditches, lake margins, and stream channels. In this alliance, *Baccharis salicifolia* is dominant or may be co-dominant with other shrub species including California sagebrush (*Artemisia californica*), tree tobacco (*Nicotiana glauca*), arrow weed (*Pluchea sericea*), sandbar willow (*Salix exigua*), *S. lasiolepis*, laurel sumac (*Malosma laurina*), and *Sambucus nigra*. Additionally, emergent trees including western sycamore (*Platanus racemosa*), *Populus fremontii*, oak (*Quercus* spp.), and willow (*Salix* spp.) may also be present in low cover. Shrubs are typically less than 5 m tall and the canopy is continuous with two tiers at 2 m and 5 m. In addition, the herbaceous layer is usually thin. The USFWS Wetland Inventory national list recognizes *Baccharis salicifolia* as a facultative wetland plant. This alliance, which is present on approximately 2.17 acres of the Project area, is primarily located in the central portion of the Project area and is generally surrounded by the *Salix gooddingii* Woodland Alliance.

### ***Baccharis salicifolia* Shrubland Alliance – 20% *Conium maculatum*-*Lepidium latifolium***

Within the Project area, this form of the *Baccharis salicifolia* Shrubland Alliance also supports the native plant species discussed for the undisturbed form of the alliance, but it displays an

understory/sub-shrub layer co-dominated by approximately 20 percent *Conium maculatum* and *Lepidium latifolium*. Approximately 2.04 acres of this form of disturbed *Baccharis salicifolia* Shrubland Alliance is present in the Project area. This is approximately 8 percent of the total *Baccharis salicifolia* Shrubland Alliances in the Project area.

***Baccharis salicifolia* Shrubland Alliance – 30% *Conium maculatum*-*Lepidium latifolium***

Within the Project area, this form of the *Baccharis salicifolia* Shrubland Alliance also supports the native plant species discussed for the undisturbed form of the alliance, but it displays an understory/sub-shrub layer co-dominated by approximately 30 percent *Conium maculatum* and *Lepidium latifolium*. Approximately 6.84 acres of this form of disturbed *Baccharis salicifolia* Shrubland Alliance is present in the Project area. This is approximately 27 percent of the total *Baccharis salicifolia* Shrubland Alliances in the Project area.

***Baccharis salicifolia* Shrubland Alliance – 40% *Conium maculatum*-*Lepidium latifolium***

Within the Project area, this form of the *Baccharis salicifolia* Shrubland Alliance also supports the native plant species discussed for the undisturbed form of the alliance, but it displays an understory/sub-shrub layer co-dominated by approximately 40 percent *Conium maculatum* and *Lepidium latifolium*. Approximately 14.18 acres of this form of disturbed *Baccharis salicifolia* Shrubland Alliance is present in the Project area. This is approximately 56 percent of the total *Baccharis salicifolia* Shrubland Alliances in the Project area.

***Lepidospartum squamatum* Shrubland Alliance – Dense and Sparse Scalebroom Scrub**

A total of approximately 27.27 acres of *Lepidospartum squamatum* Shrubland Alliance is present in two forms in the Project area. The two forms include a dense and more mature form that is present on the banks of the upstream portion of the Project area and the other is a sparser form that occurs in the active wash. The denser form occupies approximately 5.08 acres or 18 percent of the total area covered by this alliance and the sparser form covers approximately 22.19 acres or 81 percent.

***Lepidospartum squamatum* Shrubland Alliance**

This alliance is generally found between 50 and 1,500 m amsl in intermittently or rarely flooded, low gradient alluvial deposits along streams, washes and fans. In this alliance scalebroom (*Lepidospartum squamatum*) is dominant, or co-dominant, or conspicuous in the shrub canopy in association with burrobrush (*Ambrosia salsola*), *Artemisia californica*, *Baccharis saicifolia*, brittlebush (*Encelia farinosa*), yerba santa (*Eriodictyon* sp.), *Malosma laurina*, California buckwheat (*Eriogonum fasciculatum*), sugar bush (*Rhus ovata*), poison oak (*Toxicodendron diversilobum*), and other shrubs. The shrubs in this alliance are typically less than 2 m in height and some emergent taller plants may be present at low cover including *Platanus racemosa*, *Populus* spp., and *Sambucus nigra*. The herbaceous layer varies and may be grassy. This alliance within the Project area may be considered equivalent to a Riversidean Alluvial Fan Sage Scrub described in *Preliminary Descriptions of the Terrestrial Natural Communities of California*

(Holland 1986). Approximately 5.08 acres of *Lepidospartum squamatum* Shrubland Alliance is present within the Project area. This denser form of the alliance makes up approximately 19 percent of the *Lepidospartum squamatum* Shrubland Alliance in the Project area. This alliance is located along the banks of the channel in the northeastern portion of the Project area and is generally surrounded by the *Brassica nigra* and other mustards Herbaceous Semi-Natural Alliance, *Baccharis salicifolia* Shrubland Alliance, *Salix gooddingii* Woodland Alliance, and *Artemisia californica* - *Eriogonum fasciculatum* Shrubland Alliance.

#### **Sparse *Lepidospartum squamatum* Shrubland Alliance – Sparse Scalebroom Scrub**

This is a variation of the *Lepidospartum squamatum* Shrubland Alliance in which the vegetation community exists as described in the unaltered description (see previous) but at a greatly diminished cover value. This community refers to the upstream regions of the riparian corridor where the channel widens and vegetation occurs as single individuals of different taxa or small islands of associated taxa spaced throughout the corridor. The species present tend to be species associated with seasonal water channels and range from medium-sized shrubs (e.g. scale broom) to full-size cottonwoods (*Populus* spp.) and *Salix* spp. While both woodland and shrub species are present, herbaceous species are almost totally lacking. A canopy is lacking except for within the islands of cottonwoods and/or willows. Approximately 22.19 acres of Sparse *Lepidospartum squamatum* Shrubland Alliance is present in the Project area. This is approximately 81 percent of the total acres of *Lepidospartum squamatum* Shrubland Alliance in the Project area. This alliance variation occupies the open wash in the upstream portion of the Project area.

#### ***Artemisia californica*-*Eriogonum fasciculatum* Shrubland Alliance – Undisturbed and Disturbed California Sagebrush-California Buckwheat Scrub**

A total of approximately 8.34 acres of undisturbed and disturbed *Artemisia californica*-*Eriogonum fasciculatum* Shrubland Alliance, which is also referred to as California sagebrush-California buckwheat scrub, is present in the Project area. The undisturbed form of this alliance generally exhibits an understory comprised of native plant species. The areas considered undisturbed comprise approximately 1.88 acres or 23 percent of all of the *Artemisia californica*-*Eriogonum fasciculatum* Shrubland Alliances in the Project area. The disturbed forms of this alliance support an understory of native plant species but also support varying percentages of nonnative and invasive plant species. The nonnative and invasive plants in the understory contribute to the degradation of the *Artemisia californica*-*Eriogonum fasciculatum* Shrubland Alliance plant community because they easily out-compete the native plant species. The disturbed forms of this alliance comprise approximately 6.46 acres or 77 percent of all of the *Artemisia californica*-*Eriogonum fasciculatum* Shrubland Alliances in the Project area.

#### ***Artemisia californica*-*Eriogonum fasciculatum* Shrubland Alliance**

This alliance is generally found between 250 and 950 m amsl in alluvial or colluvial soils on slopes that are usually steep, south facing, and are rarely flooded or in low-gradient deposits along streams. *Artemisia californica* and *Eriogonum fasciculatum* are co-dominant in the shrub canopy with each species having 30 to 60 percent relative cover. Associated species include chamise (*Adenostoma fasciculatum*), *Malosma laurina*, California ephedra (*Ephedra californica*), lemonade berry (*Rhus integrifolia*), white sage (*Salvia apiana*), and other shrubs present at low

cover. The canopy is intermittent to continuous and may be two-tiered with the upper layer less than 5 m and most shrubs less than 2 m. The herbaceous layer varies both seasonally and annually. This alliance, which covers approximately 1.88 acres, is primarily located along the northwestern edge of the Project area with a small patch also located in the southwest portion of the site, adjacent to Oak Grove Drive. In the northwestern areas, this alliance is generally bordered by the *Brassica nigra* and other mustards Herbaceous Semi-Natural Alliance, Sparse *Lepidospartum squamatum* Shrubland Alliance, and *Baccharis salicifolia* Shrubland Alliance.

***Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance – 20% *Lepidium latifolium***

This form of *Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance is considered disturbed due to the presence of invasive plant species in the understory. The native plant composition is similar to the description above for this alliance but the understory is dominated by approximately 20 percent cover of *Lepidium latifolium*. Approximately 4.38 acres of *Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance containing approximately 20 percent cover of *Lepidium latifolium* is present in the Project area.

***Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance – 30% *Lepidium latifolium***

This form of *Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance is considered disturbed due to the presence of invasive plant species in the understory. The native plant composition is similar to the description above for this alliance but the understory is dominated by approximately 30 percent cover of *Lepidium latifolium*. Approximately 2.08 acres of *Artemisia californica-Eriogonum fasciculatum* Shrubland Alliance containing approximately 30 percent cover of *Lepidium latifolium* is present in the Project area.

***Quercus agrifolia* Woodland Alliance - Coast Live Oak Woodland**

This alliance generally occurs between 0 and 1,200 m amsl in habitats with deep, loamy, or sandy soils with a high amount of organic matter and on alluvial terraces, canyon bottoms, stream banks, slopes, and flats. In this alliance, coast live oak (*Quercus agrifolia*) is dominant or may be co-dominant in association with other trees including bigleaf maple (*Acer macrophyllum*), boxelder (*A. negundo*), *Platanus racemosa*, *Populus fremontii*, blue oak (*Quercus douglasii*), valley oak (*Q. lobata*), black oak (*Q. kelloggii*), and *Salix lasiolepis*. The canopy is open to continuous with trees being less than 30 m tall. A sparse to intermittent shrub layer may be present as well as a sparse to grassy herbaceous layer. Within the Project area, this alliance also variously displays a disturbed bare-ground understory associated with recreational use within the Park, an understory of nonnative grasses and forbs, and/or escaped horticultural cultivars. Approximately 22.80 acres of *Quercus agrifolia* Woodland Alliance is present within the Project area. This alliance is primarily located along the western side in Oak Grove Park and along the eastern side along the base of the hills below the residential development. This alliance generally occurs in the more upland portions of the Project area.

### ***Platanus racemosa* Woodland Alliance Disturbed – California Sycamore Woodlands**

This alliance generally occurs between 0 and 2,400 m amsl and may be present in gullies, intermittent streams, springs, seeps, stream banks, and terraces adjacent to floodplains that are subject to high-intensity flooding. Soils are rocky or cobbly alluvium with permanent moisture at depth. In this alliance, *Platanus racemosa* is dominant or co-dominant in the tree canopy with white alder (*Alnus rhombifolia*), southern California black walnut (*Juglans californica*), *Populus fremontii*, *Quercus agrifolia*, *Quercus lobata*, *Salix exigua*, *S. gooddingii*, *S. laevigata*, *S. lasiolepis*, yellow willow (*S. lutea*), Peruvian peppertree (*Schinus molle*), and California bay (*Umbellularia californica*). The canopy is open to intermittent with trees generally being less than 35 m tall. An open to intermittent shrub layer may be present as well as a sparse to grassy herbaceous layer. The USFWS Wetland Inventory national list recognizes *Platanus racemosa* as a facultative wetland plant (USFWS 1998). Within the Project area, this alliance also variously displays a disturbed bare-ground understory associated with recreational use within the Park, an understory of nonnative grasses and forbs, and/or escaped horticultural cultivars. Approximately 1.58 acres of *Platanus racemosa* Woodland Alliance Disturbed is present along the edges of the percolation basins located in the northeastern portion of the Project area. This alliance is generally surrounded by the *Brassica nigra* and other mustards Herbaceous Semi-Natural Alliance.

### ***Brassica nigra* and other mustards Herbaceous Semi-Natural Alliance – Upland mustards**

This alliance generally occurs between 0 and 1,500 m amsl and may be present in fallow fields, grasslands, roadsides, levee slopes, disturbed coastal scrub, riparian areas, and waste places. In this alliance, black mustard (*Brassica nigra*), common mustard (*B. rapa*), Saharan mustard (*B. tournefortii*), short podded mustard (*Hirschfeldia incana*), Dyer's woad (*Isatis tinctoria*) or wild radish (*Raphanus sativus*) are dominant or co-dominant in the herbaceous layer with emergent trees and shrubs that may be present at low cover. This alliance is dominated by nonnative, invasive grasses. The canopy in this alliance is open to continuous with an herb layer generally less than 3 m tall. Approximately 23.09 acres of *Brassica nigra* and other mustards Herbaceous Semi-Natural Alliance is present within the Project area. This alliance occurs throughout the Project area but is more concentrated in the percolation basins on the northeastern side of the Project Area. This alliance is the most dominant nonnative alliance cover within the Project area.

### ***Conium maculatum* Herbaceous Semi-Natural Alliance – 30 % *Lepidium latifolium***

This alliance generally occurs between 0 and 1,000 m amsl and is found in all topography types including wetlands. The USFWS Wetland Inventory national list recognizes *Conium maculatum* as a wetland indicator plant (USFWS 1998). In this alliance, *Conium maculatum*, sweet fennel (*Foeniculum vulgare*), or another nonnative invasive plant of the family *Apiaceae* is dominant or co-dominant. Other nonnative plants are also present in the herbaceous layer and emergent trees and shrubs may be present at low cover. This alliance is dominated by nonnative, invasive plants. The canopy in this alliance is open to continuous with an herb layer generally less than 2 m tall. Approximately 6.23 acres of *Conium maculatum* Herbaceous Semi-Natural Alliance is present within the Project area and approximately 30 percent of the areas covered by this alliance support an understory dominated by *Lepidium latifolium*. This alliance is present in

small patches within the project area adjacent to areas containing *Baccharis salicifolia* Shrubland Alliance and *Salix gooddingii* Woodland Alliance.

***Lepidium latifolium* – *Conium maculatum* Semi-Natural Herbaceous Stand – Poison Hemlock – Perennial Pepperweed Patches (Unofficial Alliance)**

This alliance is not listed in *A Manual of California Vegetation*, 2<sup>nd</sup> Edition. Rather, it is an amalgam of two nonnative alliances from the manual, *Lepidium latifolium* Semi-Natural Herbaceous Stands and *Conium maculatum-Foeniculum vulgare* Semi-Natural Herbaceous Stands. This unofficial alliance was identified to best describe the areas where *Lepidium latifolium* and *Conium maculatum* are co-dominant in the Project area and it refers to that site only. Both *Lepidium latifolium* and *Conium maculatum* are considered wetland indicator species by the USFWS. A low cover of emergent trees, eucalyptus trees, and shrubs also occur within this alliance, as well as other invasive annuals. Approximately 13.28 acres of this alliance is present within the Project area. This combination land cover type occurs in both the upland and riparian corridor topographies on site and is concentrated in the central and western portions of the site where it is surrounded by the *Salix gooddingii* Woodland and the *Baccharis salicifolia* Shrubland alliances.

***Lepidium latifolium* Herbaceous Semi-Natural Alliance – Perennial Pepper Weed Patches**

This alliance generally occurs between 0 and 1,900 m amsl and is found within intermittently and seasonally flooded fresh and saltwater marshes and riparian corridors. The USFWS Wetland Inventory national list recognizes *Lepidium latifolium* as a wetland indicator plant. In this alliance, *Lepidium latifolium* is dominant in the herbaceous layer with emergent trees and shrubs that may be present at low cover. This alliance is dominated by nonnative, invasive plants. The canopy in this alliance is intermittent to continuous with an herb layer generally less than 2 m tall. Approximately 1.80 acres of monotypic *Lepidium latifolium* Herbaceous Semi-Natural Alliance is present in the western portion of the Project area adjacent to areas containing *Baccharis salicifolia* Shrubland Alliance and *Salix gooddingii* Woodland Alliance.

***Rumex crispus* Herbaceous Semi-Natural Alliance – Curly dock patches (Unofficial Alliance)**

This alliance is not listed in *A Manual of California Vegetation*, 2<sup>nd</sup> Edition. The *Rumex crispus* Herbaceous Semi-Natural Alliance is an unofficial alliance to best describe the areas where nonnative curly dock (*Rumex crispus*) seasonally dominates and it refers to this site within the Project area only. This alliance only occurs in a 0.3 acre small, depressional area in the old mining pit in the western portion of the site. The old mining pit receives precipitation and urban run-off and may remain inundated for extended periods. As the water soaks into the ground, the curly dock begins to grow and by the time the water has dried up completely, the entire depression becomes vegetated with this nonnative plant species. The depression in the mining pit where the curly dock occurs is mostly surrounded by the *Salix gooddingii* Woodland alliance on site.

### ***Xanthium strumarium* Herbaceous Alliance – Cocklebur patches (Unofficial Alliance)**

This alliance is not listed in *A Manual of California Vegetation*, 2<sup>nd</sup> Edition. It is a modification of the existing alliance from that reference called *Persicaria lapathifolia* - *Xanthium strumarium* Provisional Herbaceous Alliance. The official alliance is characterized by *Xanthium strumarium* or other knotweed species being dominant or co-dominant in the herbaceous layer with other herbaceous species including Devil's beggartick (*Bidens frondosa*), five angled dodder (*Cuscutta pentagona*), barnyard grass (*Echinochloa* spp.), and common spikerush (*Ecleocharis marostachya*). The unofficial *Xanthium strumarium* Herbaceous Alliance occurs in areas in the Project area where *Xanthium strumarium* seasonally dominates and it refers to this site only. This unofficial alliance occupies approximately 1.50 acres along the frequently flooded stream terraces closest to the dam where the soils are typically clay-rich or silty.

### ***Eucalyptus (globulus, camaldulensis)* Woodland Semi-Natural Alliance – Eucalyptus groves**

This alliance generally occurs between 0 and 300 m amsl and is typically planted as trees, groves, and windbreaks and may become naturalized in uplands and along stream courses. In this alliance, red gum (*Eucalyptus camaldulensis*), blue gum (*E. globulus*), or other gum tree is dominant in the tree canopy. The canopy in this alliance is intermittent to continuous with trees typically less than 50 m tall. The shrub layer and herbaceous layer are typically sparse to intermittent. Within the Project area, this alliance covers approximately 0.27-acre area near the dam. Nonnative grasses and forbs dominate the understory and the surrounding habitat is classified as disturbed. Eucalyptus trees are also common throughout the portions of the Project area but not in stands that would classify as an alliance.

### ***Fraxinus velutina* Forest Alliance - Velvet Ash Stands (Unofficial Alliance)**

This alliance is not listed in *A Manual of California Vegetation*, 2<sup>nd</sup> Edition. The unofficial *Fraxinus velutina* Forest Alliance best describes areas where velvet ash (*Fraxinus velutina*) trees were dominant. This alliance was identified in a 0.46-acre area in the northwestern corner of the Project area along the edge of the existing road. The small area is otherwise surrounded by the *Salix gooddingii* Woodland alliance on site. Velvet ash also commonly occurs as individuals bordering the perimeter trail on the west side of the Project area.

### **Landscaped**

The landscaped cover type refers to ornamental vegetation that does not exist in a natural state; rather the landscaped land cover type contains vegetation that has been planted and is regularly irrigated and maintained. A small 0.15-acre area along the southernmost edge of the Project area adjacent to Oak Grove Drive was classified as landscaped.

### **Depression/Bare Ground (Associated with Seasonally Wet Area)**

The depression/bare ground land cover type refers to ground cover within two small areas in the central portion of the project area that are associated with the seasonally wet areas. These two small areas have a combined area of 0.39 acres. They are seasonally inundated with water and, when dry, are generally bare or are sparsely vegetated.

## Disturbed

The disturbed land cover type refers to areas where human activities have altered the environmental conditions in such a way that the natural vegetation community has been extirpated and the area is now bare of vegetation or supports a community of nonnative or ruderal plant species. Approximately 16.08 acres within the Project area were classified as the disturbed land cover type. This land cover type exists in the more highly disturbed habitats, in the basins on the eastern side of the Project area, and in the paved and dirt roads and trails.

### **3.4.2 Special-Status Plant Species**

Rare plant surveys were conducted on the Project site for eight special-status plant species that have potential to occur due to presence of suitable habitat: Nevin's barberry (*Berberis nevinii*), Plummer's mariposa lily (*Calochortus plummerae*), Parry's spineflower (*Chorizanthe parryi* var. *parryi*), slender-horned spineflower (*Dodecahema leptoceras*), mesa horkelia (*Horkelia cuneata* ssp. *puberula*), white-rabbit tobacco (*Pseudognaphalium leucocephalum*), Parish's gooseberry (*Ribes divaricatum* var. *parishii*), and Graeta's aster (*Symphytotrichum greatae*). None of these species were observed during the focused surveys (Chambers Group 2014a) and at the time of the surveys, the conclusion was that the Project site does not support any special-status plant species.

