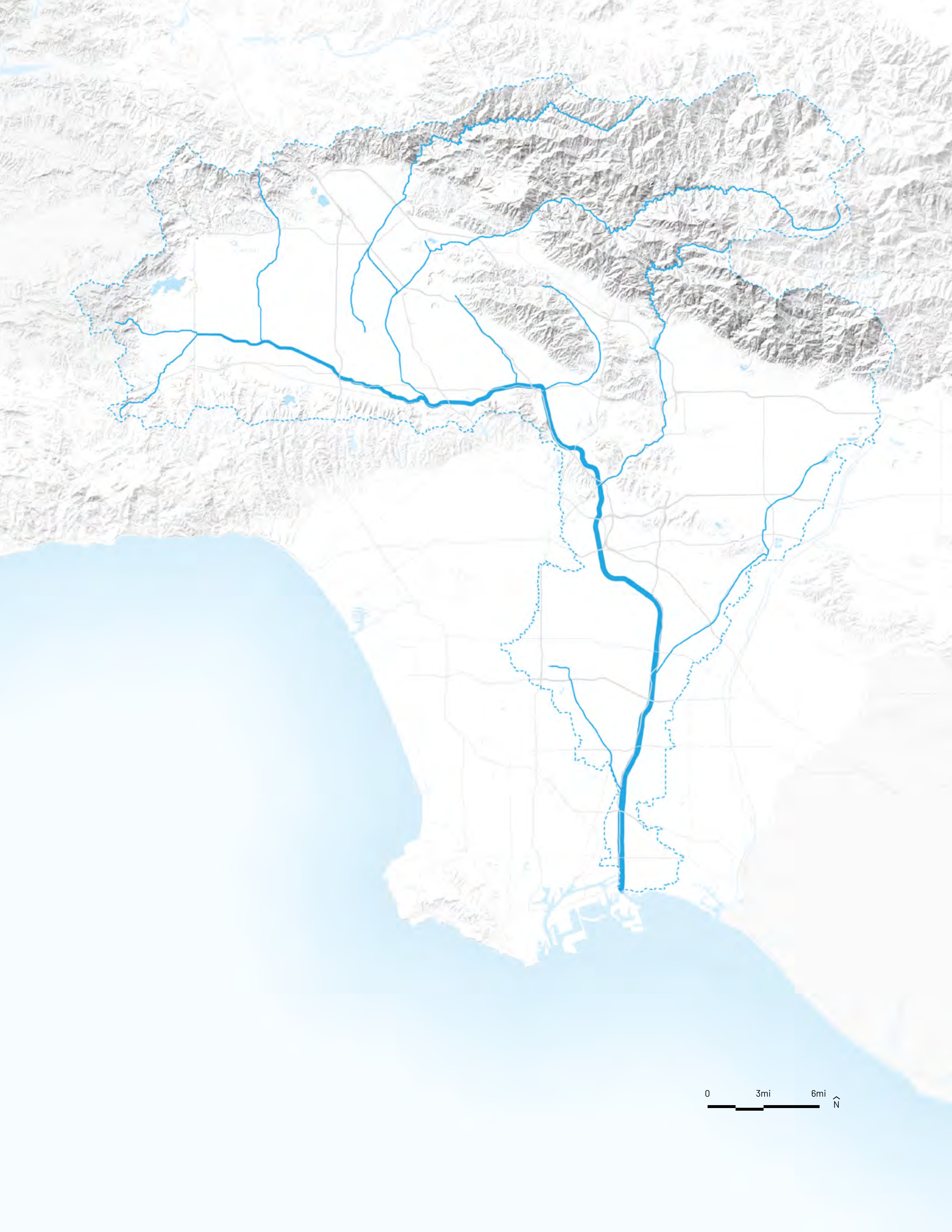
LA RIVER MASTER PLAN

APPENDIX VOLUME II

TECHNICAL BACKUP DOCUMENT

JUNE 2022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PREPARED FOR:
LOS ANGELES COUNTY AND LOS ANGELES COUNTY PUBLIC WORKS

THIS BOOK IS APPENDIX VOLUME II FOR THE LA RIVER MASTER PLAN

PREPARED BY:

Geosyntec OLIN Gehry Partners, LLP

Figure 1. Three black-necked stilts in the LA River channel adjacent to the Dominguez Gap Wetlands at river mile 5.
Source: LA County Public Works, 2018.

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THIS DOCUMENT IS COMPRISED OF TECHNICAL MATERIALS THAT SUPPORT THE LA RIVER MASTER PLAN.

RELATED DOCUMENTS:

LA River Master Plan

Appendix Volume I: Design Guidelines

Figure 2. LA County Public Works leads a tour of the LA River at river mile 27. Source: Geosyntec, 2019.

SECTION I: **INTRODUCTION**

Figure 3. Parks adjacent to the LA River are used for organized and informal recreation, as seen here in DeForest Park at river mile 7.2.
Source: OLIN, 2019.

1.
ABOUT THE DOCUMENT

THIS TECHNICAL BACKUP DOCUMENT PROVIDES ADDITIONAL REFERENCES FOR THE DATA-BASED, GOAL-DRIVEN LA RIVER MASTER PLAN

The LA River Master Plan is data-based. The inventory, analysis, and research completed as part of the development process is unprecedented in its depth. Over 140 existing related planning documents were reviewed, over 200 datasets were analyzed, and over 40 new datasets were created. Entire analysis efforts around housing, flooding, homelessness, water supply, ecology, water quality, access, arts and culture, community demographics, and education were undertaken as part of this plan. While the high-level summaries of these topics are included in the main volume of the plan, additional information in this volume can inform decision making for community leaders, technical professionals, and organizations engaged in plan implementation.

HOW TO USE THIS DOCUMENT

ORGANIZATION OF THE TECHNICAL APPENDIX DOCUMENT

This supplemental volume to the LA River Master Plan brings together additional technical resources that are not included in the main volume to provide more context, knowledge, and decision making tools for those who will work to implement the plan. Each of these sections builds on information in the main volume of the Master Plan, so it is recommended that readers first reference the main document and then use these resources for further reading.

Section I INTRODUCTION establishes the concept of river miles and the river ruler system.

Section II ADDITIONAL ANALYSIS contains three subsections: River Ruler Atlas, Hydrology and Hydraulics, and Needs Weighting and Mapping. The River Ruler Atlas is a comprehensive collection of data sets that have been transformed into ruler format, allowing for a quick reading and comparison of existing conditions along the river's length. The atlas incorporates several categories of data: Flood Risk; Water Quality; Water Supply; Ecosystems; Open Space, Recreation, and Trails; Community, Art, and Culture; Access; Demographics; Sustainability and Resiliency; and Operations and Maintenance. Hydrology and Hydraulics assess the suitability and applicability of possible strategies along the LA River and within the LA River watershed. Needs Weighting and Mapping provides an in-depth view into the criteria and datasets behind the nine needs maps, one for each of the nine Master Plan goals in the LA River Master Plan, Chapter 6.

Section III SITES contains additional data and information regarding the suite of projects and sites that together have the potential to transform the LA River, its right-of-way, and adjacent land from an infrastructural necessity to a vibrant, multi-benefit corridor.

Section IV DESIGN contains additional information and graphics relating to proposed multiuse corridors as well as information supporting the Master Plan goals to expand biodiversity across the LA River.

Section V REFERENCES contains information regarding the information that aided in the creation of the Master Plan, including data sources and referenced planning.

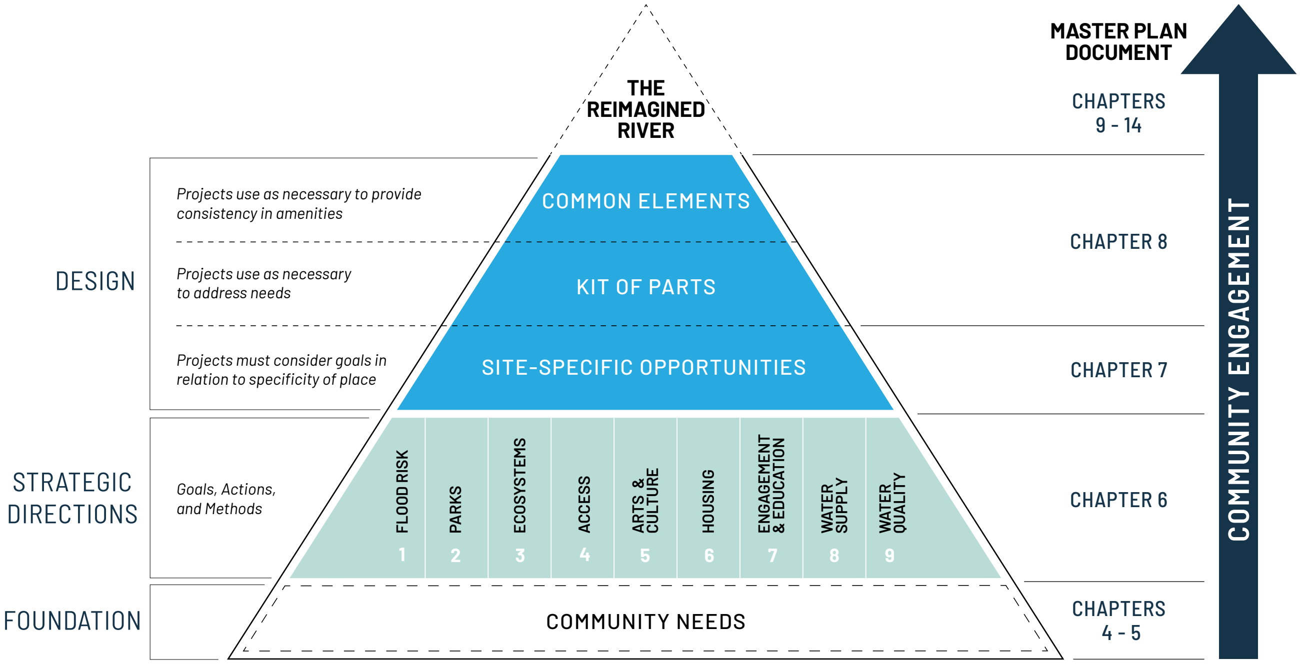


Figure 4. The LA River Master Plan is a goal-driven framework built around a robust data-based methodology to assess community needs. All strategic directions and design opportunities are informed by community needs and site opportunities to support the vision for the reimagined river.

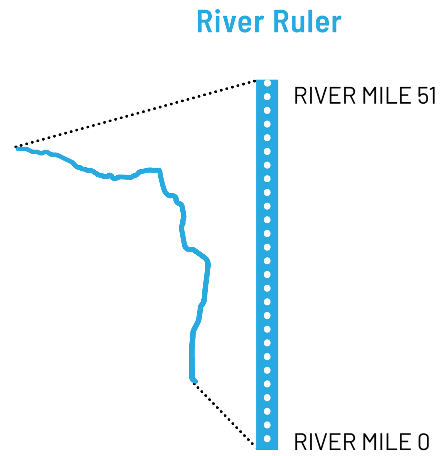
RIVER MILE SYSTEM

LA RIVER MILES

The LA River is 51 miles long, flowing from mile 51 in Canoga Park within the City of Los Angeles to mile 0 at Long Beach where the river meets the Pacific Ocean. The river mile system was developed in 2016 to reduce confusion between different jurisdictional reach designations.

Figure 5. The river mile system illustrated here allows all jurisdictions and members of the public to understand the relationship of locations along the 51 miles of the LA River. Reach designations and numbering systems of other agencies can be seen in Appendix Volume I: Design Guidelines, Chapter 2.

REPRESENTING THE RIVER AS A STRAIGHT LINE ALLOWS THE EYE TO QUICKLY PERCEIVE HOW CONDITIONS ALONG THE RIVER CHANGE FROM ONE RIVER MILE TO THE NEXT



The river ruler is a vertical straight-line representation of the 51 miles of the LA River.

RIVER RULER SYSTEM

The LA River is a complex system with many layers of information and data. To better understand conditions along the river, the LA River Master Plan used over 200 "river rulers" to organize and collect existing data and new data that was created as part of the Master Plan process.

The river ruler is a vertical straight-line diagram that represents and takes measure of the entire 51 miles of the LA River. Representing the river as a straight line allows the eye to quickly perceive how conditions along the river change from one river mile to the next.

The vertical axis (height) of the river ruler represents the 51 miles of the LA River, with river mile 51 at Canoga Park in the West San Fernando Valley at the top of the ruler and river mile 0 at Long Beach where the LA River meets the Pacific Ocean at the bottom of the ruler.

The horizontal axis (width) of the river ruler varies depending on the data being shown. Unless otherwise noted, most river rulers show conditions found directly at the river channel. Where a centerline is shown, conditions found immediately along the left and right banks are shown. Many river rulers show conditions within the larger river corridor up to one mile away from either side of the channel.

Lastly, some river rulers have variable widths to show the magnitude of a particular condition and have reference lines and the unit labeled. Examples of a variety of ruler types can be seen at right in Figure 6.

The benefit of the river rulers is that multiple rulers can be aligned on a single page so that multiple categories of data can be assessed easily side by side. Comparing across multiple categories at multiple locations along the river in a single drawing is essential for understanding the river as a complex urban and ecological system and for recognizing where planning and design proposals can achieve multiple benefits at a particular location.

Throughout the LA River Master Plan, river rulers are typically used in tandem with maps that show the same data in the context of the broader LA River watershed. In the inventory and analysis sections, the rulers are commonly used at the conclusion of the chapter so that various datasets can be compared.

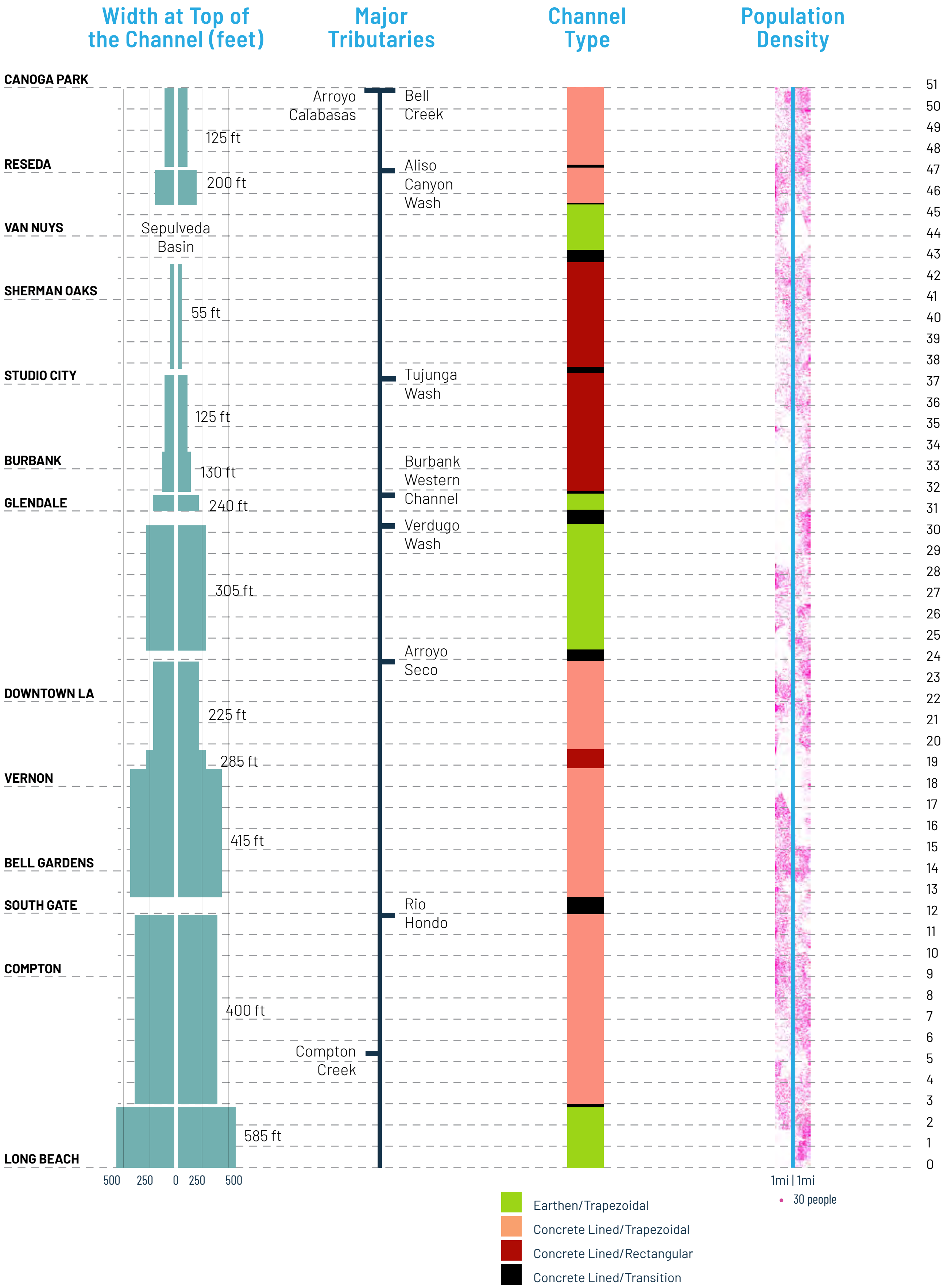


Figure 6. River rulers provide the ability to compare different types of data easily and efficiently.

Figure 7. **The LA River is home to many different types of flora and fauna including herons in the Glendale Narrows at river mile 31 .**
Source: LA County Public Works, 2018.

SECTION II:
ADDITIONAL ANALYSES

Figure 8. Vegetation grows in sediment islands in the LA River at river mile 26.3 near the site of the present day G1 Bowtie Planned Major Project.
Source: Geosyntec, 2012.

2.
RIVER RULER ATLAS

OVER 200 DATA SOURCES CREATE COMPREHENSIVE 51-MILE RIVER RULERS FOR THE LA RIVER MASTER PLAN

The LA River Master Plan is based on a rich collection of data describing the physical, social, and cultural attributes of the LA River system.

The plan relies on over 200 datasets to determine needs and opportunities along the LA River. Many of these datasets are based on existing sources; however, several data points were created or digitized as part of the Master Plan.

This atlas includes the 10 main analysis areas in the Master Plan, as well as the rulers created from the Master Plan needs and sites:

1. Existing Flood Risk Reduction
2. Existing Water Quality
3. Existing Water Supply
4. Existing Ecosystems and Habitat Conditions
5. Open Space, Recreation, and Trails
6. Existing Community Art, and Culture
7. Existing Access
8. Existing Demographics
9. Existing Sustainability and Resilience
10. Existing Operations and Maintenance
11. LA River Master Plan Rulers

Each analysis category has detailed maps, rulers, and descriptions within the main volume of the Master Plan. The Ruler Atlas includes a comprehensive collection of rulers used in the project for reference.

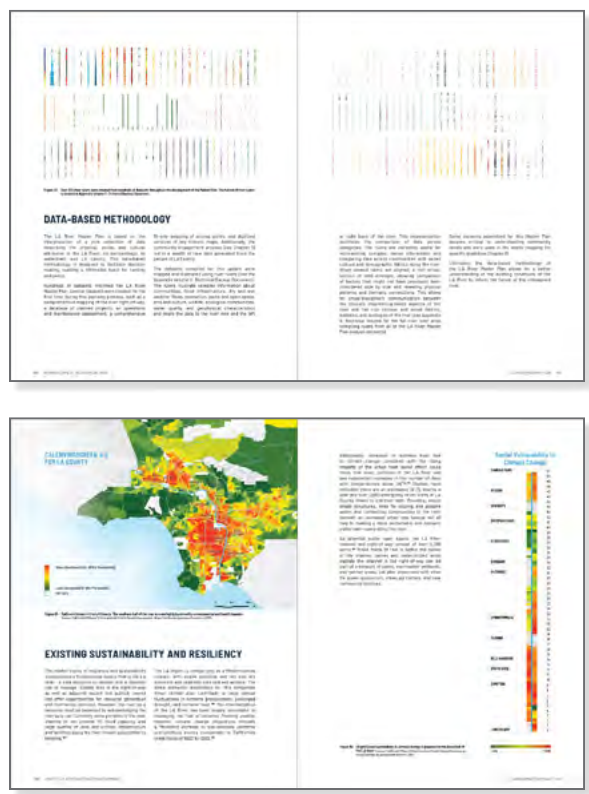


Figure 9. The data-based methodology used as a basis for analyzing and reimagining the LA River is described in the LA RIver Master Plan, Chapter 2. To see select rulers in the existing conditions summary, see LA River Master Plan, Chapter 4.

EXISTING CONDITIONS

EXISTING FLOOD RISK REDUCTION

Chapter 4 of the LA River Master Plan includes a summary of existing flood risk reduction. Provided here are additional datasets used to develop the plan.

The 51-mile LA River and its nine major tributaries drain an 834-square-mile watershed that consists of steep mountains, foothills, and low-lying alluvial plains. About one-third of the watershed is mountainous and undeveloped land, but much of the watershed is highly developed, with intense urbanization almost exclusively contained on the alluvial plains. During a typical storm, the most intense precipitation falls in the mountains, where it runs off the steep slopes and collects rapidly in the tributaries, before entering the main channel.

Channel Physical Characteristics

The LA River channel's physical characteristics vary from Canoga Park to Long Beach. Thirteen Hydraulic Design Reaches, A through M, that have broadly similar physical and hydraulic characteristics were developed. These reaches are often delineated by major tributaries, where the additional inflow changes the hydraulics and/or the channel becomes wider to increase the flow capacity. An exception is the channel width below Sepulveda Basin that decreases markedly due to the ability of the basin to store water and attenuate peak flood flows.

The channel structure (or shape) also varies between rectangular box channel with vertical walls and trapezoidal channel with sloped walls. The channel is primarily concrete, with the exceptions of Sepulveda Basin, the Glendale Narrows, and the estuary portion near Long Beach, which are soft bottom. In the Glendale Narrows, the soft bottom portion has become heavily vegetated, resulting in decreased flood conveyance capacity. Levees have been built within this region, but flood capacity is still deficient. Levees and parapet walls were also constructed in the lower river to improve the flood conveyance capacity.

The condition and hydraulic roughness of the concrete within the channel also varies as a result of different construction (i.e., smooth concrete versus grouted stone sides) and different age and maintenance regimes.

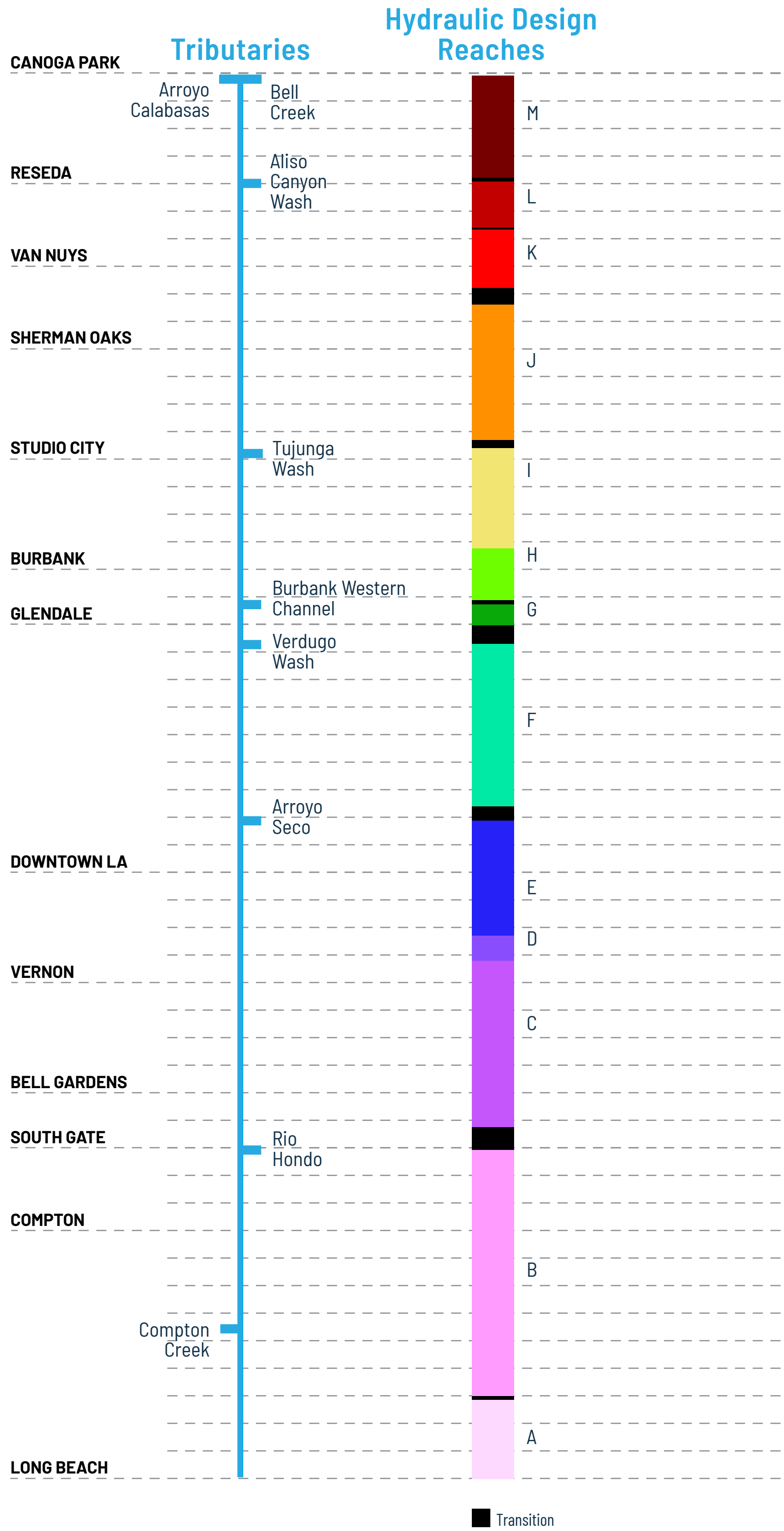
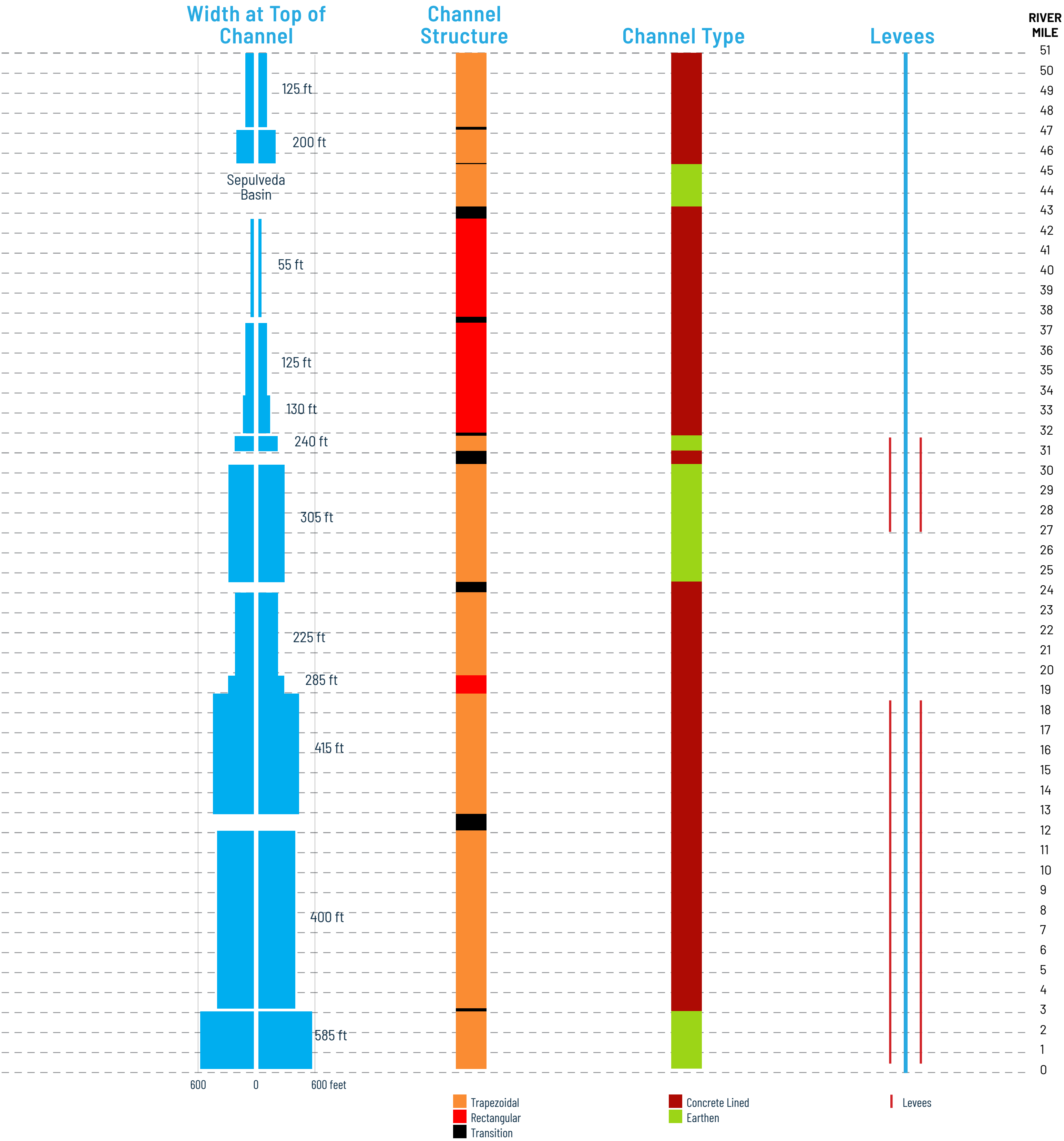


Figure 10. Flood risk is impacted by conditions within and beyond the LA River channel itself. Width, channel structure, channel type, the presence of levees, and surface roughness are some of these in-channel conditions. Source: See table of figures on page 286 for all source information related to ruler data.



Width at Top of Channel
Channel Structure
Channel Type
Levees
RIVER MILE
125 ft
200 ft
Sepulveda Basin
55 ft
125 ft
130 ft
240 ft
305 ft
225 ft
285 ft
415 ft
400 ft
585 ft
600
0
600 feet
51
50
49
48
47
46
45
44
43
42
41
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
Trapezoidal
Rectangular
Transition
Concrete Lined
Earthen
Levees

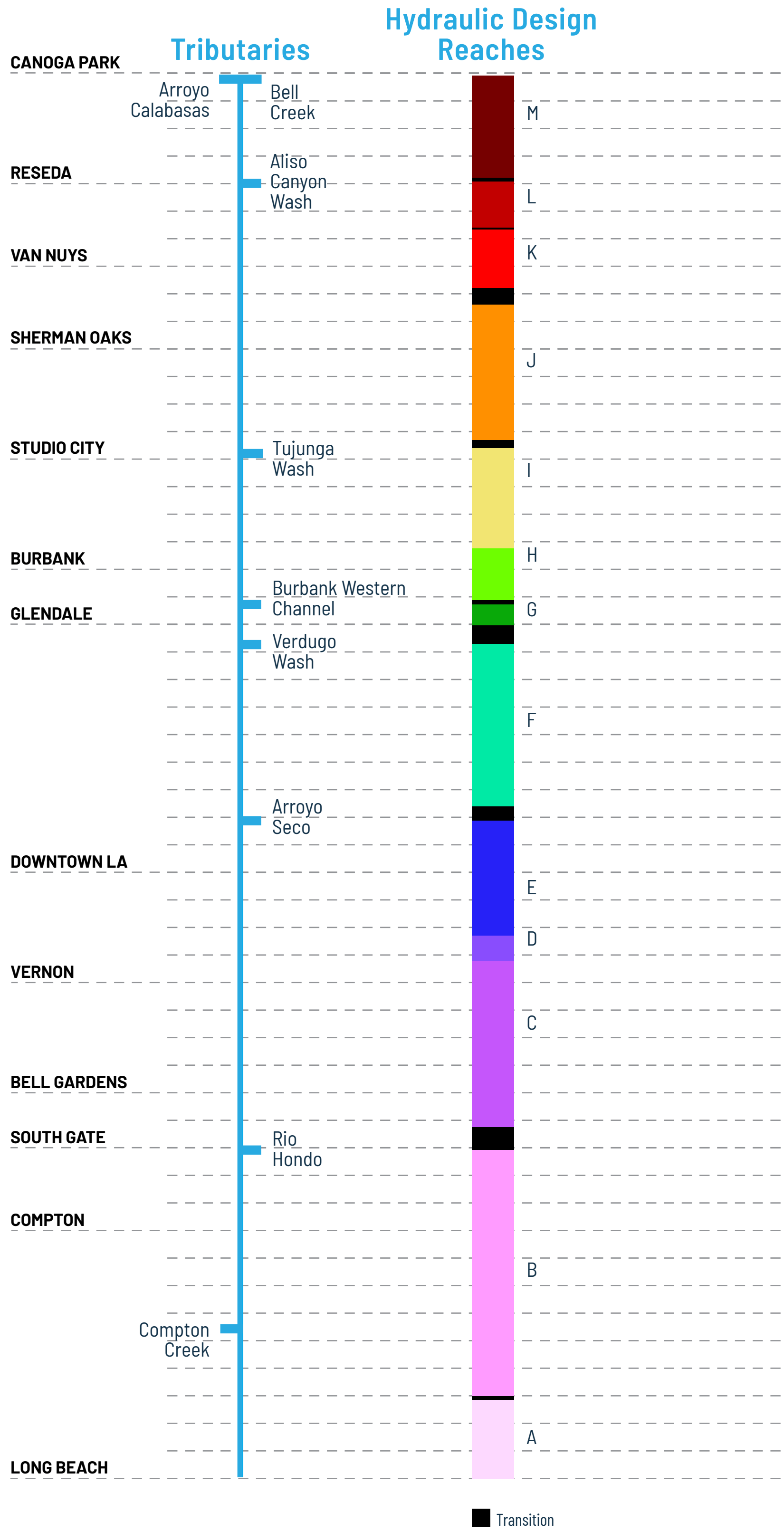
EXISTING FLOOD RISK REDUCTION

Channel Hydraulic Characteristics
The Hydraulic Design Reaches are useful for providing a broad classification of the channel and hydraulic characteristics but do not provide all the detail within each reach where localized effects are important. Analysis of modeling results using the USACE regulatory design discharge provides additional detail on the flow depth, velocity, and Froude number. The hydraulics are complex, with a mixture of subcritical regions (Froude number < 1 indicating slower, deeper flow) and supercritical regions (Froude number > 1 indicating faster, shallower flow).

The flow is predominantly subcritical in the soft bottom portions, including the Sepulveda Flood Control Basin and the Glendale Narrows, although there are short supercritical regions in the Glendale Narrows where the channel bottom locally consists of concrete and the flow is accelerated to reduce depths under bridges.

The concrete portions of the river are predominantly supercritical, although local constrictions such as bridges cause flow to locally back up, form hydraulic jumps, and become subcritical.

There are several regions along the river that are hydraulically unstable (0.86 < Froude number < 1.13), which may result in large and unstable surface waves. Effects of these waves are often mitigated by increasing channel and levee height to contain the waves and/or constructing channel side-slopes with rough cobble material to reduce wave run-up.



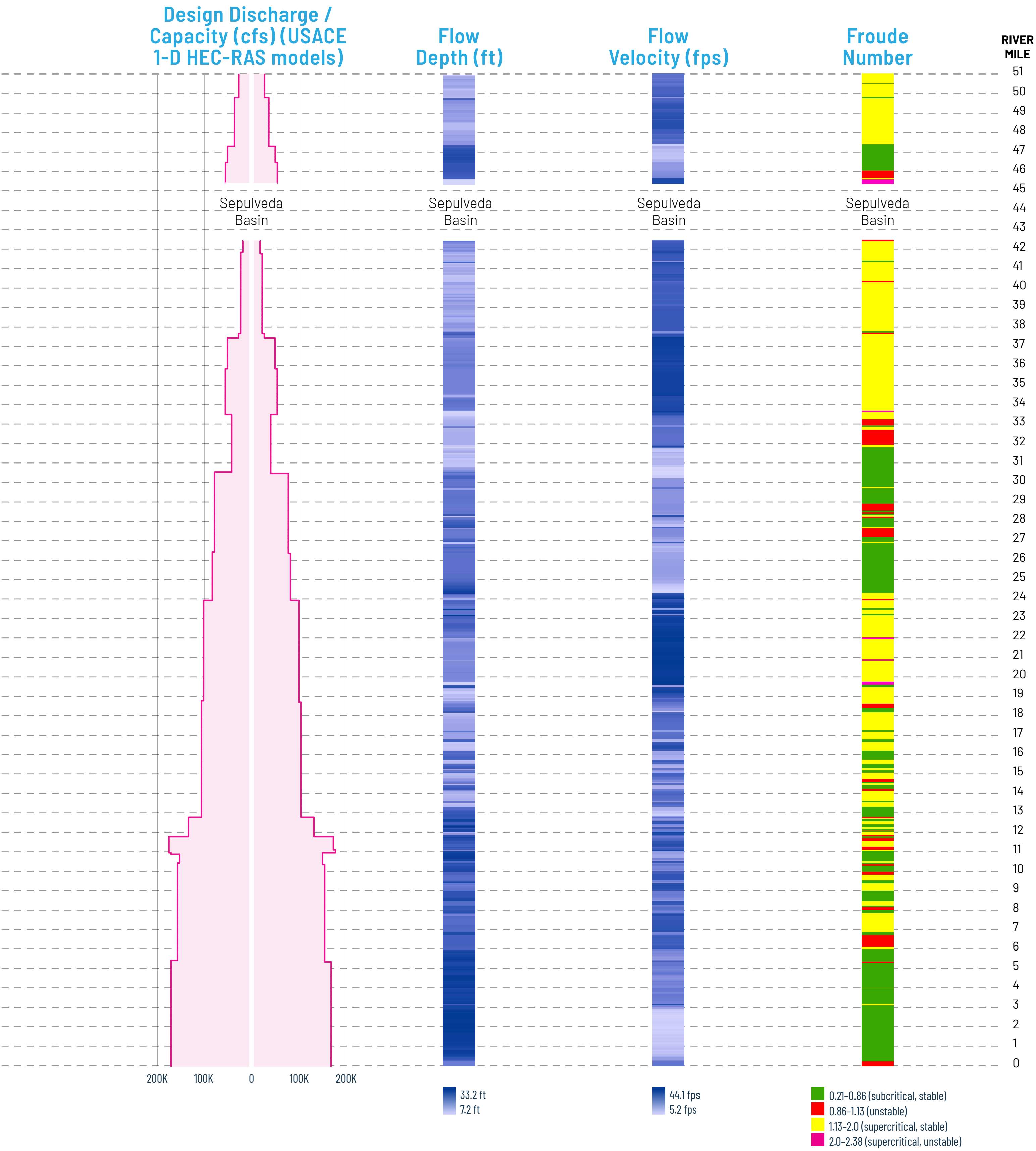


Figure 11. Design reaches, capacity, flow depth, flow velocity, and Froude number establish a basic hydraulic portrait of the LA River. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING FLOOD RISK REDUCTION

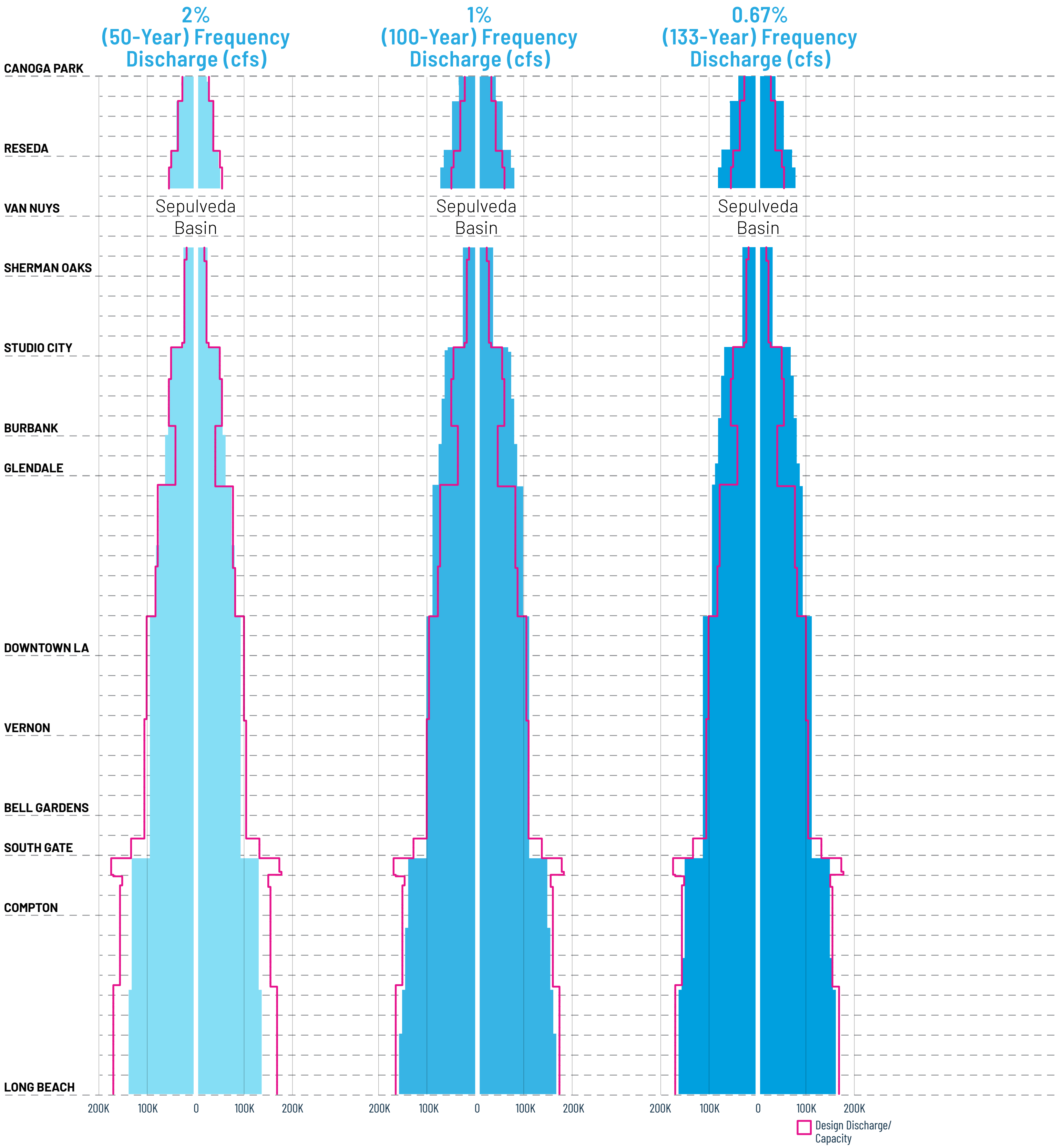
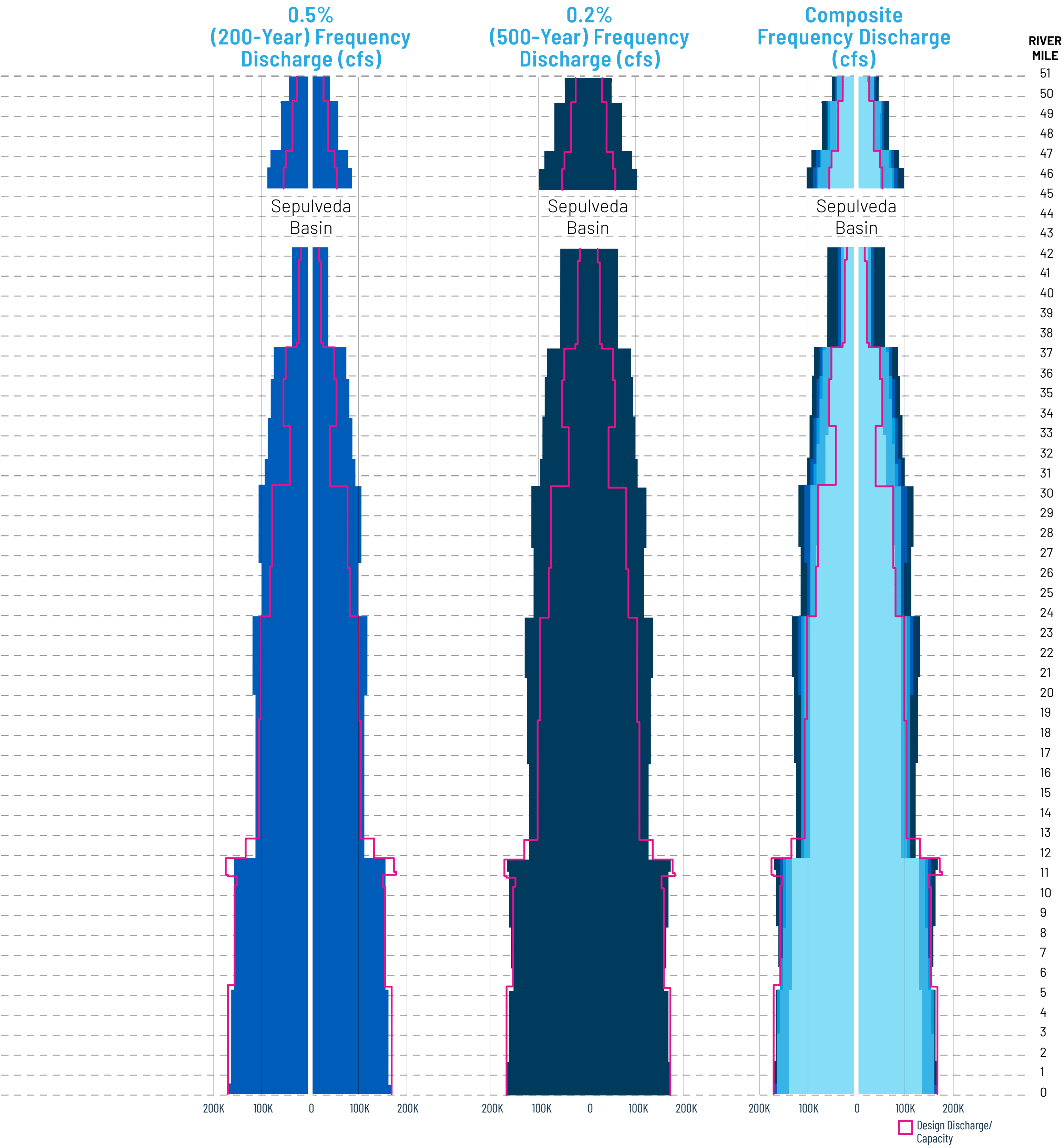


Figure 12. **The design discharge and capacity of the LA River generally increases in the downstream direction to account for the increasing flow from runoff from the contributing tributary watersheds. The design capacity of the channel varies in levels of flood risk reduction, and has worse than 2% (50-year) flood event capacity along the Glendale Narrows. Other portions of the river provide better than 1% (100-year) flood event capacity, including the lower 12 miles which were improved to 0.67% (133-year) flood event capacity as part of the LACDA project in the late 1990s to early 2000s.** Source: See table of figures on page 286 for all source information related to ruler data.


0.5%
(200-Year) Frequency
Discharge (cfs)
0.2%
(500-Year) Frequency
Discharge (cfs)
Composite
Frequency Discharge
(cfs)
RIVER MILE
51
50
49
48
47
46
45
44
43
42
41
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
Sepulveda Basin
Sepulveda Basin
Sepulveda Basin
200K
100K
0
100K
200K
Design Discharge/
Capacity

EXISTING FLOOD RISK REDUCTION

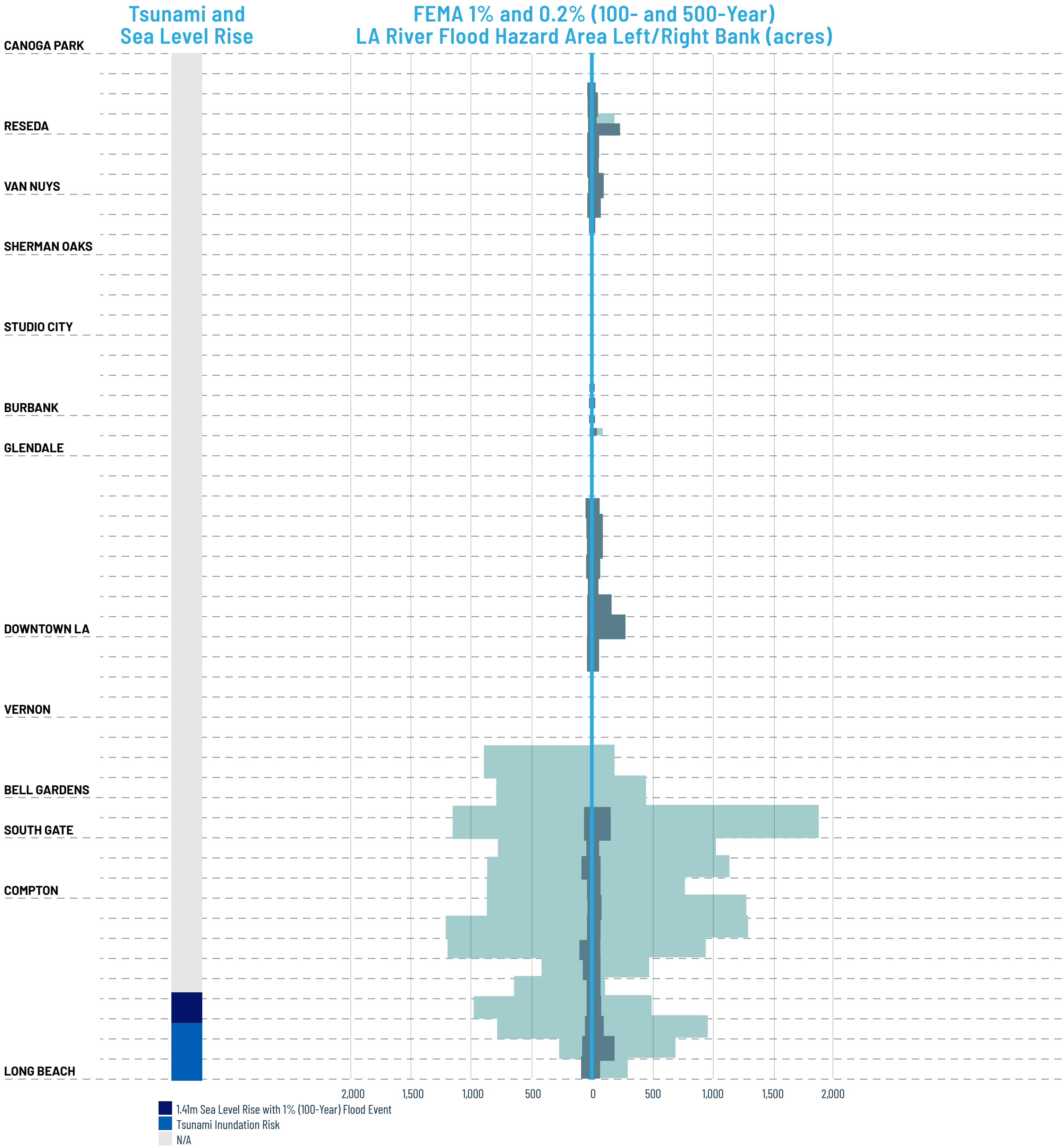
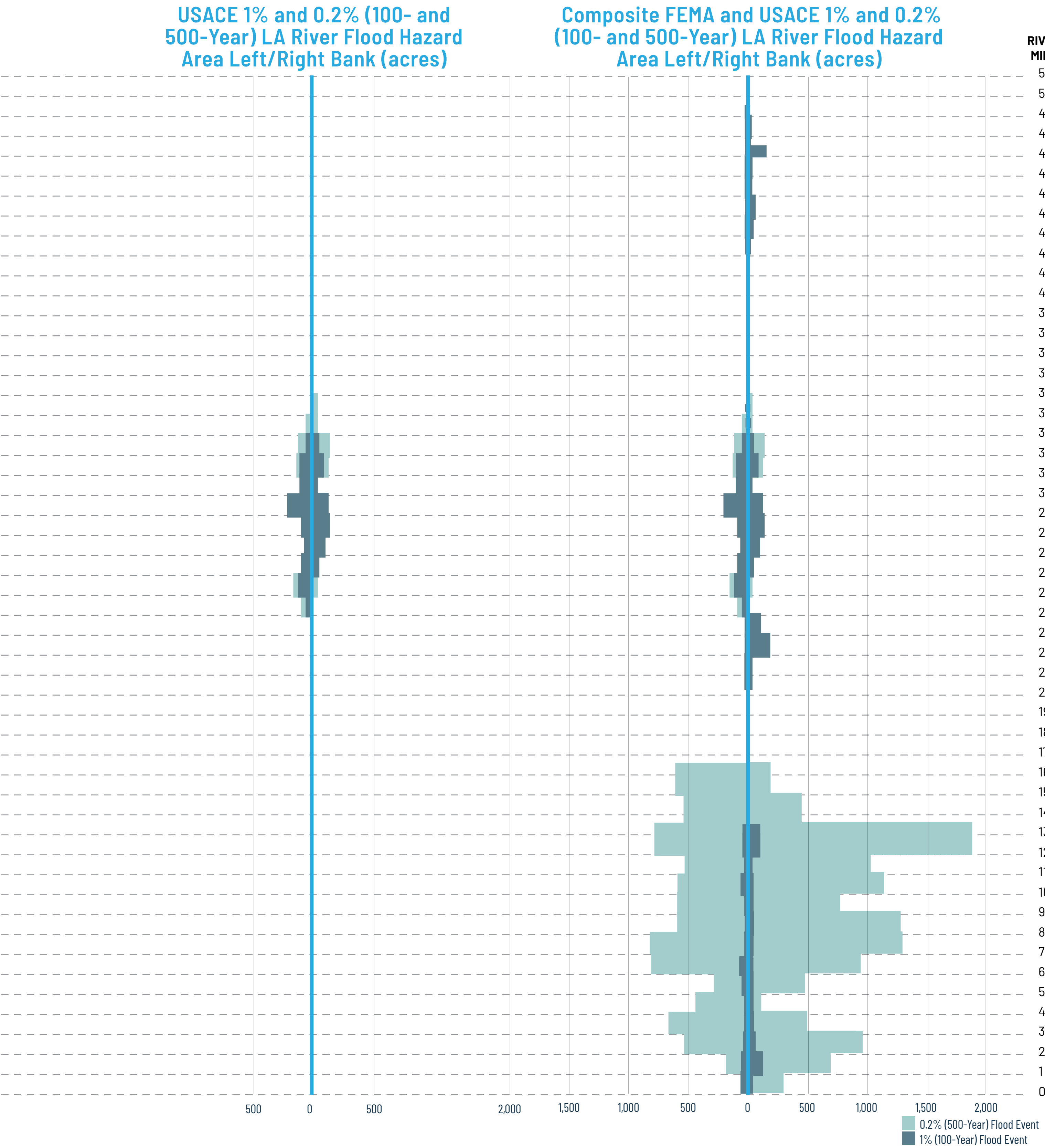


Figure 13. FEMA and the USACE have conducted studies to map floodplains around the LA River. Upstream of Sepulveda Basin there is a 1% (100-year) floodplain, that is largely confined close to the channel. Similarly, in the Glendale Narrows the 1% (100-year) floodplain and the 0.2% (500-year) floodplain are confined relatively close to the channel. By contrast, due to the flat topography, the 0.2% (500-year) floodplain in the lower river covers a much larger area. The lower two to three miles of the river is subject to risks from tsunamis and sea level rise. Source: See table of figures on page 286 for all source information related to ruler data.



USACE 1% and 0.2% (100- and 500-Year) LA River Flood Hazard Area Left/Right Bank (acres)
Composite FEMA and USACE 1% and 0.2% (100- and 500-Year) LA River Flood Hazard Area Left/Right Bank (acres)
RIVER MILE
51
50
49
48
47
46
45
44
43
42
41
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
500
0
500
2,000
1,500
1,000
500
0
500
1,000
1,500
2,000
0.2% (500-Year) Flood Event
1% (100-Year) Flood Event

EXISTING FLOOD RISK REDUCTION

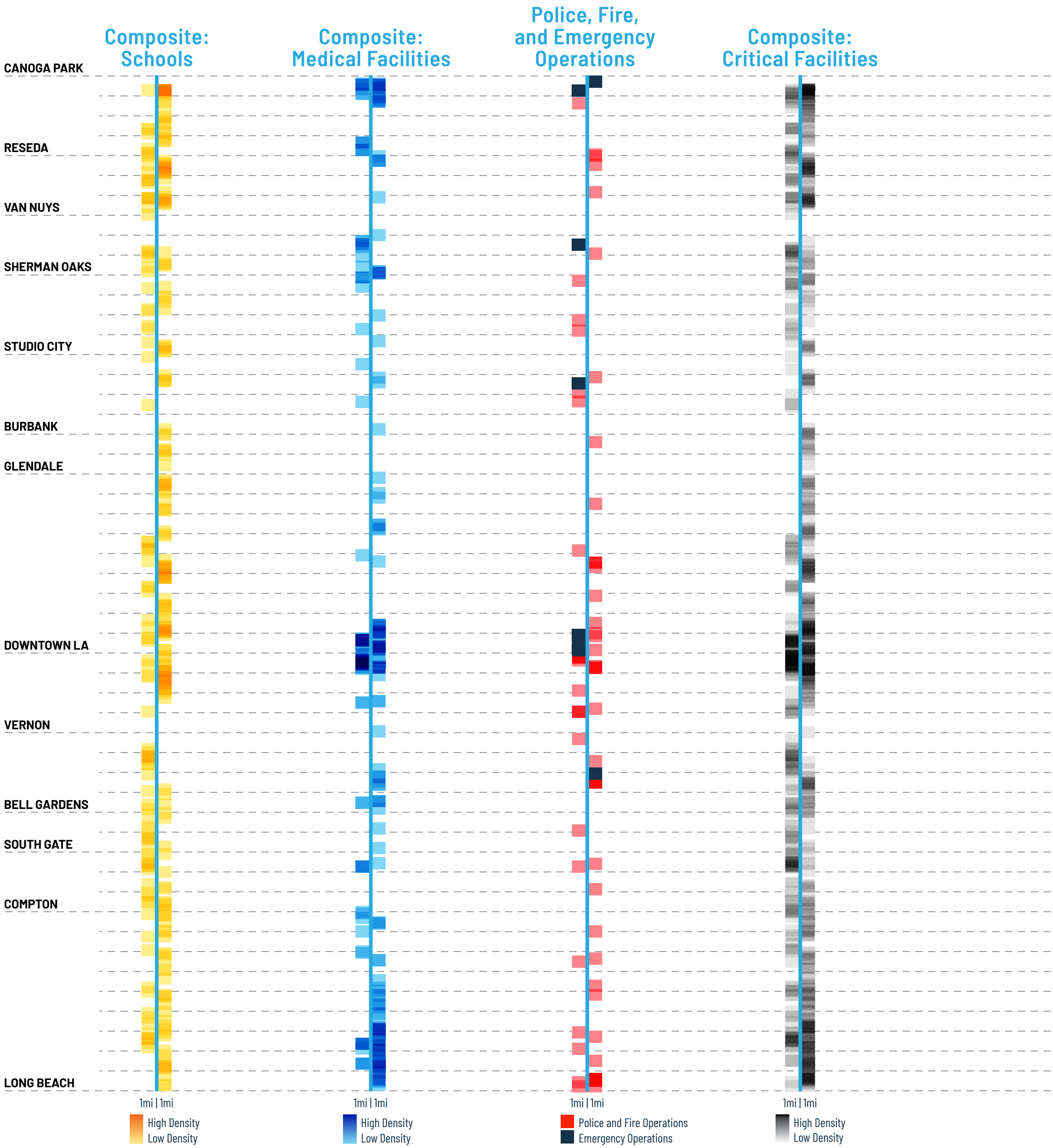


Figure 14. There are numerous critical facilities within one mile of the LA River. Source: See table of figures on page 286 for all source information related to ruler data.

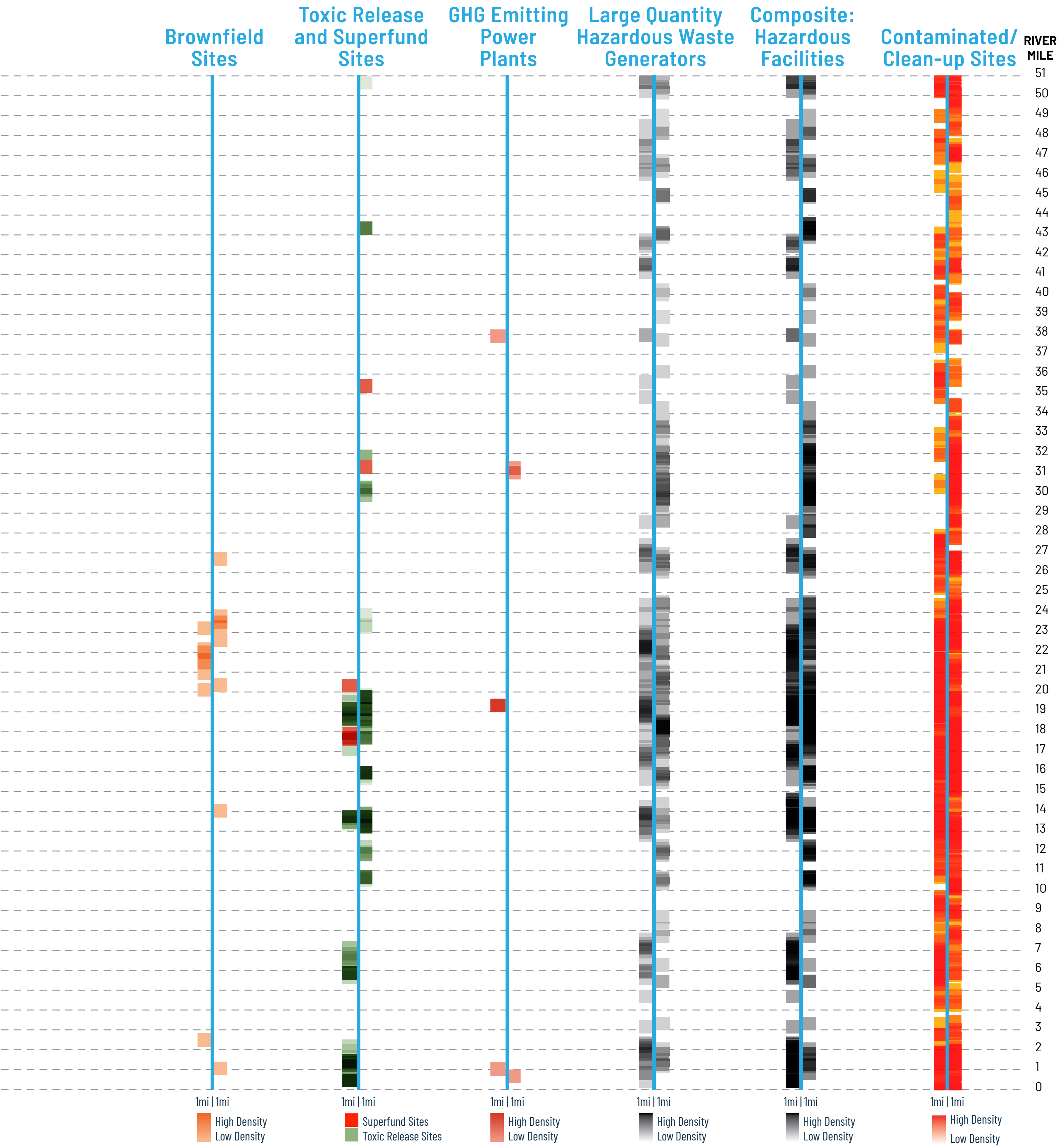
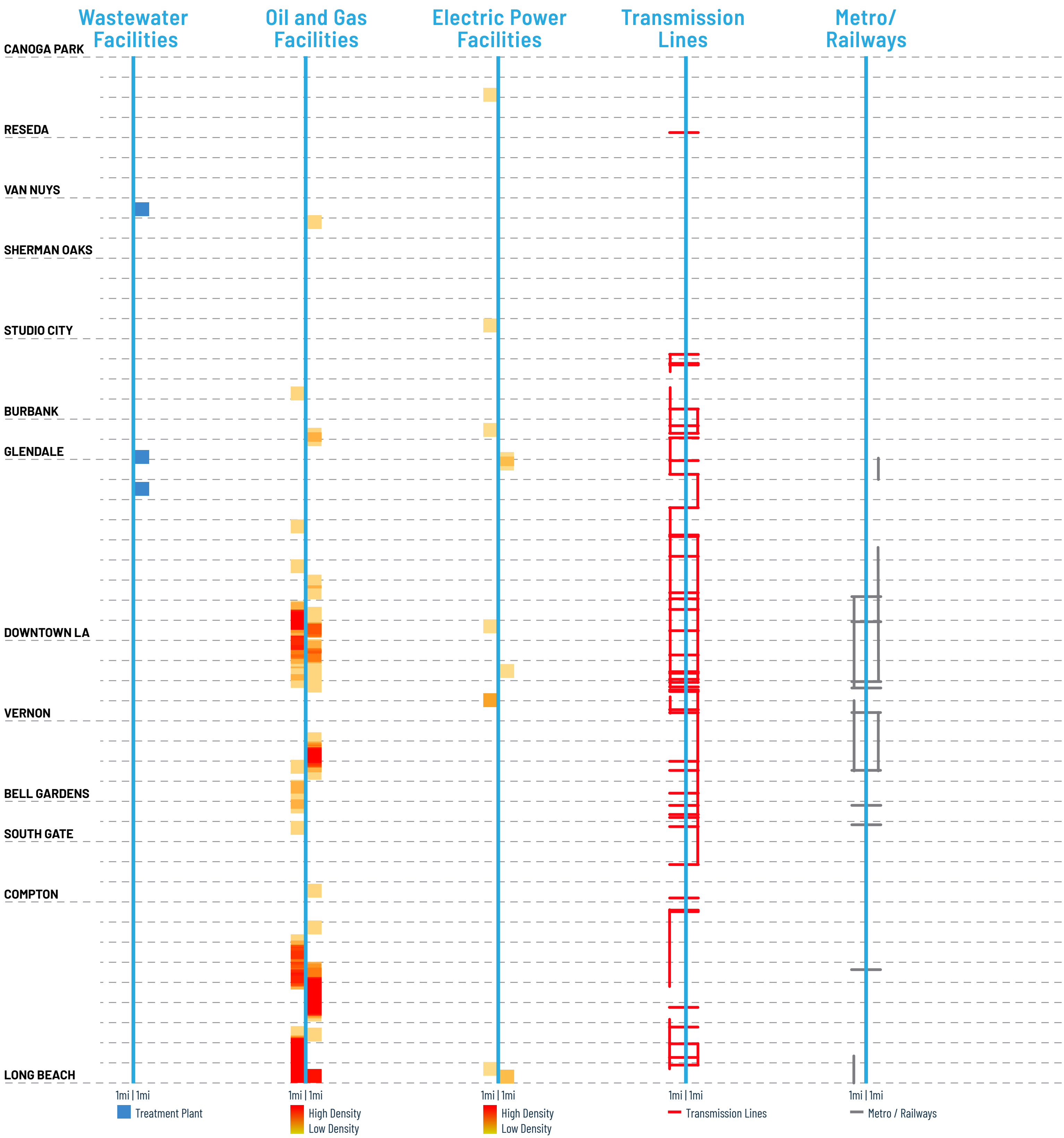


Figure 15. **There are numerous hazardous facilities within one mile of the LA River.** Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING FLOOD RISK REDUCTION



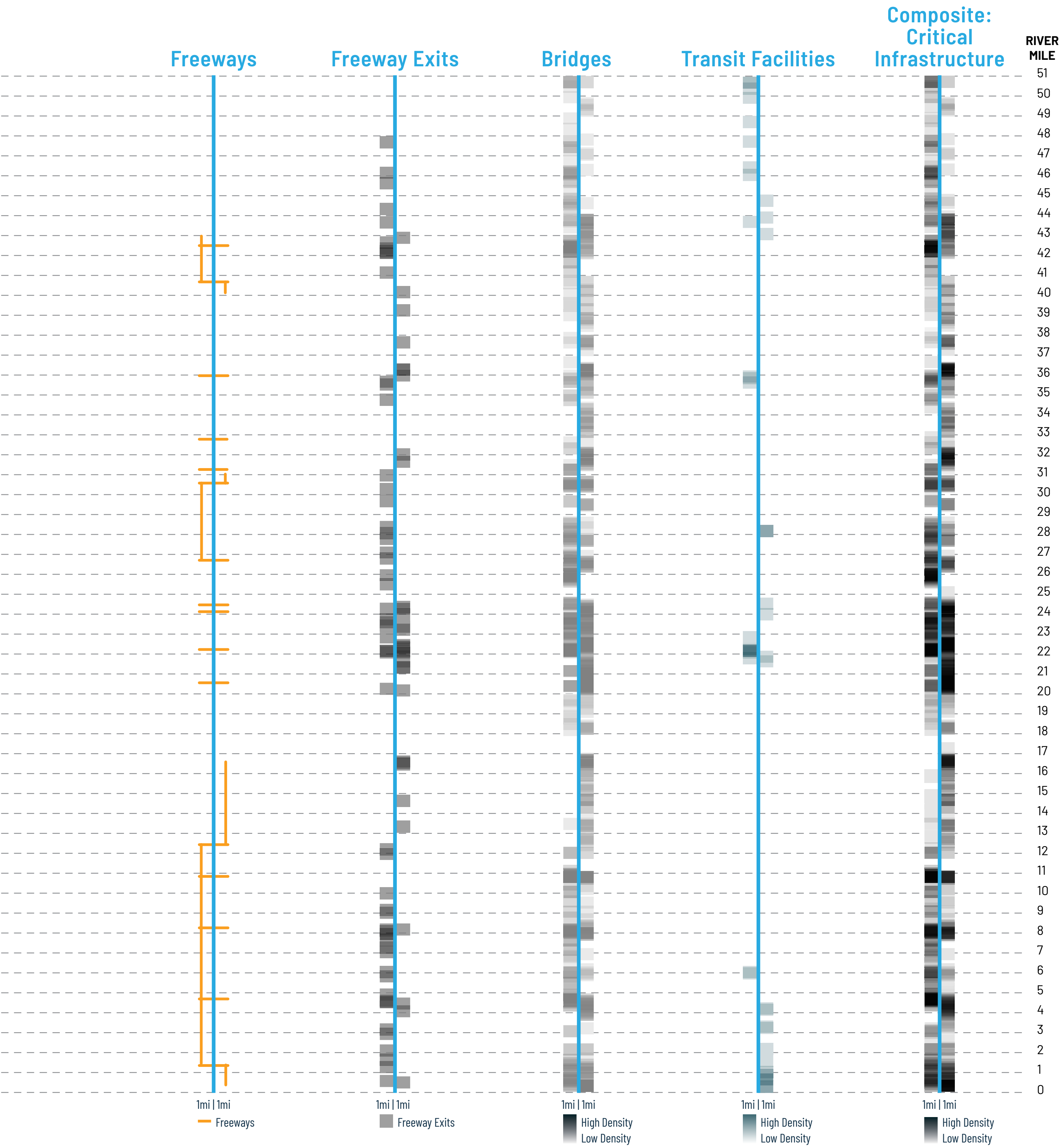


Figure 16. There are numerous critical infrastructure within one mile of the LA River. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING WATER QUALITY

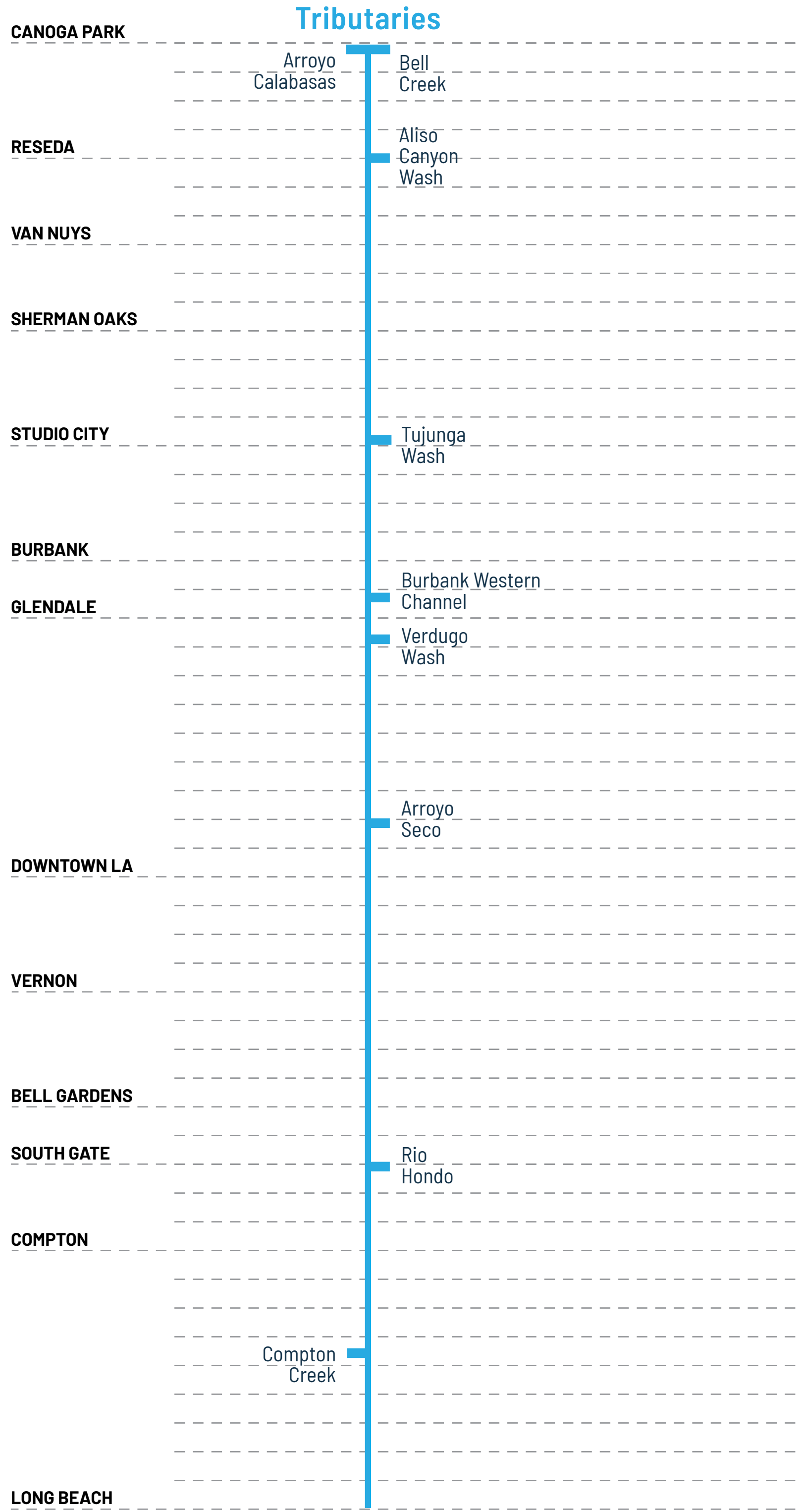
Chapter 4 of the LA River Master Plan includes a summary of existing water quality. Provided here are additional datasets used to develop the plan.

The LA River is an impaired water body with multiple total maximum daily load requirements (TMDLs) established to regulate pollutants. While over 800 water quality improvement projects are planned or have been completed within the LA River watershed, additional efforts are needed to meet applicable water quality targets established in Enhanced Watershed Management Program/ Watershed Management Program (EWMP/WMP), which are the guidance documents for regulatory compliance. While most EWMP/WMP documents that directly impact the river's mainstem have sufficient projects in place to meet water quality requirements, there is much uncertainty in the funding and implementation of these plans to keep pace with the approved planned milestones.

Water Quality TMDL

Many water bodies in the watershed, including the LA River itself, are classified as impaired waters by the Clean Water Act; requiring "treatment" to support their designated beneficial uses established in the Basin Plan. Approximately 62% of the LA River Watershed is developed with mixed land uses. Pollutants typically generated from the land use activities can be mobilized by dry and wet weather runoff and transported into the river, leading to degraded water quality and creating negative impacts on the aquatic ecosystem as well as human use of the waterway.