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### **3.5 Existing Wildlife Usage**

A total of 76 species of wildlife have been documented on the Project site and in immediately surrounding areas during wildlife surveys (Chambers Group 2014a). The Project site provides a large block of natural habitat in the middle of an area dominated by urban and commercial development. As a result, the Project site would be expected to support a relatively high diversity of resident and migratory wildlife species. Species commonly observed throughout the Project site include western toad (*Anaxyrus boreas*), American bullfrog (*Lithobates catesbeianus*), common side-blotched lizard (*Uta stansburiana*), gopher snake (*Pituophis catenifer*), California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), common raven (*Corvus corax*), northern rough-winged swallow (*Stelgidopteryx serripennis*), desert cottontail (*Sylvilagus audubonii*), and California ground squirrel (*Otospermophilus beecheyi*).

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#### **3.5.1 Special-Status Wildlife Species**

A number of special-status wildlife species have been observed or have been determined to have a potential to occur on the Project site. According to the Final EIR for the Project (Chambers Group 2014a) and focused surveys conducted in 2015 (Chambers Group 2015a; J. Griffith personal communication, October 8, 2015), the special-status wildlife species that have been documented on the Project site during various general and focused surveys included least Bell's vireo, southwestern willow flycatcher, yellow warbler (*Setophaga petechia*), two-striped garter snake (*Thamnophis hammondi*), and coast patch-nosed snake (*Salvadora hexalepis virgultea*). Other species of concern that were determined to have a moderate to high potential to occur within the Project site included coast range newt (*Taricha torosa*) and southwestern pond turtle (*Actinemys pallida*) (Chambers Group 2014a). During focused surveys conducted in 2016, two special status species were observed on the project site, including yellow warbler (*Setophaga petechia*) and yellow-breasted chat (*Icteria virens*).

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Focused surveys for least Bell's vireo (ECORP 2016b), southwestern willow flycatcher and western yellow-billed cuckoo (Leatherman 2016), and coastal California gnatcatcher (*Poliioptila californica californica*) were conducted in 2016 (ECORP 2016c). Table 3.5 provides a summary of the focused surveys that have been conducted for listed species between 2010 and 2016. Appendix B includes the 2016 focused survey reports prepared by ECORP and Leatherman for least Bell's vireo, southwestern willow flycatcher and western yellow-billed cuckoo, and coastal California gnatcatchers.

**Table 3.6 Summary of Focused Surveys for Listed Species**

Dates	Results	Report Reference
<b>Least Bell's Vireo Only Surveys</b>		
May 27-August 19, 2010	Negative for vireo.	Chambers Group 2010
April 17-July 9, 2013	Positive – 1 unpaired male vireo was identified during 4 of the first 6 surveys. No female was observed and no nesting behavior was identified.	Chambers Group 2013b
April 20-August 29, 2016	Ten surveys were conducted. A pair observed on first survey and only a male was observed at the same location on the second survey (May 4). Single juvenile observed on August 1 and a male was heard on August 17.	ECORP 2016b
<b>Willow Flycatcher and Least Bell's Vireo Combined Surveys</b>		
May 9-July 22, 2014	Negative for vireo (noted in report that the quality of the habitat where vireo was observed in the previous year had declined); 1 migrant willow flycatcher detected on May 20, but negative for nesting southwestern willow flycatcher.	Chambers Group 2014c
<b>Western Yellow-Billed Cuckoo</b>		
July 25-August 14, 2015	Negative for cuckoo. Two vireo family groups were observed on August 14 and one willow flycatcher family group observed on August 14.	Chambers Group 2015a
September 11, 2015	One vireo observed near ponded area at West Altadena Stormdrain on September 11 during monitoring of the IMP project	Chambers Group 2015a
June 20-July 31, 2016	Negative for cuckoo.	Chambers Group 2016
<b>Willow Flycatcher and Western Yellow-Billed Cuckoo Combined Surveys</b>		
May 16-August 1, 2016	Negative for both willow flycatcher and cuckoo. Included surveys for least Bell's vireos that were reported in ECORP 2016b.	Leatherman 2016
<b>Coastal California Gnatcatcher Surveys</b>		
April 26-June 7, 2016	Negative for coastal California gnatcatcher.	ECORP 2016c

### Least Bell's Vireo

Eight surveys for least Bell's vireo were conducted according to the USFWS accepted protocols for the Devil's Gate Reservoir site in 2010, 2013, and 2014 (Chambers Group 2010, 2013b, 2014c). Ten surveys were conducted in 2016, which included the eight surveys required by the accepted protocol plus two additional surveys at the end of the summer that were conducted at the request of the USFWS. The additional surveys were conducted in August of 2016 (ECORP 2016b). The results of all of the vireo surveys are provided in Table 3.5 and the results show

that least Bell's vireos are using the Project site during the spring and fall migration but nesting at the Project site was not documented during any of the focused surveys. The Project site is not located within designated Critical Habitat for this species.

### **Southwestern Willow Flycatchers**

Southwestern willow flycatchers had not been documented at the Project site until focused western yellow-billed cuckoo surveys were conducted in 2015 (Chambers Group 2015a). Migratory willow flycatchers have been documented during previously conducted focused surveys (see Table 3.5). Observations of this species in August 2015 in the western portion of the reservoir indicate that the individuals observed were either migratory willow flycatchers or possibly the southwestern willow flycatcher subspecies. Nesting territories were not documented during any of the focused surveys. The Project site is not located within designated Critical Habitat for this species.

### **Western Yellow-Billed Cuckoo**

Western yellow-billed cuckoo is not listed under the Federal Endangered Species Act but the results of the focused surveys have been included for completeness since the species is listed under the California Endangered Species Act. This species was not observed on the Project site during focused surveys conducted in 2015 and 2016 (Chambers Group 2015a; Leatherman 2016). The habitat on the Project site is not optimal for this species as it contains the appropriate riparian plant species but the habitat patch is likely not large enough to support the presence of this species.

### **Coastal California Gnatcatcher**

Coastal California gnatcatchers were not observed on the Project site during focused surveys conducted in 2016 (ECORP 2016c). Limited suitable habitat is present on the Project site. The Project site is not located within designated Critical Habitat for this species.

### **2.3.5.2 Wildlife Movement**

Even though much of the habitat currently present in the reservoir area behind the dam is disturbed due to the high levels of invasive and nonnative plant species, the area does function as an important area for wildlife. The reservoir area provides essential habitat connectivity between Flint Wash and the Arroyo Seco located downstream of the dam, Hahamongna Watershed Park, and areas located upstream in the Angeles National Forest. The habitats in the reservoir area and the adjacent Hahamongna Watershed Park function as a critical linkage in a highly developed area. Not only do wildlife species reside in the area because the native vegetation provides the necessary cover, forage, and shelter, but wildlife species also use the area for juvenile dispersal, seasonal migration, and home range connectivity. Improving the habitat will greatly increase the likelihood that listed species of wildlife, including least Bell's vireo, southwestern willow flycatcher, and potentially western yellow-billed cuckoo, will establish breeding territories at Devil's Gate, or will use the area on a regular basis during migration or for juvenile dispersal.

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## 2-3.6 Historic, Existing, and Planned Land Use

The Project site is located within the Hahamongna Watershed Park, which is owned and operated by the City. The northwestern portion of the Project site is adjacent to the California Institute of Technology/National Aeronautics and Space Administration Jet Propulsion Laboratory. To the west of the Project site is La Cañada High School and Hillside School and Learning Center. Single-family residential land use surrounds the Project site to the north, east, and south and the southern portion of the Project site is bordered by Interstate 210 Foothill Freeway. Since its construction in 1920, the Devil's Gate Dam has been used for collecting and holding stormwater to reduce the flow rates and prevent flooding downstream of the dam.

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## 3-3.7 Public Outreach

Multiple public outreach efforts were conducted for the Devil's Gate Reservoir Sediment Removal Project between 2011 and 2014, in which public input was encouraged for the development of the Environmental Impact Report (EIR). Various public outreach efforts included an extended 45-day scoping period for public input from September 28, 2011 to November 11, 2011. Two public scoping meetings were held on October 5 and 15, 2011. The Draft Environmental Impact Report (DEIR) was released to the public in October of 2013 for an extended review and comment period of 90 days from October 23, 2013, to January 21, 2014. DEIR community meetings were conducted on November 6, 14, and 16, 2013. The FEIR was then released in October of 2014 followed by three informational meetings held on November 1, 3, and 6, 2014. Based on community input regarding the use of alternative project plans with fewer impacts to the environment, an environmentally superior alternative was approved by the Board of Supervisors on November 12, 2014.

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## 3-3.8 Functions and Values

### 3-3.8.1 Impact Areas

#### 3.8.1.1 Non-Wetland Waters

The following is an assessment of the functions and values attributable to the identified non-wetland waters in the project area. This includes portions of the main channel, braided channel, and non-wetland riparian areas as delineated in the 2013 Jurisdictional Delineation Report (Chambers Group 2013a).

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**Short-term or Long-term Surface Water Storage:** The main and braided channels are ephemeral and consist of sandy, well-drained soils (Chambers Group 2013a). Stormwater flows through these features immediately after storms, after which they are dry again, and thus the features do not provide significant short- or long-term (>7 days) surface water storage. The overall function of the reservoir is to provide a combination of flood control and water storage during storm events. Areas within the reservoir supporting riparian vegetation are indicative of higher groundwater and more evidence of surface long-term inundation has been observed in historical aerial photos. These areas, primarily near the dam, have the highest potential for short- and long-term surface water storage.

**Subsurface water storage:** The majority of the underlying soils of the non-wetland waters in the Project area are well-drained (Chambers Group 2013a), leading to high infiltration rates for stormwater. The majority of water storage function within the reservoir is, therefore, expected to be subsurface. The non-wetland waters likely provide a moderate amount of subsurface water storage.

**Moderation of groundwater flow or discharge:** The lower gradient of the non-wetland waters in the Project area, coupled with the high amounts of silt and sediment, likely provide some moderation of groundwater flow or discharge by spreading the flows across much of the flood basin. The higher conductivity of the underlying soils may reduce this to some degree.

**Dissipation of energy:** The main channel flow energy is very high during storm events and lowers quickly immediately afterwards as stormwaters infiltrate the deep alluvial deposits. During the jurisdictional delineation, the channel was observed to have little or no existing vegetation or minimal micro- and macrotopography to hinder water flow velocities during flood events. However, the large woody debris, vegetative structure, and changes in topography that exists in the braided channels and non-wetland riparian areas do provide a moderating effect on water flow velocities during flood events. Part of the purpose of the dam is to slow and detain storm flows to protect life and property downstream within the Cities of Pasadena, South Pasadena, and Los Angeles.

**Cycling of nutrients:** The abundant riparian vegetation along the main and braided channels is indicative that the nutrient cycle is occurring adjacent to the channels. The channels themselves, however, are non-perennial and lack adequate standing water, vegetation, and aquatic organisms to significantly contribute to nutrient cycling within the watershed.

**Removal of elements and compounds:** Although newly deposited sediments are present in the main and braided channels, they lack the vegetation and long-term inundation to significantly contribute to the removal of elements (heavy metals) and other compounds. The non-wetland riparian areas, however, have the vegetation, sediment load, and seasonal inundation necessary to moderately contribute to the removal of elements and compounds.

**Retention of particulates:** The main and braided channels alone lack the vegetation necessary to retain sediment and other particulates but the relatively low gradient of the channels leads to sediment and particulate accumulation. In addition, the non-wetland riparian areas have significant tree, shrub, and herbaceous vegetative communities that can withstand erosive flood events and retain sediments and other particulates.

**Export of organic carbon:** Due to the lack of vegetation within the main and braided channels, along with accumulated sediment, there is little opportunity for these areas to export organic carbon downstream. Conversely, the non-wetland riparian areas have considerable vegetation and detritus present to significantly contribute to off-site export of organic carbon.

**Maintenance of plant and animal communities:** The non-wetland waters in the project area provide little wildlife habitat within them, other than flood-conveyed debris and burrowing substrate. Along the edges of the channels, there are a number of wetland and riparian plant communities of varying levels of succession. Although the lack of long-term inundation in these areas preclude significant macroinvertebrate and other aquatic wildlife populations, the non-

wetland riparian areas do support significant wetland and riparian vegetation communities that in turn provide habitat for a high diversity and abundance of wildlife species.

#### 3.8.1.2 Wetland Waters

The following is an assessment of the functions and values attributable to the identified wetland waters within the project area. Wetland waters are delineated in the 2013 Jurisdictional Delineation Report (Chambers Group 2013a) and the 2016 Updated Delineation Report (ECORP 2016a).

**Short-term or Long-term Surface Water Storage:** The areas delineated as wetland waters are located at the lowest elevational level of the project area adjacent to Devil's Gate Dam, consisting of the West Altadena Stormdrain along with lower portions of the channels approaching the dam. The West Altadena Stormdrain collects flows from the adjacent developed area to the east and runoff enters the ponds within this wetland on a nearly year-round basis. Depending on the season and volume of water, these areas provide both short- and long-term (>7 days) storage of surface water.

**Subsurface water storage:** The majority of the underlying soils of the wetland waters in the project area consist of deposited sediment at varying depths. The wetland waters likely provide subsurface water storage.

**Moderation of groundwater flow or discharge:** The lower gradient of the wetland waters in conjunction with the fine sediment substrate and perching of surface water in these areas moderate groundwater flow or discharge.

**Dissipation of energy:** The wetland waters within the West Altadena Stormdrain portion are ponded and the topography, along with the size of the drain, moderates storm flows. The other wetland areas are located within stream features that do not support adequate vegetative structure and topography to provide any moderating effect on water flow velocities during flood events. However, the dam moderates these flows by allowing water to back up behind it.

**Cycling of nutrients:** The wetland waters areas are frequently inundated during storm flow events. They also receive supplemental inputs from Berkshire Creek and Flint Wash, from runoff through the Oak Grove Area of Hahamongna Watershed Park, and from urban runoff into the West Altadena Stormdrain. This, in conjunction with the well-established riparian vegetation and remnant detritus present in these areas, likely contribute to moderate nutrient cycling within the watershed. The area near the West Altadena Stormdrain supports a higher degree of wetland vegetation, due to the ponding, and supports more of these functions than do the other wetland areas.

**Removal of elements and compounds:** The wetland waters in the West Altadena Stormdrain area have the vegetation, sediment load, and inundation period necessary to moderately contribute to the removal of elements and compounds within the watershed. The other wetland waters areas are small and less vegetated due to scouring that occurs during storms, and are expected to have less of this functionality.

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**Retention of particulates:** The wetland waters areas within the West Altadena Stormdrain have significant tree and shrub vegetative communities that can withstand erosive flood events and retain sediments and other particulates. The other wetland waters areas are less vegetated due to scouring that occurs during storms, and are expected to have less of this functionality.

**Comment [MC78]:** Given the purpose of the project is to remove sediment, it appears the project area functions to retain sediment (i.e., due to the dam).

**Export of organic carbon:** The wetland waters area associated with the West Altadena Stormdrain have considerable vegetation and detritus present to moderately contribute to off-site export of organic carbon. The other wetland waters areas are less vegetated due to scouring that occurs during storms, and are expected to have less of this functionality.

**Maintenance of plant and animal communities:** The wetland waters areas associated with the West Altadena Stormdrain currently support riparian woodland and herbaceous plant communities. The seasonal inundation in these areas likely support modest macroinvertebrate and other aquatic wildlife populations. The other wetland waters areas are less vegetated due to scouring that occurs during storms and are expected to have less of this functionality.

### **7.1.13.8.2 Proposed Mitigation Sites**

#### **7.1.13.8.2.1 Non-Wetland Waters**

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The following is an estimate of the functions and values that will likely be gained by proposed on-site mitigation for non-wetland waters impacts related to the Project. This includes proposed restoration of portions of the main channel, braided channel, and non-wetland riparian areas within the reservoir.

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**Short-term or Long-term Surface Water Storage:** The proposed main and braided channel portions of the non-wetland waters mitigation sites will primarily serve to convey water and will not provide significant short- or long-term surface water storage. Some of the proposed non-wetland riparian mitigation sites will likely provide some degree of short- and long-term surface water storage.

**Subsurface water storage:** Subsurface water storage capacity of the proposed non-wetland waters mitigation sites would not likely change significantly from current conditions. These areas will likely provide a moderate amount of subsurface water storage.

**Moderation of groundwater flow or discharge:** The ability for the proposed non-wetland waters mitigation sites to moderate groundwater flow or discharge would not likely change significantly from current conditions. It is anticipated that they will likely provide some moderation of groundwater flow or discharge.

**Dissipation of energy:** Proposed mitigation activities at all non-wetland waters mitigation sites will likely increase perennial vegetative cover, micro- and macro-topography, and other structural complexity in these areas. As such, the ability for the proposed non-wetland waters mitigation sites to moderate water flow velocities during flood events will likely improve in comparison to current site conditions.

**Cycling of nutrients:** Proposed mitigation activities at all non-wetland waters mitigation sites will provide additional vegetative cover, woody debris, and other structural complexity to these areas. It is anticipated that this will significantly improve the nutrient cycling ability of these areas in comparison to current site conditions.

**Removal of elements and compounds:** Proposed mitigation activities at all non-wetland waters mitigation sites will provide additional vegetative cover, woody debris, and other structural complexity to these areas. Although these areas will still lack long-term inundation, their ability to remove elements (heavy metals) and other compounds will likely improve in comparison to current site conditions.

**Retention of particulates:** Proposed mitigation activities at all non-wetland waters mitigation sites will provide additional vegetative cover, woody debris, and other structural complexity to these areas. This will improve the ability of these areas to withstand erosive flood events and retain sediments and other particulates.

**Export of organic carbon:** Proposed mitigation activities at all non-wetland waters mitigation sites will provide additional vegetative cover, woody debris, and other structural complexity to these areas. This will improve the ability of these areas to significantly contribute to off-site export of organic carbon.

**Maintenance of plant and animal communities:** Proposed mitigation activities at all non-wetland waters mitigation sites will provide additional vegetative cover, woody debris, and other structural complexity to these areas. This will improve the ability of these areas to maintain healthy riparian plant communities and will improve habitat for a high diversity and abundance of wildlife species.

#### 7.1.1-23.8.2.2 Wetland Waters

The following is an estimate of the functions and values that will likely be gained by proposed on-site mitigation for wetland waters impacts related to the Project. This includes proposed wetland creation at Johnson Field and wetland restoration at the former mining pit, Berkshire Creek confluence, and the West Altadena Stormdrain outfall.

**Short-term or Long-term Surface Water Storage:** Due to proposed mitigation activities, short- and long-term surface water storage capacity will significantly increase at the Johnson Field and in the former mining pit. Minor increases in short- and long term water storage capacity are anticipated at the Berkshire Creek confluence and the West Altadena Stormdrain outfall sites.

**Subsurface water storage:** Subsurface water storage capacity of the proposed wetland waters mitigation sites would not likely change significantly from current conditions. These areas will likely provide a moderate amount of subsurface water storage.

**Moderation of groundwater flow or discharge:** The ability for the proposed wetland waters mitigation sites to moderate groundwater flow or discharge would likely increase due to proposed mitigation activities.

**Dissipation of energy:** Proposed mitigation activities at all wetland waters mitigation sites will increase vegetative cover and water holding capacity of these areas. As such, the ability of these areas to moderate water flow velocities during flood events will likely improve in comparison to current site conditions. The former mining pit accepts surface water flows from

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adjacent areas and the depression in the pit provides dissipation of energy as the output allows the flows to spread out and decrease in velocity.

**Cycling of Nutrients:** Proposed mitigation activities at all wetland waters mitigation sites will provide additional vegetative cover, woody debris, and additional water holding capacity and residence times (Johnson Field and former mining pit) to these areas. It is anticipated that this will significantly improve the nutrient cycling ability of these areas in comparison to current site conditions.

**Removal of elements and compounds:** Proposed mitigation activities at all wetland waters mitigation sites will provide additional vegetative cover, woody debris, and additional water holding capacity and residence times (Johnson Field and former mining pit) to these areas. It is anticipated that this will significantly improve the ability of these areas to remove elements (heavy metals) and other compounds in comparison to current site conditions. The wetland waters in the former mining pit area have the vegetation, sediment load, and inundation period necessary to moderately contribute to the removal of elements and compounds within the watershed.

**Retention of particulates:** Proposed mitigation activities at all wetland waters mitigation sites will provide additional vegetative cover, structural complexity, and additional water holding capacity and residence times (Johnson Field and former mining pit) to these areas. It is anticipated that this will significantly improve the ability of these areas better withstand erosive flood events and retain sediments and other particulates in comparison to current site conditions. The wetland waters areas within the former mining pit have significant tree and shrub vegetative communities that can withstand erosive flood events and retain sediments and other particulates.

**Export of organic carbon:** Proposed mitigation activities at all wetland waters mitigation sites will provide additional vegetative cover and woody debris to these areas. This will likely improve the ability of these areas to increase production and off-site export of organic carbon in comparison to current site conditions. The wetland waters area associated with the former mining pit have considerable vegetation and detritus present to moderately contribute to off-site export of organic carbon.

**Maintenance of plant and animal communities:** Proposed mitigation activities at all wetland waters mitigation sites will provide additional vegetative cover, woody debris, structural complexity, and additional water holding capacity and residence times (Johnson Field and former mining pit) to these areas. This will improve the ability of these areas to maintain healthy riparian plant communities and greatly improve habitat for a variety of wildlife species.

### **7-23.9 Baseline Information for Mitigation Sites**

A total of 27 mitigation sites-areas are associated with the Project. All of the mitigation sites-areas are located within the Project area, which is described in detail in Section 2.0. All of the background information presented in that section is applicable for the mitigation sites-areas.

Table 1.6 in Section 1.5 lists the mitigation sites-areas and includes a brief description of each. Figure 1-7 in Section 1.5 shows the location of the mitigation sites-areas.

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**Comment [BLR79]:** The project is one mitigation site (on-site).

**Comment [BLR80]:** Revise 'sites' to 'areas' throughout.

## 1.4.0 MITIGATION WORK PLAN

### 4.1 Responsible Parties

#### 4.1.1 Restoration Ecologist

The Restoration Ecologist, as appointed by LACFCD, shall be responsible for monitoring the mitigation areas to ensure project activities are completed according to the guidelines set forth in this plan and applicable permits. The Restoration Ecologist shall be familiar with all aspects of habitat restoration and native habitats within southern California. The duties of the Restoration Ecologist shall include overseeing all aspects of work performed by the Restoration Contractor. In addition, the Restoration Ecologist shall have the responsibility of documenting and reporting the progress of the developing riparian community to LACFCD and regulatory agencies, as well as making recommendations on how to meet established performance standards. If necessary, the Restoration Ecologist may also prescribe remedial measures.

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#### 5.1.14.1.2 Restoration Contractor

The Restoration Contractor responsible for the mitigation shall have successfully completed (with documented agency acceptance) a minimum of three mitigation projects (installation and maintenance) involving the establishment of riparian and wetland habitats that are comparable to this project in terms of size and species composition. The Restoration Contractor shall provide at least one English-speaking person who is experienced with all aspects of habitat restoration and thoroughly familiar with all aspects of the project, including equipment and materials being utilized or installed and the best methods for their installation and application. This person shall be present at all times during the execution of this work and shall direct and supervise all work specified herein. The foreman for the Restoration Contractor shall be on site no less than 90 percent of the time that crews are working.

### 4.2 Description of Mitigation Sites Areas

All of the compensatory mitigation sites are located on-site within Devil's Gate Reservoir and in areas immediately adjacent to the reservoir (Figure 4-1). The proposed compensatory mitigation sites include three sites where wetlands will be established (DG-W-1), rehabilitated (DG-W-2), or re-established (DG-3). In addition, six sites are included where non-wetland WOUS will be re-established (DG-W-2 [Outlet], DG-SF-1, DG-SF-2, DG-7, DG-8, and DG-9), four sites are included where enhancement activities of non-wetland WOUS will be implemented (DG-4-Drainage, DG-4-Sheet Flow, DG-4-WOUS, and DG-1-WOUS), and one site is included where non-wetland WOUS will be rehabilitated (DG-PARK-Drainage). An additional nine riparian buffer sites will be re-vegetated (DG-2A, DG-2B, DG-4A, DG-4B, DG-4C, and DG-5) and enhanced (DG-2, DG-3A, and DG-4) and three upland buffer sites will be re-vegetated (DG-4D and DG-6) and enhanced (DG-1). The wetlands compensatory mitigation sites are described first in the paragraphs below followed by the mitigation sites for non-wetland WOUS. Following the discussion of mitigation sites for wetlands and non-wetland WOUS, the riparian and upland buffer mitigation sites are described as well as activities for the permanent maintenance area side slopes. Appendix F includes a photographic compendium of all of the proposed mitigation sites.

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**Comment [BLR81]:** This shows WOUS in the same location as the current condition. We need to be able to compare the current WOUS map to the anticipated future WOUS map. Can you revise a figure, or create a new figure?

**Comment [BLR82]:** See early comment. What is Mitigation Type though (level of functional lift)? Enhancement?

**Figure 4-1 Proposed Mitigation Areas**

### 5.1.24.2.1 Wetlands Compensatory Mitigation Sites

#### 4.2.1.1 DG-W-1

DG-W-1 (Johnson Field) is a 3.44-acre non-operational percolation basin on the east side of the Reservoir. This area is not currently jurisdictional as it is not considered wetlands or non-wetland WOUS. Bounded by an elevated dirt maintenance road on all sides, most of the basin consists of disturbed fill of varying grades of sediment and gravel from previous maintenance activities associated with the Interim Management Project to manage sediment behind Devil's Gate Dam. The disturbed portion of the site primarily consists of a Mustard and Annual Brome Semi-Natural Herbaceous Stand community dominated by nonnative annuals including mustards, nonnative grasses, tocalote, wild radish, Italian thistle, and some perennial pepper weed. Several escaped cultivars border the basin on the east and west sides including palms and large eucalyptus trees. The mitigation objective for DG-W-1 is the establishment or creation of wetlands surrounded by riparian woodland and/or mulefat thicket vegetation communities. The sediment in the basin will be removed and the bottom of the basin will be lowered to a level that can become inundated during high flows. In addition, the target for portions of the lowered elevation of the bottom of the basin is a level that will allow groundwater to keep the soils wet enough to support wetlands vegetation. The maintenance road on the west and south sides of the basin will be removed and the area will be reintegrated into the adjacent channel. Inflow to the newly established wetlands will likely occur during inundation after storms and from a stormdrain/culvert located to the east of the basin. The post-project condition of this mitigation site will be a USACE jurisdictional wetland.

**Comment [BLR83]:** Can you add next to the title of each of these, the Mitigation Type(s) applied?

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**Comment [MC84]:** 1-year event? 5-year event?

**Comment [MC85]:** Is this area going require maintenance by vector control for mosquitos?

#### 4.2.1.2 DG-W-2

Site DG-W-2 is a 2.13-acre area on the west side of the Reservoir that is included within the overall DG-4 enhancement area. The site is located within a topographic depression that was created when the area was historically mined. The majority of DG-W-2 has been delineated as USACE jurisdictional wetlands. This area has a history of inundation following storm events, which is evident in historic aerial photographs. In addition to inundation, the former mining pit receives sheet flows from the Oak Grove Area of Hahamongna Watershed Park through a culvert under the road located to the west of the mining pit. Flow also historically entered the pit from the east during high flows as evidenced by the presence of jurisdictional non-wetland WOUS sheet flow area located east of the pit. DG-W-2 currently supports vegetation that is typical of both wetland and riparian habitat. Vegetation within this area was a mix of dock (assumed *Rumex crispus*) in areas with high clay content, surrounded by thickets of mulefat (*Baccharis salicifolia*) and black willow (*Salix gooddingii*) in areas where soil appeared to be higher sand content. Black willow thickets had willows ranging from approximately 10 to 20 feet in height with trunks having diameter at breast height of four to six inches. The area closest to the existing culvert outlet (on western bank) has a prevalence of accumulated soils that seem to range in texture from sand, silty sand, silty clay, clay loam, to sandy loam (determined by visual examination, texture analysis was not performed). Much of this accumulated soil has likely been deposited into this area during storm events. Cursory excavations into the soil profile (by-hand) revealed that accumulated sediments with clays and silts may only be present within the first 12 to 18 inches of soil. Adjacent vegetation communities include disturbed California sagebrush/buckwheat scrub to the north, riparian woodland/mulefat thickets to the south and east, and developed areas to the west. Overflow exits DG-W-2 to the south and when it

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encounters a heavily used trail, it is diverted to the south as evidenced by multiple sheet flow channels running east towards the main channel. Evidence of inundation from the south is also present, which is likely a result of filling of the reservoir during heavy storms.

The mitigation objective for DG-W-2 is the rehabilitation of wetland habitat within the depression area surrounded by riparian woodland/scrub. Accumulated sediment and the existing berms left over from former mining activities will be re-contoured and debris and unwanted materials will be removed to improve the overall function of the basin. Existing native plants will be avoided to the extent possible during the sediment removal and re-contouring of the basin. The goal for the lowered elevation of the pit will be a level that allows groundwater to keep the pit wet enough to support wetland vegetation. Wetland vegetation will be ~~established~~ ~~planted~~ as appropriate and the perimeter will be planted with willows and mulefat to ~~establish~~ ~~form~~ a multi-structured riparian habitat surrounding the basin. The post-project condition of this mitigation site will continue to be a USACE jurisdictional wetland.

#### 4.2.1.3 DG-3B

Site DG-3B is a 0.62-acre area, referred to as the West Altadena Stormdrain, on the southeastern edge of the Reservoir just north of the spillway. It is an area that will be temporarily impacted by the Project but it is not located within the boundaries of the permanent maintenance area. The area was delineated as a USACE jurisdictional wetland. Currently, the site supports disturbed riparian woodland/scrub habitat, a small wetland area with open water and patches of cattail (*Typha* spp.) located at the opening of a drainage culvert, and unvegetated streambed. Adjacent vegetation communities include riparian woodland on the west side and disturbed mulefat thickets and eucalyptus trees on the east side. The mitigation objective for DG-3B is the re-establishment of a 0.62-acre wetland that would naturally treat the urban runoff that exits the culvert. The outlet of the culvert and the area around the culvert would be modified to allow for the establishment of wetlands vegetation (bullrush and cattails) that can naturally treat the urban runoff and improve the water quality entering the reservoir. In addition, mulefat and willows will be planted around the wetland to re-establish riparian habitat scrub as a buffer and to provide additional functional value for wildlife. The post-project condition of the site will continue to be a USACE jurisdictional wetland.

### 5.1.34.2.2 Non-Wetland WOUS Compensatory Mitigation Sites

#### 4.2.2.1 DG-W-2 (Outlet)

Site DG-W-2 (Outlet) is a 0.13-acre channel area that will be re-established on the southwest side of the former mining pit (DG-W-2). At present, the outflow channel from the former mining pit intersects a heavily used trail and the flow is diverted along the trail towards the main drainage channel. Currently, the area where the channel will be re-established is vegetated with a patchy distribution of mulefat scrub and riparian woodland/scrub. The understory of the existing habitat contains an abundance of perennial pepper weed and other nonnative plants. To improve the function of the rehabilitated wetland in the former mining pit and to allow flow to return to the historic flow path to the western portion of the reservoir, a non-wetland WOUS channel will be reestablished. The location of where the channel exits the former mining pit will remain approximately the same but the channel will be re-established by removing the sediment that has created the diversion to the south and re-contouring the channel. The re-

**Comment [MC86]:** Will the basin require maintenance by vector control for mosquitos?

**Comment [BLR87]:** Its good to avoid use of the word 'establish' unless referring to the Mitigation Type 'establishment' to avoid confusion in terminology.

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**Comment [MC88]:** It appears the access road traverses through the site. Will this be a permanent access road?

**Comment [MC89]:** How will the change in topography affect surrounding riparian vegetation? Will the area require maintenance by vector control for mosquitos?

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**Comment [BLR90]:** Are there Rehabilitation regions around the Re-establishment?

established channel will be approximately 475 feet long and the width will approximately match the existing outflow channel and the existing channel where the connection will be re-established (approximately 4 to 10 feet wide). The trail that has caused the diversion of this drainage in the past will be closed. Approximately 0.13 acre of non-wetland WOUS will be reestablished, which will result in a return of natural flow from the mining pit to the western portion of the reservoir. Existing native plants will be avoided to the extent possible during the construction of the channel. Invasive and nonnative plants and weeds will be removed and willows and mulefat will be planted along the banks of the re-established channel, where appropriate, to create or restore the riparian woodland/scrub. The mitigation objective for DG-W-2 (Outlet) is the re-establishment of a single stable outflow channel through the DG-4 enhancement area. This area will continue to be USACE non-wetlands WOUS.

**Comment [BLR91]:** Do these have the potential to develop wetlands?

**Comment [MC92]:** Is the gradient such that the drainage will drain or will water pond in the channel? The topography in that area appears flat.

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#### 4.2.2.2 DG-SF-1 and DG-SF-2

To improve the function of the existing non-wetland WOUS channel in the western portion of the reservoir, two areas that currently exhibit a dispersed sheet flow will be modified to re-establish the historic connections with the existing channel. The northernmost sheet flow area (DG-SF-1) encompasses approximately 0.38 acre. At the point where the re-established outflow channel from the former mining pit enters this sheet flow area, the channel will be re-established and connected up with the channels that enter from the Oak Grove area and the former mining pit. This will re-establish the connections of the two channels with the existing non-wetland WOUS channel that proceeds through the western portion of the reservoir to Berkshire Creek. The southernmost sheet flow area (DG-SF-2) encompasses approximately 0.13 acre. A channel will also be re-established through this area to reconnect the channel from where it originates upstream in the Oak Grove Area and at the former mining pit to where it terminates downstream near Berkshire Creek. Re-establishing the entire channel will more efficiently and more regularly convey water flows through the habitat in the western portion of the reservoir. The channel will be re-established by re-contouring and removing sediment that blocked the historic flow path. Invasive and nonnative plants and weeds will be removed and willows and mulefat will be planted along the banks of the re-established channel, where appropriate, to reinstate the riparian woodland/scrub. The total acres of non-wetland WOUS channels that will be re-established in the sheet flow areas is 0.09 acre but the remaining 0.42 acre in the sheet flow areas will be enhanced through the removal of nonnative and invasive plants and weeds and subsequent planting of willows and mulefat, where appropriate. This area will continue to be USACE non-wetlands WOUS.

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#### 4.2.2.3 DG-7 and DG-8

Sites DG-7 and DG-8 are areas (1.41 acres and 0.87 acres, respectively) located in the upstream, central portion of the reservoir on either side of the current channel. Both areas were delineated as non-wetland WOUS and will be temporarily impacted during the initial sediment removal phase of the Project. Currently, both areas consist of a mix of scoured streambed, riparian woodland, and mule fat thicket habitat types. Adjacent habitat types include scoured streambed, riparian woodland, and mulefat thickets. The mitigation objective for DG-7 and DG-8 is ~~the re-establishment of riparian woodland and mulefat thickets~~ where appropriate, depending on site conditions following the temporary impacts from the Project. This area will continue to be USACE non-wetlands WOUS.

**Comment [BLR93]:** If WOUS now, then proposed activities would probably result in either the Mitigation Type enhancement or rehabilitation.

#### 4.2.2.4 DG-9

Site DG-9 is a 14.12-acre area in the upper central portion of the channel that will be temporarily impacted by the Project. This site was delineated as non-wetland WOUS and the majority of the site consists of scoured wash with patches of riparian woodland and RAFSS in the interior and California sage/buckwheat scrub on the periphery. The mitigation objective for DG-9 is the re-establishment of RAFSS and willow scrub, where appropriate, in the channel. The actual re-establishment of vegetation in this mitigation site will depend upon site conditions following the initial removal of sediment. After the removal of sediment from DG-9 is completed, the soils will be ripped to create micro-topographic features prior to being seeded with species characteristic of RAFSS. Where appropriate, willow and mulefat cuttings may be installed if suitable pockets of wetted soils are present. This area will continue to be USACE non-wetlands WOUS.

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**Comment [MC94]:** RAFSS establishes on higher sand benches that are subject to infrequent large storm events. Will the topography be re-established so the area is suitable for RAFSS following temporary impacts? Or will the entire area be a lower elevation relative to the current condition (i.e., so it will be subject to more frequent/annual storm events)

#### 4.2.2.5 DG-PARK-Drainage

A relatively small, non-wetlands WOUS channel originates north of the reservoir, in a horse corral within Hahamongna Watershed Park, and flows through the western portion of the reservoir where it ultimately connects to Berkshire Creek. Even though this drainage originates outside of the reservoir, it conveys natural flows to the future mitigation areas in the reservoir. The portion of this drainage that is proposed for mitigation (0.03 acre) traverses the eastern edge of the Lower Oak Grove Parking Lot. The drainage is partly unvegetated but it is bordered by a few oak trees, willows, and mulefat and it contains some nonnative vegetation. The non-wetland WOUS will be rehabilitated by re-contouring the drainage to improve the function and slow the flows, removing an old footbridge, relocating disc golf holes that impact the drainage, and replanting with additional native vegetation to create a functional habitat for wildlife. This area will continue to be USACE non-wetlands WOUS.

**Comment [BLR95]:** Terminology. Only use when referring to Mitigation Type, rather than activities or habitat types.

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**Comment [MC96]:** Is the horse corral the origin of the water? Is this a reliable water source?

#### 4.2.2.6 DG-4-Drainage

An existing non-wetlands WOUS channel extends through the DG-4 mitigation site and it appears that it had a historic connection with the channels extending from the Oak Grove area and the former mining pit (DG-W-2). As previously described for mitigation sites DG-W-2 (Outlet), DG-SF-1, and DG-SF-2, the historic channel connections were diverted into sheet flow areas or by trails at some point in the past. The existing 0.22-acre channel through DG-4 shows evidence of water flows, however, human impacts and debris have degraded this channel in some areas. Trash, a retaining wall sort of structure, and fallen trees and roots are impacting the natural flows. At present, widening this drainage and planting along the banks may not be necessary; however, the removal of debris will open up areas that can be restored to improve the function of the drainage. During the final mitigation planning for the project, the elevation of this drainage from the mining pit (DG-W-2) to its connection with Berkshire Creek will be assessed to determine if widening or deepening the drainage will be necessary. The trash and debris, as well as invasive and nonnative plants, will be removed from this drainage and willows and mulefat will be planted, where appropriate, to enhance the habitats along this drainage. This area will continue to be USACE non-wetlands WOUS.

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•[4.2.2.7](#) DG-4-Sheet Flow

The DG-4-Sheet Flow mitigation site includes the non-wetland WOUS sheet flow portions (0.42 acre) of the DG-SF-1 and DG-SF-2 that are outside of where the non-wetland WOUS channel will be re-established. These sheet flow areas support patches of riparian plant species but perennial pepper weed and other nonnatives are present in monotypic patches and interspersed throughout. The open patches within these sheet flow areas will be enhanced through the removal of invasive and nonnative plant and subsequent planting of willows and mulefat, where appropriate. This area will continue to be USACE non-wetlands WOUS.

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•[4.2.2.8](#) DG-4-WOUS

The DG-4-WOUS mitigation site includes the non-wetland WOUS sheet flow portions (1.88 acre) of the inlet to the former mining pit (DG-W-2). These sheet flow areas support patches of riparian plant species but perennial pepper weed and other nonnatives are interspersed throughout. The open patches within these sheet flow areas will be enhanced through the removal of invasive and nonnative plants and subsequent planting of willows and mulefat, where appropriate. This area will continue to be USACE non-wetlands WOUS.

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•[4.2.2.9](#) DG-1-WOUS

An approximately 0.48-acre area of non-wetland WOUS in the southwestern edge of DG-1 will be enhanced to improve the existing riparian woodland and unvegetated channel. The woodland, which is relatively sparsely vegetated, will be enhanced through the removal of nonnative plant species and planting of additional riparian plant species to increase the structural diversity. Because this area is immediately adjacent to the temporary impact area in DG-8, the full extent of the enhancement activities will be determined following the initial sediment removal. This area will continue to be USACE non-wetlands WOUS.

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•~~4.2.2.3~~ ***Riparian Buffer Mitigation Sites***

•[4.2.3.1](#) DG-2

DG-2 is a 5.15-acre site in the eastern portion of the Reservoir located between the Reservoir channel and the pedestrian pathway. Currently, the site consists of a mix of riparian woodland, mulefat thickets, and riparian herbaceous vegetation communities with several areas dominated by exotics including perennial pepper weed, poison hemlock, mustards, wild radish, and Italian thistle. The mitigation objective for DG-2 would be the enhancement of riparian habitats via the removal of exotics and native planting/seeding where appropriate.

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•[4.2.3.2](#) DG-2A

Site DG-2A is a 0.10-acre area on the easternmost side of the Reservoir immediately adjacent to the pedestrian pathway. The site is on an elevated terrace nearly level with the adjacent pathway and primarily consists of a Mustard and Annual Brome Semi-Natural Herbaceous Stand community dominated by nonnative grasses, mustards, and horehound. Adjacent vegetation communities include pockets of riparian woodland interspersed in mulefat thickets on the west side, disturbed oak woodland bisecting the site, and coast live oak woodland on the east side of

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the pathway. The mitigation objective for DG-2A is ~~the re-establishment of~~ riparian scrub and oak woodland vegetation communities.

**Comment [BLR97]:** I'm guessing Mitigation Type is enhancement or rehabilitation.

#### 4.2.3.3 DG-2B

Site DG-2B is a 0.38-acre area on the easternmost side of the Reservoir also adjacent to the pedestrian pathway. The site is a disturbed area that gently slopes away from the pathway and it supports a Mustard and Annual Brome Semi-Natural Herbaceous Stand community dominated by poison hemlock, perennial pepper weed, nonnative grasses, mustards, wild radish, and Italian thistle. Adjacent vegetation communities include pockets of riparian woodland interspersed in mulefat thickets on the west side and north sides and oak woodland on the east side of the pathway. The mitigation objective for DG-2B is ~~the re-establishment of~~ mulefat thickets and riparian woodland vegetation communities.