In an effort to restore impaired water bodies, Section 303(d) of the Clean Water Act established Total Daily Maximum Loads (TMDLs), a regulatory item that sets the maximum pollutant amounts allowed to be discharged into an impaired water body. The river is subject to five TMDLs that collectively regulate discharges of 13 pollutants. TMDL targets are established based on pollutant source assessments, as well as human health and ecosystem toxicity analyses. As a result, TMDL targets vary spatially and temporally throughout the River. During the development of the LA County-led Integrated Regional Water Management Plan (IRWMP) in 2014, water quality modeling was conducted to prioritize areas with significant water quality concerns in the watershed.



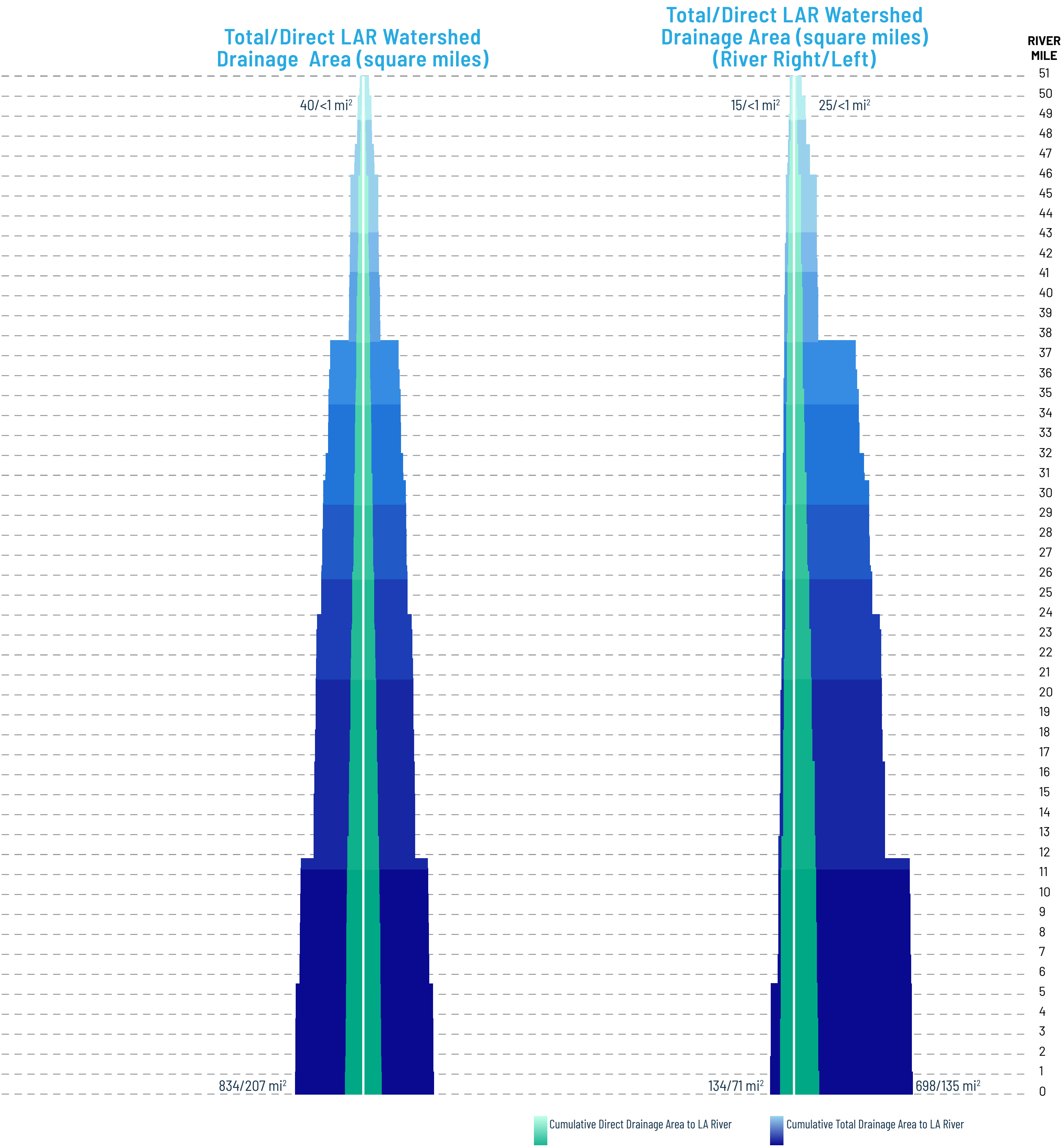


Figure 17. The area that drains directly into the LA River ranges from less than one square mile at the head of the river to 207 square miles at the mouth of the river. Total drainage into the LA River ranges from 40 square miles at the head of the river to 834 square miles at the mouth of the river. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING WATER QUALITY

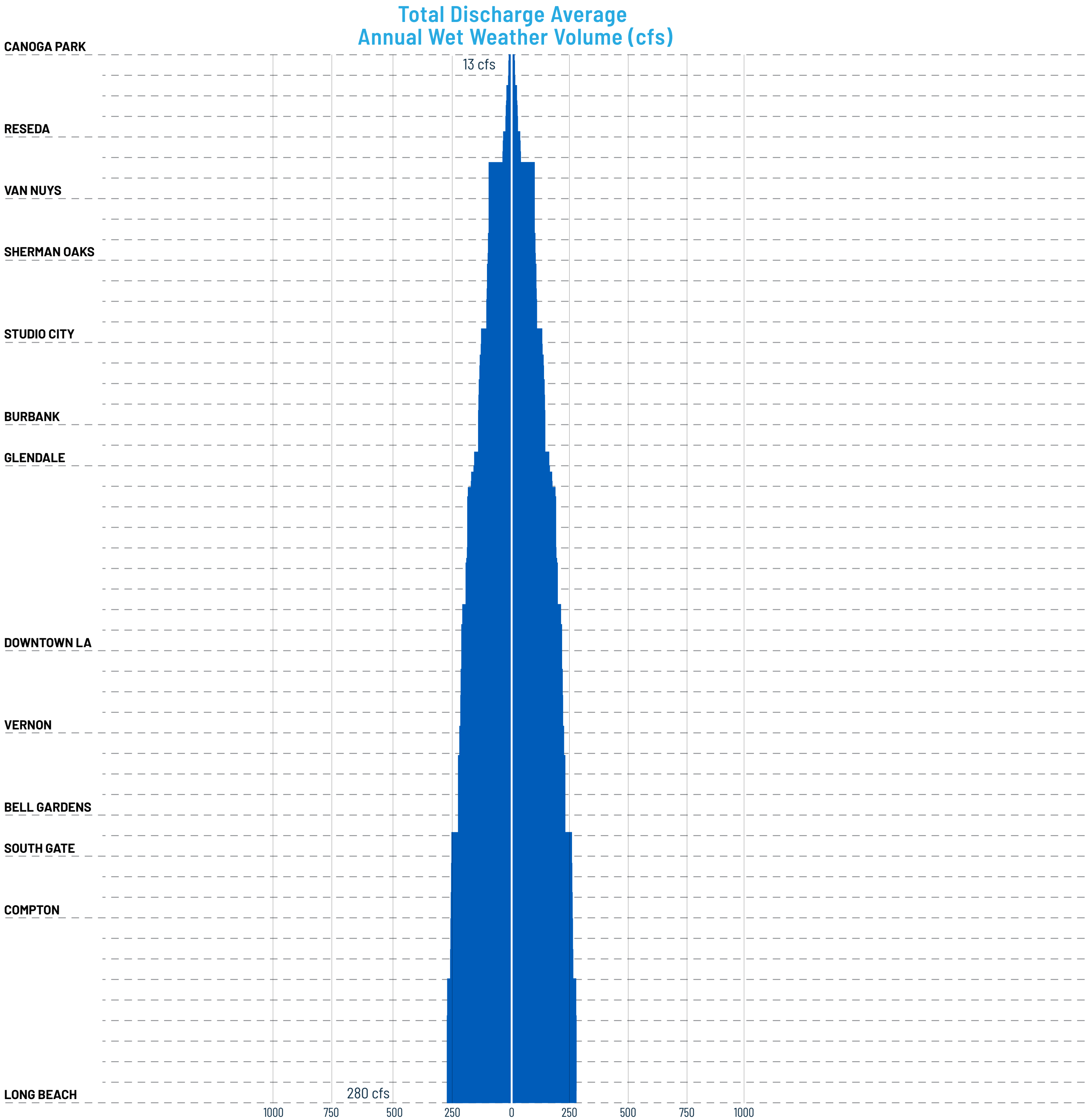


Figure 18. Annual average wet weather discharge along the LA River ranges from 13 cfs to 280 cfs. Source: See table of figures on page 286 for all source information related to ruler data.

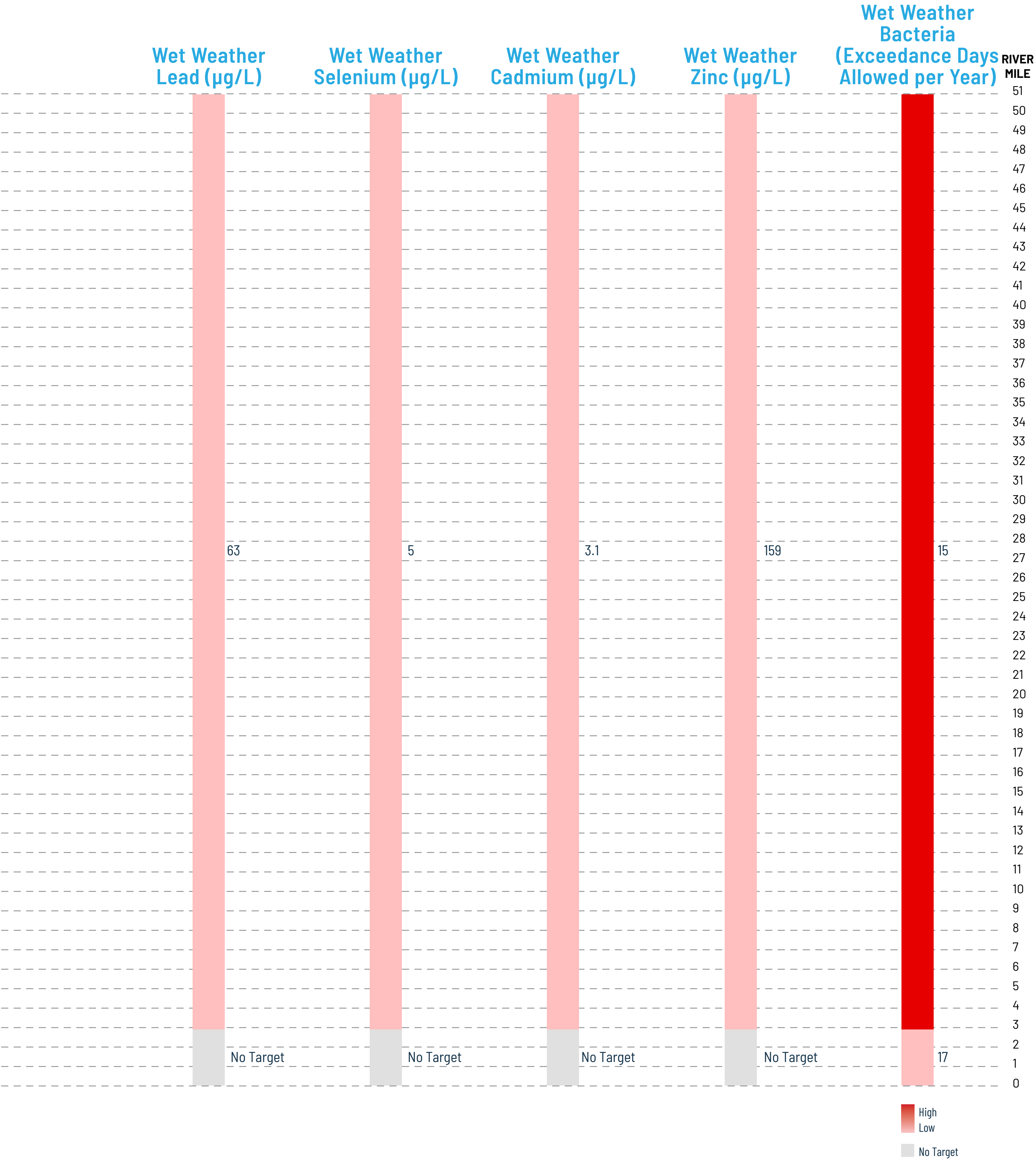


Figure 19. Total maximum daily loads for particular metals and bacteria in LA River water depends on whether there is wet or dy weather. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING WATER QUALITY

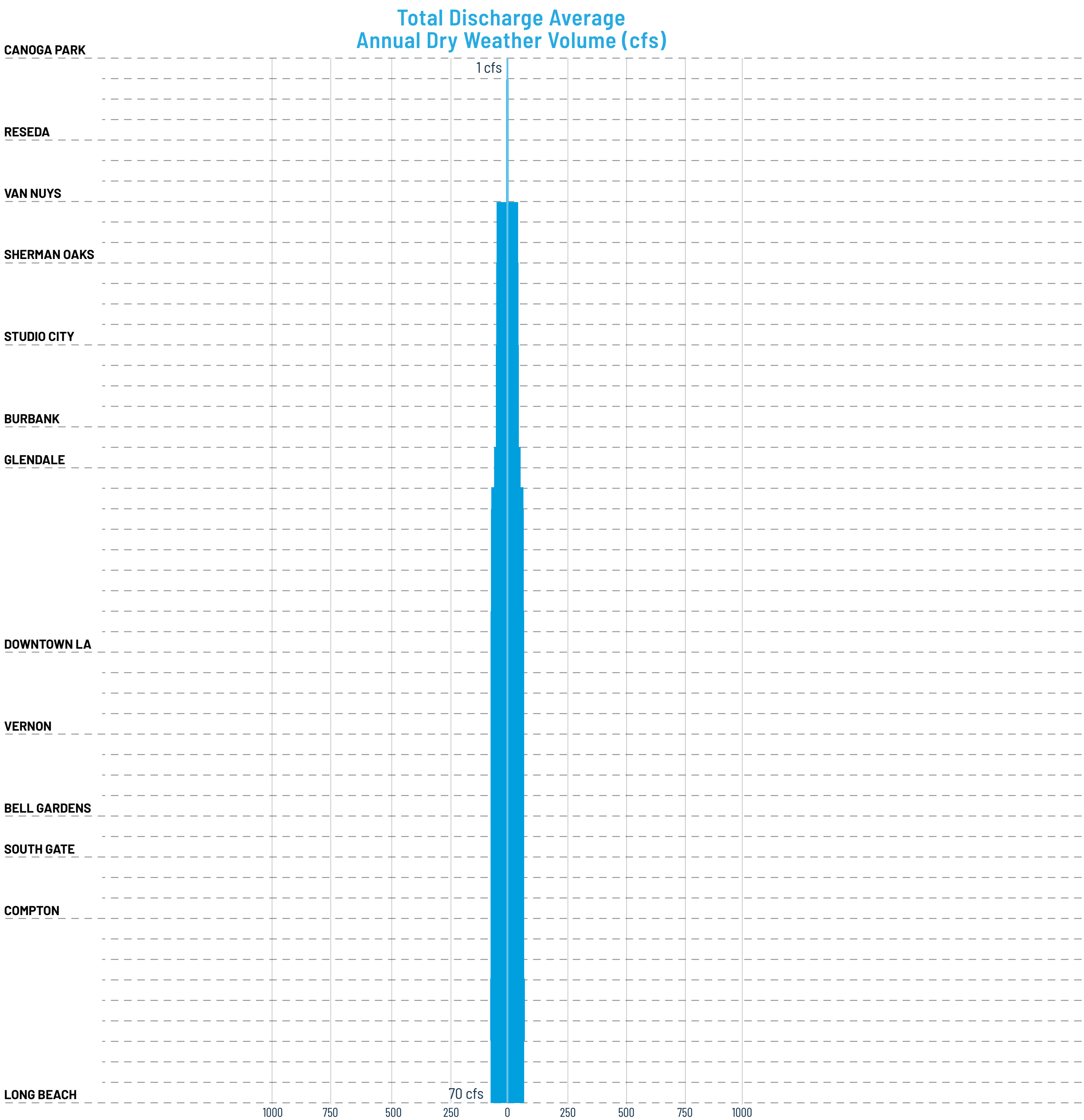


Figure 20. Annual average dry weather discharge along the LA River ranges from 1 cfs to 70 cfs. Source: See table of figures on page 286 for all source information related to ruler data.

Figure 21. Total maximum daily loads for particular metals and bacteria in LA River water depends on whether there is wet or dry weather. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING WATER QUALITY

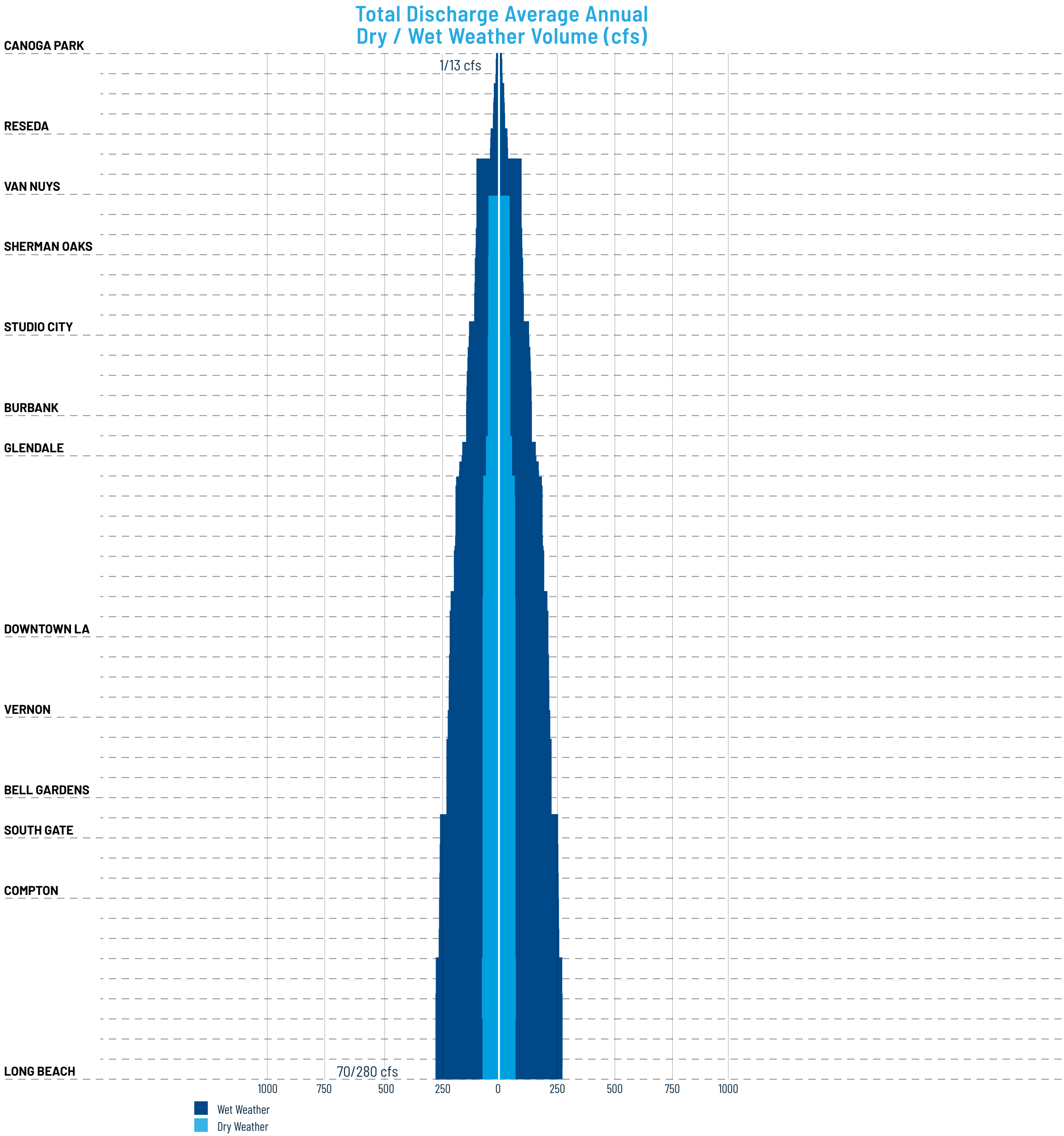


Figure 22. Annual average wet and dry weather discharge along the LA River. Source: See table of figures on page 286 for all source information related to ruler data.

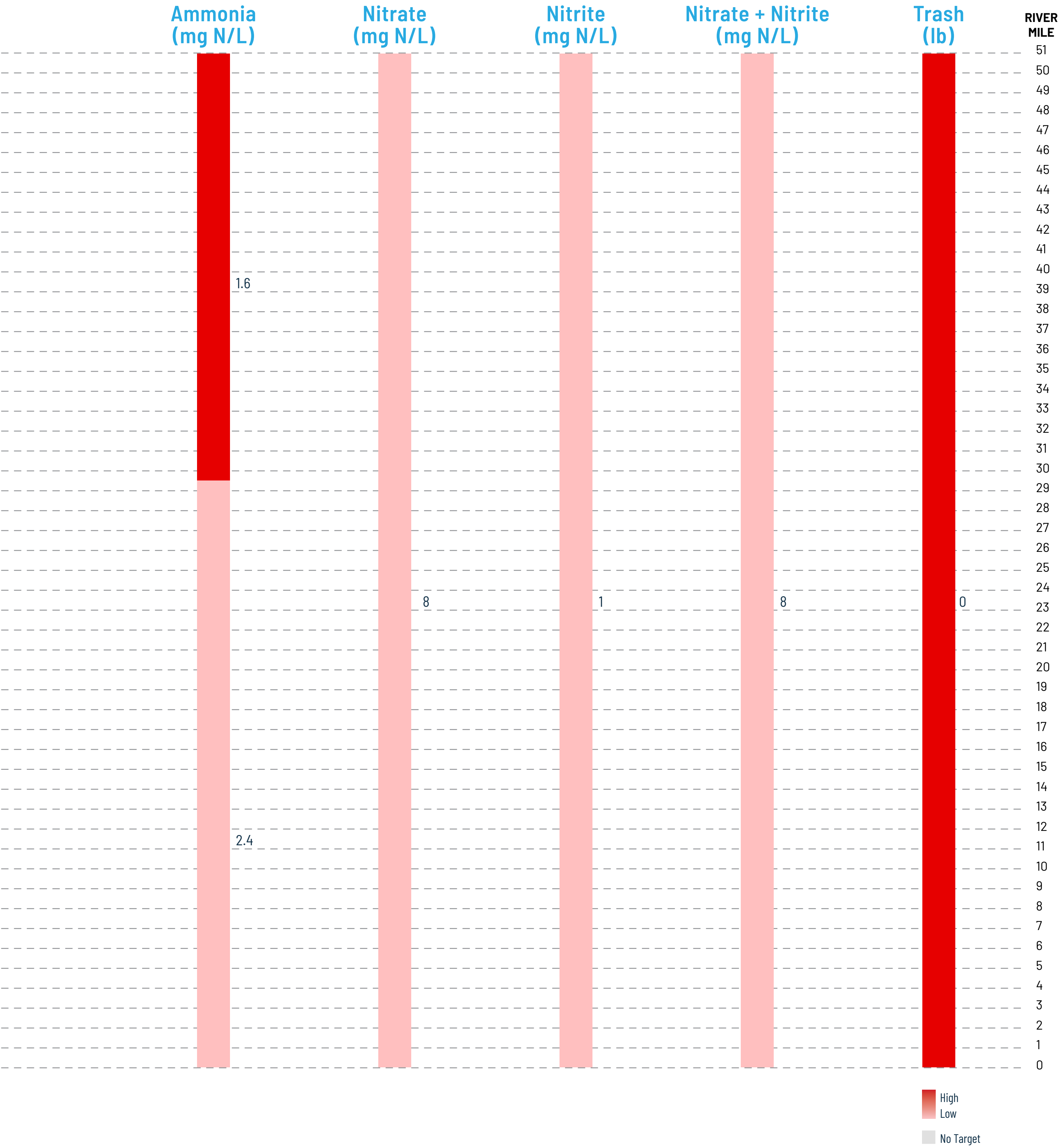


Figure 23. Compounds like ammonia, nitrate, and nitrite have different allowances in the LA River. There is zero allowance for trash. Source: See table of figures on page 286 for all source information related to ruler data.

EWMP/WMP Targets

Considerable resources from the public and private sectors have been dedicated to improve the water quality within impaired water bodies in the watershed. One Enhanced Watershed Management Program (EWMP) and two Watershed Management Program (WMPs) have been developed under the 2012 LA County MS4 Permit to facilitate watershed-wide implementation and strategies for TMDL compliance. The three plans established structural BMP implementation targets in terms of static volume retention for each subwatershed. The EWMP/WMP capacity targets and capacity achieved within the Direct Subwatersheds were aggregated to create the EWMP/WMP target ruler. Although it can be shown that planned and/or completed projects help to nearly meet the requirements set forth in the 2012 MS4 permit, there is much uncertainty in the funding and implementation of these plans to keep pace with the approved planned milestones.

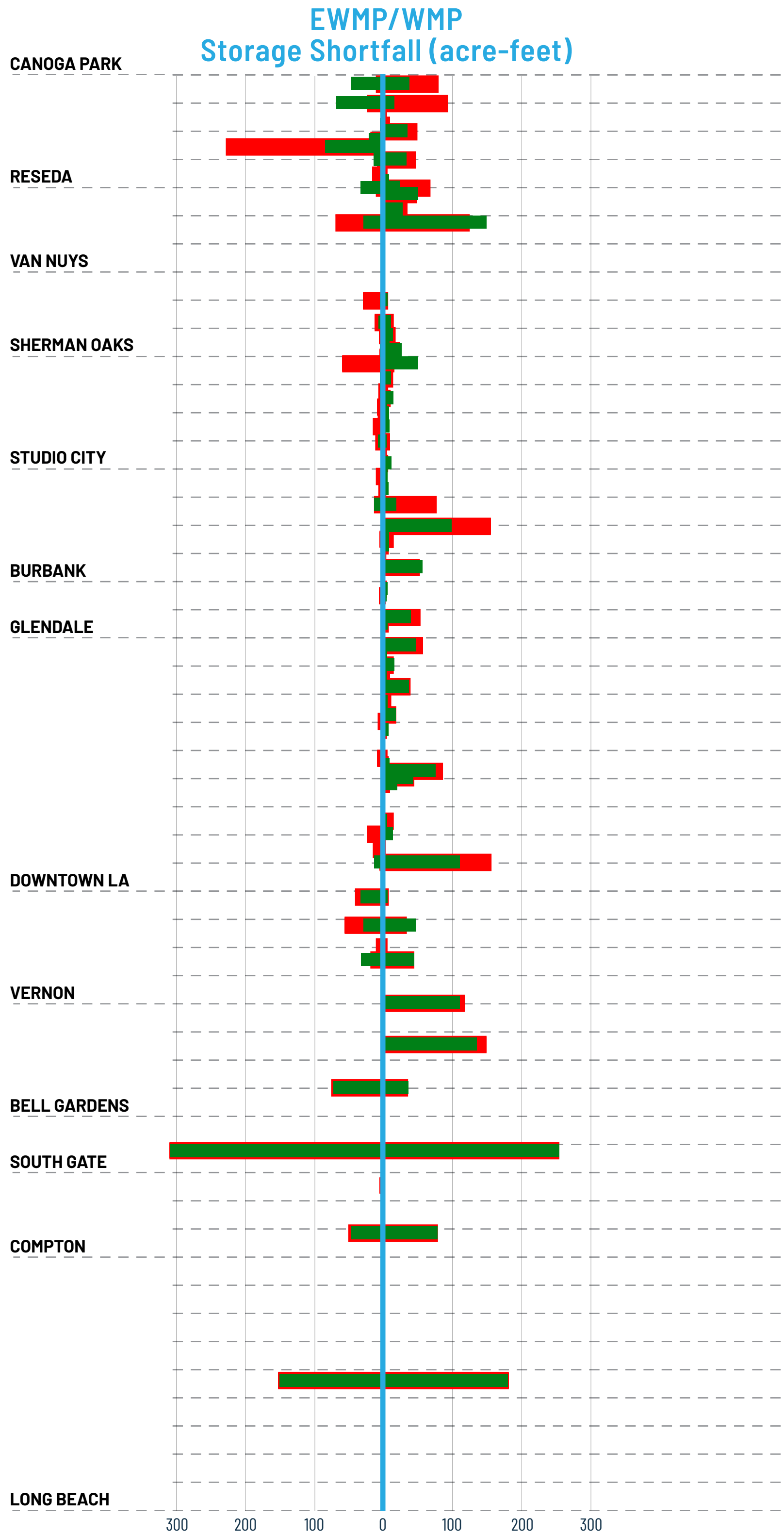
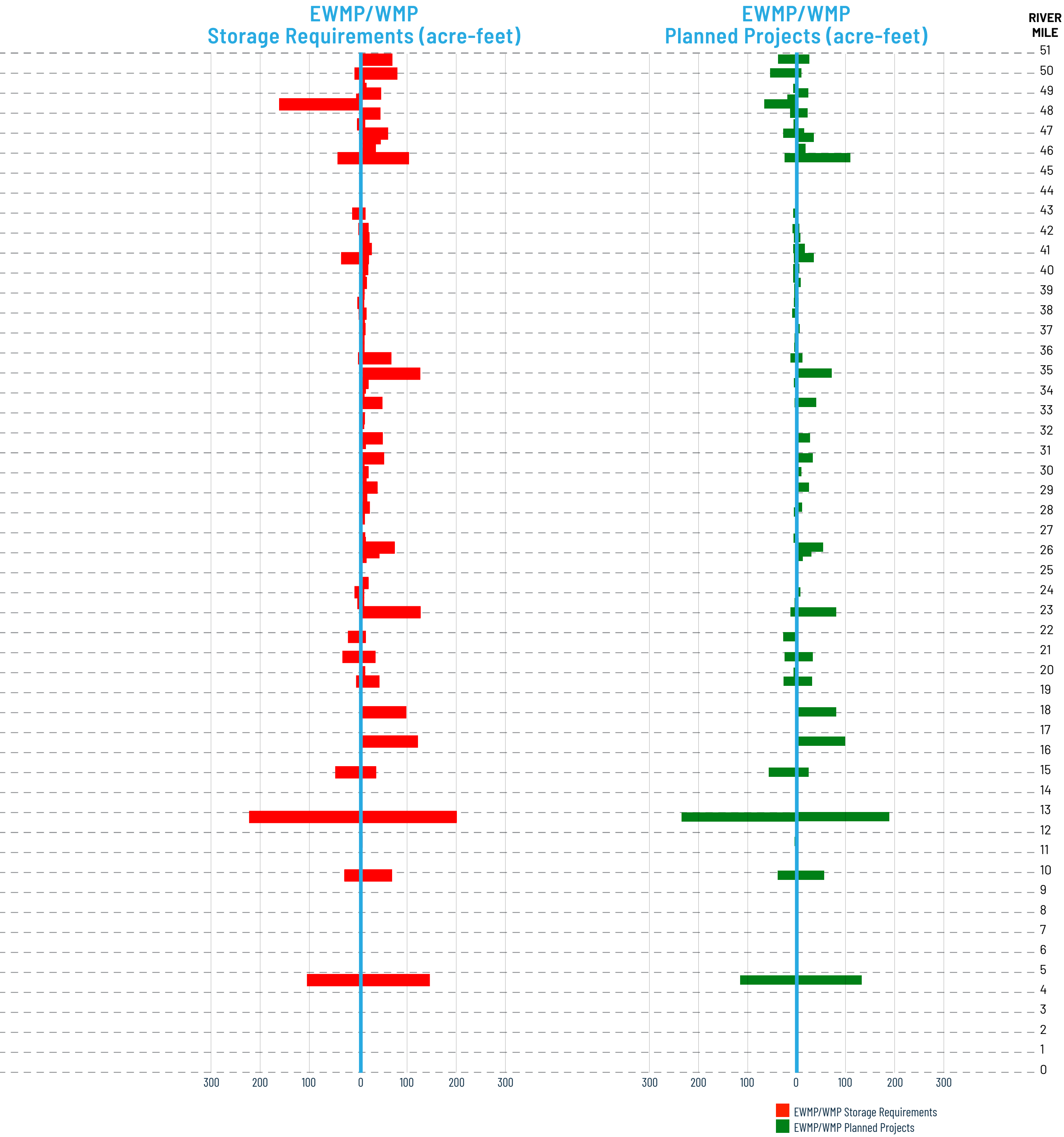


Figure 24. Watershed management programs have created plans to achieve TMDL compliance that focus on static volume retention for each subwatershed of the LA River. Source: See table of figures on page 286 for all source information related to ruler data.