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#### 4.2.3.4 DG-3A

Site DG-3 is a 1.13-acre site in the southeastern portion of the Reservoir located between Site DG-3B and the pedestrian pathway. Currently, the site consists of disturbed riparian/oak woodland dominated by large eucalyptus trees with an understory of exotics including mustards and nonnative grasses. The mitigation objective for DG-3A would be the enhancement of riparian/oak woodland communities via the removal of the eucalyptus trees and exotics and native planting/seeding where appropriate.

**Comment [BLR98]:** I'm guessing Mitigation Type is enhancement or rehabilitation.

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#### 4.2.3.5 DG-4

Site DG-4 is a 28.37-acre site encompassing the majority of the habitat on the western side of the Reservoir located just north of the dam and east of the paved access road/pathway. Currently, the site is dominated by riparian woodland interspersed with mulefat thickets and riparian herbaceous vegetation communities as well as intermittent transition zones between oak woodland and riparian woodland. Much of the site is infested with large populations of perennial pepper weed along with poison hemlock, wild radish, mustards, and escaped cultivars (eucalyptus, fig trees, purple passionflower vine, and cape ivy). The mitigation objective for DG-4 would be the enhancement of riparian communities via the removal of the exotics and escaped cultivars and native planting/seeding where appropriate.

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#### 4.2.3.6 DG-4A

The sites that comprise DG-4A include approximately 5.59 acres of patches dominated by monotypic stands of perennial pepper weed. These sites are located within the riparian woodland/scrub mitigation site labelled DG-4 but because they contain almost no native vegetation, they will require a different approach to restore them to native habitat. These sites will require an aggressive approach to eliminate the perennial pepper weed. Following the removal of the pepper weed, the sites will be revegetated with native species characteristic of the surrounding riparian woodland/scrub. The goal will be to restore these sites to a dense riparian scrub with an overstory of willows.

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**Comment [BLR99]:** State Mitigation Type. Enhancement.

•4.2.3.7 DG-4B

Site DG-4B is a 0.54-acre area on the far west side of the Reservoir immediately adjacent to the pedestrian pathway and east of the Lower Oak Grove Parking Lot. Currently, the site consists of disturbed bare ground with patches of exotic annuals including horehound, mustards, poison hemlock, and perennial pepperweed. Adjacent vegetation communities include mulefat thickets and patches of riparian woodland to the north, east, and south and disturbed areas to the west. The mitigation objective for DG-4B is the revegetation of mulefat thickets/riparian scrub habitat types.

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Comment [BLR100]: Enhancement?

•4.2.3.8 DG-4C

Site DG-4C is a 0.45-acre area on the far west side of the Reservoir immediately adjacent to the pedestrian pathway and northeast of the Oak Grove Park lower parking lot. Currently, the site consists of disturbed riparian scrub habitat with patches of exotic annuals, including nonnative grasses and mustards. Adjacent vegetation communities include early successional riparian woodland to the east and south and disturbed areas to the west. The mitigation objective for DG-4C is the revegetation of riparian scrub habitat.

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Comment [BLR101]: Enhancement?

•4.2.3.9 DG-5

Site DG-5 is a 0.26-acre area on the far west side of the Reservoir immediately adjacent to the pedestrian pathway and the larger enhancement area site DG-4. Currently, the site consists of compacted disturbed bare ground with patches of riparian scrub. Adjacent vegetation communities include riparian woodland on the north, east, and west sides and oak woodland on the opposite side of the pathway to the west. One of the baskets from the disc golf course is located within DG-5 and the site receives fairly regular pedestrian traffic. The mitigation objective for DG-5 is the revegetation of riparian woodland/riparian scrub habitat.

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Comment [BLR102]: Enhancement?

~~5.1.54.2.4~~ Upland Buffer Compensatory Mitigation Sites

•4.2.4.1 DG-1

DG-1 is a narrow 5.42-acre area located on the east side of channel at the upper end of the Reservoir. Currently, the site consists of disturbed California sagebrush/buckwheat scrub and small patches of RAFSS vegetation along the edges of the Reservoir channel. The area experiences moderate use from pedestrian travel via a narrow secondary trail that runs through the northern portion of the site. The mitigation objective for DG-1 is the enhancement of approximately 5.42 acres of California sagebrush/buckwheat scrub and RAFSS habitats via the removal of exotics and native planting/seeding where appropriate. The 5.42 acres of the non-riparian habitat in DG-1 would be considered a non-aquatic buffer mitigation area.

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•4.2.4.2 DG-4D

DG-4D is a 2.32-acre area on the far west side of the Reservoir adjacent to the pedestrian pathway and immediately east of the Tom Sawyer Camp horse stables. Currently, the site consists of bare ground, severely disturbed California sagebrush/buckwheat scrub, and a small patch of riparian woodland habitat. Adjacent vegetation communities include California

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sagebrush/buckwheat scrub to the north, east, and south interspersed with pockets of riparian woodland, and disturbed areas to the west. The mitigation objective for DG-4D is the revegetation of California sagebrush/buckwheat scrub habitat and would be considered a non-aquatic buffer mitigation area. In addition, portions of DG-4D will be included in the City plans for their Disc Golf Course Expansion Project. In addition to typical California sagebrush/buckwheat scrub species, additional native shrubs and/or trees will be incorporated into the final planting design of DG-4D.

Comment [BLR103]: Enhancement?

4.2.4.3 DG-6

DG-6 is a 1.46-acre area on the far west side of the Reservoir between the pedestrian walkway and the Tom Sawyer Camp horse stables. Currently, the site consists of bare ground, stockpiles of river rock, disturbed California sagebrush/buckwheat scrub, and disturbed riparian scrub. The mitigation objective for DG-6 is the removal of the debris and revegetation of California sagebrush/buckwheat scrub habitat. This area would be considered a non-aquatic buffer mitigation area.

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5.1.64.2.5 Permanent Maintenance Area Side Slopes

The side slopes of the Permanent Maintenance Area (10.89 acres) will be replanted with native vegetation, including shrub and annual species associated with riparian and RAFSS vegetation communities. In addition, mulefat will be allowed to grow on the side slopes to provide foraging habitat for least Bell’s vireo and other wildlife species. The side slopes will be seeded and then allowed to grow naturally with only maintenance to control nonnative species. The side slopes may be periodically affected by recontouring if large sediment deposits bury portions of the side slopes. In this case, the sediment will be removed and the side slopes will be recontoured and allowed to naturally revegetate. Woody species, such as willows and cottonwoods, will not be allowed to grow on the side slopes.

4.3 Implementation Schedule

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MITIGATION IMPLEMENTATION	
Time Frame	Activity
October 1-April 30	<b>Site Preparation</b>
	Nonnative invasive species control (year-round activity)
	Identification of planting areas
	Soil Management (e.g., testing, grading, de-compaction)
	Irrigation system installation
	<b>Implementation</b>
	Planting
Seeding	
<b>120-day Plant Establishment Period</b>	
Monthly	Monitoring (Horticultural, photo-documentation)
Once per week (if needed)	Site Irrigation
Monthly	Irrigation System Maintenance
Monthly (at a minimum)	Weed Abatement/Invasive Plant Control
Monthly	Maintenance of site protection measures (if required)
End of Plant Establishment Period	Email Memorandum to LACFCD and Agencies

## 4.4 Site Preparation

### 4.4.1 Nonnative Plant Control

#### 4.4.1.1 Perennial Pepper Weed

Perennial pepper weed infestations are widespread throughout the proposed mitigation areas within the Reservoir. Infestation densities within the Project area range from near monospecific stands of perennial pepper weed in the DG-4A sites to trace (less than 1 percent) amounts in other areas. Control methodology within the Project area will be dependent on the level of the infestation and its proximity to native vegetation, sensitive resources, and open water. Control of perennial pepper weed in highly infested areas may take more than five years to achieve full control of the infestations.

##### *Control in Highly Infested Sites*

Approximately seven to eight acres within the compensatory mitigation sites are heavily infested with perennial pepper weed at levels greater than 50 percent cover, mostly concentrated in DG-2 and the sites that make up DG-4A. In addition to perennial pepper weed, these highly infested areas typically include other exotics at lower levels such as poison hemlock, mustards, and wild radish interspersed with native vegetation. Control of perennial pepper weed in these areas will require an integrated management approach consisting of mechanical removal via mowing and hand removal, multiple years of herbicide applications, and revegetation with native riparian plant species. Soil management may also be required in these areas due to the potential of high concentrations of extract salts being deposited on the soil surface by this species.

Initial control activities for perennial pepper weed in the highly infested areas would require large-scale mowing and hand removal when plants are at their flowering bud stage, which is typically May to early June in the region. In order to minimize soil compaction, rubber-tired vehicles (i.e., tractors, front-end loaders) with mowing attachments will perform the bulk of the biomass removal. Multiple years of thatch have also accumulated in many of these areas and will need to be mowed concurrently with the live biomass. Hand removal or weed whips will be employed in those areas adjacent to sensitive resources, open water, or native vegetation. All vehicles used in these areas will be cleaned of any dirt or plant material prior to leaving the Project area to avoid spreading any weed seed.

Following mechanical removal activities, resprouting perennial pepper weed plants will be foliarly treated with an herbicide at the bolting or flower bud stage. Any herbicides and associated surfactants used adjacent to open water will be limited to those registered for aquatic use and approved for use in wetland restoration by the regulatory agencies. It is anticipated that an aquatic-approved form of glyphosate (i.e., Aquamaster®) will be used in areas adjacent to open water and chlorsulfuron (i.e., Telar®) will be used in all other areas. A blue marking dye will be added to allow for the identification of areas sprayed.

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### *Control in Low to Moderately Infested Sites*

Low to moderate infestations of perennial pepper weed (<1-50% cover) can be found throughout most of the mitigation sites. Within these areas, smaller perennial pepper weed patches and individuals are more sporadically dispersed amongst native vegetation. In mature riparian woodland habitats (DG-4), perennial pepper weed is prolific and in some places dominates the understory. In mulefat thicket communities, it is co-dominant with mulefat. Sporadic perennial pepper weed individuals are also present in riparian scrub, California sagebrush/buckwheat scrub habitats, and disturbed habitats.

Due to the close proximity to native vegetation and associated wildlife, use of mowers or vehicles will not be used in these areas. Control of perennial pepper weed in these areas will require a combination of hand removal and spot treatments with approved herbicides. Since perennial pepper weed typically bolts concurrently with nesting bird season, a biological monitor will be required to accompany crews when pulling or treating plants in these areas.

#### **4.4.1.2 Other Invasive Plants**

Small infestations or isolated individuals of other invasive plants are present in every mitigation site. Of particular concern are incipient populations of giant reed, salt cedar, Spanish broom, pampas grass, and fountain grass. When encountered in the proposed mitigation areas, each species will be managed according to the best control method for that particular species.

#### **5.1.84.4.2 General Weed Control**

In addition to the control of all invasive nonnative plants, other nonnative annual and perennial plants will be controlled to the greatest extent practicable in the mitigation areas to ensure the success of the restored native plant communities. Hand tools, weed whips, and/or herbicide will be used to achieve this task. The goal is to eliminate weed seedlings before they mature. If flowering parts are present, all cut material will be collected, bagged, removed from the site, and taken to an approved off-site location for disposal.

#### **5.1.94.4.3 Groundwater Depth Testing**

Since the majority of the habitat types targeted for mitigation activities are reliant on the presence of some level of subsurface groundwater, site-specific hydrological analyses (groundwater depth) may be required for some of the proposed mitigation sites. This is particularly true for those sites targeted for potential wetland habitat establishment (DG-W-1) and rehabilitation (DG-W-2).

Prior to any earthwork and native planting/seeding activities, the depth to groundwater will be measured at those sites targeted for potential wetland habitat establishment. Groundwater levels may need to be measured several times throughout the year to capture seasonal fluctuations.

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#### **5.1.104.4.4 Soil Testing**

Site-specific physical and/or chemical analyses of soils may be required for several of the proposed mitigation sites, particularly the sites within the Reservoir targeted for habitat establishment and re-establishment. Testing will include an assessment of soil texture, nutrients, pH, compaction, and salinity. Soil testing will occur prior to any earthwork and native planting/seeding activities and may be done periodically throughout initial mitigation implementation for monitoring purposes.

#### **5.1.114.4.5 Grading/Contouring**

##### **4.4.5.1 DG-W-1**

###### *Soil Exportation and Redistribution*

The basin has approximately 11,250 cubic yards of sediments that are currently being stockpiled in the center of the site that should be exported off site. These soils will not be used for future habitat restoration/creation.

To support the creation of riparian and wetland habitat at this site, the raised trail around the west and south sides of the basin will be abandoned but the soils will remain on site and be incorporated into existing soils at the site as a substrate for revegetation (after the 11,250 cubic yards of sediment is removed). Only the portion of the trail that surrounds the site will be abandoned so that the continuum of the trail system on the north and east sides of the basin will not be interrupted. The estimated volume of soil to be removed from the section of abandoned trail is approximately 7,500 cubic yards. The soil that comprises the trail base will be removed up to the margin of the existing native riparian vegetation on the west and south and to grade with base of palm trees.

A Restoration Ecologist will need to be onsite during grading to ensure that the minimum amount of riparian vegetation (i.e., mulefat and elderberry [*Sambucus nigra* ssp. *caerulea*]) is disturbed. The trail soil will be decompacted and homogenized with the upper three feet of soil that remains following export of sediments from the center of the site. Prior to final contouring of the site, all ornamental/nonnative palms will be removed and disposed of legally off site. The final grade of the site nearest to the main channel should match the current elevations which are estimated to be 1,042 feet as of November 19, 2015. The site should slope slightly upward to the east with a rise of approximately two to three feet above the existing main channel elevation. In addition, the site should meet flush with the existing riparian habitat that exists to the south and southwestern edges of the site. Following redistribution and homogenization of soils, compaction to no greater than 70 percent should occur.

###### *Grading for Creation of Wetland Areas*

Once sediments have been removed and the trail soil redistributed throughout the site, up to three areas with lower elevations with respect to surrounding area will be graded for future wetland habitat creation. A Restoration Ecologist will need to be onsite to demarcate up to three wetland areas. The wetland zones will be eight to 10 feet below grade of surrounding riparian habitat elevations (at their lowest point), with banks that gradually slope to surrounding

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riparian elevations at approximately three-degree slope. Steep banks will not be appropriate or acceptable. Soil that is removed to create wetland site(s) can be intentionally placed in areas around the site to create a terraced effect, or can be applied to the eastern slope, immediately adjacent to the segment of trail that will be left in place.

#### *Modify Existing Culvert*

Based on a cursory survey of the area, it appears that West Kent Street currently drains down the hillside and into the riparian zone located southwest of the DG-W-1 site. The culvert should be modified so that it drains into the DG-W-1 site. This added input of water during storm is expected to benefit wetland areas, riparian areas, and still provide water to the riparian area southwest of the site. Installation of a culvert pipe under the existing trail will be necessary. It is recommended to use a minimum width of 18 inches for the culvert pipe (corrugated galvanized steel). The culvert inlet should be fortified wing walls, or other means, so that the potential for erosion is minimized. The culvert will traverse below an existing maintenance road and a cemented cobble-stone drainage will be constructed that ends at toe of slope and connects to the culvert outlet to prevent slope erosion. The cobble-stone drainage will be reinforced with rebar. Slope drainage below the culvert outlet should be a minimum of 6-foot wide and have a concave surface. Cemented rip-rap will be included at the toe of slope as an energy dissipater. Rip-rap zone should be approximately 100 square feet in size. Equivalent materials may be used if erosion control can still be achieved.

#### 4.4.5.2 DG-W-2 and DG-W-2 (Outlet)

#### *Improve Existing Culvert*

To assist with providing conditions that are conducive to supporting riparian and wetland habitat, improvements to the existing culvert that is present should occur. The culvert inlet is positioned at the southeastern margin of the adjacent disc golf course and to the west of the Project Area. It appears that during storm events run-off flows from northeast to southwest at a slope of approximately two degrees. The drainage in the immediate vicinity of the culvert inlet has a width of four to six feet and a depth of two to three feet. The culvert inlet is centered at latitude 34°11'36.91"N, longitude 118°10'29.00"W. The culvert inlet should be fortified wing walls, or other means, so that the potential for erosion is minimized. The culvert itself should be replaced with corrugated galvanized steel pipe with a minimum diameter of 24 inches. The culvert will traverse below an existing maintenance road and a cemented cobble-stone drainage will be constructed that ends at toe of slope and connects to the culvert outlet to prevent slope erosion. The cobble-stone drainage will be reinforced with rebar. Slope drainage below the culvert outlet should be a minimum of 6-foot wide and have a concave shape. Cemented rip-rap will be included at the toe of slope as an energy dissipater. Rip-rap zone should be approximately 100 square feet in size. Equivalent materials may be used if erosion control can still be achieved. Existing culvert will be improved so that erosion and increased sedimentation into the mining pit is minimized.

#### *Soil Manipulation and Nonnative Plant Removal*

Accumulation of a variety of sediments has occurred over time, the majority of which appear to be from sediment-laden water entering the area from upland areas. However, in the past,

**Comment [BLR104]:** Let's discuss. This may be permanent impacts in WOUS, which is okay, but needs to be in Project Description and approved. Is there a drawing of this 100 square foot structure? Are there any other proposed structures? Let's discuss.

**Comment [BLR105]:** Need engineered drawings for structures.

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**Comment [BLR106]:** See above comment.

inundation of the area has occurred in part due to high flows from the Arroyo Seco that transported sediments from the mountains located to the north. Rather than major exportation of soils from this area, the top four inches of soil should be removed and exported off site only from areas that are dominated by nonnative plant species such as curly dock (nonnative plant). A Restoration Ecologist will need to be present to determine the limits of soil removal and to identify the vegetation that should be avoided. Following removal of nonnative vegetation and its seed bank, a mini skid-steer dozer should be used to break-up the top two to three feet of soil and homogenize it with the sandy substrate that exists lower in the soil profile. Following homogenization of soils, compaction to no greater than 70 percent should occur. Use of a mini dozer will reduce the impact to established native vegetation and allow for ease of movement within the work area. The approximate area that would require soil removal and soil mixing is 1.3 acres. The approximate volume of sediments mixed with vegetation that would need to be removed is 690 cubic yards.

#### *Re-Establish Connection to Main Channel*

The DG-W-2 site is expected to support both wetland and riparian species in the future, and have some connection to the main channel of the Arroyo Seco. In order to do this, a drainage feature will be created that originates at the southwest margin of DG-W-2 site and flows to the southwest to meet with an existing tributary of the Arroyo Seco. The drainage feature is anticipated to require a length of 750 feet and have a width of six feet and a depth of two feet. The drainage feature should meander slightly to avoid a straight-edge trajectory. A Restoration Ecologist will need to be present to determine the most appropriate path to follow. The Restoration Ecologist will flag the centerline of the path prior to creation of the drainage feature.

#### **4.4.5.3** DG-3A

Since mitigation site DG-3A is a planned temporary impact area within the proposed Project boundary, grading and/or contouring will likely be needed to prepare the site for native wetland and/or riparian habitat ~~re-establishment~~. This may include light contouring of portions of the site to create a more natural appearance or additional grading/excavating of portions of the site targeted for the creation of a treatment wetland. Final grading levels will be addressed in the final Mitigation Site Grading Plan.

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#### **4.4.5.4** DG-7, DG-8 and DG-9

Sites DG-7, DG-8, and DG-9 are also planned temporary impact areas within the proposed Project boundary where grading and/or contouring may be required to prepare the sites for riparian habitat ~~re-establishment~~. Final grading and contouring plans will be addressed in the final Mitigation Site Grading Plan.

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#### ~~5.1.124.4.6~~ **Decompaction/Ripping**

Several of the proposed mitigation sites have significantly compacted soils due to years of pedestrian foot traffic, vehicle traffic, and/or high sediment loads. The majority of these include the onsite mitigation ~~sites-areas~~ within the Reservoir (DG-2A, DG-2B, DG-4B, DG-4C, DG-4D, and DG-5). Site DG-4D, in particular, is heavily compacted with remnant asphalt existing on

portions of the site that will need to be removed and transferred to an approved off-site location. Prior to planting/seeding activities, soils on all of these sites-areas will be ripped to a depth of 6" to 12", depending on site conditions and target habitat type.

#### **5.1.134.4.7 Soil Amendments**

Based on site-specific soil test results (Section 4.4.4), some modification of soil structure or chemistry may be needed at some of the mitigation sites-areas. This may include amendments to adjust pH levels, salinity, organic content, or native soil microorganisms (i.e., mychorrhizae). Specifics will be addressed in the Final HMMP.

#### **4.5 Structural Habitat Features**

In order to provide structural heterogeneity, immediate wildlife habitat benefits, and opportunities for additional plant growth, structural habitat features will be created/established in select mitigation sites-areas. These features may include rocks/boulders, brush piles, coarse woody debris, standing snags, and/or plant hummocks/sediment mounds. Structural habitat features will be created/established following any required earthwork (i.e., grading, ripping) but before any planting or seeding activities. Final locations of structural features will be addressed in the Final Planting Plan and may be adjusted to suit current site conditions.

Much of the material used for the structural habitat features for the mitigation sites within the Reservoir can be salvaged from those areas impacted by the proposed Project. Logs and other coarse woody debris will be salvaged from initial vegetation removal activities while rocks and boulders will be salvaged from subsequent excavation activities. Areas within the Project footprint infested with invasive nonnative plants (i.e., perennial pepper weed) will be avoided to minimize further spread of invasive plants.

#### **4.6 Irrigation Specifications**

Supplemental irrigation will likely be required for some of the mitigation areas in order for installed native plants and seed to become adequately established. However, any supplemental irrigation systems would only be temporary and would be removed once it was determined that the restored habitats were self-sustaining. In order for the proposed mitigation sites to meet established performance standards and subsequently deemed successful by the regulatory agencies, any restored habitat must be self-sustaining for two consecutive years following the removal of supplemental irrigation. Irrigation system type will be site-specific and will be dependent upon local water source availability, site access, and potential for vandalism.

#### **4.7 Planting Specifications**

##### **5.1.144.7.1 Desired Vegetation Communities**

##### **4.7.1.1 Riparian Scrub**

Riparian scrub (Mulefat thickets) is the primary vegetation community targeted for native planting and seeding activities within many of the proposed mitigation sites. It is one of the dominant plant communities within the Reservoir, often sharing similar species of willows with

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adjacent riparian woodland habitats. The planting palette for riparian scrub habitat includes perennial native species such as mulefat, black willow, red willow, arroyo willow, and cottonwood (Table 4.1). The seeding palette includes species such as mugwort, western ragweed, and beardless wild rye (Table 4.2). These palettes will primarily be used to define those species used for on-site establishment, re-establishment, and enhancement mitigation sites within the Reservoir.

**Table 4.1 Riparian Scrub (Black Willow Thickets) Planting Palette**

Scientific Name	Common Name	Container Size (Gallon)	# Per Acre <sup>1</sup>
<i>Artemisia douglasiana</i>	mugwort	1 gal	100
<i>Baccharis salicifolia</i>	mulefat	cutting/1 gal	250
<i>Baccharis pilularis</i>	coyote brush	1 gal	100
<i>Populus fremontii</i>	Fremont cottonwood	1 gal	100
<i>Rubus ursinus</i>	California blackberry	1 gall	100
<i>Rosa californica</i>	California wild rose	1 gal	100
<i>Salix laevigata</i>	red willow	cutting/1 gal	100
<i>Salix lasiolepis</i>	arroyo willow	cutting/1 gal	100
<i>Salix goodingii</i>	black willow	cutting/1 gal	200
<i>Sambucus mexicana</i>	Mexican elderberry	1 gal	50
<b>Total Plants</b>			<b>1200</b>
<sup>1</sup> Any native container plant substitutions that may be necessary will be at the discretion of the Restoration Ecologist.			

**Table 4.2 Riparian Scrub (Mulefat) Seed Mix**

Scientific Name	Common Name	Bulk Lbs /Acre
<i>Ambrosia psilostachya</i>	western ragweed	5
<i>Artemisia douglasiana</i>	mugwort	5
<i>Elymus triticoides</i>	beardless wild rye	5
<i>Urtica dioica</i> ssp. <i>holosericea</i>	hoary nettle	5
<b>Total Bulk Lbs. of Seed</b>		<b>30</b>
Should the percent purity and germination of each species not be available at the time of ordering, the Restoration Ecologist shall approve any variation on seed purity and germination presented by the Installation Contractor.		

4.7.1.2 Riparian Woodland (Black Willow Thickets)

Riparian Woodland - Black Willow Thickets is a desired plant community for the mitigation areas within the Reservoir. The planting palette includes species characteristic of this community such as black willow, red willow, Mexican elderberry, mulefat, and mugwort (Table 4.3). The seeding palette includes species such as yerba mansa, mugwort, tall flatsedge, and hoary nettle (Table 4.4). These palettes will primarily be used to define those species used to enhance disturbed riparian woodland mitigation sites within the Reservoir.

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**Table 4.3 Riparian Woodland (Black Willow Thickets) Planting Palette**

Scientific Name	Common Name	Container Size (Gallon)	# Per Acre <sup>1</sup>
<i>Artemisia douglasiana</i>	mugwort	1 gal	100
<i>Baccharis salicifolia</i>	mulefat	cutting/1 gal	250
<i>Baccharis pilularis</i>	coyote brush	1 gal	100
<i>Populus fremontii</i>	Fremont cottonwood	1 gal	100
<i>Rubus ursinus</i>	California blackberry	1 gall	100
<i>Rosa californica</i>	California wild rose	1 gal	100
<i>Salix laevigata</i>	red willow	cutting/1 gal	100
<i>Salix lasiolepis</i>	arroyo willow	cutting/1 gal	100
<i>Salix gooddingii</i>	black willow	cutting/1 gal	200
<i>Sambucus mexicana</i>	Mexican elderberry	1 gal	50
<b>Total Plants</b>			<b>1200</b>
<sup>1</sup> Any native container plant substitutions that may be necessary will be at the discretion of the Restoration Ecologist.			

**Table 4.4 Riparian Woodland Seed Mix**

Scientific Name	Common Name	Bulk Lbs /Acre
<i>Anemopsis californica</i>	yerba mansa	5
<i>Artemisia douglasiana</i>	mugwort	10
<i>Cyperus eragrostis</i>	tall flatsedge	5
<i>Elymus triticoides</i>	beardless wild rye	5
<i>Urtica dioica</i> ssp. <i>holosericea</i>	hoary nettle	5
<b>Total Bulk Lbs. of Seed</b>		<b>30</b>
Should the percent purity and germination of each species not be available at the time of ordering, the Restoration Ecologist shall approve any variation on seed purity and germination presented by the Installation Contractor.		

**4.7.1.3 Riparian Woodland - Coast Live Oak Woodland**

Riparian Woodland – Coast Live Oak Woodland is a desired plant community for some of the mitigation areas. The planting palette includes species characteristic of this community such as poison oak, California blackberry, grass, and common snowberry (Table 4.5). This palette will primarily be used to define those species used to enhance disturbed coast live oak woodland mitigation sites within the Reservoir. Oak trees may need to be transplanted from impact areas where the access roads will be constructed or additional oaks may need to be planted at oak woodland mitigation sites to compensate for Project impacts. The plant palette in Table 4.5 will also be used at new oak woodland mitigation sites.

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**Table 4.5 Riparian Woodland (Coast Live Oak Woodland) Planting Palette**

Scientific Name	Common Name	Container Size (Gallon)	# Per Acre <sup>1</sup>
<i>Quercus agrifolia</i>	coast live oak	1 gal, 5 gal, 10 gal, 15 gal	340 <sup>2</sup>
<i>Toxicodendron diversilobum</i>	poison oak	1 gal	100
<i>Symphoricarpos albus</i>	common snowberry	1 gal	100
<i>Peridium aquilinum</i>	bracken fern	1 gal	100
<i>Polypodium californicum</i>	California polypody	1 gal	100
<i>Rubus ursinus</i>	California blackberry	1 gal	100
<b>Total Plants</b>			<b>840</b>

<sup>1</sup> All species substitutions must be approved by the County, Permitting Agency, and Restoration Ecologist.  
<sup>2</sup>Number of plants (170) was doubled to account for potential die-off of approximately 50 percent of planted oaks. Planting total for oaks calculated at 30 feet on-center.

**4.7.1.4 Riversidean Alluvial Fan Sage Scrub**

RAFSS is present in small amounts within the upstream portions of the Reservoir and would be re-established/re-vegetated in areas deemed suitable within some of the proposed mitigation sites. The planting palette includes species characteristic of this community such as scalebroom (*Lepidospartum squamatum*), prickly-pear cactus (*Opuntia littoralis*), black sage (*Salvia mellifera*), and threadleaf ragwort (*Senecio flaccidus*) (Table 4.6). Potential locations where container plants will be placed in DG-9 will be determined after the completion of the sediment removal in this area but will most likely be located along the edges. Seeding will likely be the primary method used to re-establish the RAFSS in the majority of DG-9 due to the fact that this area will be subject to natural flows and scour. In addition, seeding may also be conducted on portions of the slopes of DG-1 if nonnative plant species removal is conducted and native plant species don't naturally recruit into the areas where the nonnative plants are removed. The plant species in the seed palette are adapted to becoming established in the active wash. The seeding palette includes California sagebrush, California croton, California buckwheat, slender buckwheat, and threadleaf snakeweed (Table 4.7).

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**Table 4.6 RAFSS Planting Palette**

Scientific Name	Common Name	Container Size (Gallon)	# Per Acre <sup>1</sup>
<i>Artemisia californica</i>	California sagebrush	1	50
<i>Eriodictyon trichocalyx</i>	hairy yerba santa	1	50
<i>Eriogonum fasciculatum</i>	California buckwheat	1	50
<i>Lepidospartum squamatum</i>	scalebroom	1	100
<i>Lotus scoparius</i>	deerweed	1	50
<i>Opuntia littoralis</i>	prickly-pear cactus	1	20
<i>Salvia mellifera</i>	black sage	1	50
<b>Total Plants</b>			<b>370</b>

<sup>1</sup> All species substitutions must be approved by the County, Permitting Agency, and Restoration Ecologist.

**Table 4.7 RAFSS Seed Mix**

Scientific Name	Common Name	Bulk Lbs / Acre
<i>Artemisia californica</i>	California sagebrush	4
<i>Croton californicus</i>	California croton	2
<i>Eriodictyon trichocalyx</i>	hairy yerba santa	2
<i>Eriogonum fasciculatum</i>	California buckwheat	4
<i>Eriogonum gracile</i>	slender buckwheat	5
<i>Gutierrezia microcephala</i>	threadleaf snakeweed	3
<i>Lepidospartum squamatum</i>	scalebroom	3
<i>Lotus scoparius</i>	California broom	2
<i>Salvia mellifera</i>	black sage	3
<i>Senecio flaccidus</i>	threadleaf ragwort	2
<b>Total Bulk Lbs. of Seed</b>		<b>30</b>
Prior to finalizing seed order the Restoration Ecologist shall review the percent purity, percent germination, and percent pure live seed per bulk pound to ensure the proper amount of bulk seed is planned for seeding which will result in revision to the amounts listed above. All species substitutions must be approved by the County, Permitting Agency, and Restoration Ecologist.		

4.7.1.5 California Sage/Buckwheat Scrub

California Sage/Buckwheat Scrub is a desired plant community for several of the mitigation areas. The planting palette includes species characteristic of this community such as California sage, buckwheat, deerweed, and white sage (*Salvia apiana*) (Table 4.8). This palette will primarily be used to define those species used to re-establish or enhance disturbed buffer habitats within several of the proposed mitigation sites within the Reservoir. The seeding palette includes California sagebrush, giant wildrye, slender buckwheat, foothill needlegrass, threadleaf snakeweed, and several other species (Table 4.9).

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**Table 4.8 California Sage/Buckwheat Scrub Planting Palette**

Scientific Name	Common Name	Container Size (Gallon)	# Per Acre <sup>1</sup>
<i>Artemisia californica</i>	California sagebrush	1	150
<i>Eriogonum fasciculatum</i>	California buckwheat	1	150
<i>Lotus scoparius</i>	deerweed	1	50
<i>Encelia californica</i>	California encelia	1	50
<i>Isocoma menziesii</i> var. <i>menziesii</i>	goldenbush	1	20
<i>Malosma laurina</i>	laurel sumac	1	30
<i>Opuntia littoralis</i>	prickly-pear cactus	1	20
<i>Salvia mellifera</i>	black sage	1	50
<b>Total Plants</b>			<b>520</b>
<sup>1</sup> Any native container plant substitutions that may be necessary will be at the discretion of the Project Restoration Ecologist.			

**Table 4.9 California Sage/Buckwheat Scrub Seed Mix**

Scientific Name	Common Name	Bulk Lbs / Acre
<i>Artemisia californica</i>	California sagebrush	3
<i>Leymus condensatus</i>	giant wildrye	6
<i>Nassella lepida</i>	foothill needlegrass	3
<i>Acmispon glaber</i>	deerweed	8
<i>Lupinus bicolor</i>	miniature lupine	4
<i>Eriogonum gracile</i>	slender buckwheat	5
<i>Gutierrezia microcephala</i>	threadleaf snakeweed	2
<b>Total Bulk Lbs. of Seed</b>		<b>31</b>
Should the percent purity and germination of each species not be available at the time of ordering, the Restoration Ecologist shall approve any variation on seed purity and germination presented by the Installation Contractor.		

4.7.1.6 Freshwater Marsh

Freshwater marsh is a desired plant community for portions of mitigation sites DG-W-1, DG-W-2, and DG-3B if site conditions are suitable and water availability is adequate to support freshwater marsh vegetation. Potential planting areas in DG-W-1 and DG-W-2 for this plant community will be determined when the final grades of the sites are established. Freshwater marsh will be an appropriate community for DG-3B as this area receives constant runoff from adjacent communities. The planting palette includes species characteristic of this community such as cattail (*Typha latifolia*), Baltic rush (*Juncus balticus*), California bulrush (*Schoenoplectus californicus*), and umbrella sedge (*Cyperus squarrosus*) (Table 4.10).

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**Table 4.10 Freshwater Marsh Planting Palette**

Scientific Name	Common Name	Container Type	# Per Acre <sup>1</sup>
<i>Typha latifolia</i>	common cattail	plugs	2400
<i>Typha domingensis</i>	southern cattail	plugs	2400
<i>Juncus balticus</i>	Baltic rush	plugs	2800
<i>Schoenoplectus californicus</i>	California bulrush	plugs	2800
<i>Schoenoplectus acutus</i>	hardstem bulrush	plugs	2800
<i>Cyperus squarrosus</i>	Umbrella sedge	plugs	1000
<i>Equisetum arvense</i>	Common horsetail	plugs	1000
<i>Bolboschoenus maritimus</i>	Alkali bulrush	plugs	2800
<sup>1</sup> Any native container plant substitutions that may be necessary will be at the discretion of the Restoration Ecologist.			

4.8 Identification of Planting Areas

When the final plans for the restoration in the mitigation areas have been approved, the Restoration Ecologist will determine planting locations of live stakes, propagated plants, and native seed based on micro-topography, hydrologic conditions, and current vegetation communities on site. The Restoration Ecologist will place colored flags at the locations where live stakes and propagated plants will be installed.

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#### 4.9 Plant Material Procurement

The services of a qualified native plant nursery and seed company will be secured immediately following approval of this Plan. The native plant nursery and native seed company will have a minimum of five years of experience with propagation and seed collection of native riparian plants. Container plants will have container sizes not less than one gallon. An additional five percent of the total number of each container species specified for planting will be ordered as a contingency for any container plant mortalities that occur.

Plant material will originate from local sources as is feasible, ideally within the Arroyo Seco and adjacent watersheds originating in the San Gabriel Mountains. Materials should be obtained from areas that have habitat conditions that are similar to those within the Project area. Plant material (i.e., cuttings, seed) will only be harvested from healthy, vigorous donor plants with no obvious signs of damage from insects or disease. Care will be taken to minimize over-harvesting from any one particular donor plant or localized plant community.

The native seed mix will be ordered according to that specified in this Plan. Seed will be of high quality with virtually no weed seed present. The Restoration Ecologist will inspect the seed mix tags of all deliveries of seed to assure that they are up to specifications (i.e., source[s], percent germination, and purity of seed). Seed quality will be the best obtainable in the year of application for both purity and germination and any seed being stored for future use within the Project area will be kept in a cool, dry place until site application.

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#### 4.10 Willow and Mulefat Cuttings/Stakes

Suitable local donor sites will be identified within Devil's Gate Reservoir. Dormant pole cuttings from appropriate species may provide a large percentage of the plant material used for the proposed mitigation sites. To ensure establishment success, cuttings will be harvested from live, dormant plants (i.e., willows) either in late fall, winter, or very early spring before the buds start to break. Willow stakes will be approximately four to five feet long and from one to two-inch diameter at their base, as vigorous young stakes with larger diameters establish more readily and successfully than older or small diameter stakes. A diagonal cut will be made at the base of each stake and the top will be cut horizontally to differentiate the rooting end from the above ground end to aid in installation. Lateral branches will also be removed during harvesting. The willow stakes will be stored (no longer than two weeks) in buckets with mixture of water and of rooting hormone in a cool shaded location until ready for planting.

Immediately prior to installation, the stakes may be dipped in a rooting hormone and then installed in pre-watered holes approximately two to four feet deep depending on the existing water table with more than half of the cutting underground. The holes will be backfilled and the soil around the stake tamped to insure good soil to stem contact and no air pockets. The willow stakes will be watered immediately following installation.

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#### 4.11 Container Planting Methods

Planting of container plants shall occur during the winter rainy season (between October 1 and April 30). Prior to installation, all plant material will be inspected by the Restoration Ecologist to

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ensure that container stock is healthy, and does not show signs of having pests or disease. If any container stock is in poor condition, it will be rejected.

Container plants will be planted using standard horticultural practice, utilizing a hole twice the diameter and depth of the rootball. The plant root crown will be two inches above grade after planting. All plants will be thoroughly watered in their containers before planting. The soil in planting holes will also be wetted before and after planting. The backfill mix will contain native soil, and rocks greater than two inches in diameter will be removed to the extent possible. Container plants will be planted in such a manner as to conform to site vegetation, soils, and hydrology patterns.

#### **4.12 Seeding Methods**

Seeding with native propagules will be performed after nonnative plant control, earthwork, installation of structural habitat features, and container plant installation has been completed. Native seed mixes will be installed using appropriate methods such as hydroseeding, imprinting, and/or hand broadcasting. Seed will be installed between October 1 and April 30 in order take advantage of natural rainfall.

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#### **4.13 Erosion Control Measures**

All proposed mitigation sites are located within floodplains and may be susceptible to flooding and erosion during stormwater events. Erosion control measures shall be installed and maintained per applicable permit conditions (i.e., SWPP Plan) and as appropriate and practicable to avoid increased erosion and/or sedimentation. Best Management Practices (BMPs) may include one or more of the following techniques: fiber rolls, jute netting, silt fencing, and straw or willow wattles. All materials shall be weed-free and subject to approval by the Restoration Ecologist prior to purchase and/or installation.

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#### **4.14 Biological Monitoring**

Biological monitoring will be performed when mitigation activities are conducted during the breeding bird season (typically from February 15 through September 15) to prevent project-related impacts to birds nesting within the work areas or immediately surrounding areas, in accordance with the Migratory Bird Treaty Act (USFWS 1918, as amended). Monitoring will also be performed if detection of a special-status species is located within or immediately adjacent to work areas and there is a potential for project-related impacts to occur to that species. A qualified biologist will perform the biological monitoring to ensure project-related impacts do not occur to these sensitive biological resources. The biologist will also help enforce the regulations and recommendations pertaining to biological resources in the project permits and agreements in order to maintain project compliance with these documents. A daily monitoring log will be maintained and the biologist will record all wildlife species, with special attention paid to special-status species, and construction activities monitored each day. The biologist will communicate with the appropriate project personnel regarding the planned activities and any noncompliance issues observed during monitoring.

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#### **4.15 120-Day Plant Establishment Period**

Following the installation of container plants and broadcasting of native seed, the Restoration Ecologist will perform an inspection of the mitigation sites. During the inspection, the Restoration Ecologist will document any issues or outstanding items that need to be addressed by the Restoration Contractor. Once the Restoration Contractor has addressed any issues or outstanding items, the Restoration Ecologist will prepare an As-Built Plan and notify LACFCD and regulatory agencies that initial mitigation activities have been completed in accordance with all applicable plans and permits. At this point, the 120-day Plant Establishment Period (PEP) will commence.

During the 120-day PEP, the Restoration Contractor will provide regular maintenance of all mitigation sites. Maintenance will include tasks such as inspection of irrigation system, nonnative plant control, erosion control, pest control, dead plant replacement, and trash removal. The contractor will make general irrigation system checks once a month during this period.

During the 120-day PEP, the Restoration Ecologist will visit each site at least once per month to conduct horticultural assessments. During these assessments, the Restoration Ecologist will record moisture levels, condition of the seeded and planted areas, erosion issues, signs of herbivory, insect damage or disease, and signs of anthropogenic disturbance. Photo documentation will occur from permanently established points. The Restoration Ecologist will prepare an e-mail memorandum for LACFCD after each site visit to provide a summary of restoration site conditions, recommended remedial measures if problems arise, and the results of any remedial work performed by the Restoration Contractor. At the end of the 120-day PEP, the Restoration Ecologist will document any issues or outstanding items that still need to be addressed by the Restoration Contractor. Once the Restoration Contractor has addressed any issues or outstanding items, the Restoration Ecologist will notify LACFCD and regulatory agencies that the 120-day PEP is complete and request approval to enter into the 5-year maintenance and monitoring periods.