EWMP/WMP
Storage Requirements (acre-feet)
EWMP/WMP
Planned Projects (acre-feet)
RIVER MILE
51
50
49
48
47
46
45
44
43
42
41
40
39
38
37
36
35
34
33
32
31
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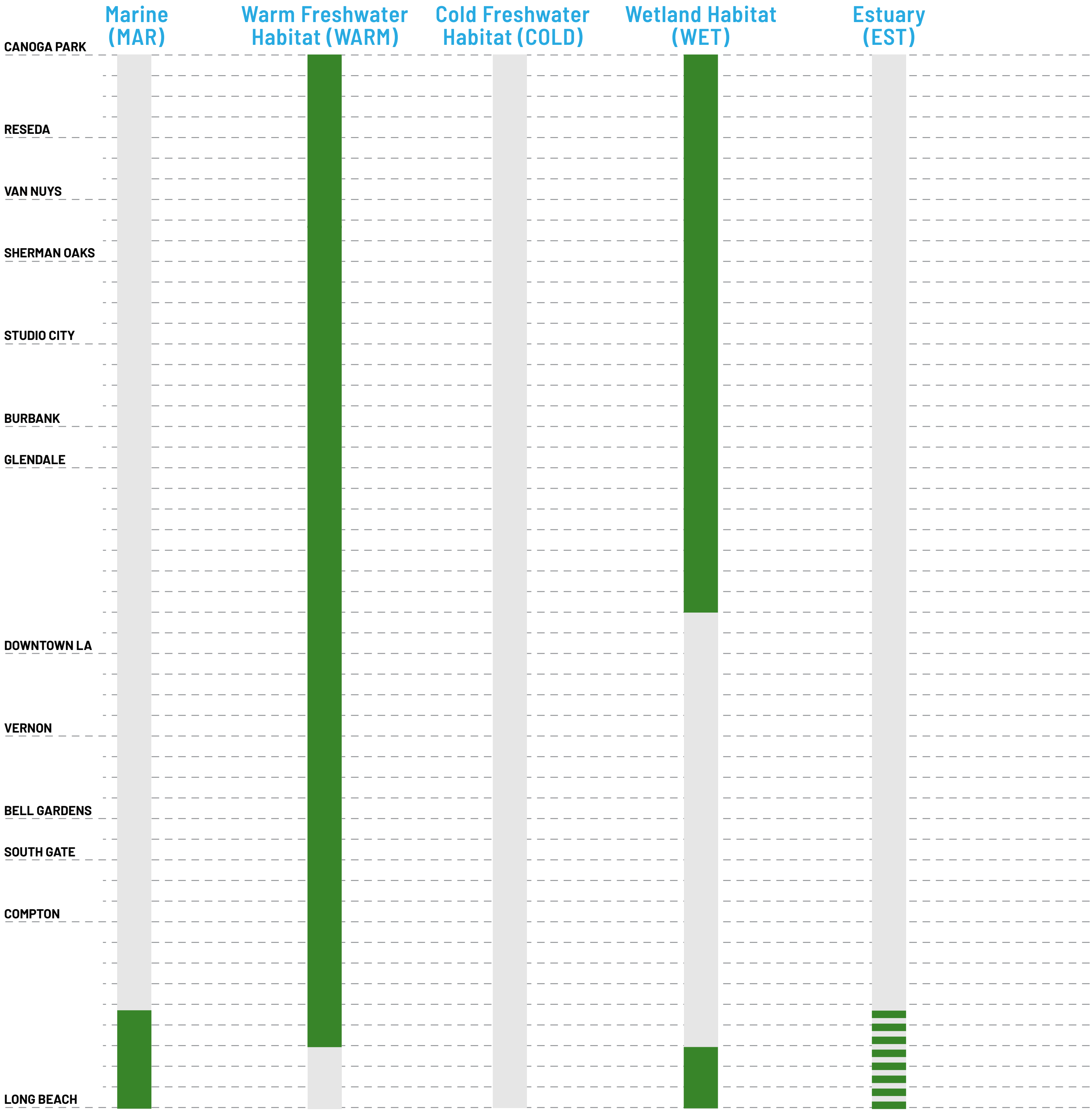
EWMP/WMP Storage Requirements
EWMP/WMP Planned Projects

EXISTING WATER QUALITY



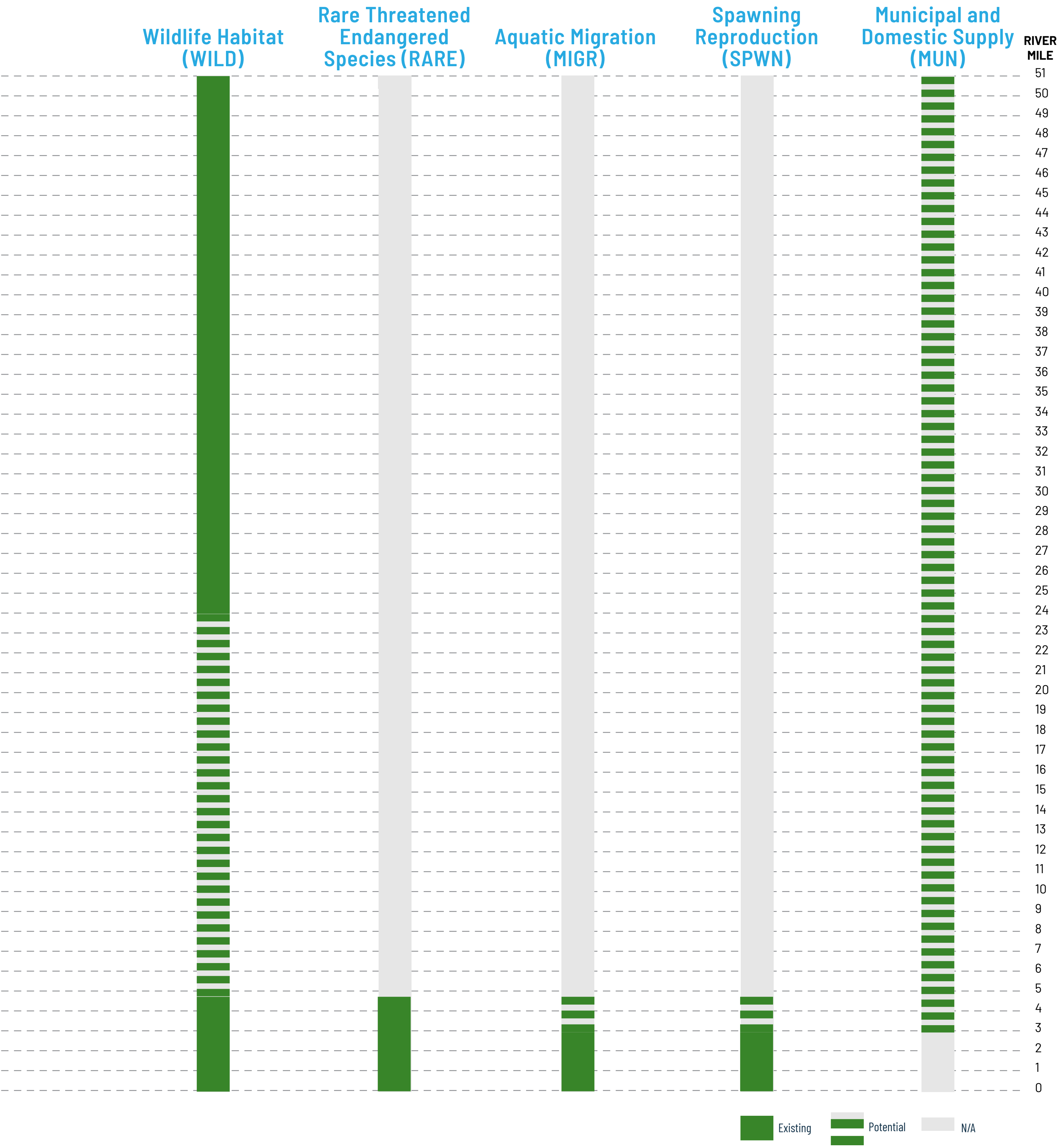
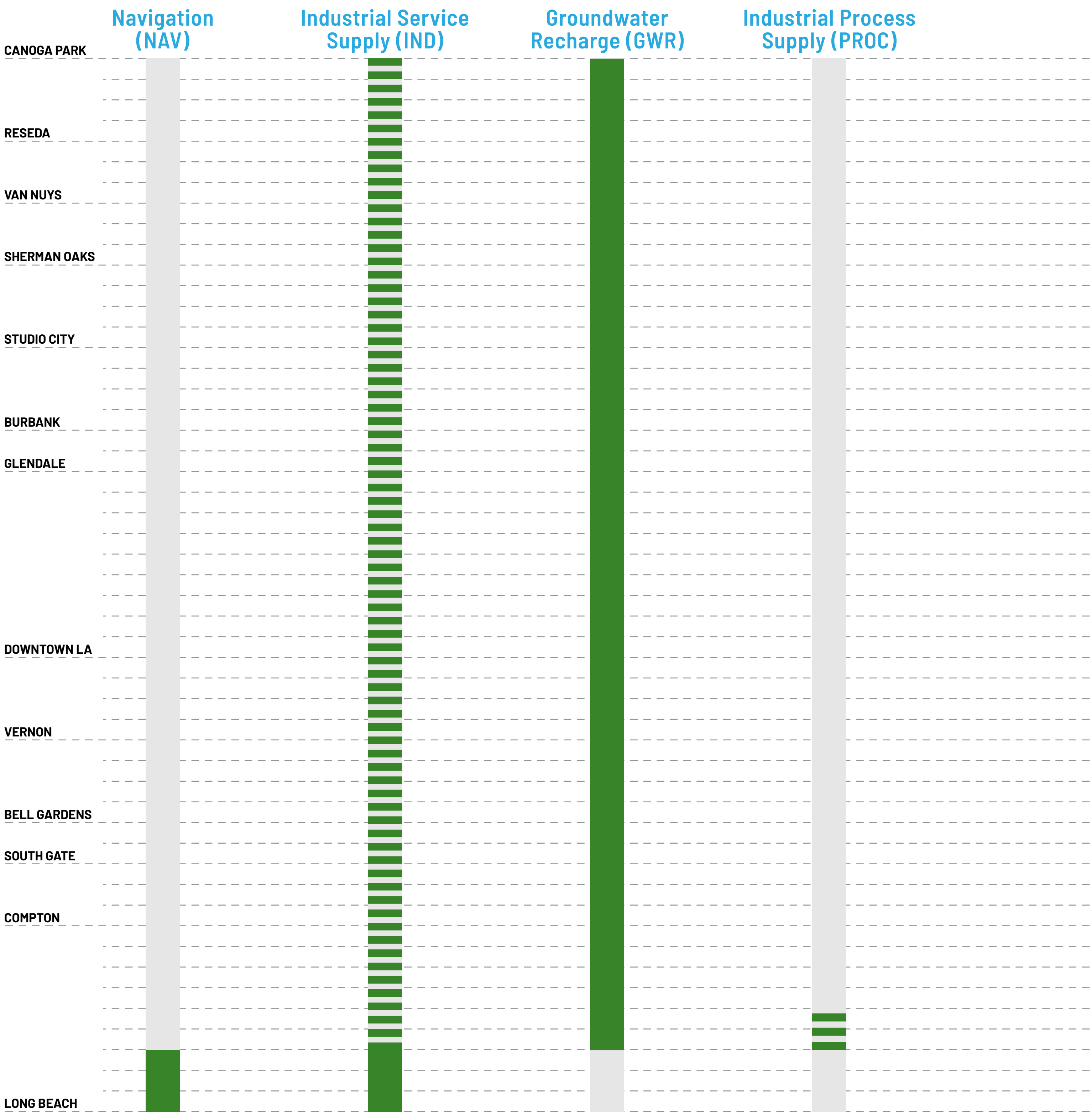


Figure 25. The Los Angeles Regional Water Quality Control Board Basin Plan (Basin Plan) established 24 designated beneficial uses of waterbodies in the watershed, 18 of which were identified for the LA River and other waterbodies in the watershed. Appropriate water quality objectives were subsequently established to ensure the protection of such beneficial uses. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING WATER QUALITY



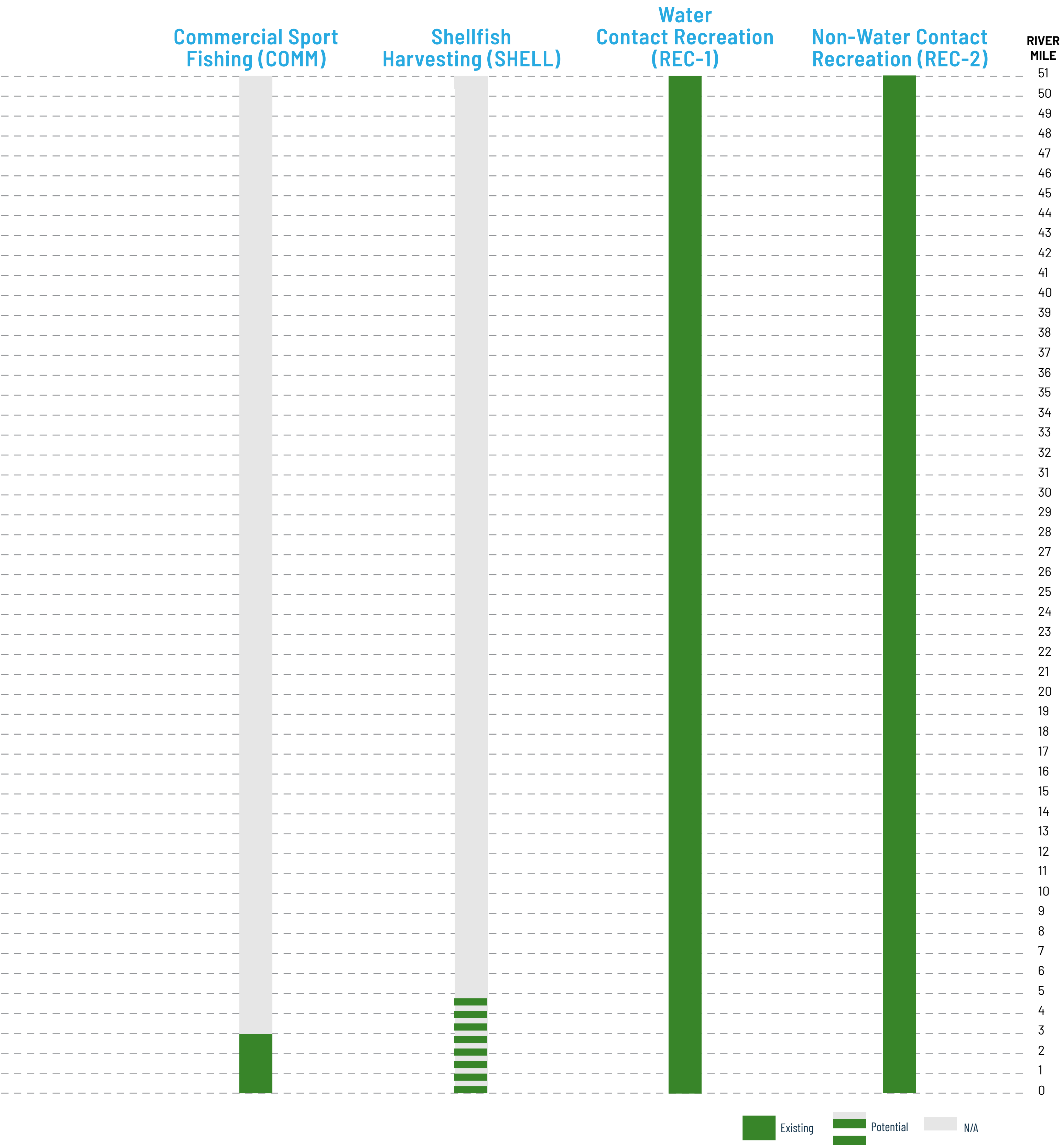


Figure 26. The Los Angeles Regional Water Quality Control Board Basin Plan (Basin Plan) established 24 designated beneficial uses of waterbodies in the watershed, 18 of which were identified for the LA River and other waterbodies in the watershed. Appropriate water quality objectives were subsequently established to ensure the protection of such beneficial uses. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING WATER SUPPLY

Chapter 4 of the LA River Master Plan includes a summary of existing water supply. Provided here are additional datasets used to develop the plan.

The LA River captures large quantities of precipitation that are managed in several ways to support beneficial uses within the region. Groundwater recharge within the Upper Los Angeles River Area (ULARA) is a major source of supply for municipal water systems in the area. Surface flow along the river also supports environmental and recreational uses within the river corridor. These uses of water within the corridor may be expanded in the future as part of the Master Plan. Creating new water uses within the river corridor for recreation and environmental enhancements is possible while still increasing the use of the river as a source of municipal water supply. The value of a new municipal water supply from the river may ultimately help pay for the cost of environmental and recreational enhancements along the river.

Groundwater Basins and Recharge

The ULARA Watermaster manages the four groundwater basins underlying the ULARA, which are the San Fernando Basin (SFB), Sylmar Basin, Verdugo Basin, and Eagle Rock Basin. Groundwater pumping in the ULARA includes native recharge from the watershed and imported water return flows (incidental recharge from water importation). One of the key challenges in the ULARA is the need to increase recharge into the local groundwater basins. The decline in storage, primarily occurring in the SFB, is due to several factors including pumping in excess of long-term recharge, decrease in natural recharge caused by increased urbanization and runoff leaving the basin, and a decrease in stormwater spreading. In 2016, the available storage space in the SFB is approximately 600,000 AF.

LA County Public Works and LADWP own and operate spreading grounds in the northeastern portion of the SFB, downstream of Pacoima, Big Tujunga, and Hansen Dams, with the goal of partially offsetting the increase in runoff due to urbanization. The long-term average amount of spreading operations in the SFB is 30,000 AFY. Increasing annual spreading operations provides benefits to SFB, which include restoring storage and allowing for pumping to offset imported demand. The City of LA and the LA County Public Works are cooperating on projects to increase capture of stormwater in the ULARA to offset these trends. The city is also proposing recharge of the basin with recycled water, balancing this need against needs for continued flow of this water within the LA River.

The Water Replenishment District of Southern California (WRD) manages the Central Basin (CB) and West Coast Basin (WCB), which overlie the reaches of the LA River downstream of Downtown LA. The existing uses of the basin are sustained through natural and artificial recharge via spreading of local stormwater from precipitation overlying the basin and the San Gabriel River watershed and by the artificial recharge of foreign water via spreading and injection. Through this artificial recharge of the basin, WRD has created a stable and reliable groundwater supply without reliance on the LA River. For continued use of the basin at current levels of development, there is no apparent need for additional water. However, continued pressure on imported water may increase pumping in the basins, leading to new needs for recharge. Also, WRD may want to release some recycled water resources that it currently uses for replenishment to other agencies with growing needs. This could be accomplished through the use of additional water from the LA River, provided those supplies are economically attractive compared to other development options.

At the LA and Montebello Forebays in the Central Basin, permeable sediments are exposed at ground surface, allowing groundwater to percolate and subsequently augment the Central Basin. It may be possible to develop new spreading grounds or enhance existing spreading grounds in the LA and Montebello Forebays to accomplish groundwater recharge with LA River flows. Additionally, many areas of the basin may be suitable for recharge via injection wells. This demands greater treatment, but may prove economical.

Water Purveyors and % Relying on Groundwater

In LA County, there are 228 community water systems responsible for supplying water to households, businesses, and governments. Urban Water Management Plans prepared by water suppliers in LA County identify the different sources of water supply, including groundwater. Suppliers that source 90% or more of their water from groundwater are in high need of consistent replenishment of groundwater, while suppliers that sources less than 10% of their water from groundwater have lower groundwater replenishment needs.

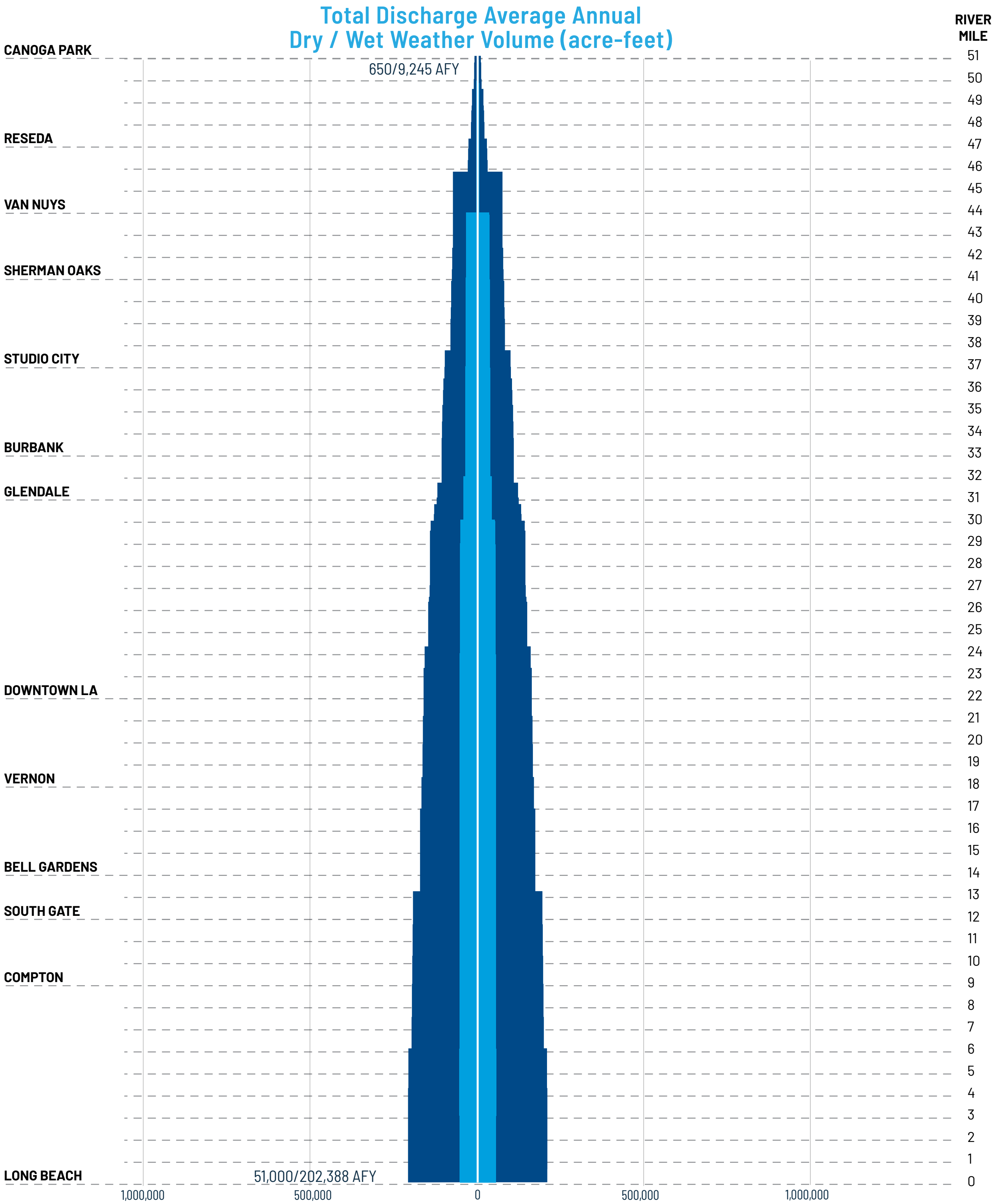


Figure 27. In an average wet weather year, the average amount of water discharged from the LA River is 202,388 acre-feet. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING WATER SUPPLY

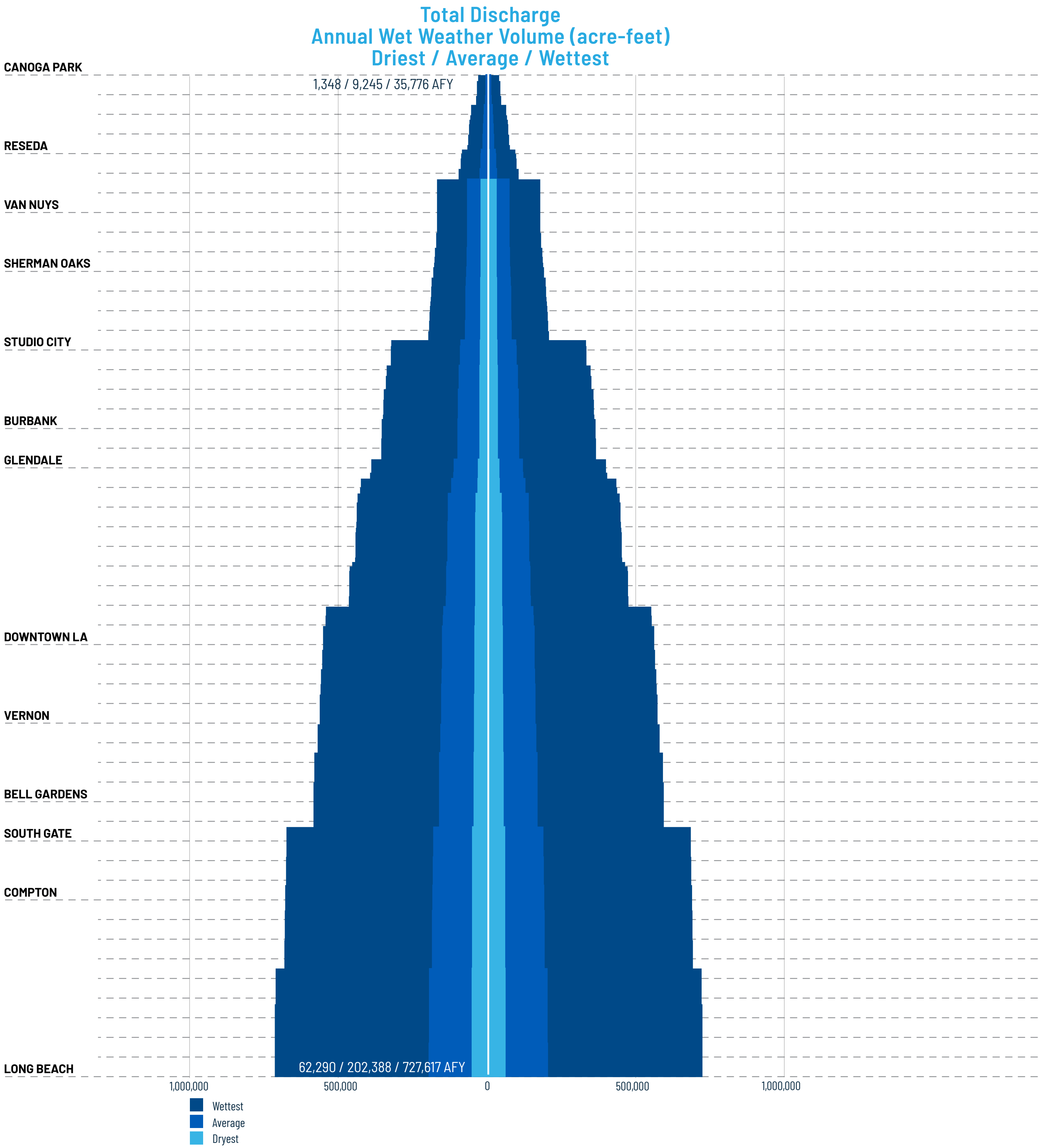


Figure 28. A comparison of the most extreme wet-and dry-weather years suggests the range of water volume flowing through the LA River annually. Source: See table of figures on page 286 for all source information related to ruler data.

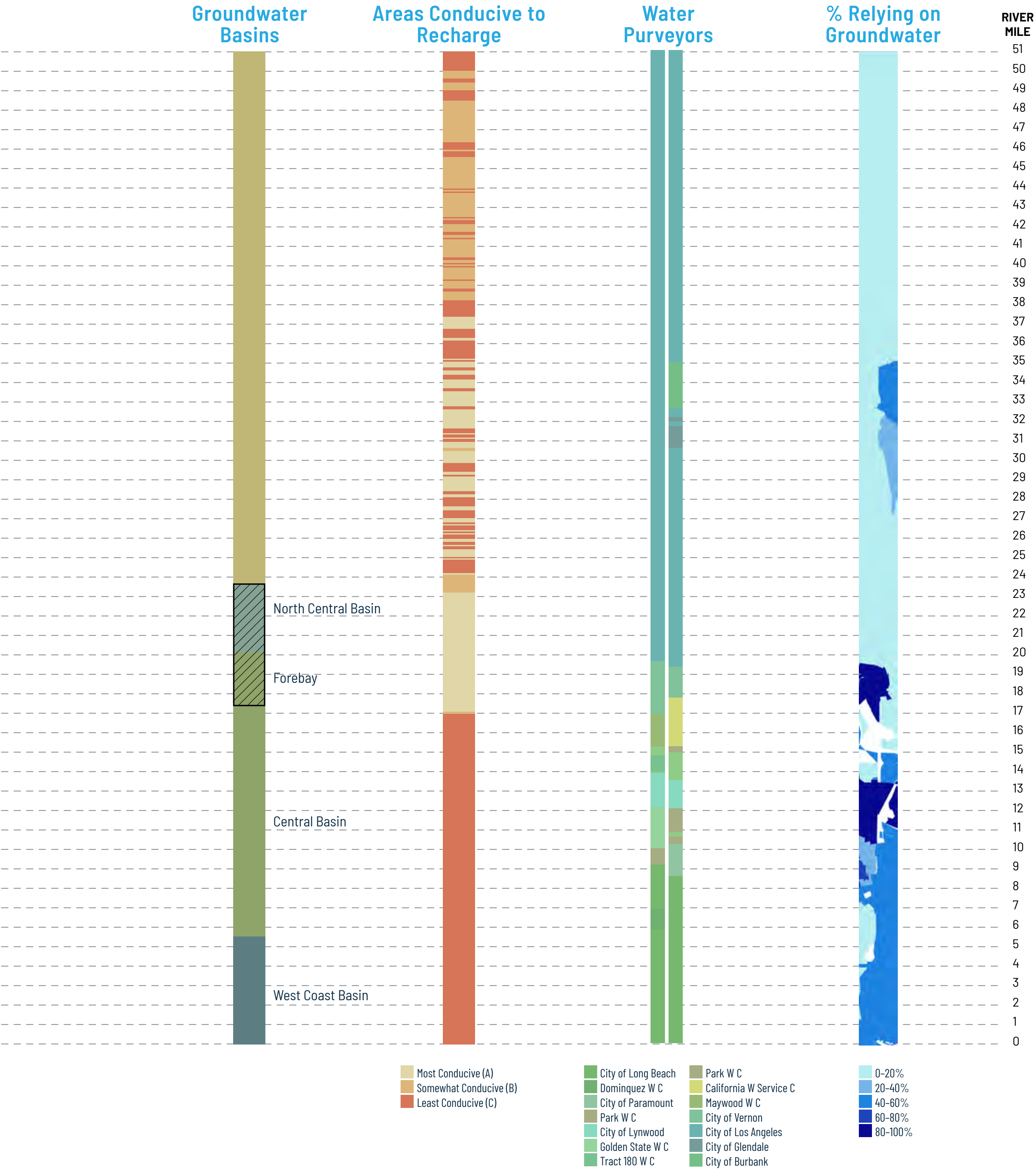


Figure 29. Water supply in LA County is an issue of natural processes as well as political boundaries. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING ECOSYSTEM AND HABITAT CONDITIONS

The concrete channelization of the river has altered the river as a native ecosystem, yet ecology remains, adapts, and changes. With further connectivity and habitat enhancement, the river has the potential to increase urban biodiversity given the high natural biodiversity occurring nearby in the region's large inland protected areas. Additionally, elements of the river's former ecology can be reintroduced where appropriate to reestablish many of the rare riparian and upland ecosystems that have been lost to urbanization.

Chapter 4 of the LA River Master Plan includes a summary of existing ecosystem and habitat conditions. Provided here are additional datasets used to develop the plan.

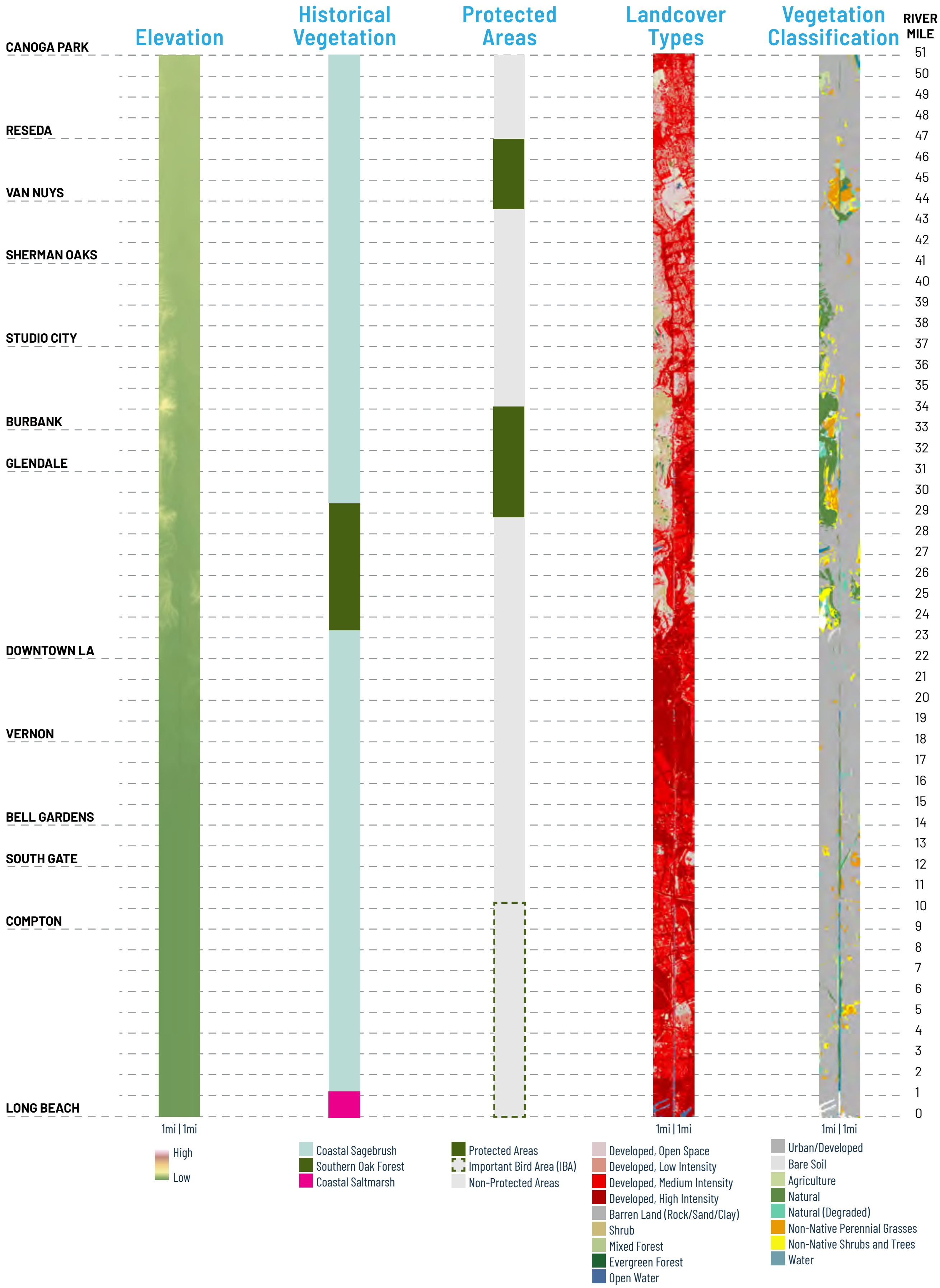
Historical Vegetation
Historic maps, historic descriptions of the region, and studies done for nearby waterways provide an indication of what historic ecologies may have existed along the LA River in the 19th-century, prior to urbanization.[1] The upper river in the San Fernando Valley was likely a mix of coastal sage scrub and valley grasslands. As the river approached the north-facing slopes of the Santa Monica Mountains, it became interspersed with large stands of oak, walnut, and riparian forests of willow, sycamore, alder, and mulefat. Flowing south through the Glendale Narrows to what is now downtown LA, the introduction of year-round groundwater from the San Fernando Basin supported a more densely forested section of the river. As the river continued south across the flat Los Angeles Plain, the river spread out over a larger alluvial plain with diminishing riparian forests. Amongst the coastal sagebrush and grassland prairie, freshwater wetlands would have been common in the river's southern reaches. At the estuarine river mouth, vast coastal salt marshes would have stretched across San Pedro Bay. Though some extant habitat patches remain near the river, most of these native ecosystems were lost during the channelization of the river and conversion to agriculture and, ultimately, urbanization. A similar diversity of landscape enhancements along the river corridor could make a significant impact in reestablishing these lost ecological types to the LA region.

Protected Areas
The LA River passes through two significant protected areas at the Sepulveda Basin and at Griffith Park. Additionally, Audubon has designated the lower river an Important Bird Area (IBA) from the mouth at Long Beach up to the 105 Freeway.

Landcover Types
The largely urbanized LA River watershed overlays an area called the South Coast Bioregion. Coastal wetlands, vernal pools, riparian woodlands, grasslands, and coastal sage scrub all have been reduced to a small fraction of their former land cover, and remaining communities typically are fragmented and/or degraded.[2]

Native/Invasive Classification
As is common in heavily urbanized and disturbed streams, invasive species outcompete many native species. This is particularly problematic in a region with such high plant endemism and a shortage of riparian and wetland habitat. In the LA River, soft bottom portions contain the most invasive plant species. Although these species still provide marginal habitat for some generalist species, the lack of native flora diminishes the role of these areas in providing habitat and foraging for other more rare species, and reduces the river's overall value in sustaining urban biodiversity.

Figure 30. (Right) Cataloging historical and current ecological conditions reveals gradients of symbiotic ecosystems along and perpendicular to the river that improve the region's biodiversity. Source: See table of figures on page 286 for all source information related to ruler data.


Elevation
Historical Vegetation
Protected Areas
Landcover Types
Vegetation Classification
RIVER MILE
CANOGA PARK
RESEDA
VAN NUYS
SHERMAN OAKS
STUDIO CITY
BURBANK
GLENDALE
DOWNTOWN LA
VERNON
BELL GARDENS
SOUTH GATE
COMPTON
LONG BEACH
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1mi | 1mi
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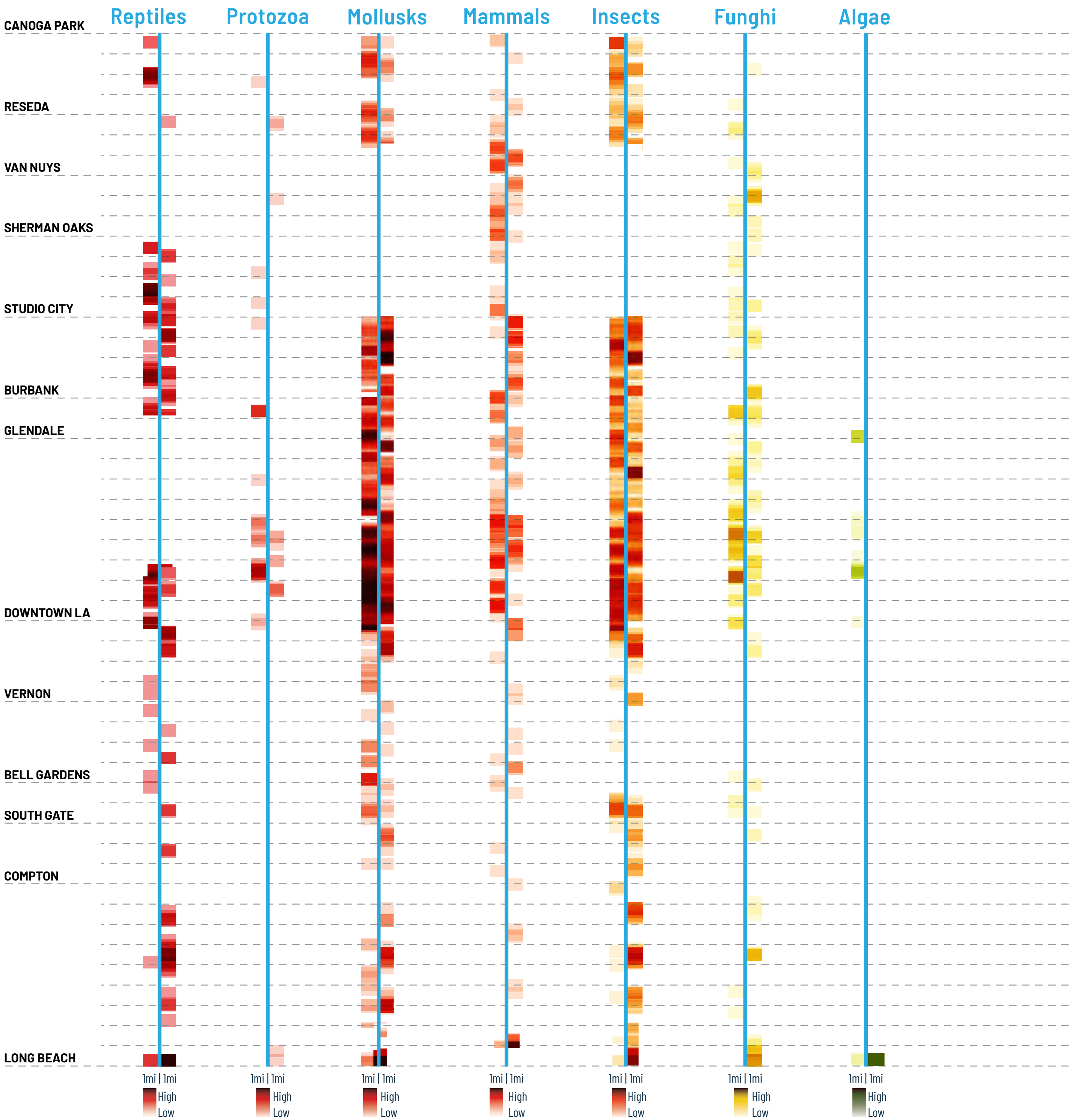
1mi | 1mi
High
Low
Coastal Sagebrush
Southern Oak Forest
Coastal Saltmarsh
Protected Areas
Important Bird Area (IBA)
Non-Protected Areas
Developed, Open Space
Developed, Low Intensity
Developed, Medium Intensity
Developed, High Intensity
Barren Land (Rock/Sand/Clay)
Shrub
Mixed Forest
Evergreen Forest
Open Water
Urban/Developed
Bare Soil
Agriculture
Natural
Natural (Degraded)
Non-Native Perennial Grasses
Non-Native Shrubs and Trees
Water

EXISTING ECOSYSTEM AND HABITAT CONDITIONS



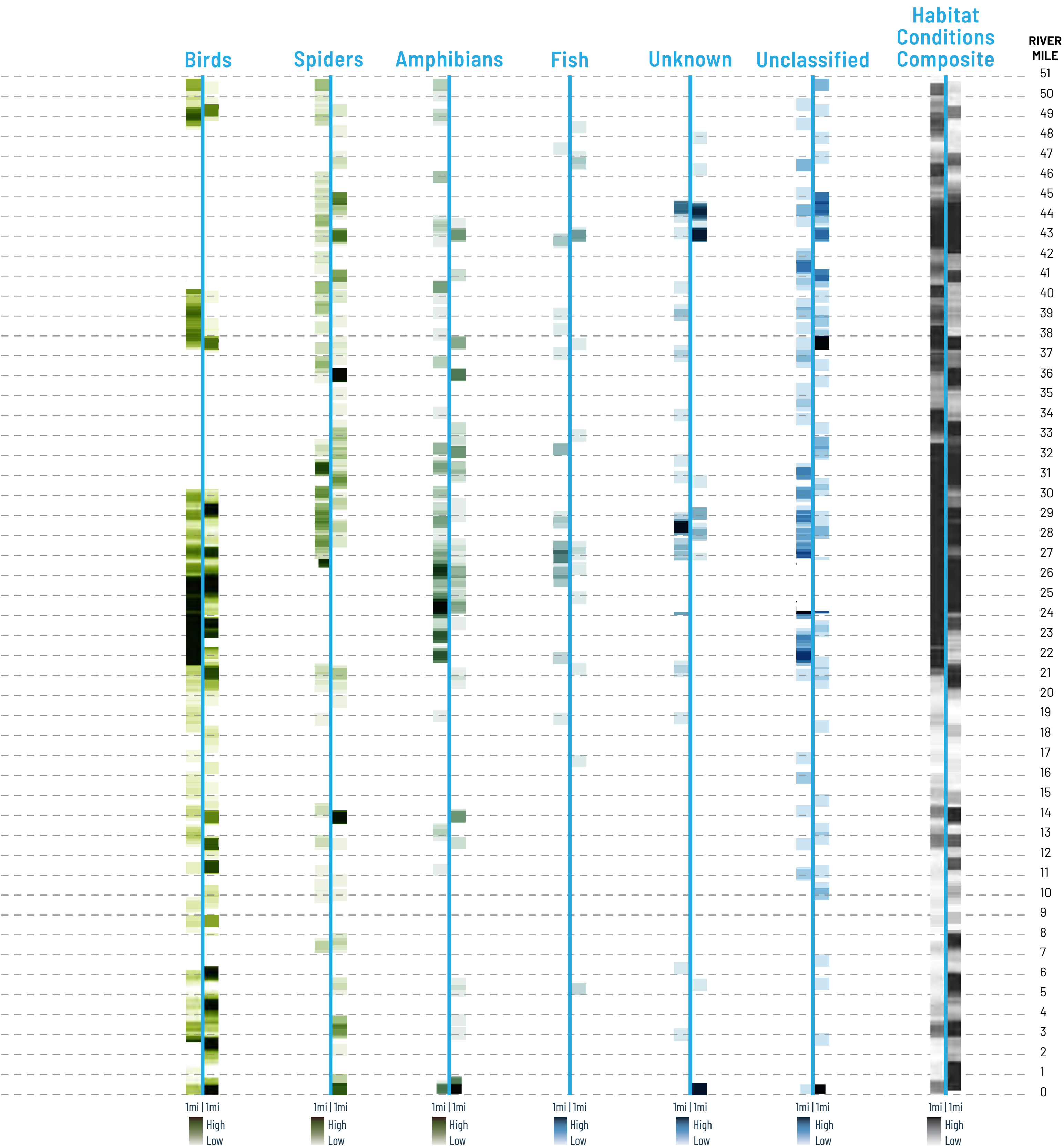


Figure 31. **Existing scientific species inventories and more recent citizen science efforts such as iNaturalist and eBird show that, despite its urbanized state, the LA River is already playing a role in providing habitat and maintaining a variety of urban biodiversity. It is recommended that existing habitat patches be enhanced and gaps in biodiversity prioritized to ensure connectivity.** Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING OPEN SPACE RECREATION AND TRAILS

Park space and access is critical for creating an equitable and healthy LA River corridor. Current research indicates that access to park space reduces the risk of diseases such as diabetes, obesity, and child asthma. Several areas along the LA River corridor require improvements in parkland (overall acreage), park size and amenities, and access.