#### **4.16 Avoidance Measures**

##### **~~5.1.154.16.1~~ Contractor Education**

An on-site, pre-construction meeting will be held prior to the commencement of restoration activities to identify sensitive areas and other sensitive resources that may be within or adjacent to the Project areas. All personnel working on the Project will attend at least one contractor education session that will be presented by the Restoration Ecologist or another authorized biologist working on the Project. Contractor education will include topics such as roles and authority of the monitors, location of designated access routes, special status species that have the potential to occur within or near the Project area, limits of work, and permit obligations. The Restoration Ecologist will provide a copy of this Mitigation Work Plan and any pertinent landscape construction documents to each contractor, along with copies of pertinent resource agency permits.

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### **5.1.164.16.2 Preparation of a Nesting Bird Management Plan**

A site-specific Nesting Bird Management Plan will be prepared that includes detailed methodologies and definitions that will allow a qualified biologist to monitor and implement nest-specific buffers based on topography, vegetation, species, and individual bird behavior. A Nest Log will be developed that will allow the tracking of each active nest and the ultimate outcome. This plan will be implemented to ensure the protection of common and sensitive bird species during construction and mitigation activities that occur are conducted in the breeding season.

### **5.1.174.16.3 Nesting Bird Surveys**

#### **4.16.3.1 Pre-Construction Nesting Bird Surveys and Monitoring**

If vegetation removal, mitigation implementation, or maintenance activities are conducted during the nesting bird season (March 15 through August 31), pre-construction nesting bird surveys will be conducted within one week prior to the start of the activities. A minimum of three surveys will be conducted on separate days to determine if least Bell's vireos or southwestern willow flycatchers are nesting within 300 feet of project boundary with one survey being conducted one-day prior to the initiation of the activities. If no nesting activities are observed within 300 feet of the project boundary, then vegetation removal, mitigation activities, or maintenance will be allowed to commence. If least Bell's vireo or southwestern willow flycatcher are observed nesting within the 300 feet, then nest monitoring will be initiated and vegetation removal or other work activities will not be allowed to occur within 300 feet of the nest until the nesting cycle is completed or if the nest fails, as determined by qualified biologist. The qualified biologist will report the results when the nest is either completed or it fails to the USFWS and work will not be allowed to proceed within the 300-foot nesting buffer until the USFWS provides their approval to proceed. The biologist conducting the survey will be a trained ornithologist with at least 40 hours of supervised experience locating vireo and mapping locations in the field. The biologist conducting surveys for southwestern willow flycatcher must hold the appropriate permits to conduct surveys for this species. If nest monitoring is required, then the biologist who conducts the monitoring must hold the appropriate permits to conduct nest monitoring for least Bell's vireo and southwestern willow flycatcher. The resumes for the biologists and monitors will be submitted to the USFWS for approval at least 7 days prior to initiation of surveys.

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#### **4.16.3.2 Periodic Nesting Bird Surveys**

Periodic nesting bird surveys will be conducted in adjacent habitat during construction, mitigation implementation, and annual maintenance activities occurring during the breeding bird season. If an active bird nest is found, then the appropriate buffer, which has been identified in the Nesting Bird Management Plan, will be established and the nest will be monitored until the nesting cycle is either completed or the nest fails.

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#### **4.16.3.3 Noise Monitoring**

Noise levels will be monitored during construction, mitigation implementation (when mechanical equipment is used), and annual maintenance activities occurring during the breeding season of

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the least Bell's vireo and southwestern willow flycatcher (March 15 through September 15). Construction noise levels will be restricted to below 60 dBA Leq hourly at 100 feet from areas occupied by the vireo. The biological monitor will conduct surveys for least Bell's vireo and southwestern willow flycatcher twice weekly in areas of suitable habitat within 500 feet of proposed activities to determine the presence of nest building activities, egg incubation activities, or brood rearing activities. If vireos or flycatchers are present, noise monitoring will be conducted weekly and will demonstrate that noise levels are less than 60 dBA Leq hourly at specified monitoring locations, no less than 100 feet from the active nest(s) as determined by the biological monitor. Weekly survey reports will be prepared during the nesting season and sent electronically to the USFWS each week that vireos or flycatchers are detected. The weekly reports will identify the location of vireo and/or flycatcher nest sites and territories within 500 feet of the project.

#### **4.17 Additional Measures**

##### **5.1.184.17.1 Preservation of Critical Linkages and Unique Resources**

Preservation of unique resources or critical wildlife linkages is an important component of the Mitigation Plan for the Project. As previously described, onsite areas will be restored to improve the function and values and result in much higher quality habitat than currently exists. Improvement of habitat in the preserved portions of Devil's Gate Reservoir will increase the value of the area as a critical linkage and will provide for additional opportunities for wildlife.

Devil's Gate Reservoir supports habitat that can potentially support eight special-status plant species and 14 sensitive wildlife species, including five listed as state and/or federal threatened or endangered species. The reservoir area provides essential habitat connectivity between Flint Wash and the Arroyo Seco located downstream of the dam, Hahamongna Watershed Park, and areas located upstream in the Angeles National Forest. The habitats in the reservoir area and the adjacent Hahamongna Watershed Park function as a critical linkage in a highly developed area. Not only do wildlife species reside in the area but they also use the area for juvenile dispersal, seasonal migration, and home range connectivity. Improving the habitat will greatly increase the likelihood that listed species of wildlife, including least Bell's vireo, southwestern willow flycatcher, and western yellow-billed cuckoo, will establish breeding territories at Devil's Gate or will utilize the area on a regular basis during migration or for juvenile dispersal.

##### **5.1.194.17.2 Modification of the Trail System**

#### **4.17.2.1 Preservation of Trails**

The proposed mitigation plan will be designed to maintain access to the existing and proposed formal trails within the HWPMP and the vicinity. These include:

- Altadena Crest Trail;
- North Perimeter Trail;
- Gould Canyon Trail;
- East/West Rim Trails;
- Perimeter Trail;
- Flint Wash Trail;

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**Comment [BLR107]:** What are the other two federal species? Spineflower? Yellow-legged frog? Arroyo toad?  
List.

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- Dam Observation Trail;
- Arroyo Seco Trail;
- Mountain View Trail; and
- Gabrielino Trail.

In general, the mitigation plan will be consistent with the Trail Plan (Exhibit 3-8) of the HWPMP by keeping open the main trails that exist around the perimeter of the reservoir. However, the trail that runs along the west and south side of Johnson Field (DG-W-1) will be eliminated to accommodate establishment of wetlands and riparian habitat in Johnson Field. Elimination of the trail will allow for the new habitat area to be contiguous with existing habitat to the west and south of Johnson Field. The trails along the north and east side of Johnson Field will remain intact.

**Comment [BLR108]:** Figure not included. Where are trails in relation to proposed mitigation site.

New trails will not be established between the boundary of the permanent maintenance area and the preserved and restored habitat areas in the reservoir. Limiting human disturbance next to the restored and preserved areas is a critical part of the mitigation plan because the goal is to provide high quality habitat that can support a large population of sensitive bird species as other wildlife. The presence of humans and dogs in and adjacent to habitat where these sensitive bird species reside can result in nest failures and could potentially discourage wildlife from using the area.

#### 4.17.2.2 Trail Refinement

Trails over five feet wide may be narrowed and restored along the edges with native plant species. Agencies USFWS and CDFW have requested that buffer plantings be done along trails to discourage people from going into natural areas and to create visual barriers between the trails and sensitive habitat areas. These buffer plantings will likely include plant species that will deter humans from encroaching into sensitive habitat areas, such as poison oak, cactus, and other species that may create a barrier. In addition, fencing (such as post and cable), large rocks, or other natural barriers, may be placed along the edges of narrowed trails to provide aesthetic value as well as to keep trail users on the established trails.

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#### 4.17.2.3 Trail Closures

Secondary trails within the routine annual maintenance footprint area and the proposed mitigation areas may need to be closed to discourage disturbance in the preserved and restored habitat areas. As stated previously, the goal is to preserve and restore high quality habitat areas that will support a large population of sensitive birds and other wildlife. The goal isn't to discourage people from enjoying the beauty of the area, the outdoor experience, or the wildlife that occur in the preserved and restored habitat in the reservoir. Human use of trails through sensitive habitat areas has a high potential to disturb birds and other wildlife as well as cause nest failures. By limiting disturbance by humans, the area will be much more attractive to wildlife and the potential for the successful establishment of large populations of sensitive birds will be much higher.

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In order to close trails, a combination of methods may be used such as signage, fencing (such as post and cable), placement of large rocks and other natural barriers, planting of selective

**Comment [BLR109]:** Can you provide a figure showing the proposed placement of these barriers?

plants at trail closure points (cactus, poison oak, wild rose, stinging nettles, and other barrier plants), using plant debris/vertical mulch to block trails, and public education.

#### 4.17.2.4 Trail Buffer Areas

Buffers will be established along existing trails to discourage site users from entering restored or sensitive habitat areas and to provide some level of protection for wildlife utilizing habitats adjacent to trails. Plantings in buffer areas will likely consist of native plants that will help to keep trail users on the trails, including poison oak, wild rose, stinging nettles, and others that are typically found in riparian habitat areas. Buffer habitat may also be established at the perimeter of the permanent maintenance area to reduce the impacts of maintenance activities on wildlife residing in adjacent habitats.

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#### 4.17.2.5 Trails Monitoring

Monitoring of the preserved trails will be conducted on a periodic basis to identify safety issues, such as erosion or fallen trees, the integrity of signage, fencing, or other natural barriers that have been placed to keep trail users on the established, preserved trails, and the presence of trash. In addition, monitoring of closed trails will also be conducted to determine the success of trail closure methods and to repair barriers or re-evaluate trail closure methods if they are not successful. In this case, alternate methods would be developed to close trails and to educate the public about the importance of trail closure. If unauthorized trails are observed during the trails monitoring, then methods will be developed and implemented to close the unauthorized trails.

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### 5.1.204.17.3 Signage

Signage will be used to identify restoration areas, trails, and off limits areas and interpretive signs will be placed at strategic locations to inform the site users about the importance of the mitigation areas and the habitat restoration activities. LACFCD will work with the City to establish consistent interpretive signage and other signage for the sediment removal project and the restoration areas. The proposed signage plan will be consistent with the City's current standards.

### 5.1.214.17.4 Public Education and Outreach

Public education and outreach is an essential component of the Mitigation Plan because the reservoir area is highly used by the public and it is an important natural area that is enjoyed by site users. LACFCD understands the importance of the area and that it is highly valued by hikers, bird watchers, equestrians, and other interested user groups. In addition, LACFCD also realizes the importance of the site users as stewards of the site and will work with the City and site users to identify issues or problems at the site, such as blockages of preserved trails by fallen trees, erosion of preserved trails, or trash dumping. Periodic presentations and updates will be provided to the agencies, the City, and to advisory groups, such as the Arroyos & Foothills Conservancy and the Altadena Crest Trail Restoration Working Group and the local community, to brief them on the ongoing restoration activities and the status of the project.

Other community outreach opportunities may include involving school groups or participants in the Tom Sawyer Camp with habitat restoration activities, wildlife inventories, nature walks, or trails cleanup. The program would be developed with input from the City, the community, and site users. Students would be encouraged to fulfill their requirements for volunteer activities through assistance with tasks such as trails cleanup, for example.

Additional outreach opportunities might include hiring staff from the local workforce to assist with invasive plant removal, trash removal, and other habitat restoration activities. This program would need to be developed but hiring local people would help support the City and its residents.

**5.1.224.17.5 *Trash Removal***

Trash removal will be conducted on a periodic basis along trails and where necessary in the preserved habitat areas. The trails monitoring and monitoring conducted in the restoration areas will identify problem areas where trash may need to be removed. In addition, LACFCD will work with the City to provide covered trash containers at strategic locations to encourage site users to place their trash in containers as opposed to on the ground. A regular program of emptying the trash containers will be implemented.

**5.1.234.17.6 *Installation of Trash Entrapment Device at West Altadena Stormdrain***

LACFCD will work with the City to develop and implement a plan to install and maintain a trash entrapment device at the West Altadena Stormdrain. A significant amount of trash enters the Arroyo Seco from surrounding communities and particularly at the West Altadena Stormdrain. Entrapment and removal of the trash before it enters the Arroyo Seco will decrease the total amount of trash that ends up in the downstream areas and will greatly improve the water quality.

**9-05.0 DETERMINATION OF CREDITS AND PROPOSED MITIGATION**

**9-15.1 USACE Jurisdictional Areas**

**9-15.1.1 Impacts and Compensatory Mitigation**

The compensatory mitigation for this Project will restore function of the reservoir site through establishment, re-establishment, rehabilitation, and enhancement of wetlands and non-wetland WOUS and revegetation and enhancement of buffer habitats. Table 5.1 lists the acres and linear feet of permanent and temporary impacts resulting from the Project to non-wetland WOUS and the acres of permanent and temporary impacts to wetlands under the jurisdiction of the USACE. The total impacts to wetlands and non-wetland WOUS resulting from the Project is 36.15 acres, which includes 1.91 acres of wetlands and 34.24 acres of non-wetland WOUS.

**Table 5.1 Total Acres and Permanent and Temporary Impacts to USACE Jurisdictional Areas**

Features	Permanent Impact	Temporary Impact	Side Slopes (Permanent)	Total Impacts	Avoided	Total
Non-wetland Waters	17.88	12.60	3.76	34.24	9.57	43.81
Linear Feet	4,909	1,127	263	6,299	13,727	20,026
Wetlands	1.02	0.10	0.79	1.91	1.71	3.62
<b>TOTAL*</b>	<b>18.90</b>	<b>12.70</b>	<b>4.55</b>	<b>36.15</b>	<b>11.28</b>	<b>47.43</b>

\*Total does not include linear feet

Impacts to resources that are jurisdictional to USACE will be offset through establishment, re-establishment, rehabilitation, and/or enhancement of 14 mitigation sites and 12 riparian and upland buffer sites, all of which are located within the reservoir and immediately adjacent to the reservoir. Each of the mitigation sites are shown on Figure 1-7. Table 5.2 lists the proposed acres of onsite compensatory mitigation for impacts to wetlands and non-wetland WOUS and the associated mitigation methods.

**Table 5.2 Acres of Onsite Compensatory Mitigation and Mitigation Methods**

	Establishment	Re-Establishment	Rehabilitation	Enhancement	Total
Wetlands	3.44	0.62	2.13	0.00	6.19
Non-Wetland WOUS	0.00	16.62	0.03	3.00	19.65
<b>Total WOUS</b>	<b>3.44</b>	<b>17.24</b>	<b>2.16</b>	<b>3.00</b>	<b>25.84</b>

The Project will impact 1.91 acres of wetlands, which includes 1.81 acres of permanent impacts and 0.10 acre of temporary impacts and the proposed compensatory mitigation will result in a total of 6.19 acres of jurisdictional wetlands that will be protected in perpetuity. This includes the establishment of 3.44 acres of wetlands and riparian habitat in an area that is currently not

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Comment [BLR110]: ?

Comment [BLR111]: Why are the impacts added to the avoided areas? (36.15+11.28=47.43)

Comment [BLR112]: ?

Comment [BLR113]: ?

considered USACE jurisdiction (DG-W-1) and the re-establishment of 0.62 acres of wetlands (DG-3B) and the rehabilitation of 2.13 acres of wetlands within the jurisdiction of the USACE.

The Project will also impact 34.24 acres of areas considered non-wetland WOUS, which includes 21.64 acres of permanent impacts and 12.60 acres of temporary impacts. The onsite compensatory mitigation for impacts to non-wetland WOUS includes the re-establishment of 16.62 acres, rehabilitation of 0.03 acre, and enhancement of 3.00 acres of non-wetland WOUS for a total of 19.65 acres.

The total onsite compensatory mitigation proposed for impacts to wetlands and non-wetland WOUS is 25.84 acres. The establishment, re-establishment, rehabilitation, and enhancement of wetland and non-wetland WOUS will greatly improve the functions of the mitigation sites by:

- 9. Establishing wetlands functions where they do not currently exist;
- 10. Improving wetlands functions in degraded and disturbed wetlands areas;
- 11. Improving water quality;
- 12. Reconnecting drainages that were cut off by sediment deposition after the Station Fire and by human intervention;
- 13. Removing trash;
- 14. Removing an extensive invasion of nonnative and invasive species;
- 15. Revegetating with native riparian plant species; and,
- 16. Improving habitat for a wide diversity of wildlife species.

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Additional onsite compensatory mitigation proposed for impacts to wetlands and non-wetland WOUS includes the revegetation and enhancement of riparian and upland buffers located immediately adjacent to the compensatory wetlands and non-wetland WOUS mitigation sites. Table 5.3 lists the acres of the riparian and upland buffers that are also proposed as compensatory mitigation and the mitigation methods that will be used to offset the impacts to wetlands and non-wetland WOUS. A total of approximately 51.17 acres of riparian and upland buffers are proposed as additional compensatory mitigation to offset Project impacts. Approximately 41.97 acres of riparian buffer sites will be improved through revegetation (7.32 acres) and enhancement (34.65 acres) activities. In addition, approximately 9.20 acres of upland buffer sites will also be improved through revegetation (3.78 acres) and enhancement (5.42 acres) activities. These buffers will serve as visual and vegetated barriers between the wetlands and non-wetland WOUS mitigation sites and adjacent trails, development, and human activities. In addition, the enhancement and revegetation of these buffer areas will greatly improve the quality of the habitats by removing nonnative and invasive species and planting of additional native plant species.

**Table 5.3 Acres of Onsite Revegetation and Enhancement to WOUS Buffer Areas**

	Re-Establishment	Enhancement	Total
Riparian Buffer Sites	7.32	34.65	41.97
Upland Buffer Sites	3.78	5.42	9.20
<b>Total Buffer Sites</b>	<b>11.10</b>	<b>40.07</b>	<b>51.17</b>

To offset the temporal loss of habitat, implementation of the habitat restoration activities on a portion of the mitigation sites will be implemented prior to the Project implementation. Additional measures that will be implemented to reduce impacts and increase function in the mitigation areas include: closure of unnecessary trails, planting of plants in buffers adjacent to permanent trails that will deter human encroachment, and placement of woody debris to increase structural diversity and to provide additional refugia for wildlife and catchment sites for plant seeds. Improvements to mitigation sites located within the buffer habitat will help protect the compensatory mitigation sites from human impacts, invasion by exotic and/or invasive plant species, and provide higher quality contiguous habitat between open space areas for wildlife shelter and movement throughout the region.

The side slopes of the Permanent Maintenance Area (10.89 acres) will be replanted with native vegetation, including shrub and annual species associated with riparian and RAFSS vegetation communities. In addition, mulefat will be allowed to grow on the side slopes to provide foraging habitat for least Bell's vireo and other wildlife species. The side slopes will be seeded and then allowed to grow naturally with only maintenance to control nonnative species. The side slopes may be periodically affected by recontouring if large sediment deposits bury portions of the side slopes. In this case, the sediment will be removed and the side slopes will be recontoured and allowed to naturally revegetate. Woody species, such as willows and cottonwoods, will not be allowed to grow on the side slopes.

#### **9-1-25.1.2 Compensatory Mitigation Checklists**

For the purposes of Clean Water Act Section 404 permitting, the proposed replacement ratios will be based on the results of the USACE South Pacific Division (SPD) mitigation ratio **checklist**.

#### **9-25.2 Beneficial Impact of the Proposed Mitigation**

The proposed compensatory mitigation for the Project includes a comprehensive approach to managing the habitats in the Devil's Gate Reservoir for the protection of the compensatory mitigation sites and for the benefit of wildlife species that utilize the area. This comprehensive approach includes the habitat restoration activities that will result in a net gain in higher quality riparian habitat and higher functioning wetlands and non-wetland WOUS as well as the implementation of additional measures designed to improve and protect the mitigation sites for the long-term. The habitats in the reservoir will be improved through the removal of the extensive infestation of nonnative and invasive plant species and the restoration of a multi-layered native riparian canopy and understory, as well as the restoration of CSS and RAFSS. In addition, woody debris piles will be placed at strategic locations in the compensatory mitigation sites to provide additional structural diversity as well as to provide refugia for wildlife and catch sites for seeds. Additional measures will include closing of trails and actively managing human access through the use of trail closures and redirection, trail designations, public outreach and education, trash removal, and monitoring of human impacts. Focused surveys for listed species of wildlife will also be implemented to monitor the usage of the reservoir as a whole by listed species. Monitoring of the progress of the habitat restoration at the compensatory mitigation sites will continue until the sites meet the performance standards and then long-term monitoring and management will be implemented to identify problems that may require the implementation of adaptive management measures. The goal of the comprehensive approach to managing the habitats in the reservoir is to greatly increase the suitability of the area to

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**Comment [BLR114]:** Does ratio checklist with CRAM match proposed mitigation acreage still?

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support listed wildlife species for the long-term. At present, very little of the habitat in the reservoir is suitable for listed species of birds due to the presence of an abundance of invasive and nonnative plants and a lack of structural diversity that is preferred by the species. Improving the habitat and restoration of additional habitat will provide higher quality habitat that can support an abundant population of least Bell's vireos, southwestern willow flycatchers, western yellow-billed cuckoos, and other sensitive species while also providing an important migration stopover and wildlife movement corridor in a highly urbanized area. Keeping human impacts on established trails located outside of the sensitive habitats will also benefit the wildlife species and will help to reduce disturbances to listed bird species. An ongoing weed and invasive plant management program will ensure that the habitat won't become degraded and will remain a functional habitat area for the long-term. Implementation of the compensatory mitigation program and the long-term protection of the habitats in the reservoir will result in a beneficial impact of the Project.

## **10-06.0 DESCRIPTION OF SITE PROTECTION INSTRUMENT**

Long-term protection of the mitigation sites identified in this HMMP will be determined and agreed upon between LACFCD and the USACE. LACFCD is currently working with the City to obtain assurances that the City recognizes the mitigation sites proposed by LACFCD within Devil's Gate Reservoir will be compensatory mitigation for the Project under the requirements of the Section 404 Permit (SPL-2014-00591), the CDFW Lake or Streambed Alteration Agreement (1600-2015-0263-R85), the CDFW Incidental Take Permit (2081-2016-031-05), and the RWQCB Section 401 Certification (15-053).

The mitigation sites are within Devil's Gate Reservoir, which is part of the City's Hahamongna Watershed Park. The City is the sole owner of the underlying property of the mitigation sites and LACFCD holds property rights over the reservoir and all mitigation sites as recorded through easements granted in May of 1919 and March of 1965. The City, in collaboration with LACFCD, recognizes the value of the mitigation sites to the Hahamongna Watershed Park.

For decades, the City has implemented policies to protect and enhance the natural character of the Arroyo Seco and the riparian and stream zone habitats through major community-based planning efforts. The City has adopted numerous policy documents relevant to Hahamongna Watershed Park, such as the Hahamongna Watershed Park Master Plan (2003), Hahamongna Watershed Park Master Plan Addendum for the Hahamongna Annex (2010), and Open Space & Conservation Element of the General Plan (2012).

These documents commit the City to protect native habitats and conserve and protect the natural resources of the Arroyo Seco. The adoption in 2003 of the HWPMP was the culmination of a five-year community planning process with extensive participation from the LACFCD. The HWPMP is the central guiding document for the City's planning for this area. The proposed compensatory mitigation sites have a General Land Use designation of Open Space and are zoned Open Space under the City Open Space & Conservation Element of the General Plan. One of the main goals for the Arroyo Seco under this plan is to "Preserve, restore and maintain the natural character of the Arroyo Seco as self-sustaining healthy ecosystems of plants and animals."

LACFCD has collaborated with the City to determine the most suitable restoration areas and ensure that the proposed mitigation sites are consistent with goals of the HWPMP and the General Plan, including:

- Protecting and enhancing the Hahamongna Watershed Park wildlife corridor linkages to the upper watershed and the downstream reaches of the Arroyo Seco.
- Restoring, enhancing, and reestablishing the historical native plant communities of the Arroyo Seco.
- Developing a grading plan that allows habitat restoration and recreational activities to coexist with flood management and water conservation.

LACFCD plans to establish, re-establish, rehabilitate, and enhance wetland and/or non-wetland WOUS in the mitigation sites. In addition, LACFCD plans to revegetate and enhance riparian and upland buffer habitat within Hahamongna Watershed Park. The mitigation sites will provide a

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significant increase in the quality of habitat for numerous wildlife species that may occur in the area, including the state and federally protected least Bell's vireo.

The Hahamongna Watershed Park is a valued recreational facility and the mitigation sites are designed to be consistent with the City's planned recreational uses. The mitigation strategy proposed by LACFCD includes a number of measures designed to reduce the impacts of human presence on the mitigation sites and to protect the wildlife that reside in the habitats. The measures include closures of unnecessary trails, planting of undesirable plants along trails to buffer sensitive habitat areas, placing woody debris at strategic locations in mitigation areas to increase functional value, removing trash, and conducting educational outreach. These measures in combination with the restoration and enhancement of habitats will greatly increase the function and the amount of suitable habitat for wildlife.

The mitigation sites will be protected by LACFCD for the long-term and will be maintained and monitored by LACFCD to ensure the established performance standards are met. In order to protect and maintain the natural condition of the mitigation sites, it is the understanding of LACFCD with cooperation from the City that LACFCD will:

- Undertake all reasonable measures to discourage actions by persons that would be inconsistent with the natural condition and objectives of the mitigation sites;
- Cooperate with USACE, CDFW, and RWQCB in the protection of the natural condition of the mitigation sites;
- Undertake construction, maintenance, and monitoring of the approved HMMP on the mitigation sites; and
- Erect signs and other notification features designed to limit access to the mitigation sites or uses of the mitigation site that are not consistent with the permitted uses of the mitigation.

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The proposed HMMP is consistent with the City's General Plan and the HWPMP and the City's future plans for Hahamongna Watershed Park. Accordingly, LACFCD is currently in the process of seeking written confirmation from the City that they are committed to assisting LACFCD in its efforts to ensure that the conservation values of the mitigation sites will be protected.

**Comment [BLR115]:** Let's discuss.

## 11.07.0 5-YEAR MAINTENANCE PLAN

At the conclusion of the 120-day establishment period, the 5-year maintenance period will commence. The 5-year maintenance period may vary for some of the mitigation sites as the implementation of the mitigation may be staggered due to the need to conduct multiple rounds of nonnative plant species removal in some mitigation sites. In addition, the impacts to some of the temporary impact areas may occur early in the Project implementation while others may occur near the end of the sediment removal process. The 5-year maintenance period will be clearly documented for each of the mitigation sites. Maintenance of the mitigation sites will be performed in accordance with all Project permits and requirements until established performance standards have been achieved. Maintenance tasks include, but are not limited to, irrigation, irrigation system maintenance, nonnative plant control, remedial measures, erosion control, trash removal, and site protection.

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### 11.17.1 Maintenance Schedule

The timing and frequency of most maintenance tasks will be determined by site-specific conditions (e.g., nonnative plants, irrigation requirements), recommendations from the Restoration Ecologist, and established performance standards. A tentative schedule for typical maintenance tasks is provided in Table 7.1.

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**Table 7.1 5-Year Maintenance Schedule**

Time Frame	Activity
<b>Year 1</b>	
Twice per month (May-Aug)	Site Irrigation
Monthly (Sept-May)	
Every two months	Irrigation System Maintenance
Quarterly (minimum) or As Necessary	Weed Abatement/Invasive Plant Control
As Required (Dec-Feb)	Supplemental plantings
As Required	Maintenance of site protection measures
<b>Years 2-5</b>	
As needed	Site Irrigation
As needed	Irrigation System Maintenance
Quarterly or As Necessary	Weed Abatement/Invasive Plant Control
As Required (Dec-Feb)	Supplemental plantings
As Required	Maintenance of site protection measures

**Comment [BLR116]:** After removal of irrigation, the site will have to show success of performance standards for at least 3 years before begin released from monitoring.

### 11.27.2 Irrigation

During the first year following initial planting, container plants will be irrigated at least twice per month if the sites have not received any rain. However, the frequency of irrigation may need to be adjusted based on site conditions and climactic conditions. The maintenance contractor will verify that all container plantings have received sufficient water during each irrigation event. The restoration monitor will conduct periodic checks to also verify that sufficient water has been applied during irrigation. Following the first year of the maintenance period, the Restoration Ecologist will annually assess each mitigation site to determine whether supplemental irrigation will continue or if it is no longer required.

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The maintenance contractor will be responsible for the regular maintenance and repair of the irrigation system. General system checks will be made at least every month from April to November, and as needed at other times of the year, to ensure the system is operating efficiently and that container plants are receiving adequate water. The restoration monitor will also verify that the irrigation system is operating correctly during periodic monitoring events. Once the restoration specialist has determined that supplemental irrigation is no longer required, all aboveground parts of the irrigation system will be removed from the mitigation sites.

### **11.37.3 Nonnative Plant Management**

#### **11.3.17.3.1 Invasive Plants**

All nonnative invasive plants ranked as High or Moderate in the California Invasive Plant Inventory (Cal-IPC 2006) will be targeted for complete eradication during the 5-year maintenance period. Control of these species within the mitigation sites, the routine annual maintenance area, and the episodic maintenance area will be an ongoing task throughout the 5-year maintenance period. In particular, the management of perennial pepper weed infestations within the Reservoir will be a multi-year endeavor that will likely take the full 5 years to achieve adequate control. The level of effort will be determined by annual monitoring results and current status of site performance standards. All control methods will be implemented according to requirements and restrictions addressed in the Mitigation Work Plan (Section 4.0).

#### **11.3.27.3.2 General Weed Control**

In addition to the control of all invasive nonnative plants, other nonnative annual and perennial plants will be controlled in the mitigation areas to ensure the success of the restored native plant communities. Hand tools, string-trimmers, and/or herbicide will be used to achieve this task with the goal of eliminating weed seedlings before they mature. Weeds adjacent to installed container plantings and existing native plants will be removed by hand without the use of herbicide. All control methods will be implemented according to requirements and restrictions addressed in the Mitigation Work Plan (Section 4.0).

If the mitigation areas develop a dense growth of annual nonnative grasses or herbs, string-trimmers will be used to cut down plants before production of flowering parts. The Restoration Ecologist and maintenance contractor will determine whether or not follow-up application with herbicide is necessary. If flowering parts are present, all cut material will be collected, bagged, removed from the restoration site, and disposed at a local landfill.

### **11.47.4 Pest Control**

The Restoration Ecologist and maintenance contractor will monitor the mitigation sites for signs of insects, diseases, or herbivory of container plants. Plants that are severely diseased or infested with insects may be removed and replaced. Exclusionary fencing or cages that have been installed to protect container plants will be monitored and repaired or replaced if damaged. Existing cages around installed container plants will be removed or enlarged, as

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appropriate, if the plants begin to outgrow them or the restoration specialist determines the plantings can survive without protection.

### **11.57.5 Supplemental Planting and Seeding**

In the event established Project performance standards (e.g., native plant cover) are not being met, the Restoration Ecologist may direct the maintenance contractor to install additional container plantings or perform additional seeding with native species. Replacement plantings, seeding, and installation practices will follow requirements and restrictions as addressed in the Mitigation Work Plan (Section 4.0).

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### **11.67.6 Trash and Debris Removal**

Trash, and debris that may compromise the success of the restoration areas, will be removed from the mitigation areas, including trash brought in by storm flow, during regularly scheduled maintenance activities throughout the 5-year maintenance period. The contractor will exercise care so that trash removal activities minimize or avoid impacts to cuttings or established native vegetation in the mitigation areas. Trash will be removed from the sites and disposed of in a landfill.

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### **11.77.7 Erosion Control**

Erosion control measures that have been installed will be monitored and repaired throughout the 5-year maintenance period. If the restoration specialist identifies any new erosion issues, additional temporary, low-impact erosion control measures may be installed. Once it has been determined by the restoration specialist that there is sufficient vegetation established within the mitigation sites, the temporary erosion control devices will be removed.

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### **11.87.8 Site Protection**

Existing site protection (e.g., exclusionary fences, signs) will be monitored and repaired throughout the 5-year maintenance period. If unauthorized access into the mitigation sites occurs, the restoration specialist will consult with LACFCD to determine whether if additional site protection measures are required.

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## 12-08.0 ECOLOGICAL PERFORMANCE STANDARDS

This section defines a set of annual performance standards, or success criteria, for evaluating the successful restoration (establishment, re-establishment, rehabilitation, or enhancement) of native habitat within the proposed mitigation sites. These performance standards are observable or measureable physical, hydrological, and biological attributes that will be used to determine if the proposed mitigation sites are meeting established objectives. These standards will also be used to gauge when and to what extent remedial measures will be required to ensure the success of the sites.

The performance standards will be measured on an annual basis beginning one year following initial mitigation activities in the mitigation areas. All mitigation sites will not be implemented at the same time based on the Project schedule. Site performance standards are dependent on the mitigation type (establishment, re-establishment, rehabilitation, or enhancement) and the target vegetation community. If the performance standards are not achieved in five years, then monitoring and adaptive management measures (if applicable) will continue until the performance standards are met. Site specific performance standards and annual targets are presented in tabular format in Appendix G. Table 8.1 shows the performance standards and each standard is described briefly below.

**Table 8.1 Performance Standards and Descriptions**

Category	Performance Standard	Description
Physical-1	Structural Patch Richness	The site must contain target % or more of the number of structural patch types found at the selected reference site.
Hydrological-1	Depth to Groundwater	Groundwater monitoring will be conducted during the wet and dry seasons to track groundwater levels and to identify unusual fluctuations.
Fauna-1	Wildlife Use Monitoring	Target riparian/aquatic species present within the boundary of mitigation site, including approved buffer, equal to at least 80% of reference site by year 5.
Flora-1	Survivorship	Target survivorship of tree, shrub, and herb strata container plants. (Annually until minimum of 2 years post-irrigation success)
Flora-2	Native Plant Cover	Percent absolute cover (for combined strata) of native species (tree, shrub, and herb strata).
Flora-3	Nonnative Plant Cover	Percent absolute cover (for combined strata) of exotic species (tree, shrub, and herb strata).
Flora-4	Native Plant Species Richness	Target native species richness values of tree, shrub, and herb strata.

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**Comment [BLR117]:** Add a function for physical sediment/topographic stability since it's a flood control basin.

**Comment [BLR118]:** Revise to 3 years.

## **12-18.1 Performance Standards**

### **12-18.1.1 Physical**

#### Structural Patch Richness

Structural patch richness is a measure of the number of different types of physical surfaces or features within a given site that may provide habitat for aquatic, wetland, or riparian species. This may include, but is not limited to debris wrack lines, cobbles/boulders, large woody debris, plant hummocks/sediment mounds, and/or standing snags. Structural patch richness will be evaluated on a yearly basis using the Riverine CRAM structural patch richness worksheet.

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**Comment [BLR119]:** There are set CRAM areas that will be used to monitor for performance. Will the areas in between (outside the AAs) be monitored. Help me understand how/if all areas will be monitored or only the AAs.

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### **12-18.1.2 Hydrological**

#### Depth to Groundwater

Depth to groundwater is a measure of the groundwater depth in existing monitoring wells. The monitoring for this performance standard is intended to ensure that groundwater levels are consistent with the historic levels in the existing monitoring wells and to identify if unusual fluctuations in groundwater depth occur. The purpose of this performance standard is to ensure that the appropriate hydrological regime continues to exist to support the habitats in the mitigation sites. Monitoring methodology is detailed in Section 9.0.

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### **12-18.1.3 Fauna**

#### Wildlife Use Monitoring

The wildlife use within the mitigation sites and buffer habitats will be determined through a series of general biological surveys and focused surveys for special-status species. The wildlife use of the mitigation sites and the buffer habitats will be evaluated every three years and compared to the corresponding reference site in order to track the success of mitigation with reference to wildlife habitat quality. Monitoring methodology is detailed in Section 9.0.

**Comment [BLR120]:** Need a map and estimate of the amount of suitable habitat planned that would have the potential to support federally listed species. Provide estimates for each area and a map.

### **12-18.1.4 Flora**

#### Survivorship

Survivorship is a measure of how many container plants or willow or mulefat stakes installed on a given site have survived since initial installation. Survivorship will be evaluated annually until the target percentage has been reached for a minimum of two years following the removal of supplemental irrigation. Monitoring methodology is detailed in Section 9.0.

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#### Native Plant Cover

Native plant cover is a measure of the percent areal coverage of native plant species (tree, shrub, and herb strata) on a given site. Native plant cover for each mitigation site will be evaluated on a yearly basis and compared to the corresponding reference site in order to track

the success of mitigation with reference to native vegetative cover. Monitoring methodology is detailed in Section 9.0.

#### Nonnative Plant Cover

Nonnative plant cover is a measure of the percent areal coverage of nonnative (exotic) plant species (tree, shrub, and herb strata) on a given site. Nonnative plant cover for each mitigation site will be evaluated on a yearly basis and compared to the corresponding reference site in order to track the success of mitigation with reference to nonnative vegetative cover. Monitoring methodology is detailed in Section 9.0.

#### Native Plant Species Richness

Native plant species richness is a measure of the number of different native plant species represented on a given site. Native plant species richness for each mitigation site will be evaluated on a yearly basis and compared to the corresponding reference site in order to track the success of mitigation with reference to native plant biodiversity. Monitoring methodology is detailed in Section 9.0.

### 12-28.2 Reference Sites

Reference sites will be established in order to define effective, objective, and realistic annual performance standard targets for the proposed mitigation sites. These sites will be established in unimpaired habitats that most closely resemble those habitats targeted for establishment, re-establishment, or enhancement within each mitigation site.

Reference sites will be established for each vegetation community type targeted for mitigation, including Mulefat thickets (Riparian scrub), Black willow thickets (Riparian woodland), Coast live oak woodland (Riparian woodland), California buckwheat scrub (non-aquatic buffer), and RAFSS. Reference sites will be established prior to the initiation of mitigation activities.

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**Comment [BLR121]:** Where? Identify nearby (within watershed) off-site references and describe habitat and targets.

Provide map. Also need to do CRAM at reference sites to compare (may not need to do CRAM though every year though).

## **29.0 5-YEAR MONITORING PROGRAM**

The following is a description of the 5-year monitoring program intended to provide information on whether the proposed mitigation sites are meeting annual objectives and established ecological performance standards. The information gathered during monitoring events will also be used to determine whether remediation or adaptive management is necessary to achieve site objectives. The following program includes monitoring frequency, duration, types of monitoring, methodologies, and reporting requirements.

Monitoring of each mitigation site will be conducted annually using a combination of horticultural and botanical monitoring methodologies in addition to photo documentation. Relevant reference site conditions (i.e., botanical monitoring) will also be collected concurrently with mitigation site conditions to provide a standard in which local and regional changes in biological and environmental conditions can be taken into account.

### **2.29.1 Monitoring Methodology**

Table 9-1 shows the monitoring schedule and each component is discussed individually below.

**Table 9.1 Monitoring Schedule**

<b>Activity</b>	<b>Time Frame</b>
Horticultural Monitoring	Year 1 – Monthly
	Years 2 and 3 - Quarterly
	Years 4 and 5 – Semi-Annually
Botanical Monitoring	Annually (May-August)
Faunal Diversity Monitoring	Annually
Groundwater and Hydrologic Monitoring	Annually
CRAM Assessments	Annually
Focused Species Surveys	Annually
Photodocumentation	Annually

#### **2.2.29.1.1 Horticultural Monitoring**

Horticultural (qualitative) monitoring will be conducted at each mitigation site by a qualified Restoration Ecologist. Data collected during horticultural monitoring events will include, but not be limited to, soil conditions (e.g., moisture), seed germination, presence of volunteer native species, nonnative plant species, significant disease or pest problems, and any erosion issues. All observations and any data collected will be logged onto a monitoring form and photo documentation will occur as needed. A qualified Restoration Ecologist will conduct horticultural monitoring at each mitigation site once every month during the first year following implementation, quarterly during Years 2-3, and semi-annually during Years 4-5.

#### **2.2.29.1.2 Botanical Monitoring**

Botanical (quantitative) monitoring will also be conducted at each mitigation site by a qualified Restoration Ecologist. Botanical monitoring events will provide quantifiable data to assist with

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determining progress towards established performance standards. Monitoring will be conducted once a year between May and August with a goal of monitoring at the same time each year. Data collected during botanical monitoring events will include container plant survivorship, native plant cover (tree, shrub and herb strata), nonnative plant cover (tree, shrub and herb strata), and native plant species richness.

Survivorship will be determined by counting every container plant installed during site implementation and will be conducted annually until the minimum of 2 years post-irrigation success. Native and nonnative plant cover determinations will be ascertained using the point-line intercept method collected along established transect lines. Transect locations will be selected and permanently marked with metal stakes and recorded using a Global Positioning System (GPS) at the beginning of the PEP. These same transects will be monitored during Year 1 through Year 5 of the 5-year monitoring period. Photos will also be taken at established photo points at each transect location whenever data is collected. Botanical monitoring will occur concurrently at established reference sites in order to obtain accurate data in which to measure annual performance standard targets.

### **2-239.1.3 Wildlife Use Monitoring**

#### Faunal Diversity Monitoring

In order to monitor the use of the restoration/enhancement areas by native wildlife species, seasonal wildlife surveys will be conducted on an annual basis in the spring and fall. These surveys will be optimally timed during the height of spring and fall migration periods to document the highest and most diverse number of species using the sites. A qualified biologist will document all species observed, detected, and/or heard during the surveys and a master wildlife compendia will be maintained to document the wildlife identified using the restoration/enhancement areas. This may coincide with the annual botanical monitoring event and with the pre-construction and focused species surveys conducted for the Project.

#### Focused Species Surveys

The Project design includes multiple pre-construction surveys and nest monitoring surveys for least Bell's vireos to ensure that Project activities (during the sediment removal phase) do not result in direct or indirect impacts to this species. Protocol-level surveys for least Bell's vireos will be coordinated with pre-construction and nest monitoring surveys to ensure that the status of this species in throughout the reservoir is determined on an annual basis during the first five years. Protocol-level surveys will also be conducted for other federally-listed species known to occur or with a potential to occur in the reservoir annually for the first five years after implementation. At present, these additional species include southwestern willow flycatcher, western yellow-billed cuckoo, and coastal California gnatcatcher. Focused protocol surveys will be conducted in accordance with the most up-to-date and widely-accepted survey protocols established for each of the target species.