Chapter 4 of the LA River Master Plan includes a summary of existing open space, recreation, and trails. Provided here are additional datasets used to develop the plan.

County Park Standards
Twelve of 14 communities directly adjacent to the river corridor do not meet LA County park standards of 4 acres of local parkland per 1,000 people.

Health Survey Park/Trail Need
Existing open space along the LA River corridor is fragmented and limited in quantity relative to overall population and population density.

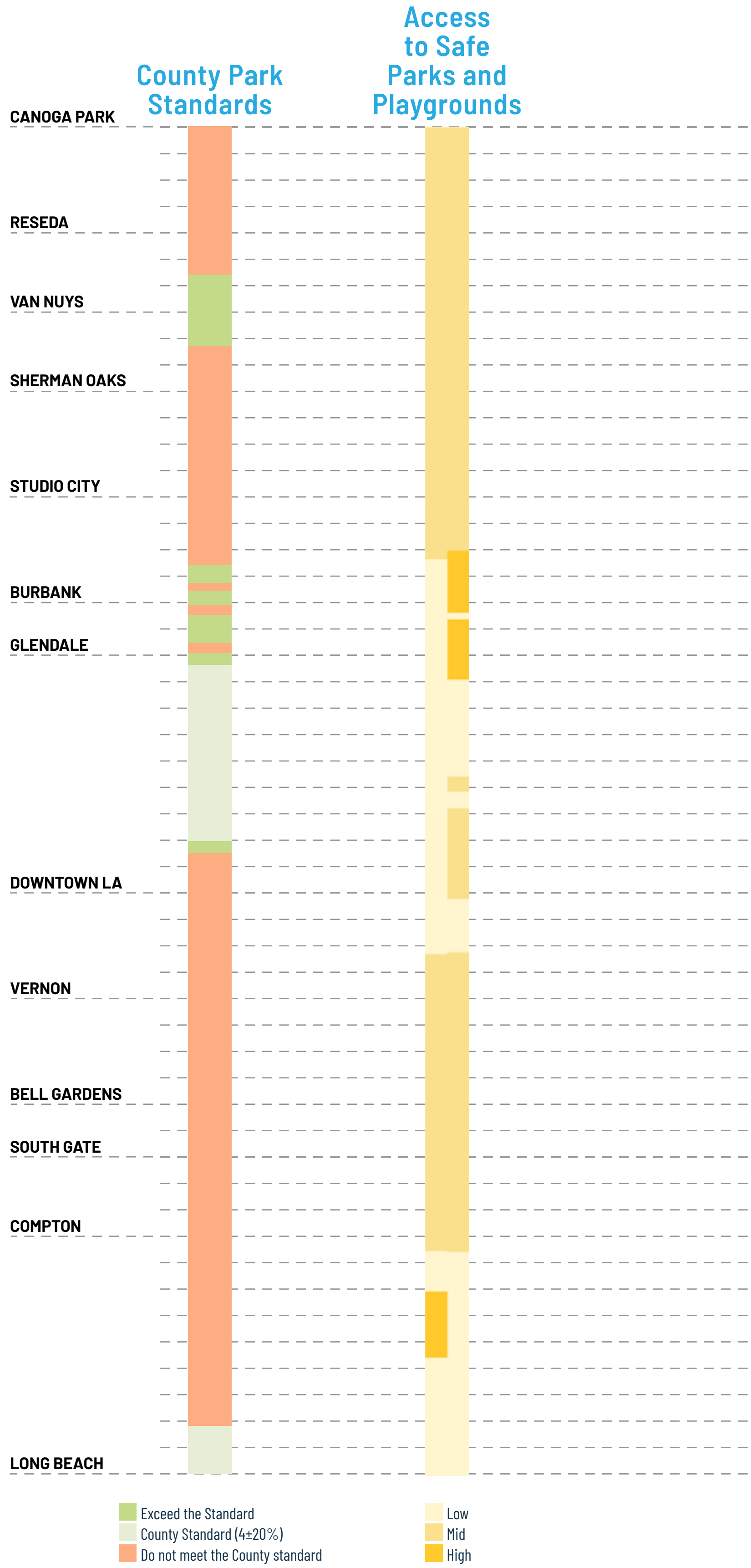
In Channel Recreation
Areas for recreation in the channel are sparse along the 51-mile stretch.

More than 1/2 Mile to a Local Park
Distance to a local park is related to walkability and access. Many areas along the LA River are over a half-mile, or 10-minute walk, to a local park. Note: These distances are determined using the street network, not as the crow flies.

Existing River Bike Path
The longest continuous segments of the LA County River Bike Path are a 16-mile stretch between the Imperial Highway and the mouth of the LA River at Long Beach and a 7-mile stretch along the Glendale Narrows.

Park Classification
While there are 26 community regional parks and regional parks within one mile of the LA River, over 80% of these parks are confined to river miles 21 through 47.

LA County Park Need Assessment Summary (2016)
A summary of over-all park needs in LA County from the Los Angeles Countywide Comprehensive Parks & Recreation Needs Assessment based on municipality and neighborhood.



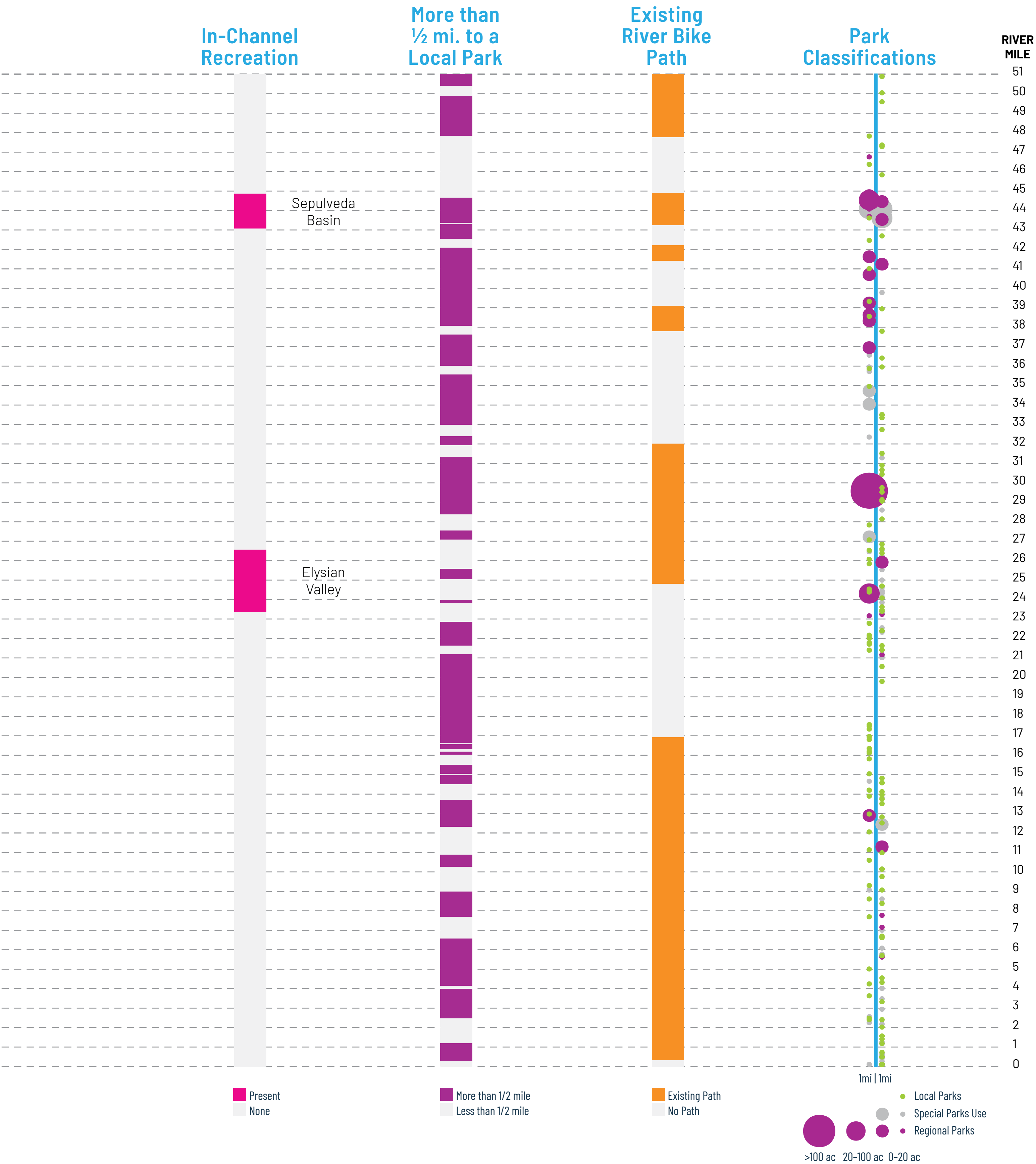


Figure 32. Several areas along the LA River corridor require improvements in parkland (overall acreage), park size and amenities, and access.
Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING OPEN SPACE RECREATION AND TRAILS

LA County Park Need

This is a combined analysis of the following page datasets to determine overall park needs in LA County from the Los Angeles Countywide Comprehensive Parks & Recreation Needs Assessment. In this assessment, less available acres, farther distance from parks, higher population density correlate to higher park need. The weighting of the datasets against each other are shown as percentages.

Population Density (60%)

Population density is a "Key Community Characteristic" in the LA Countywide Parks and Recreation Needs Assessment. Here it is measured using a one-acre grid system approach. In areas without population, the population density map appears gray, indicating that the population density in that location is zero, or nearly zero people per acre.

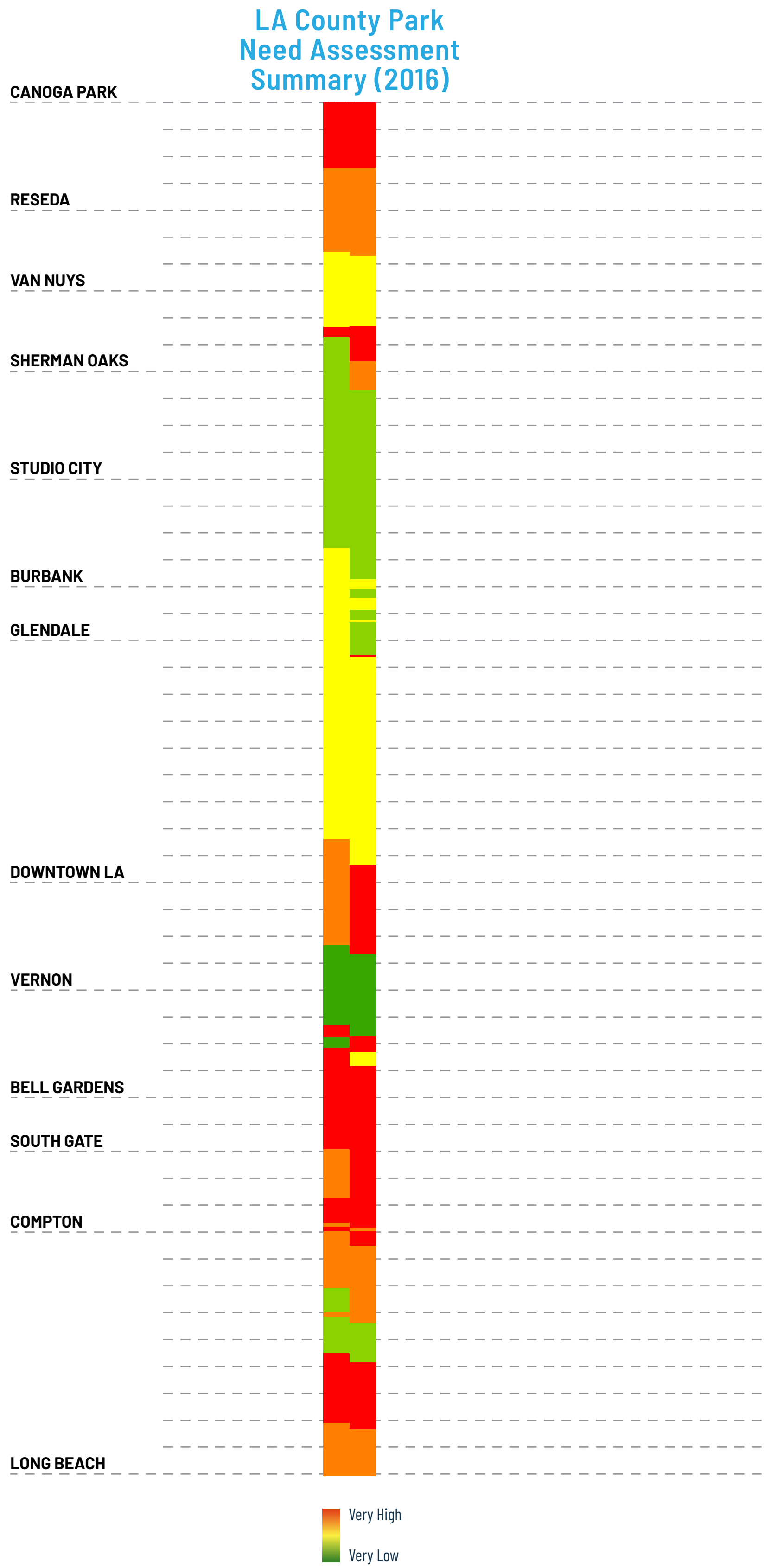
Distance to Park (20%)

This ruler shows areas within various distances to a park.

Note: distances are determined using the walkable street network, not as the crow flies. This excludes highways, which are illegal for pedestrian access.

Park Acre Need (20%)

This ruler shows the quantity of park acres available to residents. The LA Countywide Parks and Recreation Needs Assessment calculated available park acres by assigning a park service area to each park, based on the acres of the park and using LA County's service area standards as a guide for parks under 10 acres.



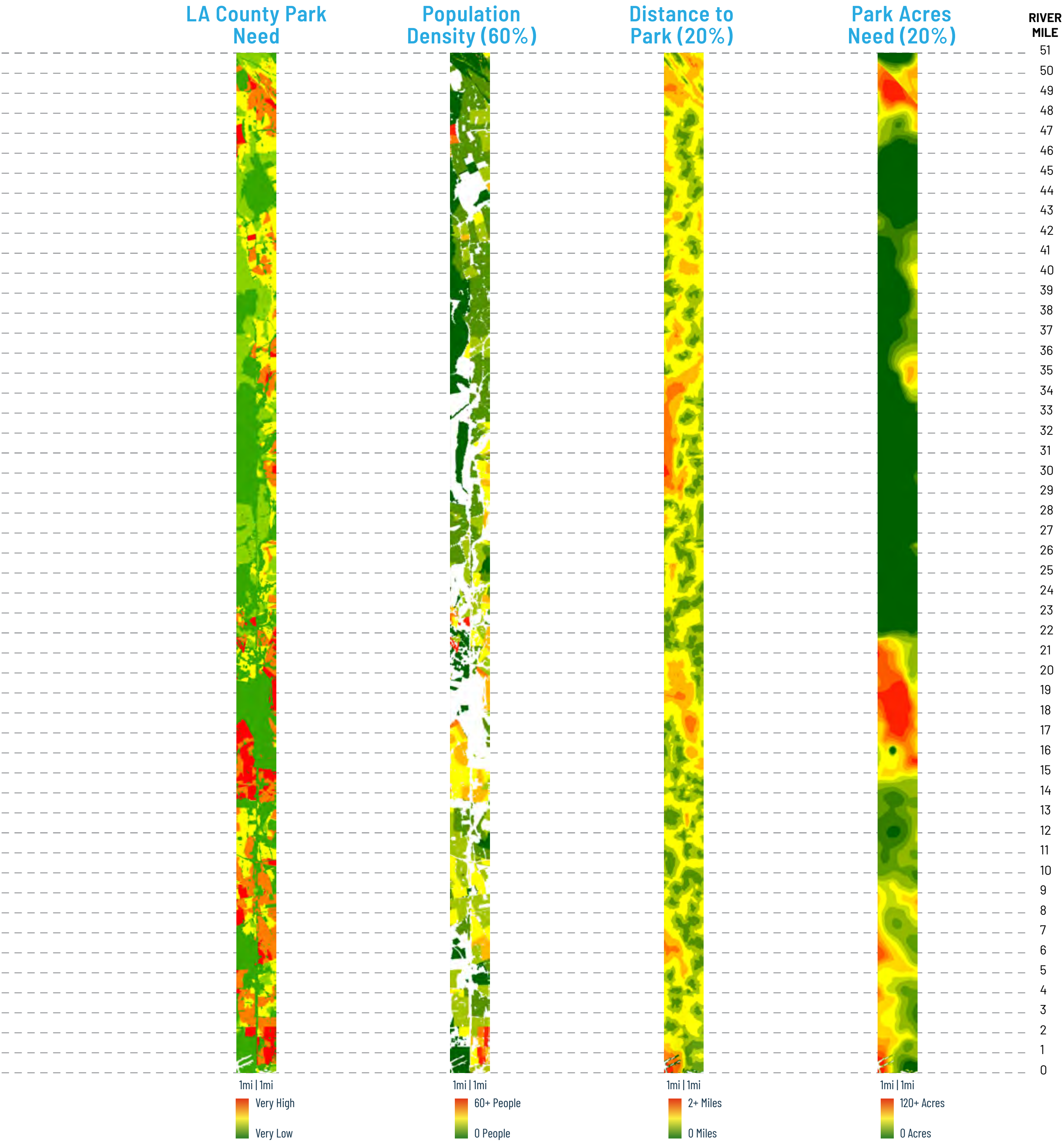
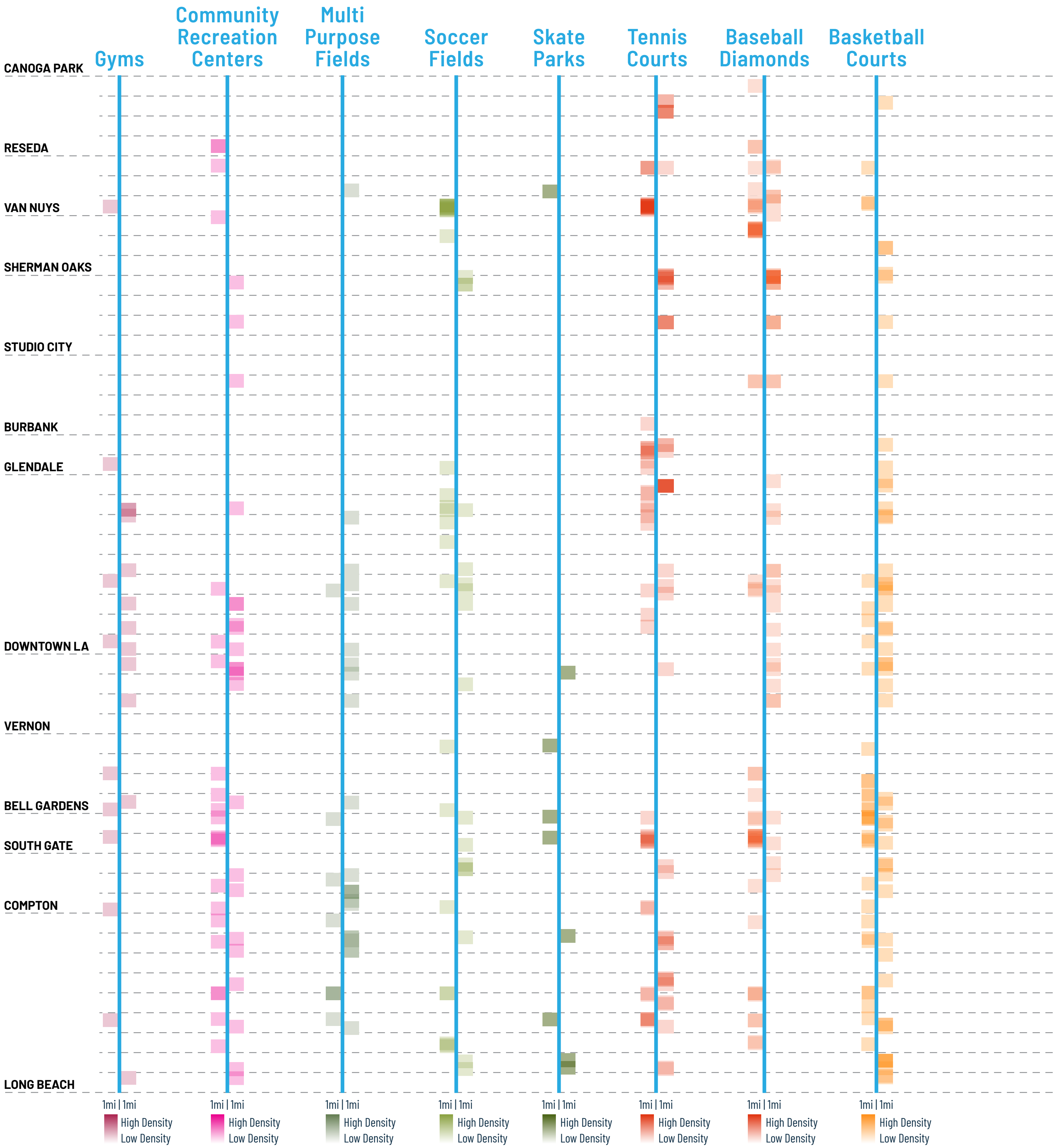


Figure 33. The rulers on this page were made from the Los Angeles Countywide Comprehensive Parks & Recreation Needs Assessment which analyzed needed parks and recreation facilities in cities and unincorporated communities in LA County. It serves as a guide for local officials, park agencies, and residents in understanding future steps that need to be taken to ensure that all communities have adequate access to thriving parks. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING OPEN SPACE RECREATION AND TRAILS



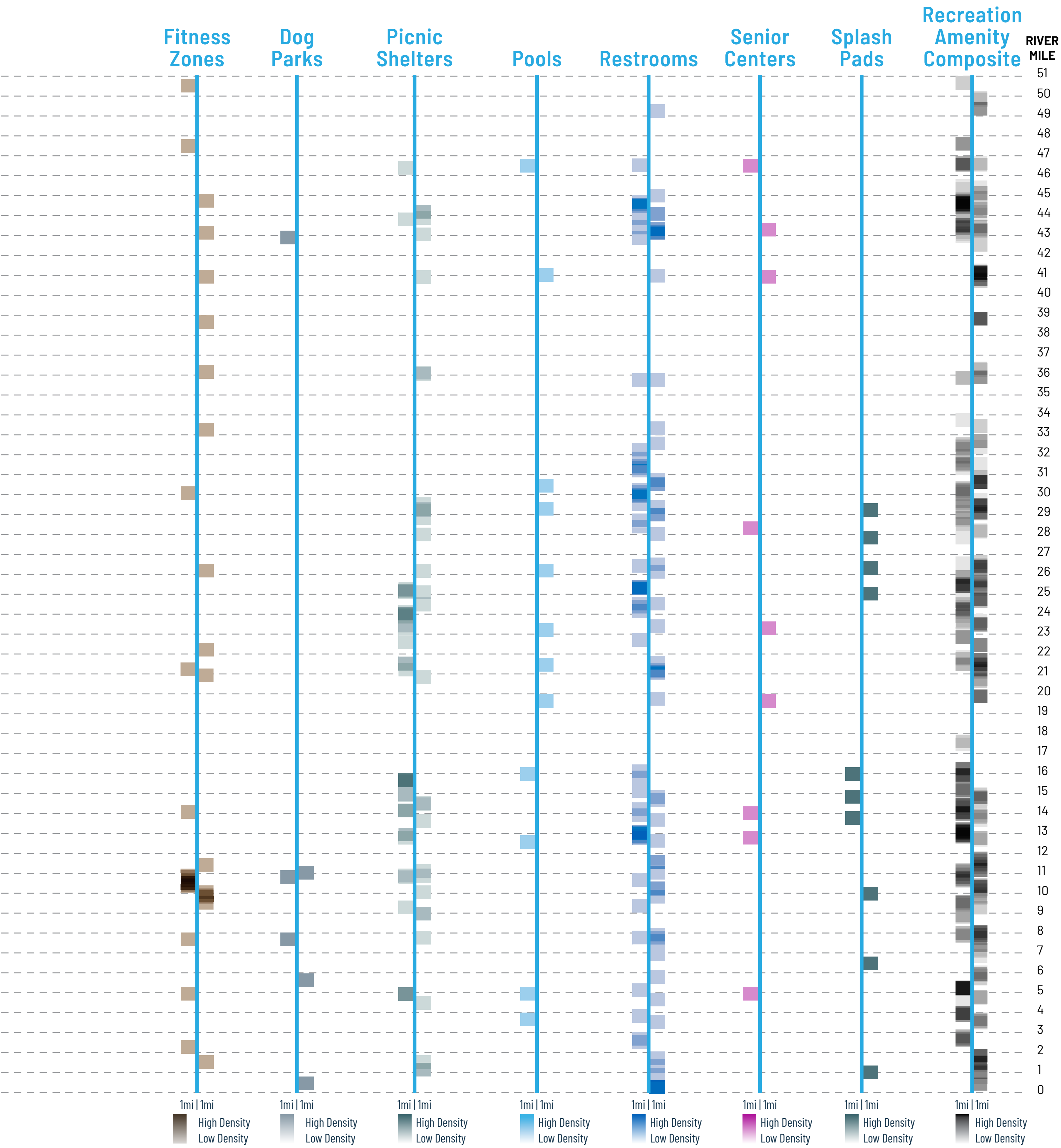


Figure 34. The Countywide Parks Needs Assessment also considered recreation amenities across LA County. There are large concentrations of recreation amenities near Sepulveda Basin, Griffith Park, Downtown Los Angeles, and South Gate. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING COMMUNITY, ART, AND CULTURE

There are 17 cities, 23 City of LA neighborhoods, and four unincorporated areas within one mile of the LA River. Within these communities, nonprofits and institutions along the banks of the LA River corridor are active and vibrant and reflect the cultural diversity and rich mosaic of people who live near the river.

Chapter 4 of the LA River Master Plan includes a summary of community, art, and culture. Provided here are additional datasets used to develop the plan.

Art
Concentrations of art institutions, cultural monuments, and permanent art installations are the densest in Downtown LA.

Community Groups
There are thousands of community organizations and facilities within one mile of the river, including over 600 community groups, more than 450 schools, and hundreds of government, social, and health services facilities.

Community Programming
Art and culture along the river is closely tied with the communities they are in, such as the Clockshop and California State Parks partnership on the site of the G1 Bowtie planned major project (river mile 26.2) site and the "SELA Arts Festival at The LA River" in South Gate.

Community Facilities
Though not necessarily focused on the river, there are thousands of facilities that support art, education, government, health, municipal services, public safety, recreation, and social services that serve the communities surrounding the river. Unsurprisingly, there appear to be concentrations of these community facilities in the densest population centers of Downtown City of Los Angeles and Long Beach, while there are fewer community facilities in industrial areas of the river around Vernon, in natural reserves between Glendale and Studio City, and between Van Nuys and Reseda *(see community facilities rulers on following spreads).*

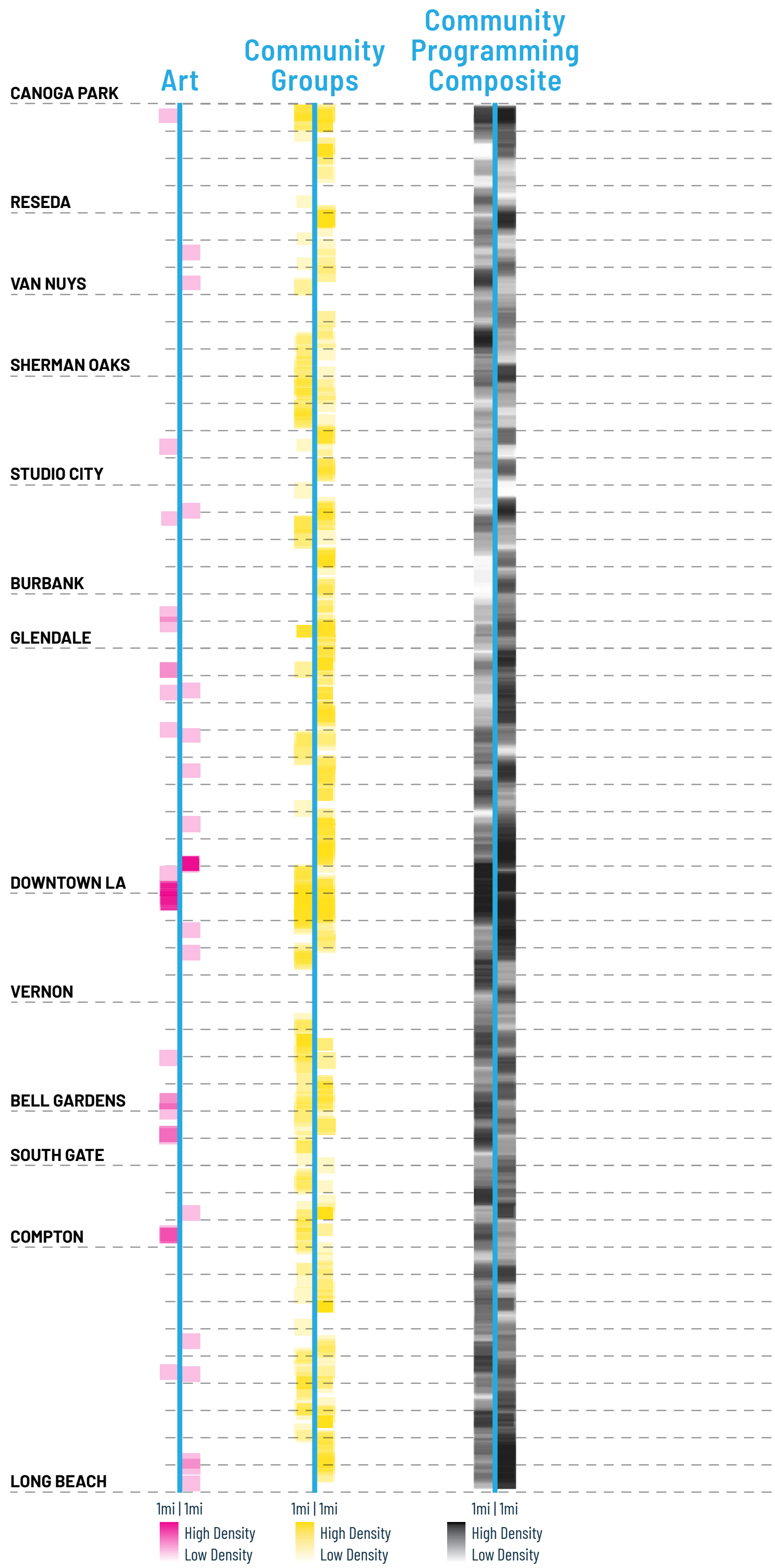
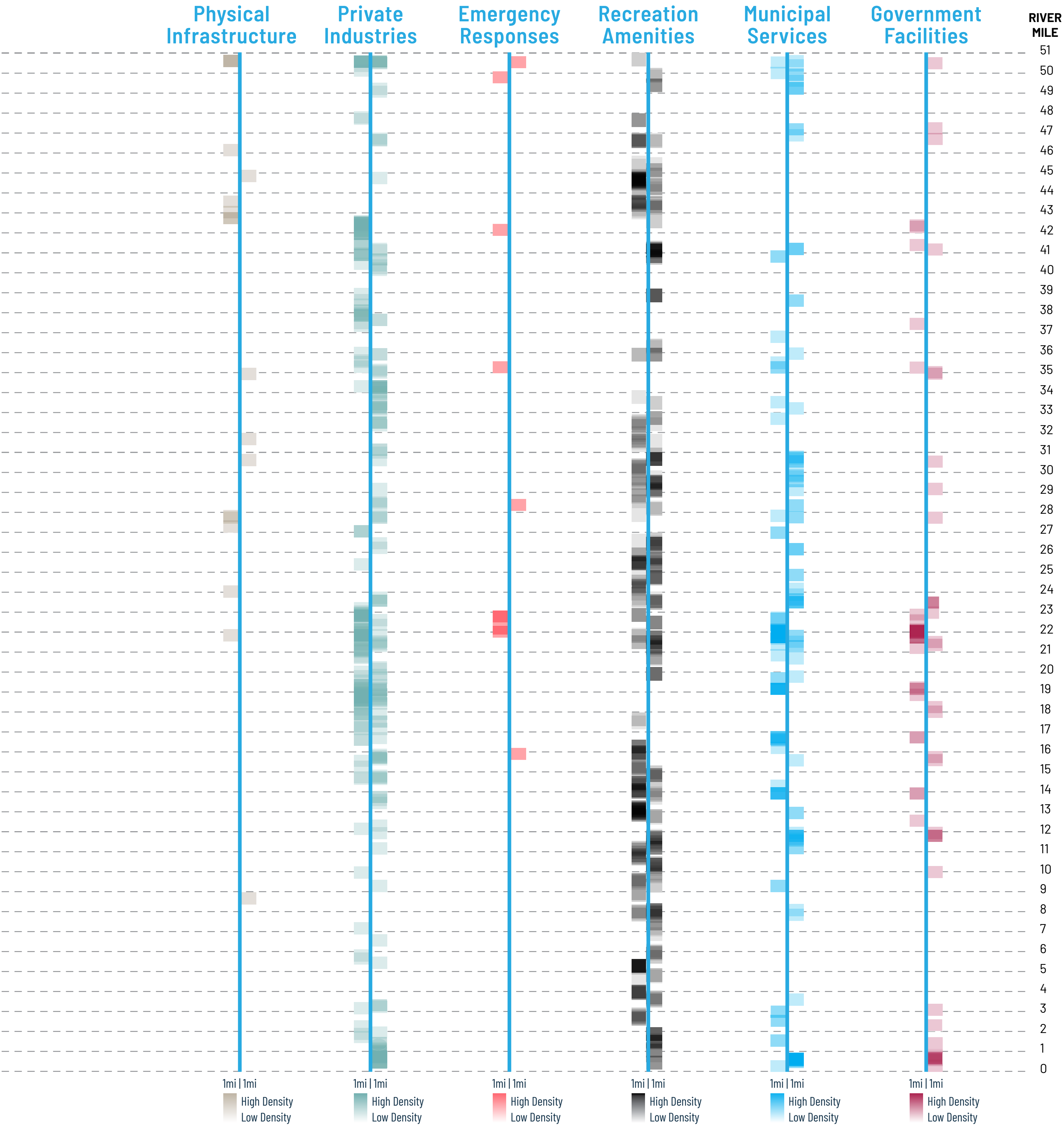


Figure 35. The distribution of cultural and community resources varies greatly along the LA River. Source: See table of figures on page 286 for all source information related to ruler data.