### **2-249.1.4 Groundwater and Hydrologic Monitoring**

Groundwater monitoring wells have been established and are regularly monitored at locations north (Jet Propulsion Laboratory monitoring wells) and east (City monitoring wells) of Devil's

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Gate Reservoir. LACFCD will acquire the groundwater level data from both JPL and the City each year during the wet and dry seasons. These data will be provided to the Restoration Ecologist along with historic groundwater data for inclusion in the annual report. The Restoration Ecologist will provide a discussion of the groundwater levels in the annual report and will identify if any unusual fluctuations have occurred. If the mitigation sites are exhibiting difficulties that may relate to the unusual fluctuations in groundwater levels, then adaptive management measures may need to be implemented.

**Comment [BLR122]:** What would those be. List and describe under Adaptive Management section.

LACFCD currently monitors the flow of water entering Devil's Gate Reservoir, the elevation levels where water is held behind the dam, and the duration of inundation at various elevation levels. These data will be continued to be monitored on an annual basis and will be reported in the annual reports. In the annual report, the Restoration Ecologist will provide a discussion of the success of the restoration sites as it relates to the hydrology information.

Specific monitoring will be conducted at mitigation sites DG-W-1 and DG-W-2, where wetland conditions are targeted as part of the restoration. A qualified biologist will dig representative soil pits to test for hydric soils on a quarterly basis during Years 1 through 3 and semi-annual basis during Years 4 and 5.

#### **9.2.29.1.5 California Rapid Assessment Method (CRAM) Monitoring**

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CRAM is a scientifically defensible, rapid assessment method designed to assess ambient conditions of wetland habitats within California. It is also a common tool used, in conjunction with other monitoring methodologies, to assess the performance of compensatory mitigation and restoration projects such as the proposed mitigation project. CRAM assesses ecological attributes such as site hydrology, physical structure, and biotic structure and provides a score in reference to similar unimpaired habitat types within California.

Following the implementation of mitigation activities, a certified CRAM practitioner will conduct annual assessments at the previously established CRAM sites for the 5-year monitoring program. Additional CRAM sites may be established in appropriate locations in the mitigation sites and these will also be monitored annually for the 5-year monitoring program. CRAM assessments will be conducted during the same timeframe each year. CRAM scores obtained during these monitoring events will be compared to baseline CRAM scores taken in 2015 and used to track habitat establishment and function. Individual CRAM metrics such as Structural Patch Richness can also be used separate from the overall score to track the progress of specific site ecological functions.

**Comment [BLR123]:** How? Expand on this.

#### **9.2.29.1.6 Photodocumentation**

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Permanent photo point stations will be established at each mitigation site to provide a visual record of progress over time at each site. The geographic coordinates of each photo station will be recorded with a GPS unit and digital photos will be taken from these points during each monitoring event throughout the 5-year monitoring period. Additional photos will be taken throughout each site that are representative of current site conditions or show issues that need to be addressed. Photos will be provided as an appendix to each annual report. The location and exact number of photo points will be determined during the PEP.

## 9.39.2 Reporting Requirements

### 9.2.1 Completion of Initial Construction

A notification memorandum will be submitted to the Agencies following the completion of initial compensatory mitigation activities (i.e., earthwork, planting). The following information will be included:

3. Date(s) all compensatory mitigation construction activities were completed;
4. Modifications (if any) to the originally-approved schedule for future mitigation monitoring, implementation and reporting pursuant to final approved mitigation plan;
5. Summary of compliance status with each special condition of associated permits or verification (including any noncompliance previously having occurred or currently occurring and corrective actions taken to achieve compliance);
6. Photographs of the habitats constructed at the compensatory mitigation site. For those aspects directly associated with pre-existing WOUS, before photos shall also be provided;
7. One copy of "as built" drawings for the entire compensatory mitigation project prepared in accordance with SPD Map and Drawing Standards.

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### 9.2.1 Annual Reporting

Annual reports will be prepared for each of the five years following the PEP or until the regulatory agencies deem the mitigation site is successful. At a minimum, annual reports will include the following information and all information as required within Project permits:

3. Description of restoration activities (e.g. site preparation, plant installation and overview of planting effort, number of replaced plants and/or recruits, when activities were conducted);
4. Description of maintenance activities (e.g. nonnative plant control, irrigation, trash removal);
5. Current site conditions (e.g. percent survival, percent cover, hydrology, methods used to assess parameters);
6. Current status and progress of the site with regard to meeting all of the mitigation success criteria;
7. Any problems or issues noted during the monitoring and steps taken to address them;
8. Wildlife species compendium;
9. Coordination with agencies; and
10. Photo documentation.

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**Comment [BLR124]:** List agencies that will review reports.

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### **2.9.2.2 Mitigation Completion**

Upon achieving established mitigation success criteria, the restoration specialist will prepare a notification memorandum for the LACFCD and regulatory agencies. The letter will provide information that verifies the successful completion of the 5-year mitigation effort for each mitigation site and request concurrence from the LACFCD and regulatory agencies. In order to be released from further mitigation and monitoring responsibilities, LACFCD must receive written confirmation from the regulatory agencies that the required onsite mitigation has met all the success criteria and that the mitigation is deemed as complete.

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## ~~2.1.10.0~~ LONG-TERM MANAGEMENT PLAN

The USACE has requested the submittal of a comprehensive Long-Term Management Plan (LTMP) that not only addresses how the mitigation sites will be managed for the long-term but also addresses how LACFCD will manage the flood control facility at Devil's Gate Reservoir to be consistent with the long-term protection of the mitigation sites. This section briefly discusses the contents of the LTMP and how the site will be managed after the success criteria have been achieved to ensure the mitigation sites will be ecologically sustainable and suitable as habitat for native wildlife and plant species. The comprehensive LTMP will be provided under separate cover.

### ~~a.10.1~~ Site Protection and Management

Long-term management and oversight of the mitigation sites will be the responsibility of LACFCD after the success criteria and/or performance standards have been met. Long-term protection of the mitigation sites from development, human-related disturbance, and infringement will also be the responsibility of LACFCD.

The LTMP will describe the measures that will be implemented by LACFCD to manage and maintain the mitigation sites in perpetuity and in conjunction with the operation of the flood control facility at Devil's Gate Reservoir. The components of the LTMP will include a focus on measures designed to reduce the impacts of human presence on the mitigation sites, to ensure the mitigation sites continue to function as intended, and to protect the wildlife that reside in the habitats in the mitigation sites. The measures generally include:

- 4.0• \_\_\_\_\_ monitoring of the condition of the habitats in both the areas where habitat restoration methods were implemented and in the buffer areas;
- 4.0• \_\_\_\_\_ monitoring of trails, maintenance of undesirable plant species along trails, and closure of unnecessary trails;
- 5.0• \_\_\_\_\_ maintenance to control nonnative and invasive plant species;
- 6.0• \_\_\_\_\_ maintenance of signage designed to alert humans to the sensitivity of the mitigation sites;
- 7.0• \_\_\_\_\_ biological surveys and monitoring prior to and during annual sediment removal maintenance activities;
- 8.0• \_\_\_\_\_ functional assessments (CRAM);
- 9.0• \_\_\_\_\_ focused surveys for listed and sensitive species of wildlife;
- 10.0• \_\_\_\_\_ adaptive management activities, as necessary; and
- 11.0• \_\_\_\_\_ annual reporting.

As part of the LTMP, perpetual conservation will be ensured through an ongoing agreement between the LACFCD and the City as approved by the USACE. The final LTMP will also include detailed information on financing to ensure the necessary funding of the management of the sites in perpetuity, including the analysis used to determine the necessary funding amount.

### ~~b.10.2~~ Long-term Financing Mechanisms

A Property Analysis Record (PAR) will be performed to determine the necessary amount of money required for long-term management activities on an annual basis. The results of the PAR

**Comment [MC125]:** This section needs to identify specific objectives and the tasks that will be funded to meet the objectives. For example:

- 1) Final native and non-native cover criteria will be maintained for the life of the project
  - a. Up to x hours of weeding will be conducted annually to limit non-native weeds to x percent cover

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will be included in the LTMP. Financial assurances and responsibilities will also be discussed in detail in the LTMP.

**Comment [BLR126]:** Status?

### **e.10.3 Responsible Parties**

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Applicant/Permittee: Los Angeles County Flood Control District  
P.O. Box 1460  
Alhambra, California 91802-1460

Long-term Manager: Los Angeles County Flood Control District  
P.O. Box 1460  
Alhambra, California 91802-1460

## **11.1.0 ADAPTIVE MANAGEMENT PLAN**

Adaptive management is a method used to address unexpected changes in site conditions, responsibilities, or performance of a mitigation site. The goal of adaptive management is to actively adjust the approach or methods so that the compensatory mitigation project achieves its objectives and ecological performance standards. Problems that might prompt the need for adaptive management include a failure of the mitigation site to attain interim and/or final performance standards, fire, storm events with unusually high levels of runoff, substantial new exotic plant or wildlife infestations, and human-related disturbances such as extreme trespassing or vandalism.

The restoration specialist will analyze site progress as part of the regularly scheduled monitoring at the mitigation sites and will suggest remedial measures to address unforeseen changes in site conditions or other components of the mitigation project. Minor problems, such as trash, vandalism, isolated instances of plant mortality, or small-scale weed or pest infestations will be addressed and resolved when they are discovered. Specific monitoring will be conducted after unusual events, such as a large storm event or fire, to document damage to the mitigation sites. If changes in the management of the mitigation sites are necessary due to the unforeseen circumstances or damage, then the restoration specialist will develop an approach to address and rectify the problems. Resolution of minor problems will be documented in the annual reporting and will not require separate notification to USACE.

If unforeseen changes noted during monitoring will result in a substantial change to the management of the mitigation sites, LACFCD will be notified immediately and an adaptive approach can be developed in a timely manner to address such changes. Largescale corrective measures, such as regrading part or all of the compensatory mitigation sites, replanting more than 20 percent of the sites to improve species cover or diversity, or supplemental soil amendments may require notification to USACE. LACFCD is ultimately responsible for the success of the implementation and will take corrective action if any component is not achieving the performance standards.

USACE will be notified if performance standards are not met at any of the mitigation sites in a monitoring year. If modifications are necessary to USACE-approved HMMP or LTMP to improve success at the mitigation sites, then the modifications may need to be approved by USACE prior to implementation.

### **11.1.1 Potential Risks and Uncertainties**

#### **11.1.1.1 Flooding**

The proposed mitigation sites are located within a flood control facility that has experienced high stormwater flows in the past. As such, there is the potential risk of flooding that may result in large-scale damage to container plantings, loss of irrigation systems, site erosion, and channel instability.

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#### 1.11.1.1.1 Corrective Measures

In the event site damage does occur, LACFCD and regulatory agencies will be notified prior to the implementation of any corrective measures. Such measures may include, but are not limited to:

- 1) Re-grading/contouring part or all of the damaged mitigation site;
- 2) Installation of additional container plantings or native seed;
- 3) Repair or replacement of damaged irrigation systems; or,
- 4) Installation of additional erosion BMPs.

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#### 2.11.1.2 Fire

Although uncommon for riparian habitats, there is the potential risk of damage to the mitigation sites from wildfire. Impacts from wildfire may include loss of container plantings and existing native vegetation, damage to irrigation systems or exclusionary barriers, potential for nonnative plant infestations, and/or potential for large-scale erosion from subsequent stormflows.

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#### 1.11.1.2.1 Corrective Measures

In the event a wildfire does occur within any of the proposed mitigation sites, LACFCD and regulatory agencies will be notified prior to the implementation of any corrective measures. Such measures may include, but are not limited to:

- 5) Installation of additional container plantings or native seed;
- 6) Repair or replacement of damaged irrigation systems or exclusionary barriers;
- 7) Additional nonnative plant control measures; or,
- 8) Installation of additional erosion BMPs.

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#### 3.11.1.3 Site Failures

Given the unpredictable nature of restoration projects, there is always the potential for site failure in the form of large-scale die-off of container plants, insufficient site hydrology to support target communities, unmanageable infestations of nonnative species, or other unforeseen issues.

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#### 1.11.1.3.1 Corrective Measures

In the event of significant site failures, LACFCD and regulatory agencies will be notified prior to the implementation of any corrective measures. Such measures may include, but are not limited to:

- 9) Re-grading/contouring part or all of the affected mitigation site;
- 10) Adding supplemental soil amendments;
- 11) Installation of additional container plantings or native seed; or
- 12) Siting of new mitigation site as compensation.

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**Comment [MC127]:** Should require additional compensation over replacement value to offset temporal loss

**Comment [BLR128]:** What if insufficient water flow? Is there an option where the County could increase the water available to the site if needed?

## **1.12.0 FINANCIAL ASSURANCE**

The funding source that the LACFCD will utilize to ensure the funds are available to implement the HMMP and LTMP will be determined and agreed upon between LACFCD and USACE. As a public agency, LACFCD cannot enter into the typical funding arrangement, such as an endowment fund, that would typically be used to ensure monies are available to implement the measures in the HMMP and the LTMP. LACFCD has the ability to budget the necessary funding to conduct the required maintenance and continuing to implement the minimization and mitigation measures on an annual basis for both the short-term and long-term activities.

LACFCD has the financial resources to undertake the mitigation and sustained long-term management of the mitigation areas. LACFCD's primary sources of funding are the ad valorem property tax for the Flood Control District and the Flood Control Benefit Assessment. LACFCD has an average annual budget of approximately \$240 million and a Bond Rating of AAA+. LACFCD has the ability and is committed to making a discrete line item in its annual budgets for the required mitigation and long-term management of the mitigation areas for the project.

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**Comment [BLR129]:** Submit line-item budget.

**Comment [MC130]:** The budget should specify the specific tasks and associated costs for each task (e.g., labor, materials, disposal, sign/fencing replacement)

## 2.13.0 REFERENCES

[Cal-IPC] California Invasive Plant Council. 2006. California Invasive Plant Inventory. Cal-IPC Publication 2006-02. California Invasive Plant Council: Berkeley, CA. Available at: <http://cal-ipc.org/ip/inventory/pdf/Inventory2006.pdf>.

Chambers Group, Inc. 2010. Focused Least Bell's Vireo Survey Report for the Devil's Gate Reservoir Project in the City of Pasadena, Los Angeles County, CA. Chambers Group, Inc., Santa Ana, CA. Submitted to the County of Los Angeles Department of Public Works.

Chambers Group, Inc. 2013a. Jurisdictional Delineation Report, Devil's Gate Reservoir Sediment Removal and Management Project in the City of Pasadena, Los Angeles County, California. Submitted to Los Angeles County Flood Control District, Water Resources Division, October 2013.

Chambers Group, Inc. 2013b. Focused Protocol Surveys for Least Bell's Vireo at the Devil's Gate Reservoir, Los Angeles County, California. Chambers Group, Inc., Santa Ana, CA. Submitted to the County of Los Angeles Department of Public Works.

Chambers Group, Inc. 2014a. Devil's Gate Reservoir Sediment Removal and Management Project Final Environmental Impact Report (FEIR), Los Angeles County, California. Submitted to Los Angeles County Flood Control District, Water Resources Division, October 2014.

Chambers Group, Inc. 2014b. Development of a Detailed Vegetation Map for the Devil's Gate Sediment Removal Project. Unpublished report submitted to Los Angeles County Department of Public Works Flood Control District, Water Resources Division.

Chambers Group, Inc. 2014c. Focused Survey Report for Least Bell's Vireo and Southwestern Willow Flycatcher at the Devil's Gate Reservoir, Los Angeles County, California. Submitted to Los Angeles County Department of Public Works, Water Resources Division, December 2014.

Chambers Group, Inc. 2015a. Focused Survey Report for Western Yellow-Billed Cuckoo at the Devil's Gate Reservoir, Los Angeles County, California. Submitted to United States Fish and Wildlife Service, November 2015.

Chambers Group, Inc. 2015b. Development of a Detailed Vegetation Map for the Devil's Gate Sediment Removal Project. Submitted to Tom Budinger, Los Angeles County Flood Control District, Water Resources Division.

Chambers Group, Inc. 2016. Focused Survey Report for Western Yellow-Billed Cuckoo at the Devil's Gate Reservoir, Los Angeles County, California. Submitted to County of Los Angeles Department of Public Works, Water Resources Division, October 2016.

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- City of Pasadena. 1919/1965. City of Pasadena Easement Agreement with Los Angeles County Flood Control District for Devil's Gate Reservoir Sediment Removal and Management Project. <http://www.ci.pasadena.ca.us/PublicWorks/Devils-Gate-Reservoir-Sediment-Removal/>
- City of Pasadena. 2003a. Arroyo Seco Master Plans, Design Guidelines. Appendix B, 3.32.100 Natural Preservation Area Established. Ordinance 6403, 2 (part), 1990. [http://www.ci.pasadena.ca.us/PublicWorks/AS\\_Design\\_Guidelines/](http://www.ci.pasadena.ca.us/PublicWorks/AS_Design_Guidelines/)
- City of Pasadena. 2003b. Arroyo Seco Master Plans, Hahamongna Watershed Park Master Plan. Section 3.0. Adopted September 29, 2003. <http://www.ci.pasadena.ca.us/PublicWorks/HWPMP/>
- City of Pasadena. 2010. Arroyo Seco Master Plans, Hahamongna Watershed Park Master Plan Addendum for the Hahamongna Annex. Adopted February 1, 2010. [http://ww2.cityofpasadena.net/councilagendas/2010%20agendas/Feb\\_01\\_10/AR%206%20EXHIBIT%20B%20HWP%20Annex%20Plan%2011-20-09.pdf](http://ww2.cityofpasadena.net/councilagendas/2010%20agendas/Feb_01_10/AR%206%20EXHIBIT%20B%20HWP%20Annex%20Plan%2011-20-09.pdf)
- City of Pasadena. 2012. Open Space and Conservation Element of the General Plan. Adopted January 23, 2012. [http://www.cityofpasadena.net/Planning/CommunityPlanning/Open\\_Space/](http://www.cityofpasadena.net/Planning/CommunityPlanning/Open_Space/)
- [ECORP] ECORP Consulting, Inc. 2016a. Jurisdictional Delineation Update for the Devil's Gate Reservoir Sediment Removal and Management Project, Los Angeles County, California. Submitted to County of Los Angeles Department of Public Works, Water Resources Division, August 2016.
- [ECORP] ECORP Consulting, Inc. 2016b. Least Bell's Vireo Survey Report 2016 for the Devil's Gate Reservoir Sediment Removal and Management Project, Los Angeles County, California. Submitted to County of Los Angeles Department of Public Works, Water Resources Division, October 2016.
- [ECORP] ECORP Consulting, Inc. 2016c. Coastal California Gnatcatcher Survey Report 2016 for the Devil's Gate Reservoir Sediment Removal and Management Project, Los Angeles County, California. Submitted to County of Los Angeles Department of Public Works, Water Resources Division, October 2016.
- [ECORP] ECORP Consulting, Inc. 2016d. Vegetation Map Update for the Devil's Gate Reservoir Sediment Removal and Management Project, Los Angeles County, California. Submitted to County of Los Angeles Department of Public Works, Water Resources Division, October 2016.
- Fryer, Janet L. 2014. *Alnus rhombifolia*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Missoula Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/plants/tree/alnrho/all.html> [2015, October 23].

- Hellmers, H., J. S. Horton, G. Juhren, and J. O'Keefe. 1955. Root systems of some chaparral plants in southern California. *Ecology* 36:667-678.
- [Leatherman] Leatherman BioConsulting. 2016. Results of Focused Surveys for the Southwestern Willow Flycatcher, Western Yellow-billed Cuckoo and Least Bell's Vireo for the Devil's Gate Reservoir Sediment Removal and Management Project. Prepared for ECORP Consulting, Inc. August 24, 2016.
- Reed, William R. 1993. *Salix gooddingii* In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at: <http://www.fs.fed.us/database/feis/> [2015, October 21].
- Robinson, T. W. 1958. Pheratophytes. Geological Survey Water Report Paper. United States Department of the Interior. 30-49.
- Snyder, Keirith A. and Williams, David G. 2000. Water sources used by riparian trees varies among stream types on the San Pedro River, Arizona. *Agricultural and Forest Meteorology*. 105. 227-240.
- State Water Resources Control Board. 2002. Section 303(d) Impaired Water Bodies List. Sacramento: State of California.
- Steinberg, Peter D. 2002. *Baccharis pilularis* In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at: <http://www.fs.fed.us/database/feis/> [2015, October 28].
- Taylor, Jennifer L. 2000. *Populus fremontii*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at: <http://www.fs.fed.us/database/feis/> [2015, October 28].
- [USFWS] United States Fish and Wildlife Service. 1918. Migratory Bird Treaty Act. Section 16 of the U. S. Code (703-712), as amended 1989.
- [USFWS] United States Fish and Wildlife Service. 1998. National List of Vascular Plant Species that Occur in Wetlands. Available at: <https://www.fws.gov/pacific/ecoservices/habcon/pdf/1998%20National%20list.pdf>