Physical Infrastructure
Private Industries
Emergency Responses
Recreation Amenities
Municipal Services
Government Facilities
RIVER MILE
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High Density
Low Density

EXISTING COMMUNITY, ART, AND CULTURE

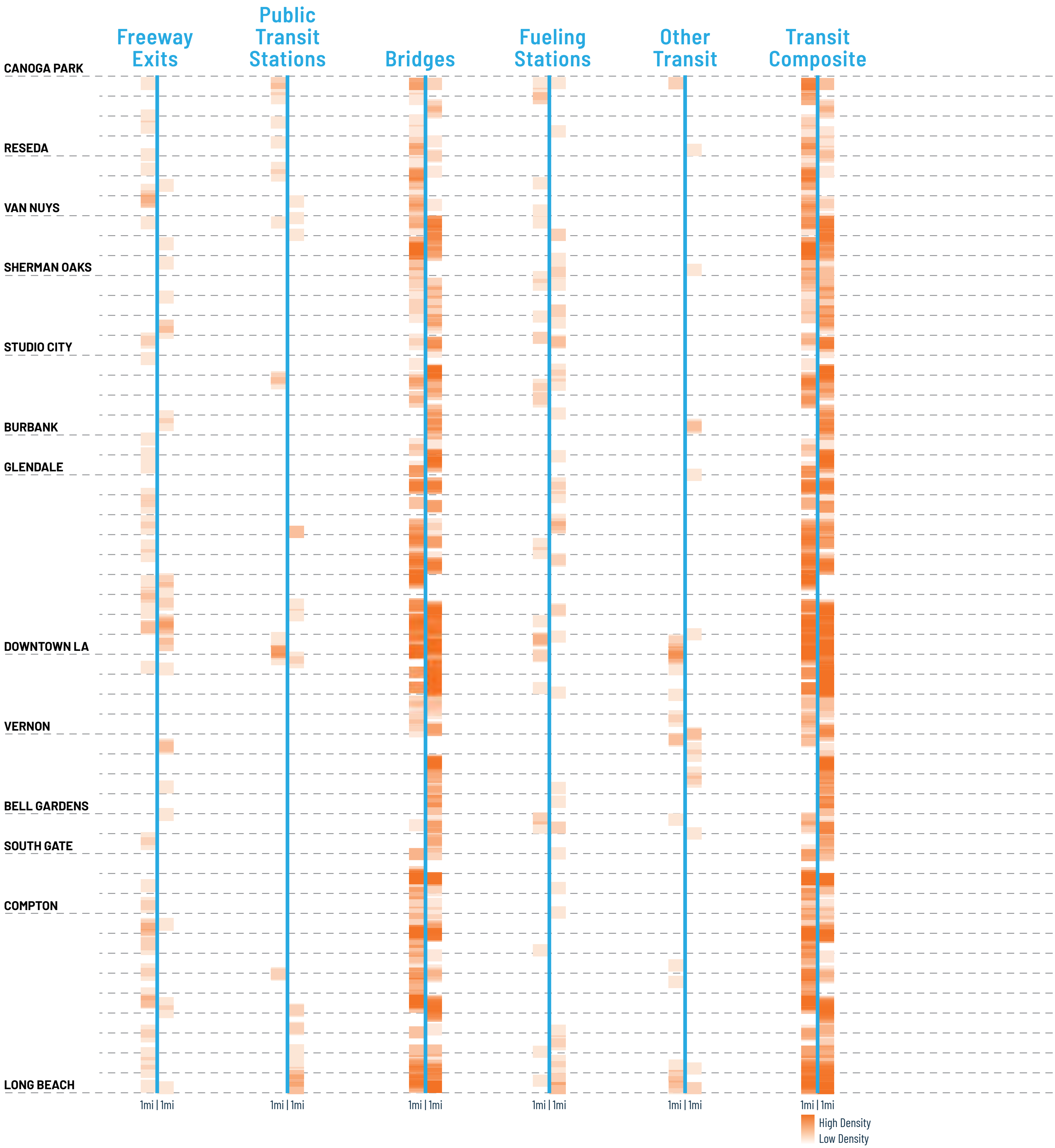


Figure 36. The LA River interacts with a complex network of roads and highways, many of which bridge the channel. Source: See table of figures on page 286 for all source information related to ruler data.

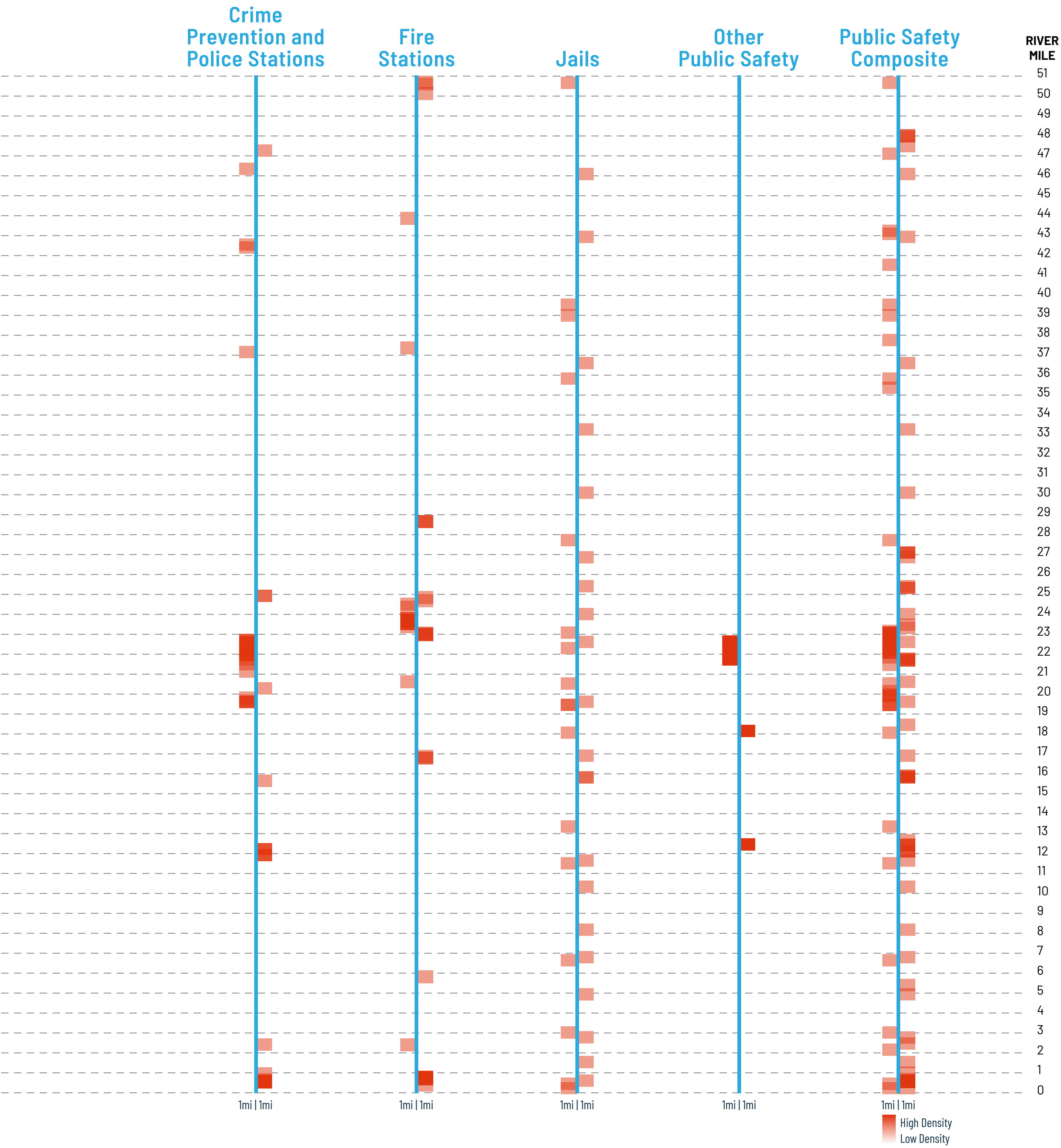
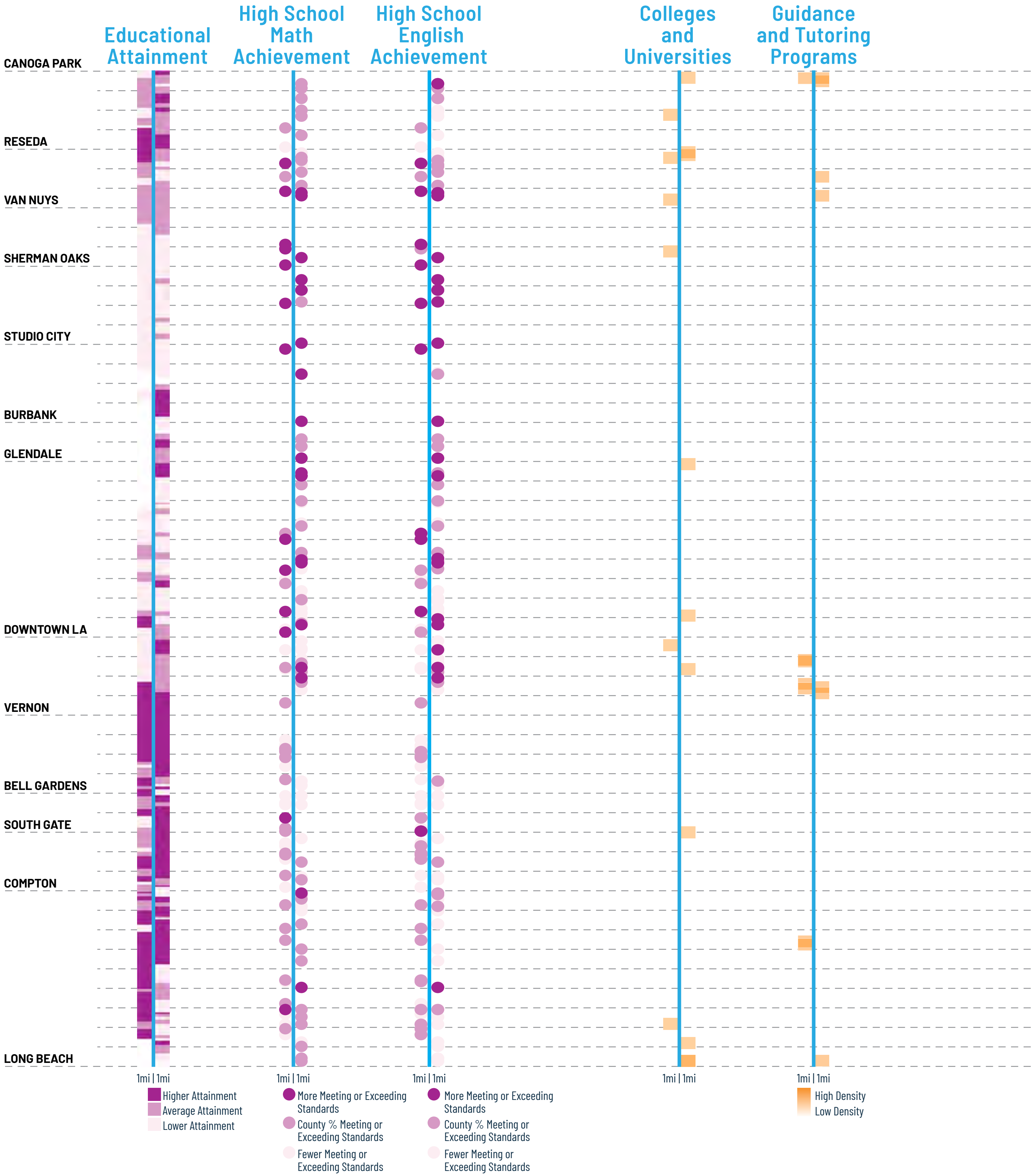


Figure 37. **There are many public safety facilities within one mile of the LA River.** Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING COMMUNITY, ART, AND CULTURE



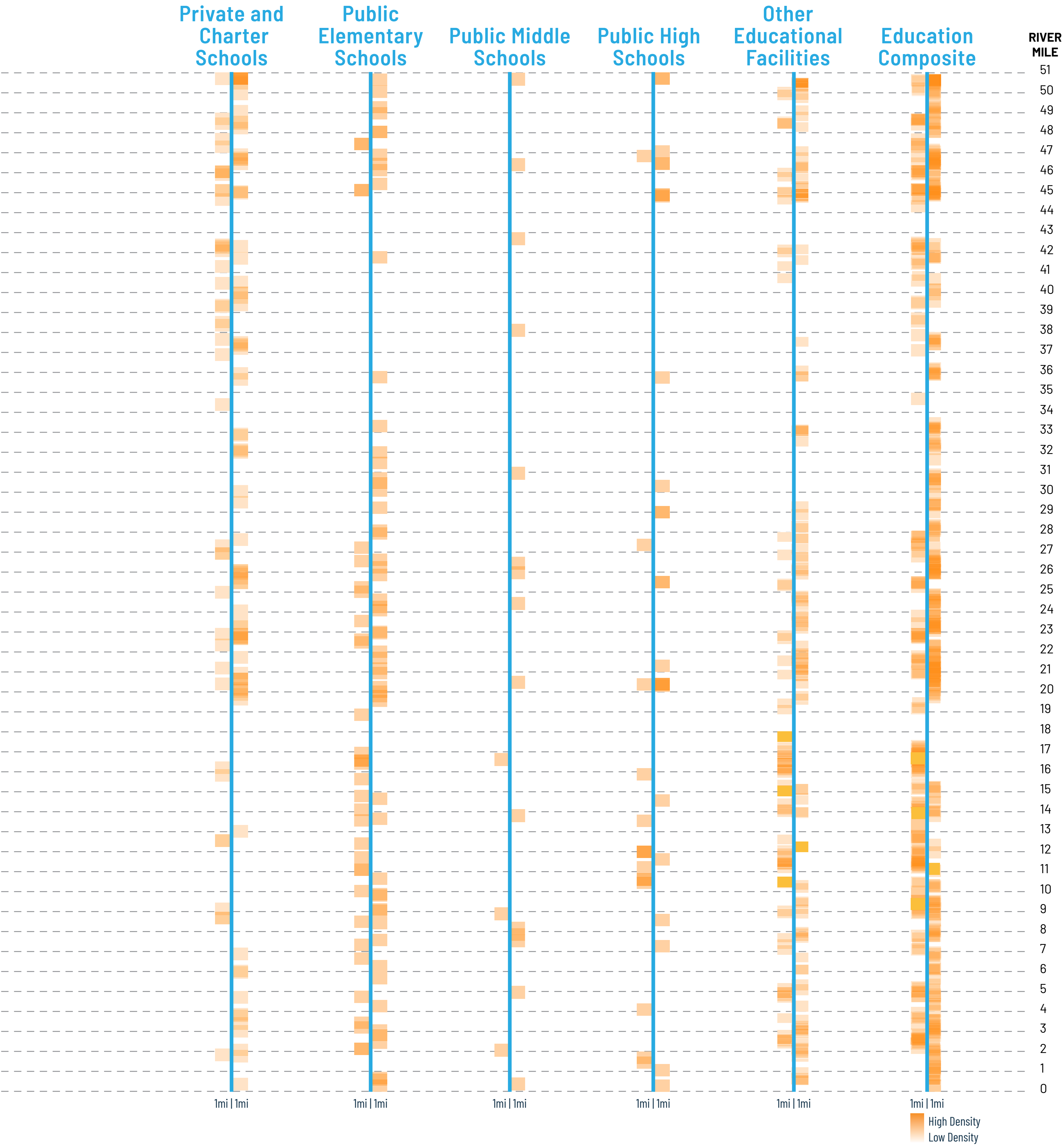


Figure 38. There are 483 educational institutions within one mile of the LA River. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING COMMUNITY, ART, AND CULTURE

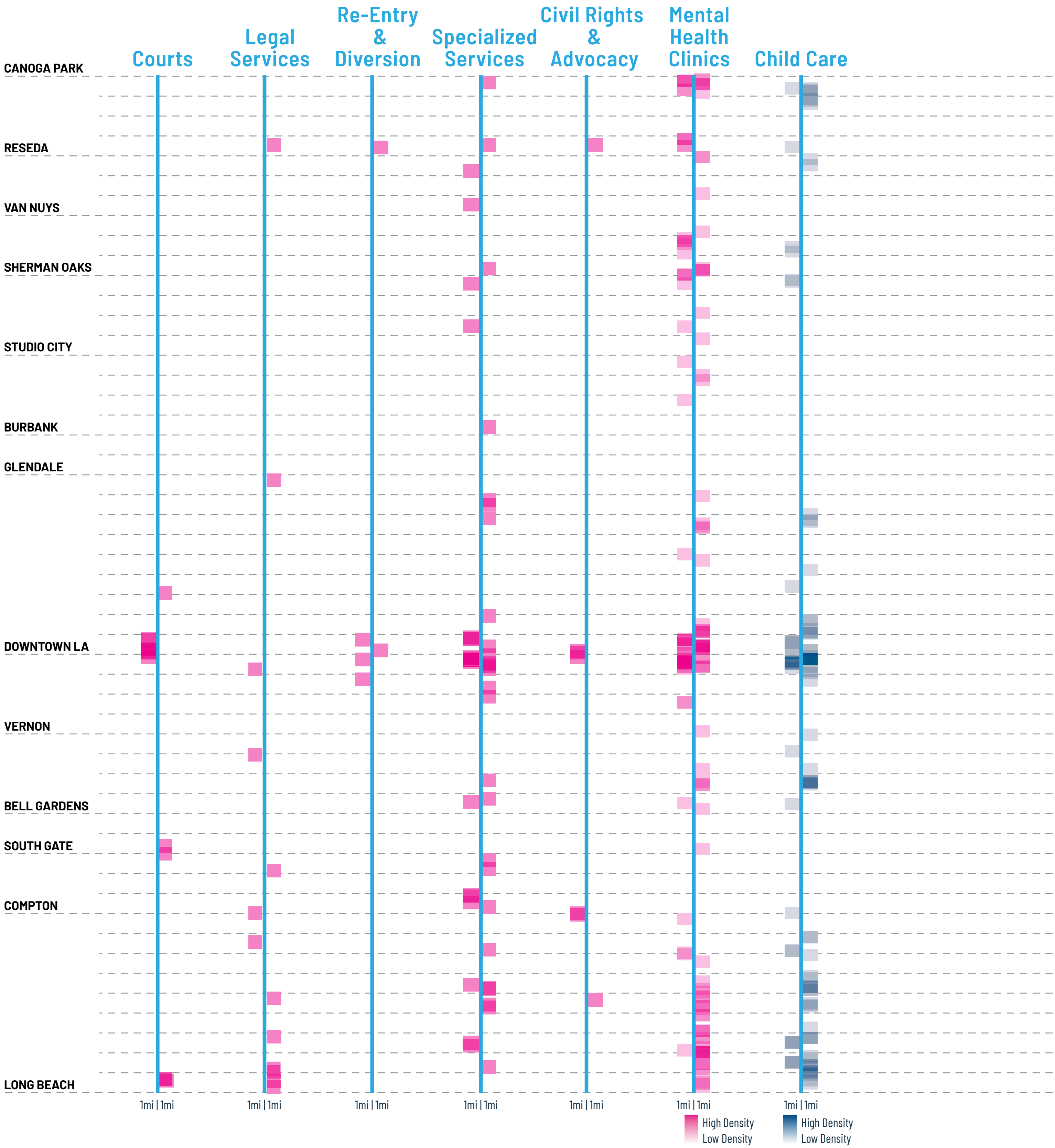


Figure 39. There are many social justice service facilities within one mile of the LA River. Source: See table of figures on page 286 for all source information related to ruler data.

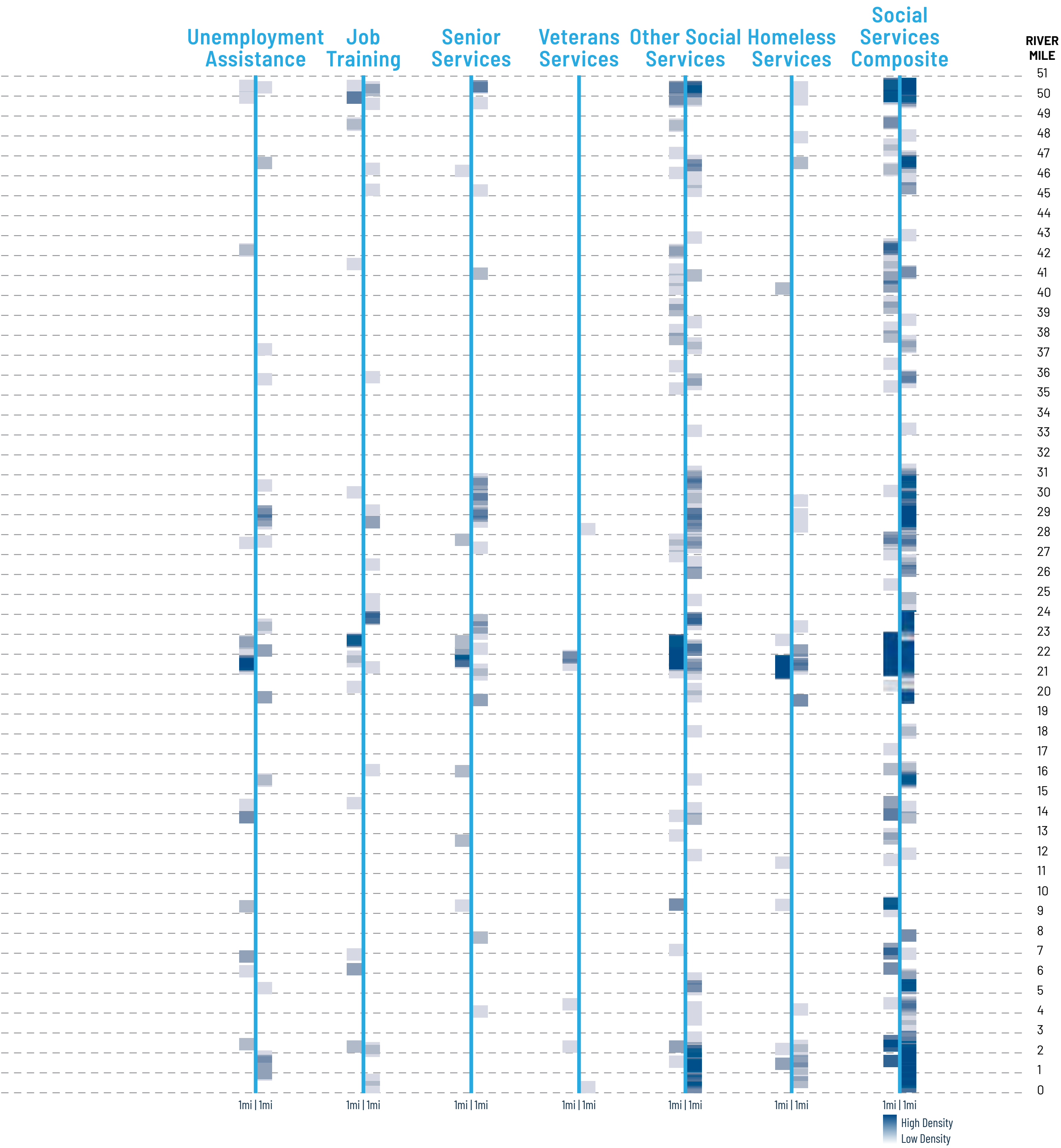


Figure 40. There are 641 social service facilities within one mile of the LA River. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING COMMUNITY, ART, AND CULTURE

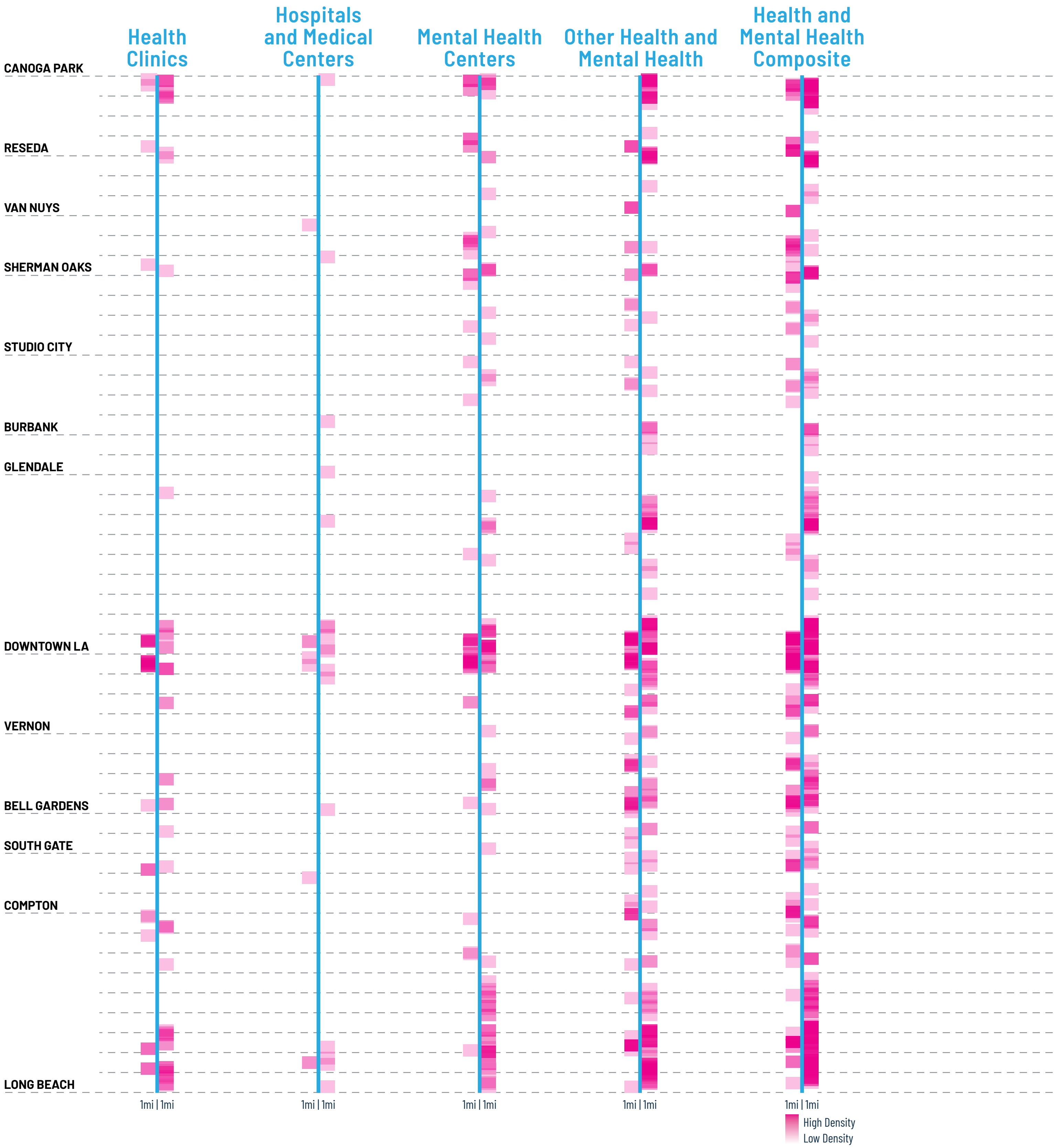


Figure 41. **There are 549 health facilities within one mile of the LA River.** Source: See table of figures on page 286 for all source information related to ruler data.

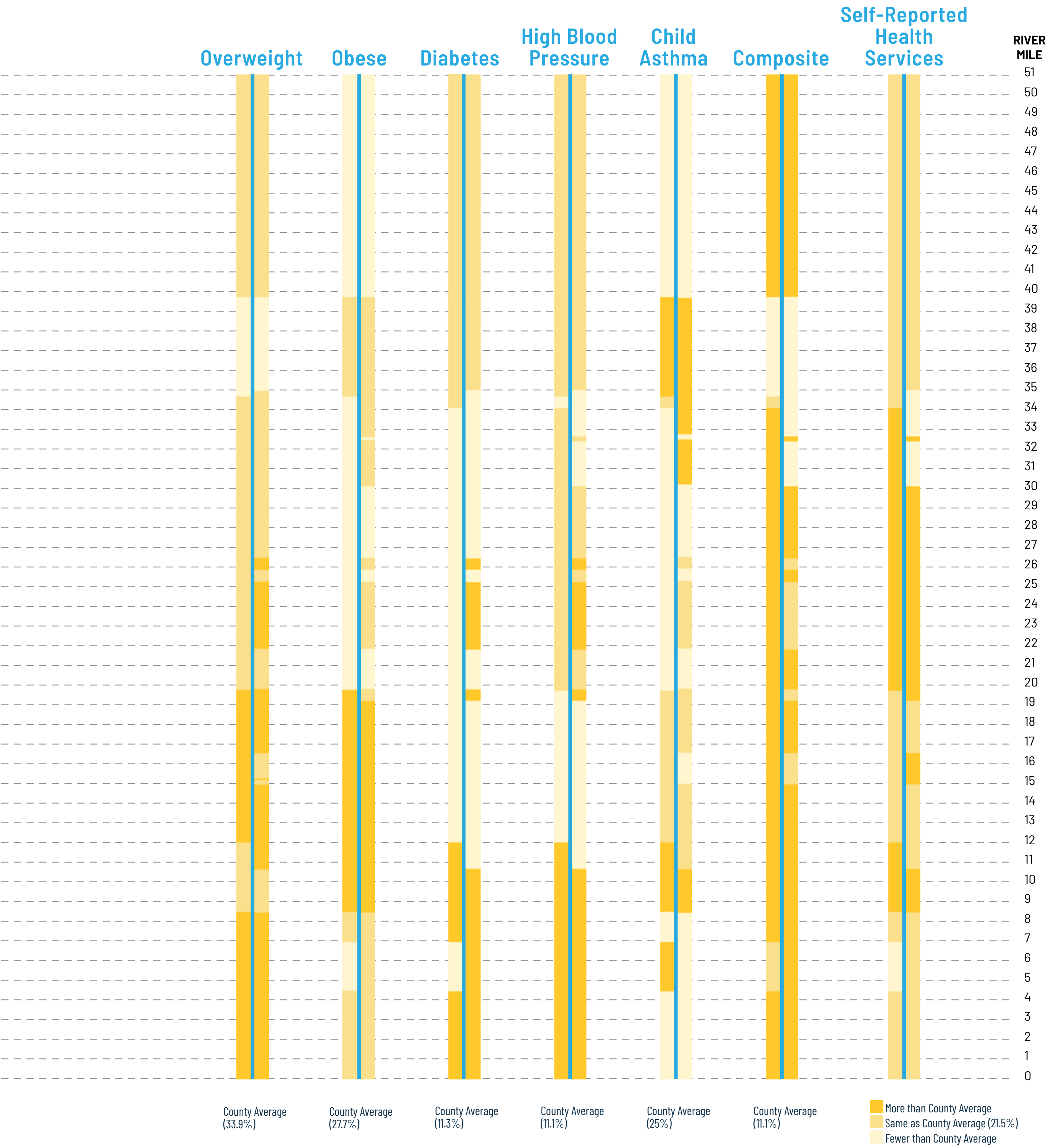


Figure 42. The southern cities along the river in LA County are most acutely impacted by health issues such as obesity, diabetes, and child asthma. "Same as county average" is considered to be the county average +/- 1/2 a standard deviation. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING ACCESS

User access includes public trails along the river, access points that connect trails to surrounding streets, paths, and parks, and the means by which the public gets to these access points.

Chapter 4 of the LA River Master Plan includes a summary of existing access. Provided here are additional datasets used to develop the plan.

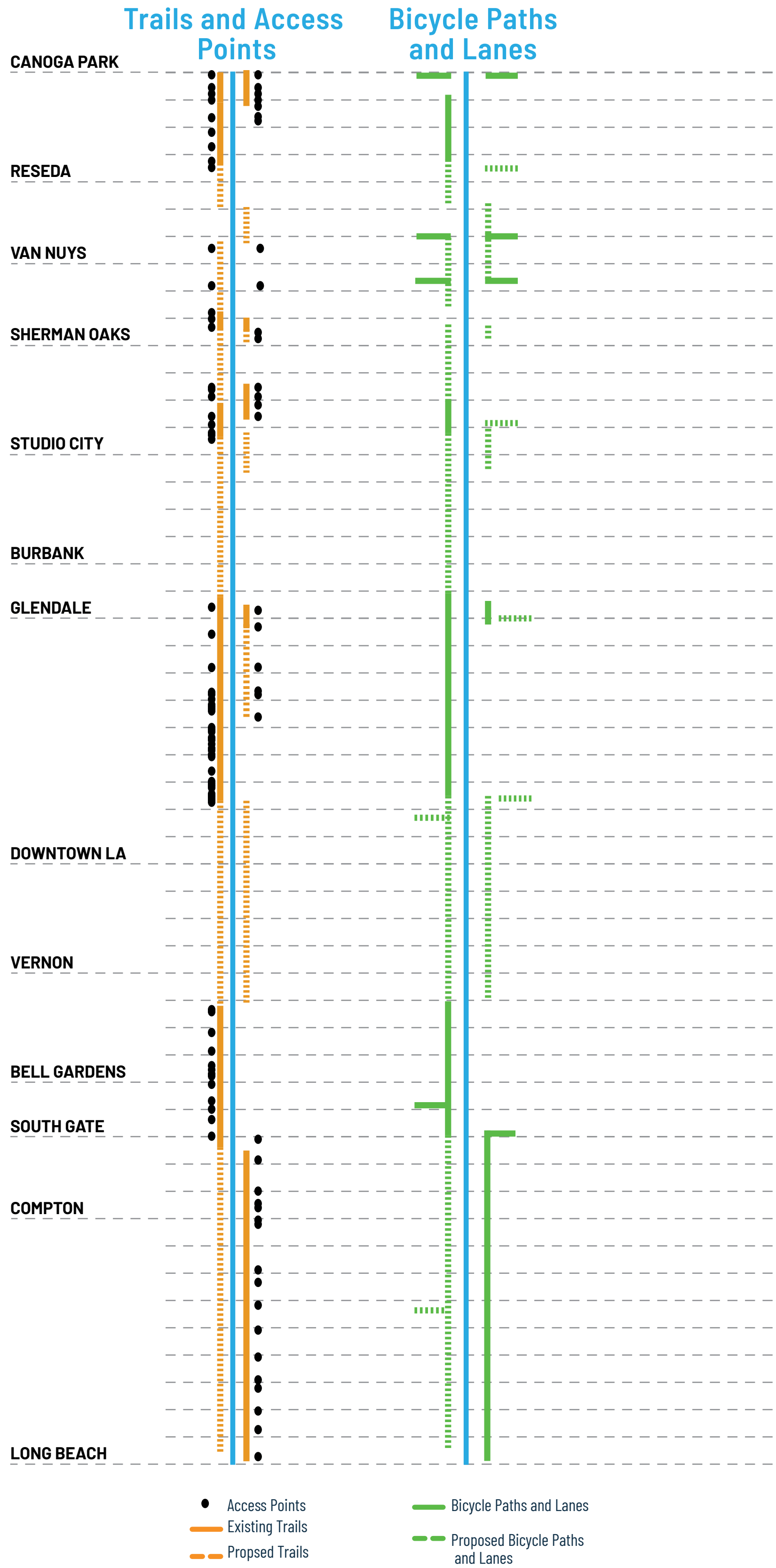
Trails and Access Points
Trails provide access to 32 of the 51 river miles, or 60% of the corridor. Beginning with a City of LA dataset, 112 access points were mapped along the river which serve 32 of the 51 river miles. This dataset includes access points identified as both "formal" and "informal," ranging from gaps in the fence to clear and well-signed trailheads.

Bicycle Paths and Lanes
Cyclists can connect to the river trail at other access points via the street network, but in many cases these street connections lack bike lanes or other affordances. Only 6% of access points are served by a bike lane or off-street path. Even for those that are, the generally fragmented nature of the cycling network in the Los Angeles area means that a continuous, protected route to the river will be available to very few.

Pedestrian Bridges
Access points, like the path, tend to be located on one side of the river at a time, although 45% connect to the opposite bank via pedestrian-accessible bridges. Moreover, access points are not always well connected by the street grid, which often becomes sparse or fragmented as it approaches the river. These network qualities tend to make paths to the trailhead longer and less intuitive.

Public Transit Proximity
Access points are generally well served by Metro buses, with 94% falling within a half mile of a stop and most having access to multiple stops. Metro rail access is more limited; although many high-ridership stops are within a half mile of the river itself, only two are within a half mile of an existing river access points. The routes from these two stops are both walkable, although they are not signed and, subjectively, do not appear to be appealing or intuitive.

Note: municipal bus lines were not included in this assessment and serve localized areas.



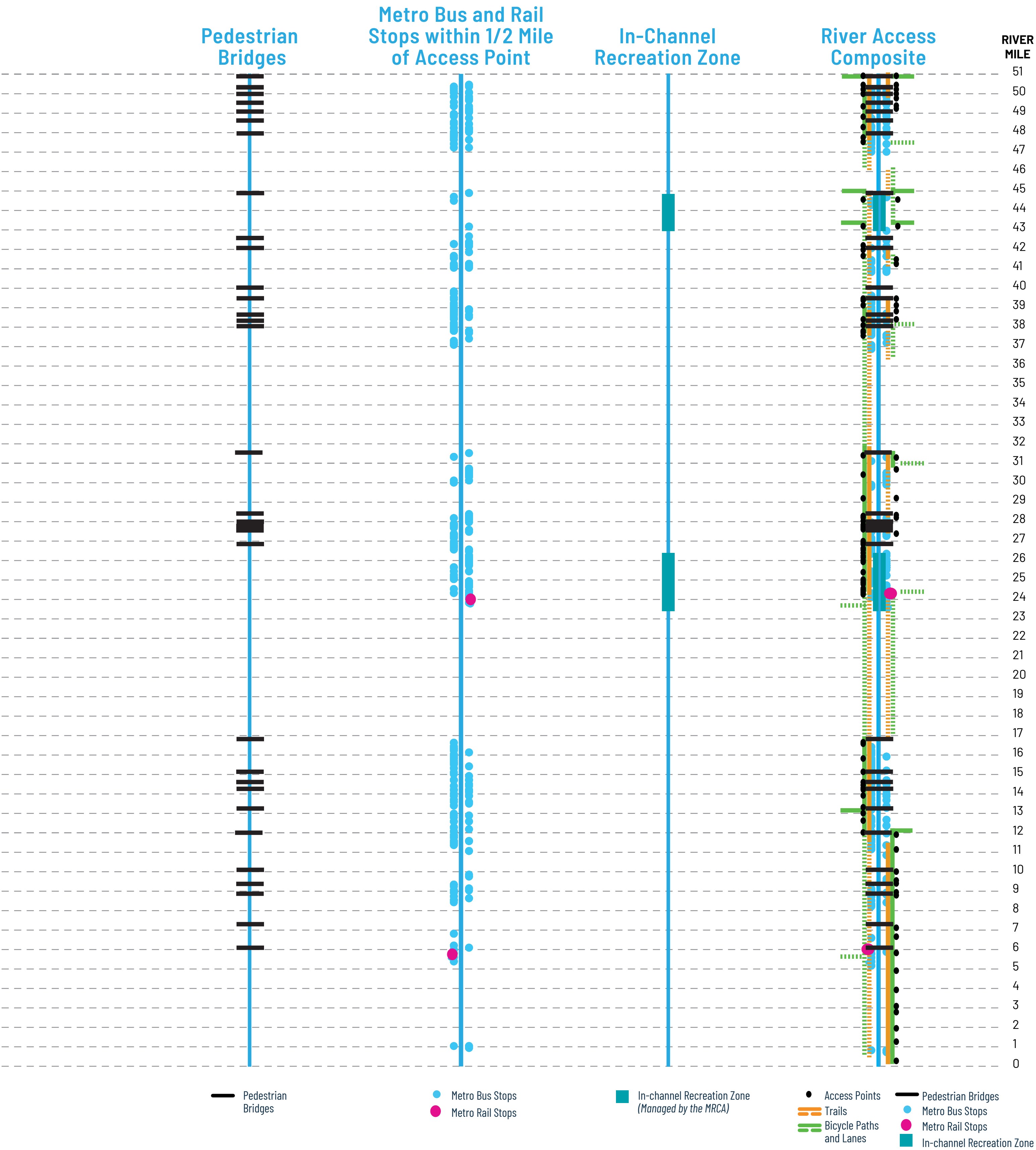


Figure 43. Trails, bike paths, and access points are unevenly distributed along the LA River, leaving discrete gaps in river access. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING DEMOGRAPHICS

With just over 10 million residents in 2019, LA County is the most populous county in the country and is a patchwork of diverse communities.

Chapter 4 of the LA River Master Plan includes a summary of existing demographics. Provided here are additional datasets used to develop the plan.

Race/Ethnicity
Between 2000 and 2019, the Hispanic and Latino population in the county inched closer to making up half the population, from 45 to 48%.[3] Nearly every community across the county is diverse, yet there are parts of the county that have larger than average shares of particular racial or ethnic groups. North of Griffith Park to Canoga Park on the LA River, communities have larger-than-average shares of non-Hispanic white residents. Near the river in Downtown LA, Chinatown, and Little Tokyo have large concentrations of Asian residents, while Glendale's 72,000 Armenians represent one of the largest Armenian populations in a city outside Yerevan, Armenia's capital.[4] South of Downtown LA, communities have larger-than-average shares of Hispanic and Latino residents.

Density
Generally, communities along the LA River from Downtown LA to Long Beach are denser, with 15,000–35,000 people per square mile, than communities along the LA River north of Downtown LA, with 5,000–25,000 people per square mile.[5]

Median Age
The average age in communities along the lower half of the LA River is about 33 years, which is lower than the average age in communities along the upper half of the river, 39 years.

Average Household Size
The average household in the county is made up of three people; households are larger along the lower stretch of the river.

Percent Unemployed
Unemployment is higher in the middle to lower stretch of the river.

Jobs
Adjacent to the river, jobs are clustered along Ventura Boulevard, at the film and television studios, and in downtowns of different cities.

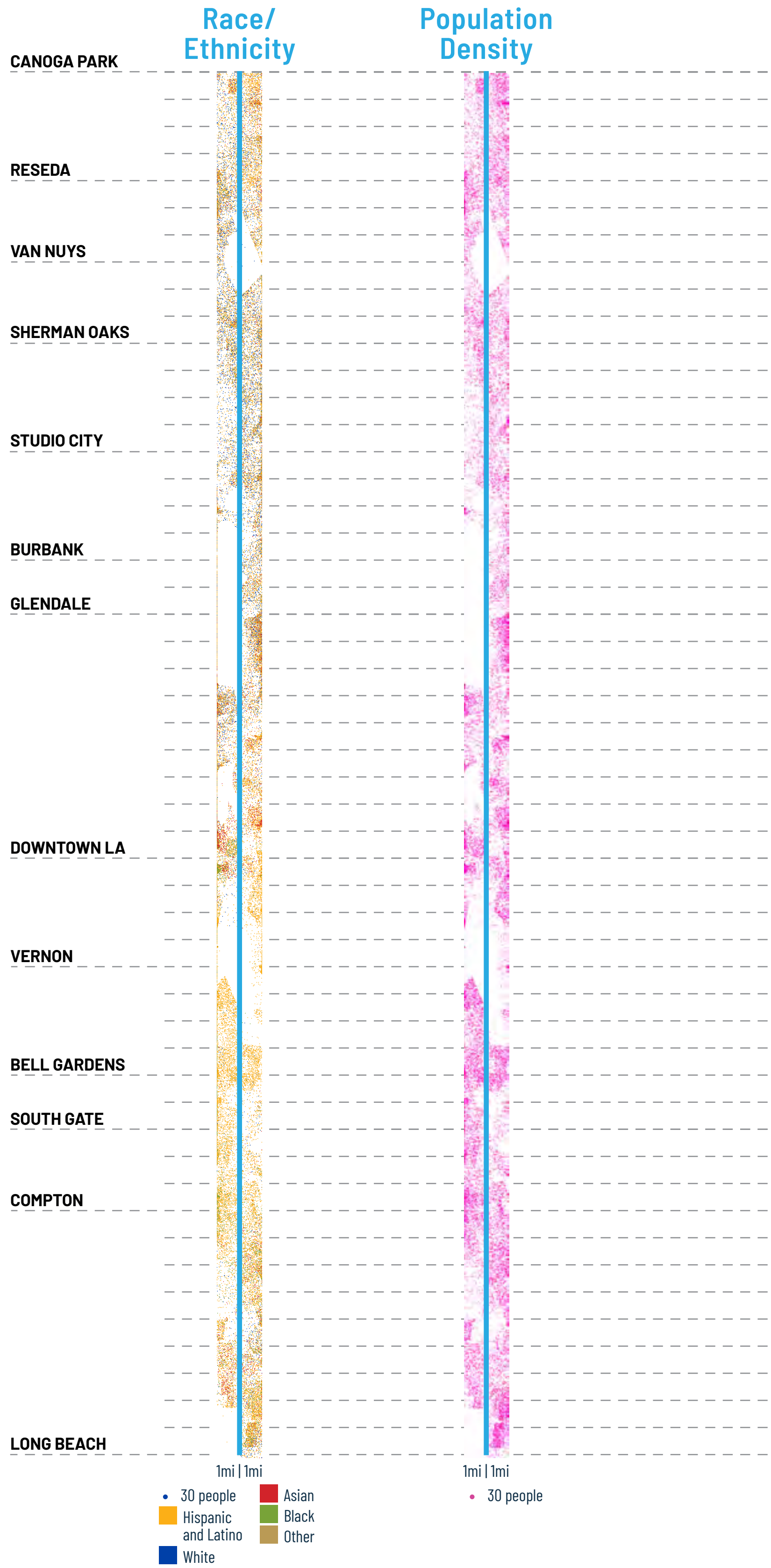


Figure 44. LA County is a patchwork of diverse communities. Source: See table of figures on page 286 for all source information related to ruler data.

Figure 45. The demographic make-up of the river shifts frequently, though certain analysis categories demonstrate broader demographic sweeps where they rise above or fall below LA County average. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING DEMOGRAPHICS: HOUSING

Median Home Value
Median home value is highest in the upper to middle stretch of the river.

Percent Home Ownership
Percent home ownership is highest in the San Fernando Valley and along the Lower LA River.

Percent Severely Rent Burdened
About a third (29%) of renters in the county are severely rent burdened, meaning they spend more than half of their income on rent.

Displacement Risk
Mapping of displacement risk related to economic pressures including areas vulnerable to displacement (Downtown LA and cities along the lower LA River), at risk of displacement (Downtown LA, Compton, and Long Beach), in a state of ongoing displacement (East LA and Chinatown), and a state of Advanced Displacement (Frogtown, LA Arts District, and South Gate).

People Experiencing Homelessness
Currently, over 8,500 people experiencing homelessness live in communities along the LA River.

Household Income
Households in communities along the LA River between Downtown LA and Compton tend to be larger and have lower household incomes than those along other parts of the river.

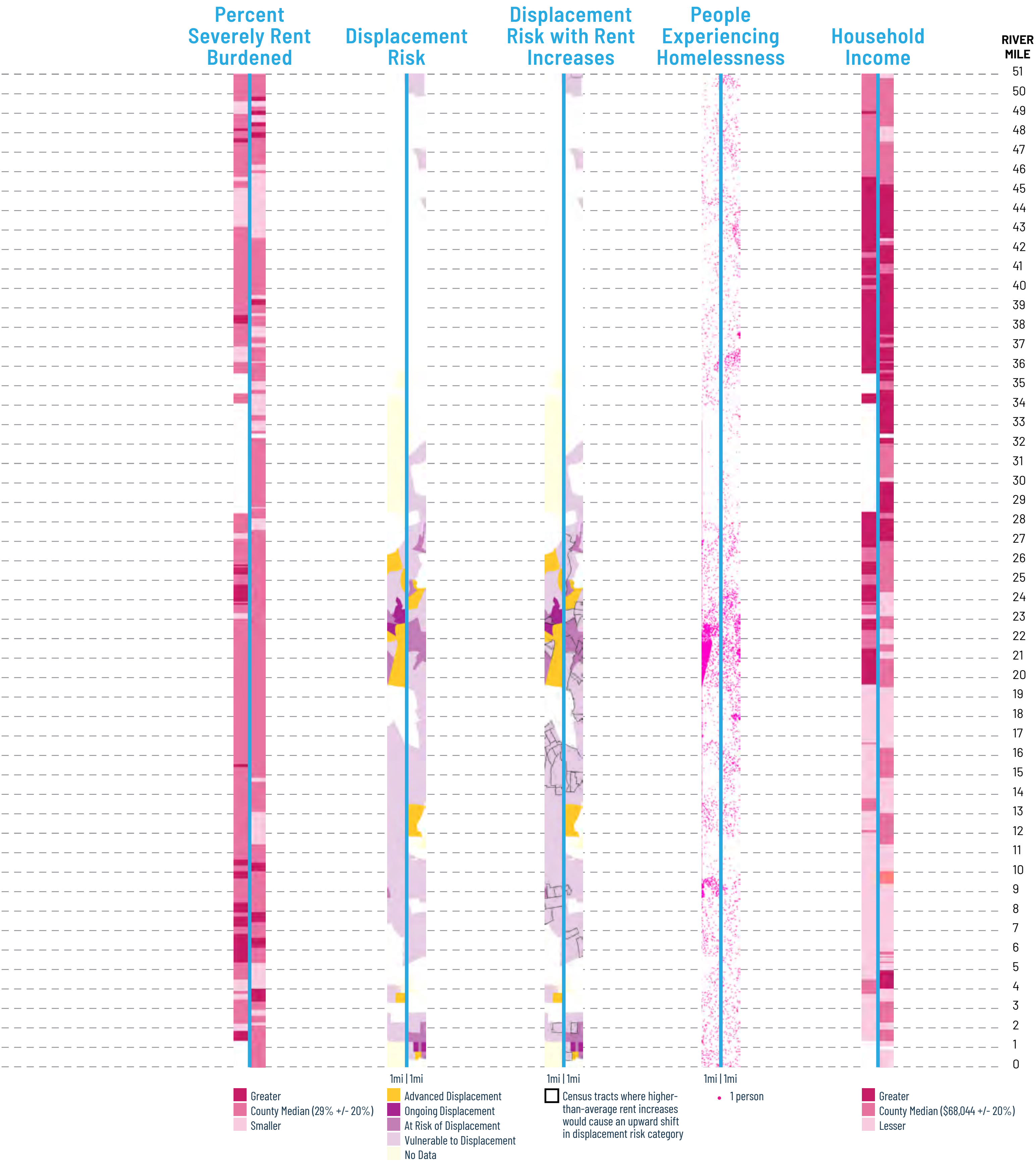
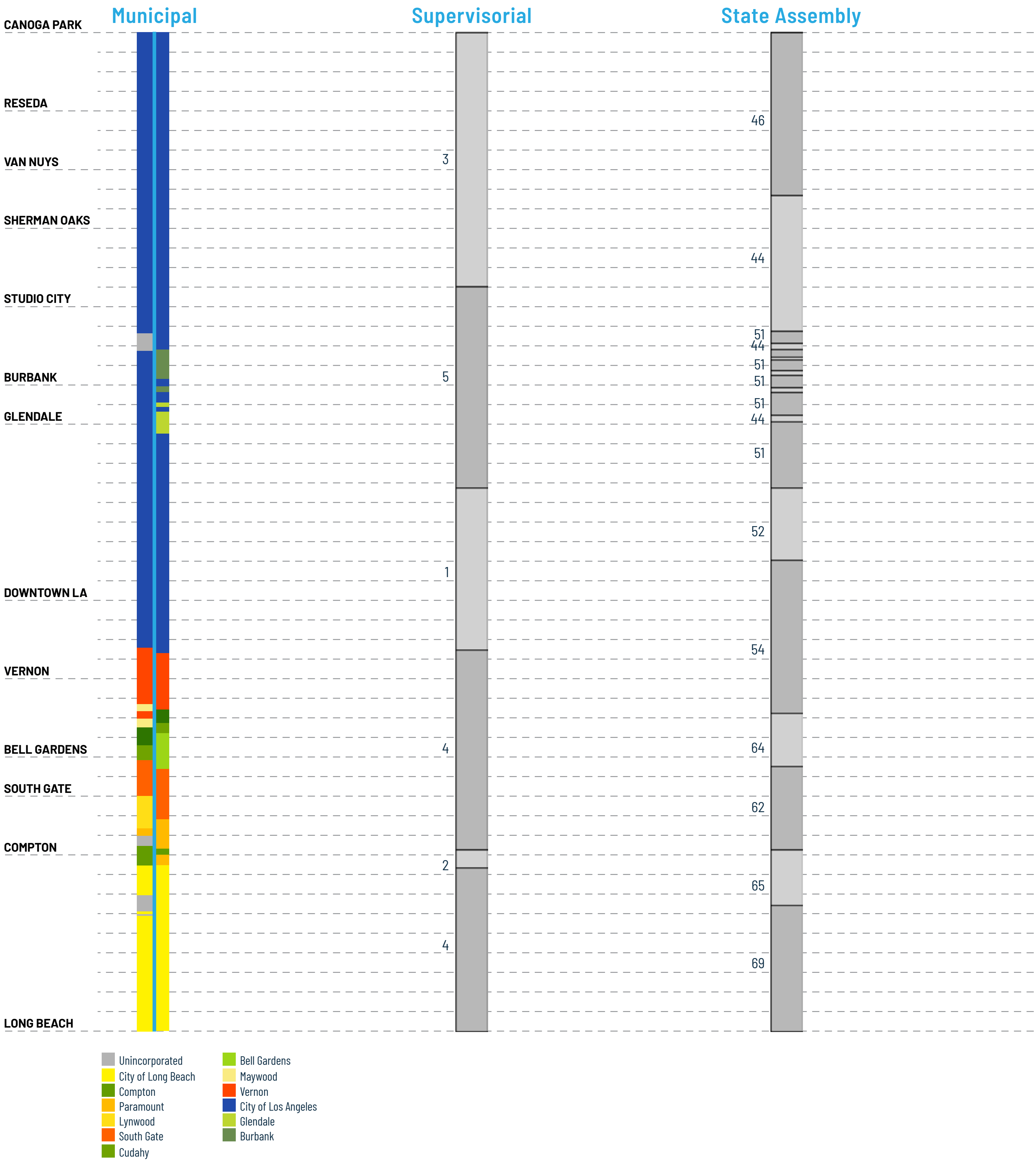


Figure 46. Housing affordability is an issue of utmost importance in LA County. There are several neighborhoods adjacent to the river where households are severely rent-burdened and at risk of displacement. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING DEMOGRAPHICS



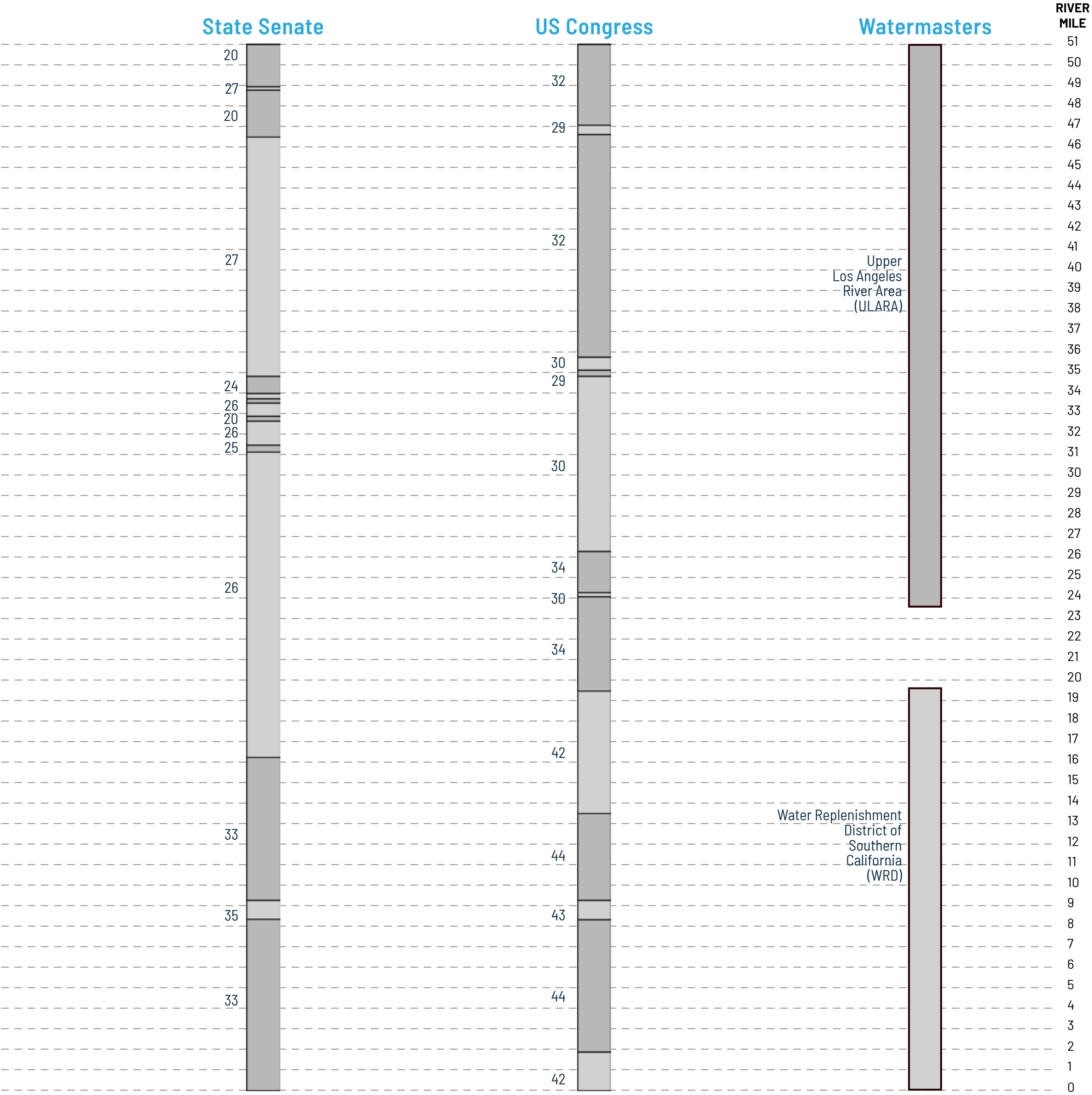


Figure 47. The LA River is a complex political landscape. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING SUSTAINABILITY AND RESILIENCY

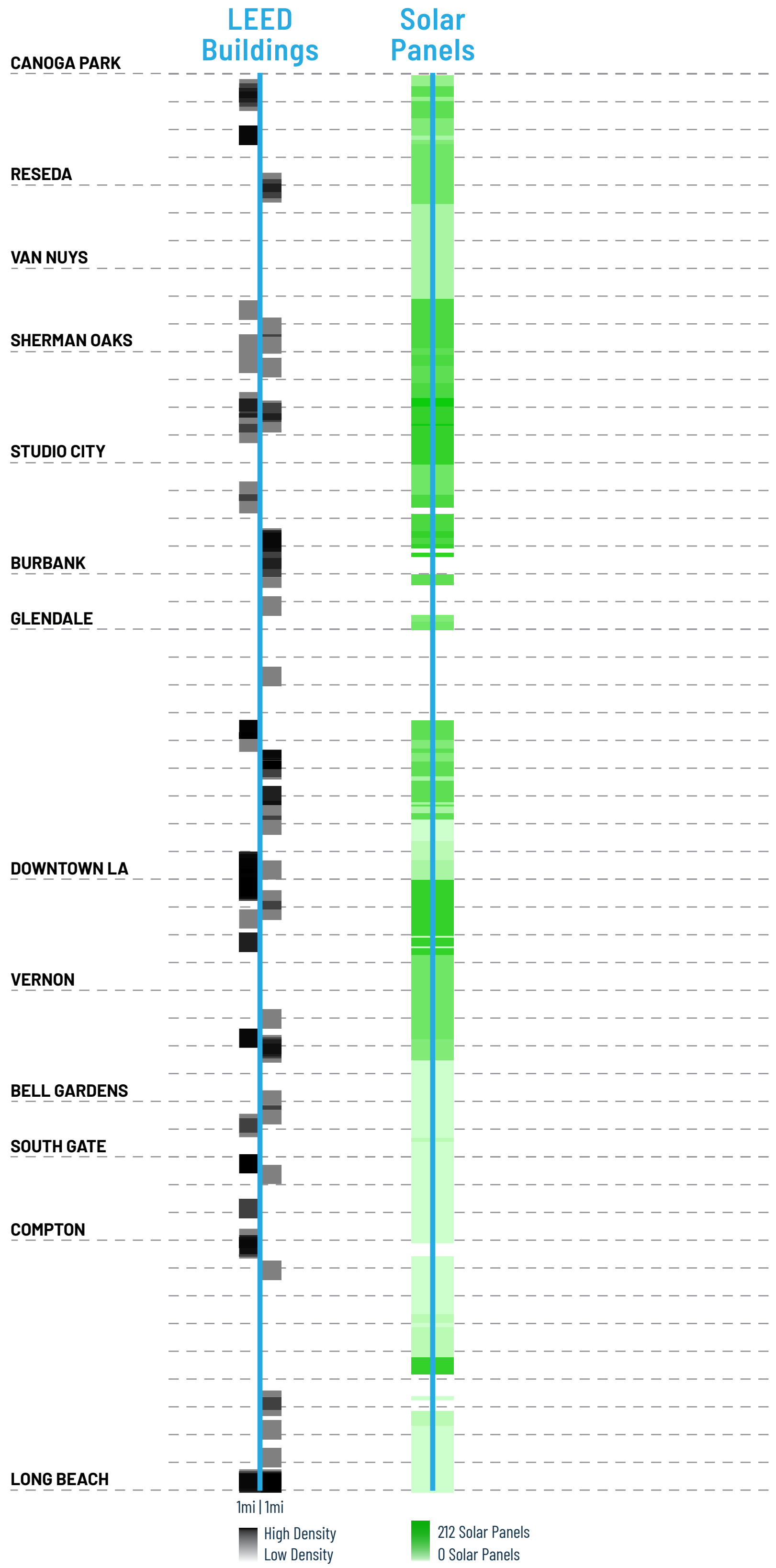
The related topics of resilience and sustainability encapsulate a fundamental duality that is the LA River: a vital resource to sustain and a dynamic risk to manage.

Chapter 4 of the LA River Master Plan includes a summary of existing sustainability and resiliency. Provided here are additional datasets used to develop the plan.

Solar
Currently solar panel installations are more common in neighborhoods along the upper half of the river. On the lower half of the river, where space adjacent to the river is more common, undeveloped land could be further utilized by local communities to increase their local solar resources.

Urban Agriculture
Some of the undeveloped rights-of-way and land adjacent to the river have been utilized for urban agriculture. One hundred and twelve urban farms and nurseries exist within one mile of the river. Community gardens, farms, nurseries, and school gardens are part of a network of facilities that produce a range of benefits compared to barren or impervious paved areas. Urban agriculture sites infiltrate water, can lower the urban heat island effect (UHIE) through evapotranspiration and added shade, and provide a sustainable local food source, employment, and education.

UHIE and Social Vulnerability to Climate Change
Heat is amplified in the city by the UHIE, where heat is amplified locally by heat-absorptive surfaces, heat-generating activities, the absence of vegetation, and high levels of air pollution, conditions common in areas adjacent to the river. This is highest in the San Joaquin Valley and in South Los Angeles. Communities with higher social vulnerability (older and younger populations, homes without air conditioning, and areas with more outdoor workers, etc.) and areas with large unsheltered populations are particularly vulnerable to the UHIE and extreme heat events in these areas *(see resiliency rulers on following spreads).*



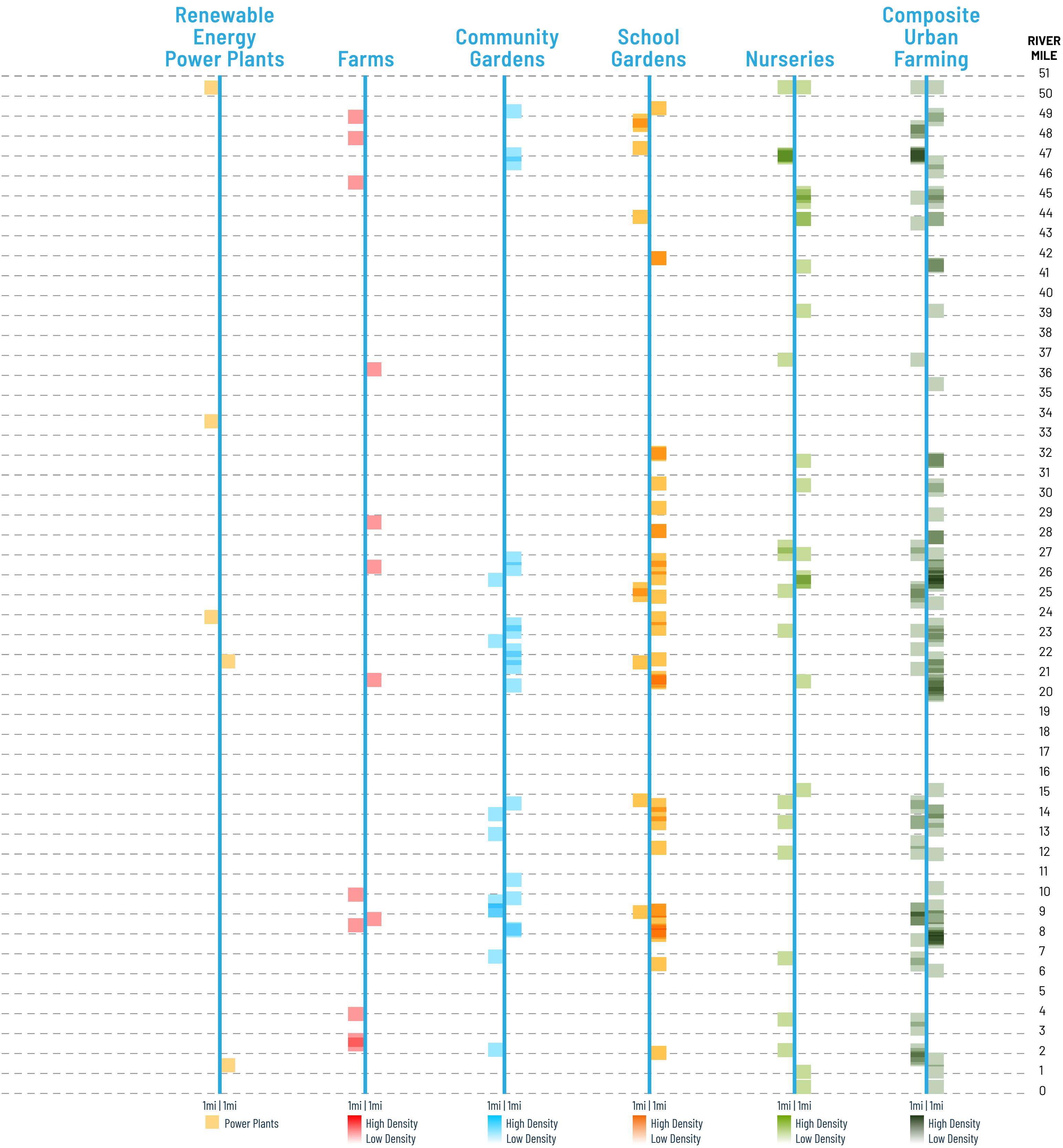
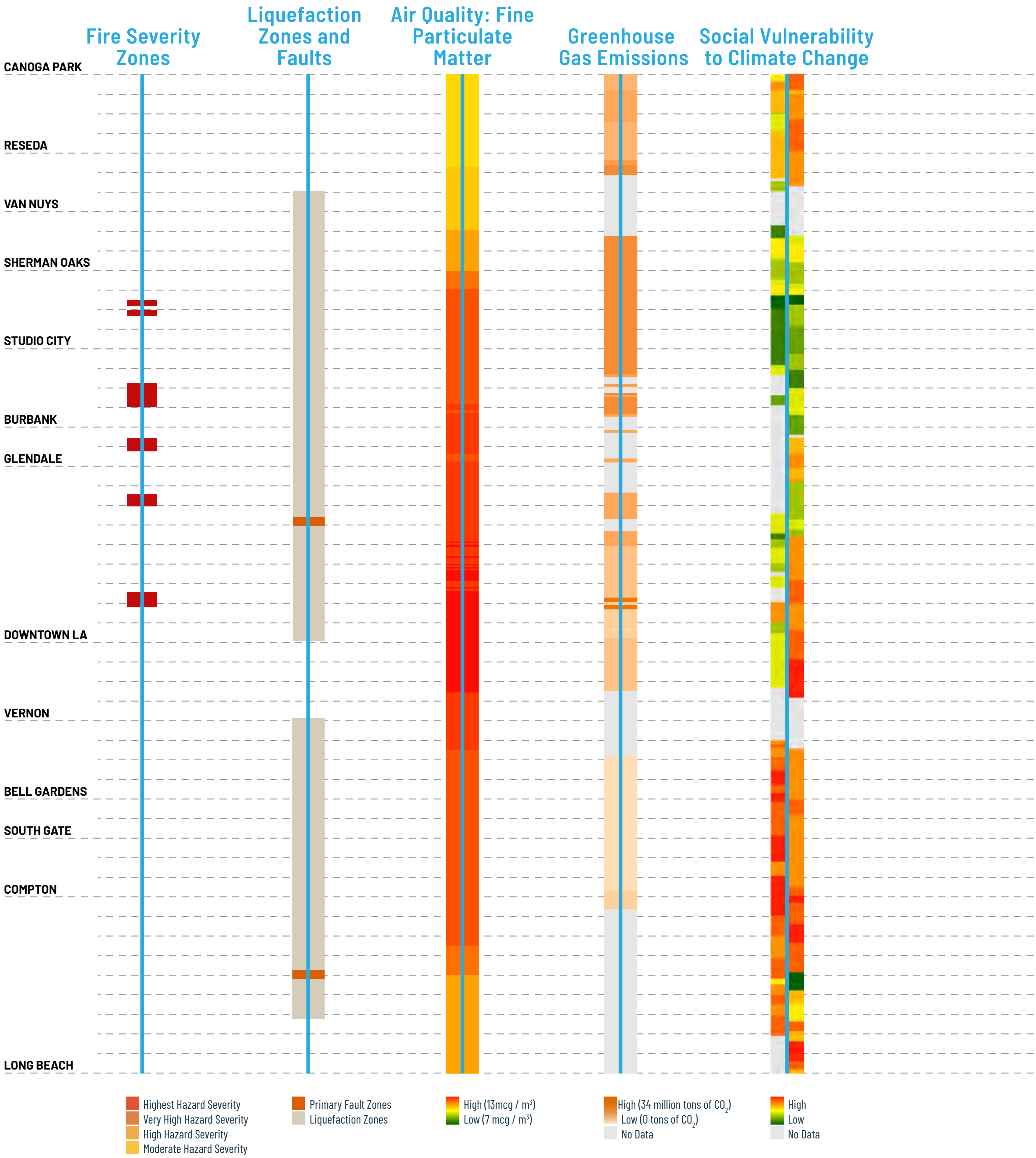


Figure 48. Strategies for reducing energy use and fostering stronger connections between communities and the environment include green buildings as well as local institutions, like community gardens, that inspire interest in the natural world. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING SUSTAINABILITY AND RESILIENCY



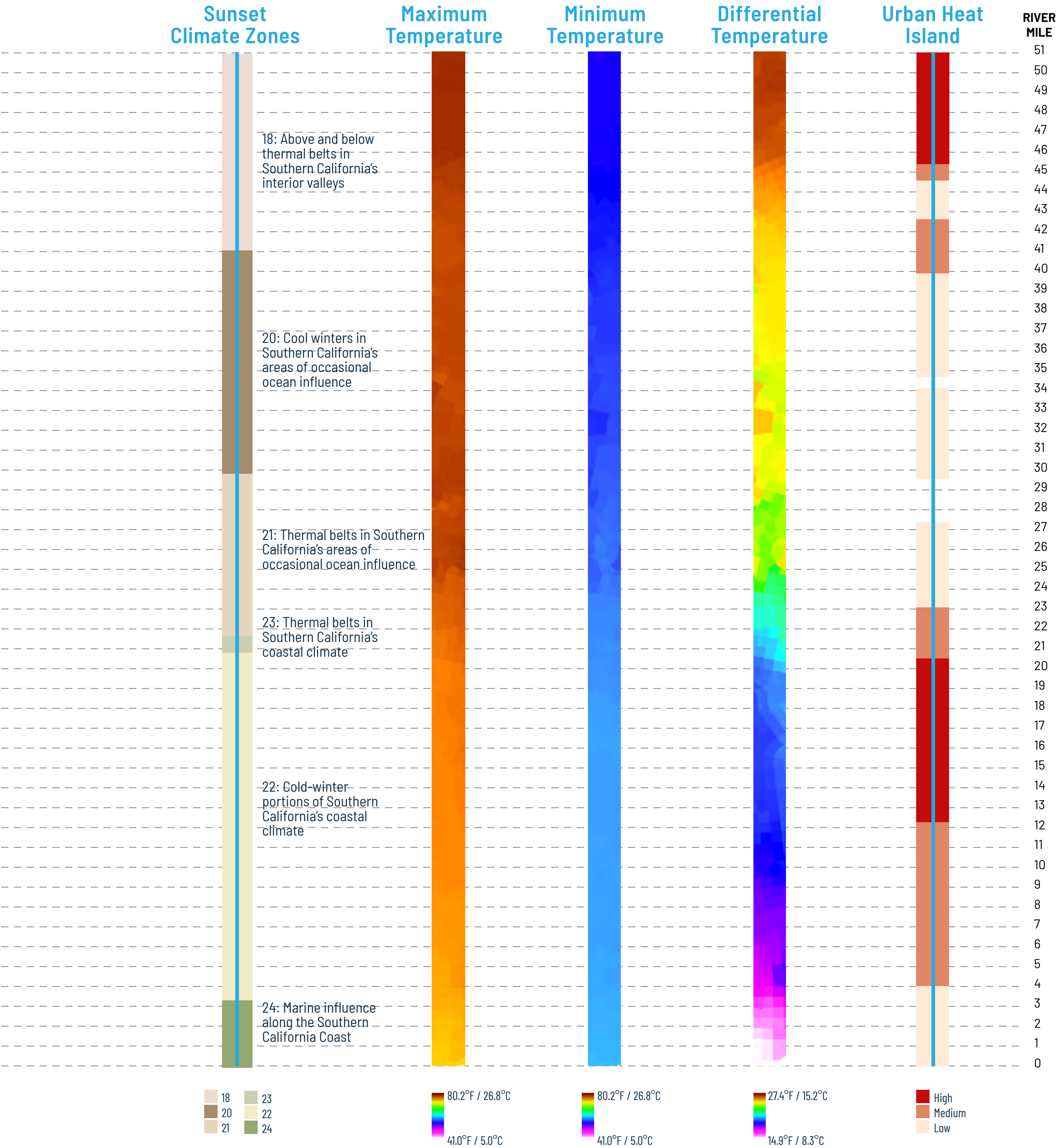


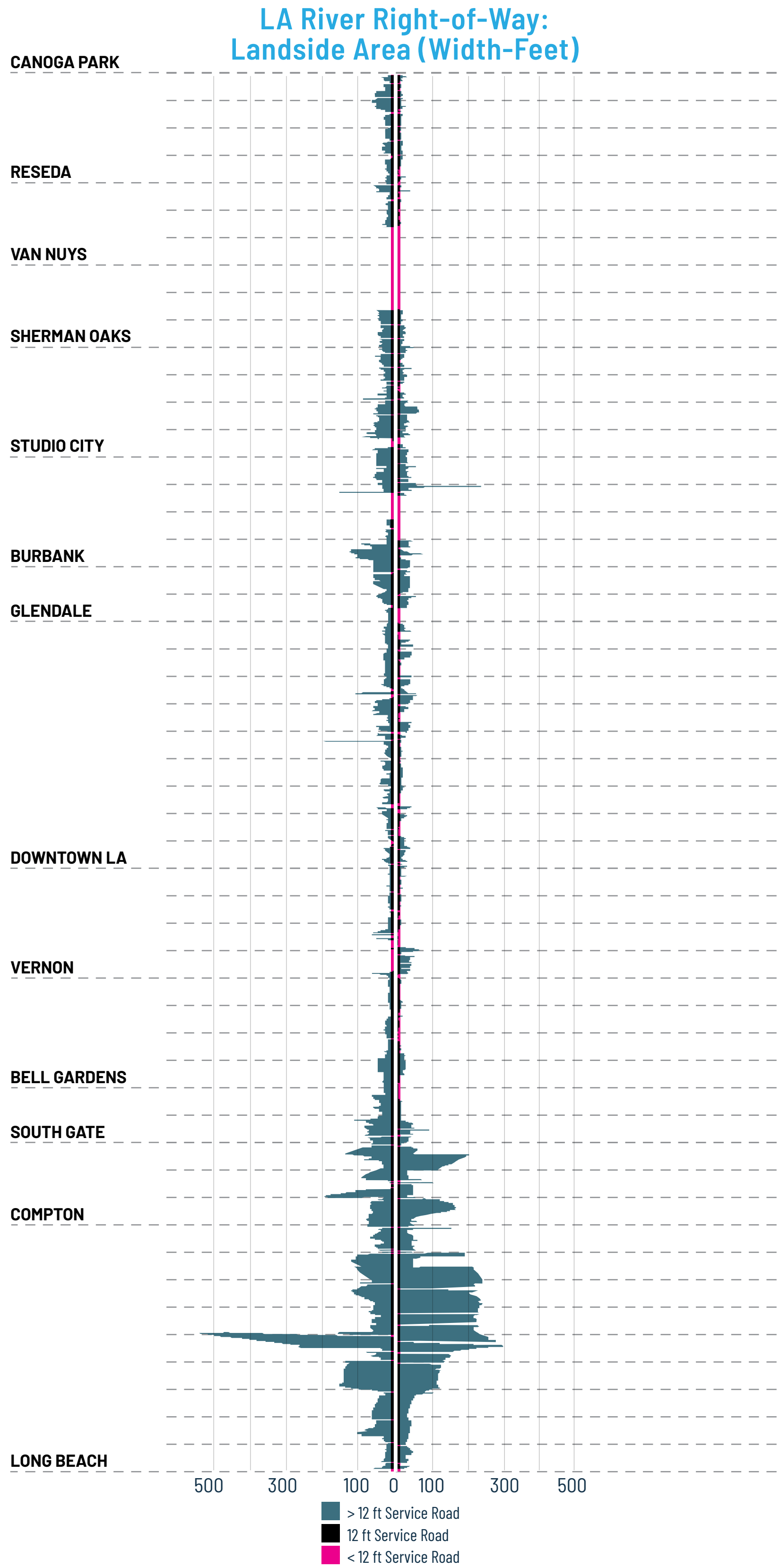
Figure 49. Resilience is defined by the capacity of a community to recover quickly from impacts related to significant adverse events. In the built environment and in a community, this can occur as both shocks and stress. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING OPERATIONS AND MAINTENANCE

The LA River spans approximately 51 miles and was converted to a flood management system in the 1930s in response to multiple serious flood events. In addition to the conversion of the main channel, Acts of Congress throughout the 1930s to the 1950s granted authority to the USACE and the LACFCD to construct and maintain flood management structures consisting of dams, debris basins, levees, and drainage channels. Currently, the USACE maintains approximately half of the LA River, while the LACFCD maintains approximately the other half of the LA River.

LA River Right-Of-Way

The LA River flows through various cross-sectional conditions along its 51-mile course, including concrete-lined and earthen reaches, as well as trapezoidal and rectangular section reaches. The typical River right-of-way includes flood management structures, such as levees and the channel itself, and access roads, which are primarily maintained by the Los Angeles County Flood Control District (LACFCD) and the United States Army Corps of Engineers (USACE). In some reaches, various recreational amenities such as bike paths, parks, and trails are found within the right-of-way of the LA River, and in other areas recreation amenities are out of the right-of-way but directly adjacent. Recreational amenities are maintained by municipal entities and/or other special interest groups. Typical O&M issues associated with the channel itself, levees, and landside between the channel/levee and the right-of-way are considered in this technical appendix.



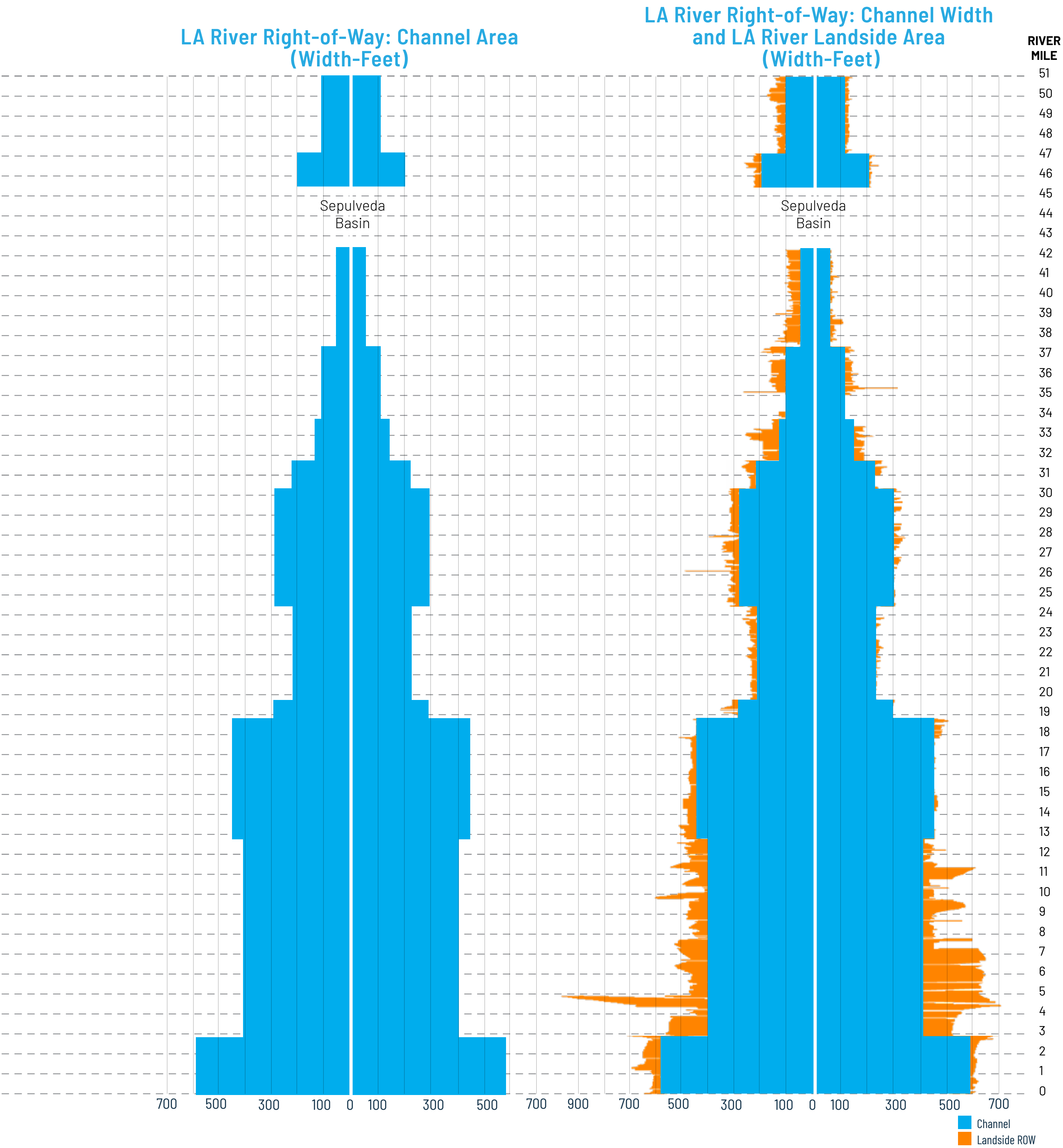
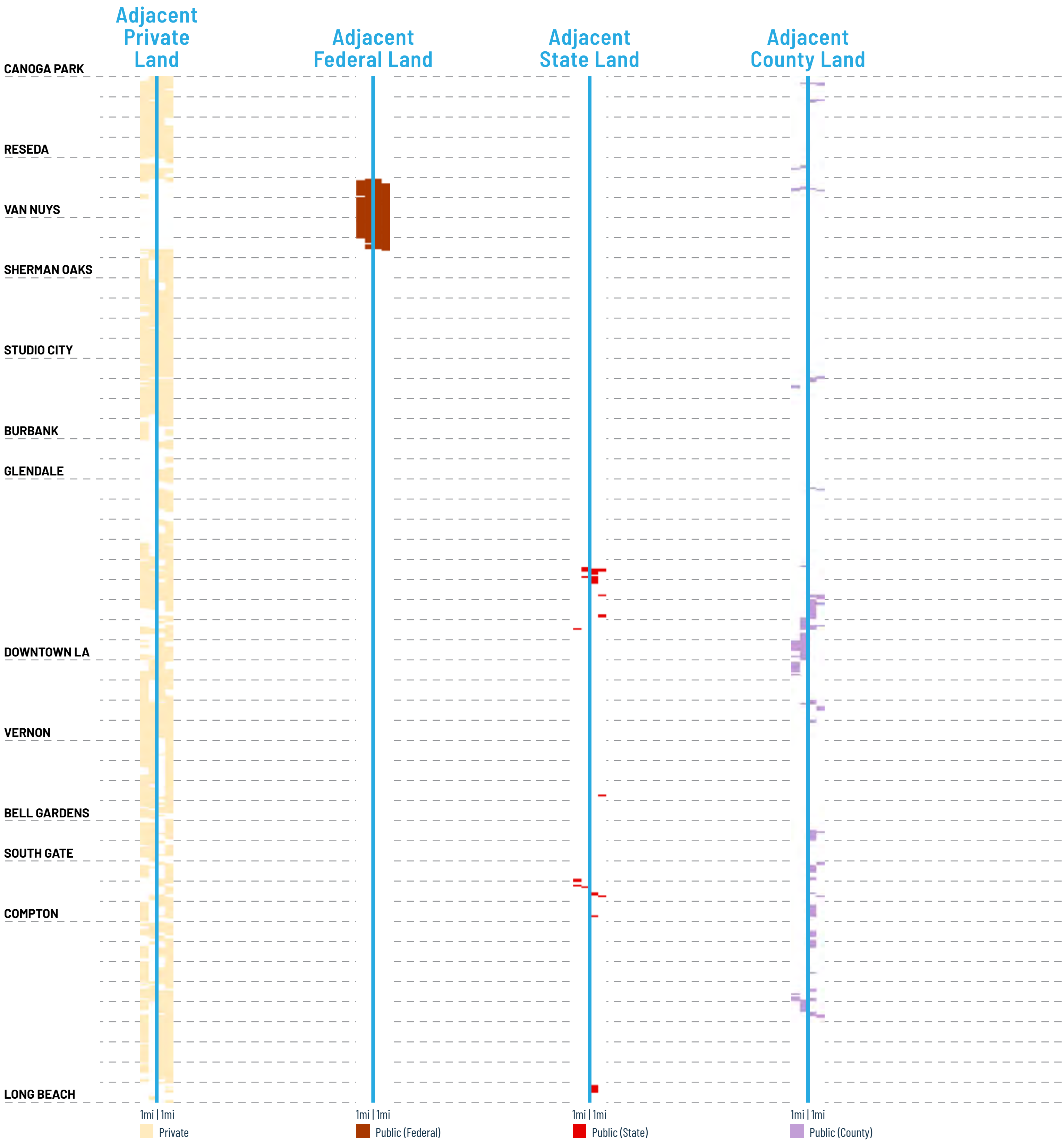


Figure 50. The width of the LA River channel and landside areas varies widely, generally increasing from river mile 51 to river mile 0. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING OPERATIONS AND MAINTENANCE



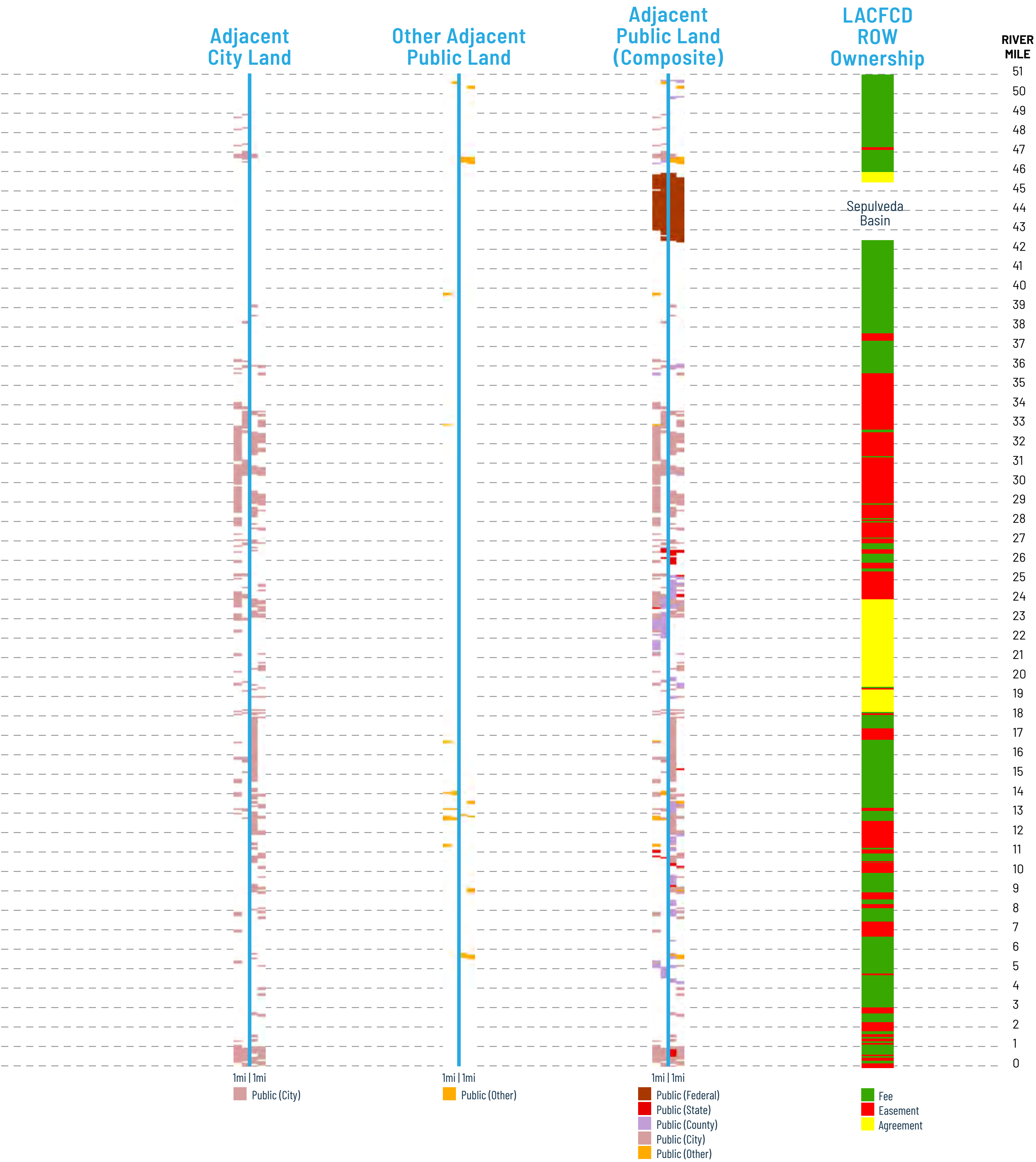
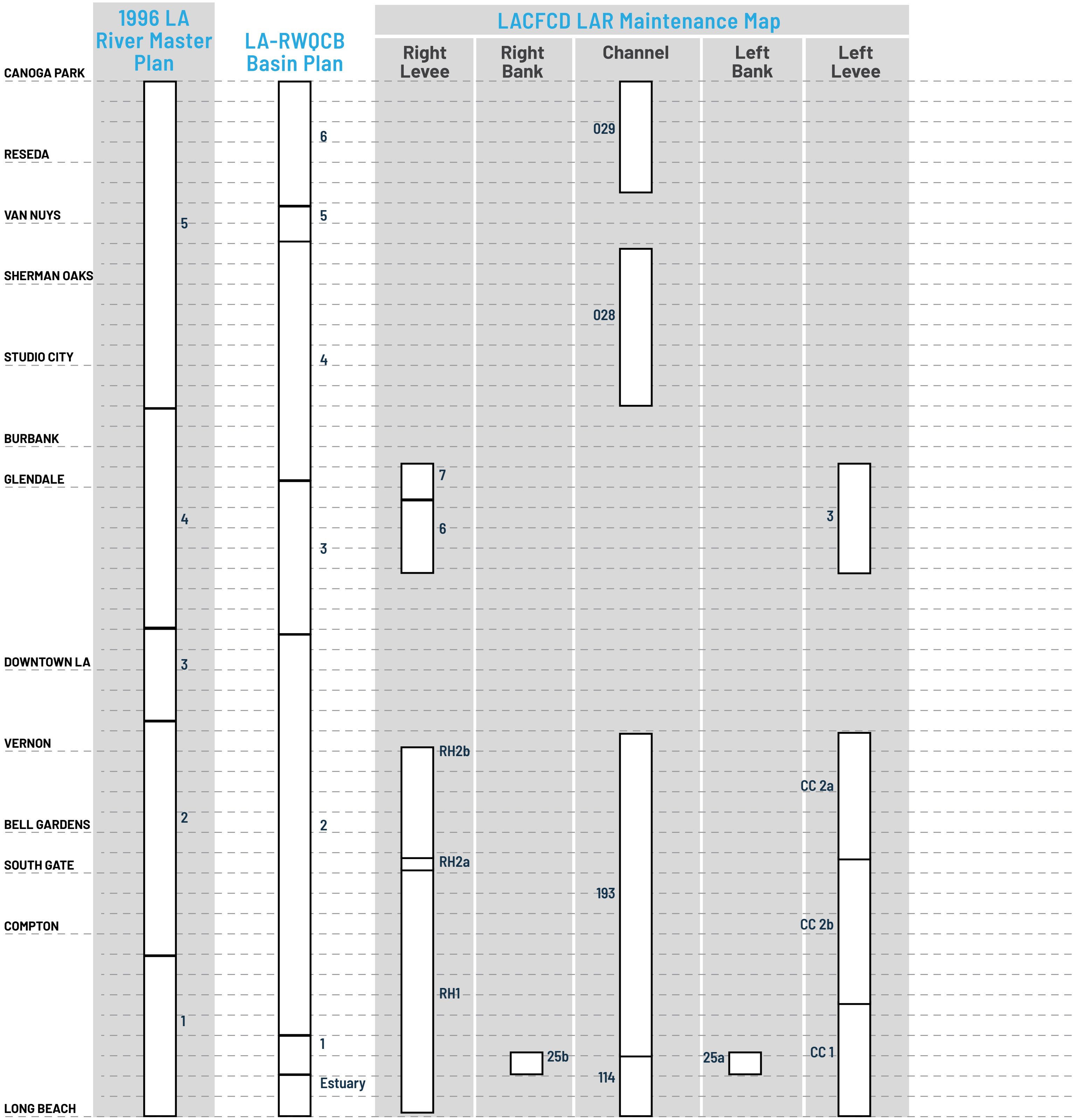


Figure 51. The river right-of-way and land adjacent to the LA River includes both public and private parcels. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING OPERATIONS AND MAINTENANCE



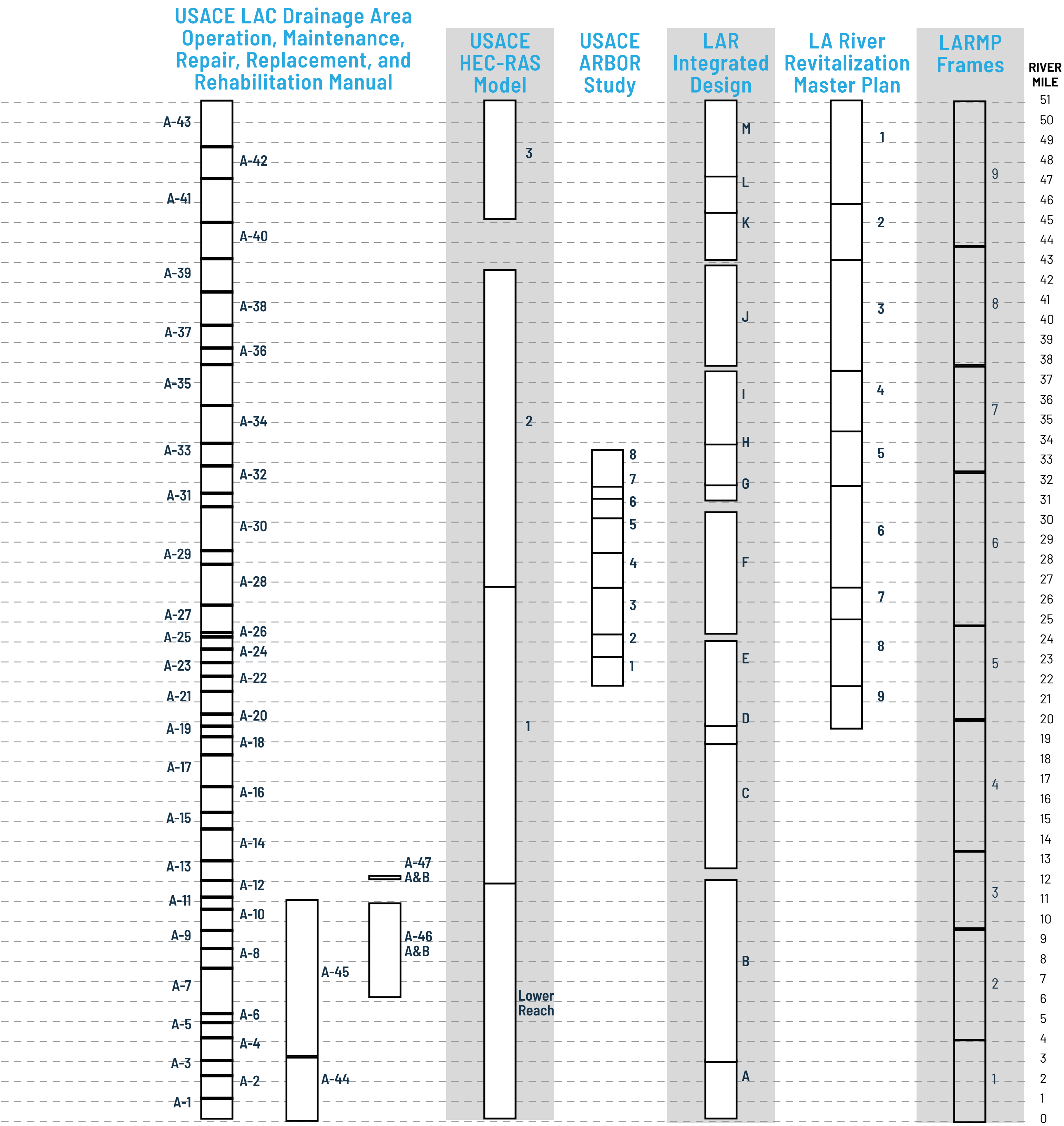
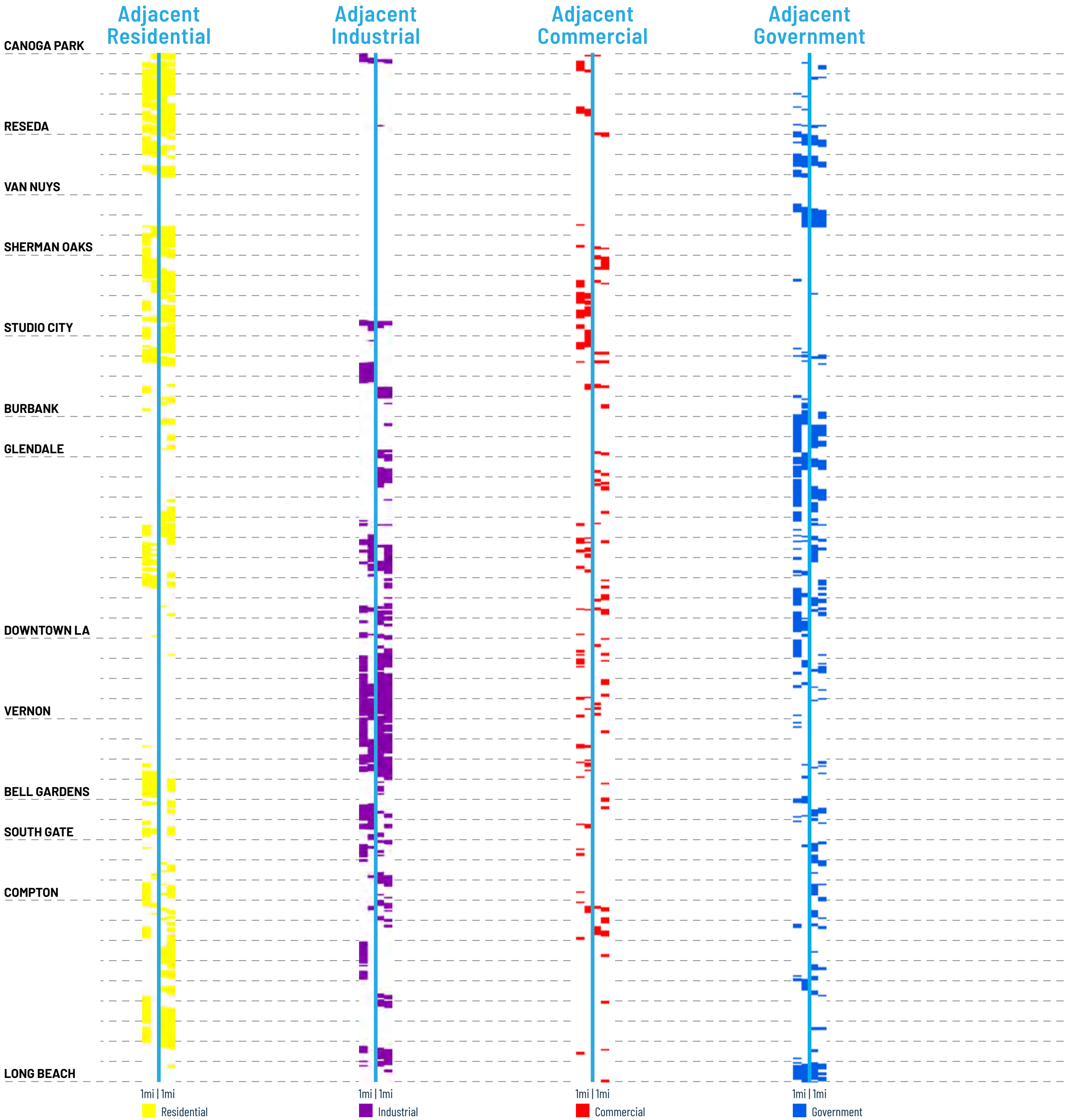


Figure 52. Historically the LA River has been divided into subsections or reaches to facilitate management. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING OPERATIONS AND MAINTENANCE



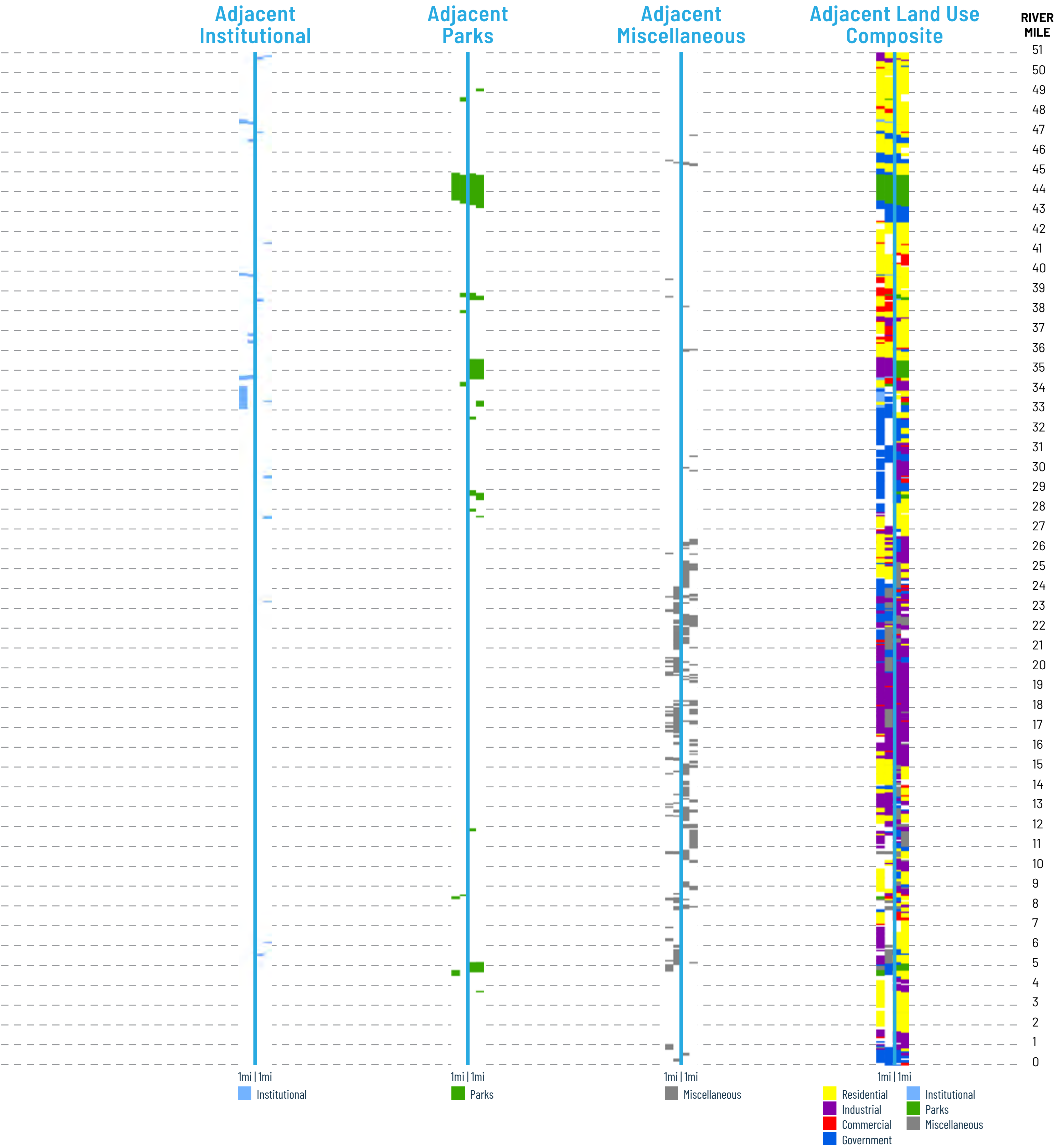


Figure 53. Adjacent land use can directly impact the health of the LA River as well as its accessibility to the public. Source: See table of figures on page 286 for all source information related to ruler data.

EXISTING OPERATIONS AND MAINTENANCE

Channel Conditions

The LA River generally has either concrete-lined or earthen-bottomed channels, with or without levees. In total, there are 36 miles of concrete-lined channels and 15 miles of earthen channels.

Concrete-lined channels typically have reinforced concrete sides and bottoms and a low-flow channel along the centerline. The concrete channels vary in geometry (rectangular or trapezoidal) and widths (from 55 feet to over 400 feet). Subdrain systems, which consist of networks of subdrain pipes, groundwater relief vaults, cleanouts at channel bottoms, and multiple rows of weep holes along channel sides, are typically present to mitigate potential build-up of water pore pressures underneath channel bottoms and behind channel sides. Primary O&M concerns for concrete-lined channels are structural integrity, vegetation, and proper functionality of the subdrain systems and weep holes. Structural issues observed in the channel include buckling and fracturing at joints, uplifting, separation, spalling of concrete slabs, and exposure of steel reinforcement. Failures in subdrain systems and weep holes may contribute to channel lining failures by compromising subgrade conditions beneath and behind channel lining. Vegetation growth may also impact the channel lining by reducing channel capacity and uprooting and weakening channel lining.

Earthen channels typically have concrete-lined or riprap sides, and engineered earthen bottoms, with large riprap and vegetation such as grasses, shrubs, and trees. Earthen channels typically have higher resistance to water flows than concrete-lined channel due to a rougher channel bottom and often dense vegetation in channel. Sediment removal and vegetation management are routine and critical O&M activities for earthen channels. Vegetation in the earthen channels has emerged spontaneously over time and includes both native and invasive species. Giant reed (Arundo donax, commonly referred to as just Arundo) is particularly aggressive and problematic, as it outcompetes other native riparian plant species. Arundo brings multiple O&M challenges: it constricts flood flows due to its tendency to grow in dense clumps, it is difficult to remove, and its rhizomatic root structure leads to sediment buildup within the earthen channel. Other dominant invasive species common to the earthen channel and adjacent lands include: Jubata (Phoenix canariensis), Mexican fan palm (Washingtonia robusta), Canary Island date palm (Phoenix canariensis), pampas (Cortaderia selloana), fountain grass (Pennisetum setaceum), and a host of other ornamental, non-natives.

Infrastructure (Flood Control Structures, Other Infrastructure)

There are many features and infrastructures that make up the LA River and its right-of-way, including outfalls and levees.

Outfalls under the maintenance jurisdiction of either the USACE or the LACFCD only make up a small portion of the total number of outfalls. Many of the outfalls are local municipal drains, Caltrans drains, or private drains, all of which are relatively smaller (less than 4-5 feet in diameter) compared to either USACE or LACFCD drains. Some of the drains are undocumented and may be illicit, discharging unregulated or non-stormwater discharges with high pollutant loads. Many of the outfalls observed were visibly unmaintained. In addition, many of the trash racks or flap gates at outfalls appeared damaged or non-functional (clogged, stuck open/closed).

Levees currently span the LA River along the Glendale Narrows from river mile 27 to river mile 32 and along the Lower LA River from river mile 0 to river mile 19. The primary O&M objectives for levees are to maintain satisfactory levee and in-channel conditions, to ensure that the channel can convey their designed flood events. Vegetation is not permitted on or within 15 feet of any levee on the LA River, and branches from vegetation may not overhang into the vegetation-free zone below a height of 8 feet, as root systems can potentially uproot and compromise levees. Leaky irrigation systems can potentially erode and compromise levees as well. Irrigation systems within the right-of-way are typically installed and maintained by other entities.

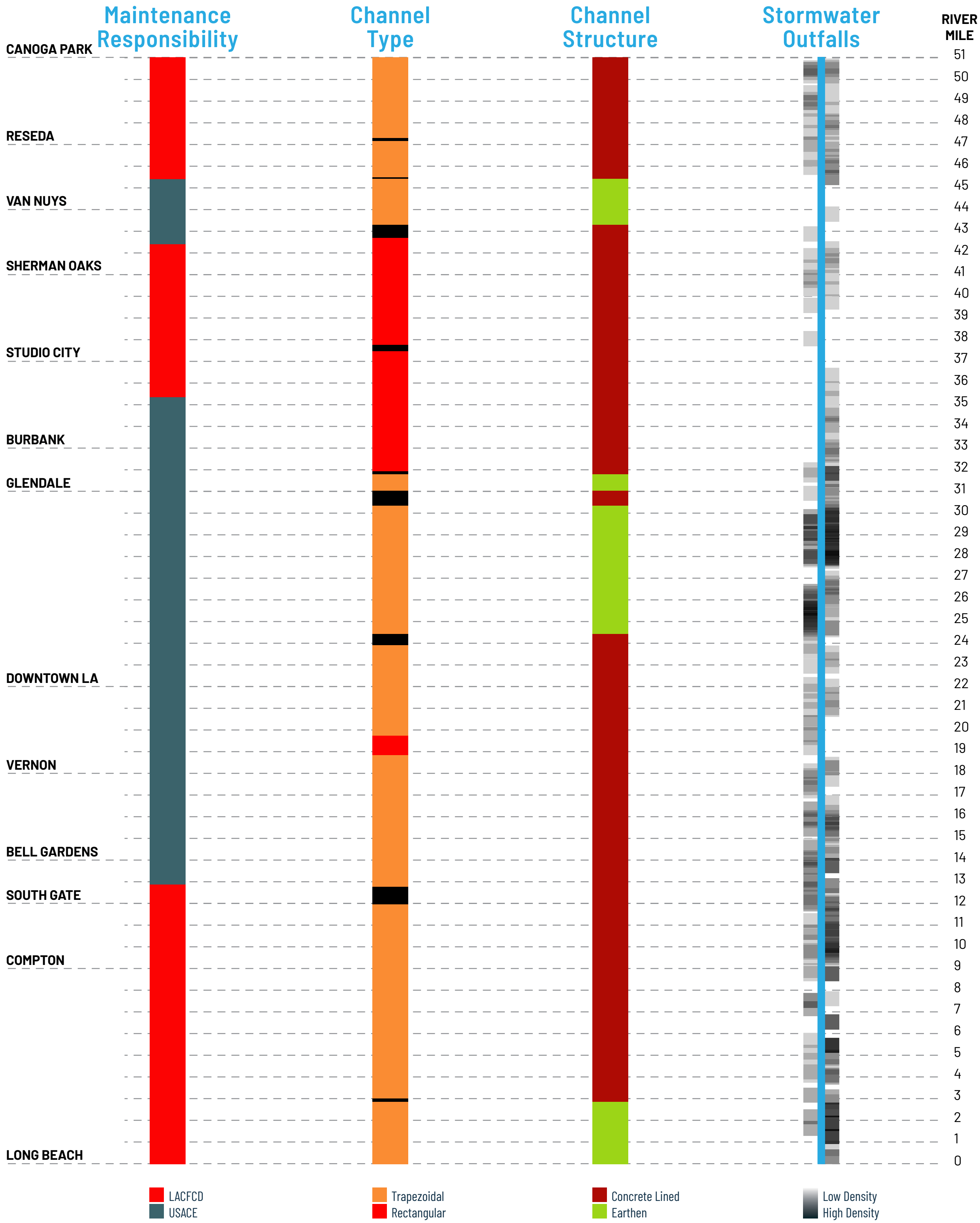


Figure 54. **The LA River is heterogeneous in form and management, alternating between a trapezoidal and rectangular in shape, lined and earthen in material, and falling into the jurisdiction of two institutions: LACFCD and USACE.** Source: See table of figures on page 286 for all source information related to ruler data.

LA RIVER MASTER PLAN RULERS

SITES RULERS

These rulers show the location sites along the LA River that include planned major projects and proposed project sites. To learn more about the LA River Master Plan sites, see the LA River Master Plan, Chapter 7. For comprehensive lists of the LA River Master Plan Sites, see Chapters 5 (M, L, XL Sites Index) and 6 (XS, S Sites Index) in this document.

NEEDS RULERS

To evaluate which portions of the LA River are most in need when it comes to fulfilling the goals of the Master Plan, a GIS-based need analysis was conducted for each goal. For each LARMP goal, criteria for evaluating the magnitude and spatial distribution of need were established using the most applicable datasets collected as part of the inventory and analysis process. These river rulers show the analysis for each goal up to one mile from the river on either side. For more about the LARMP needs analysis, see the LA RIver Master Plan, Chapter 6 and Chapter 4 (Needs Weighting and Mapping) in this document.

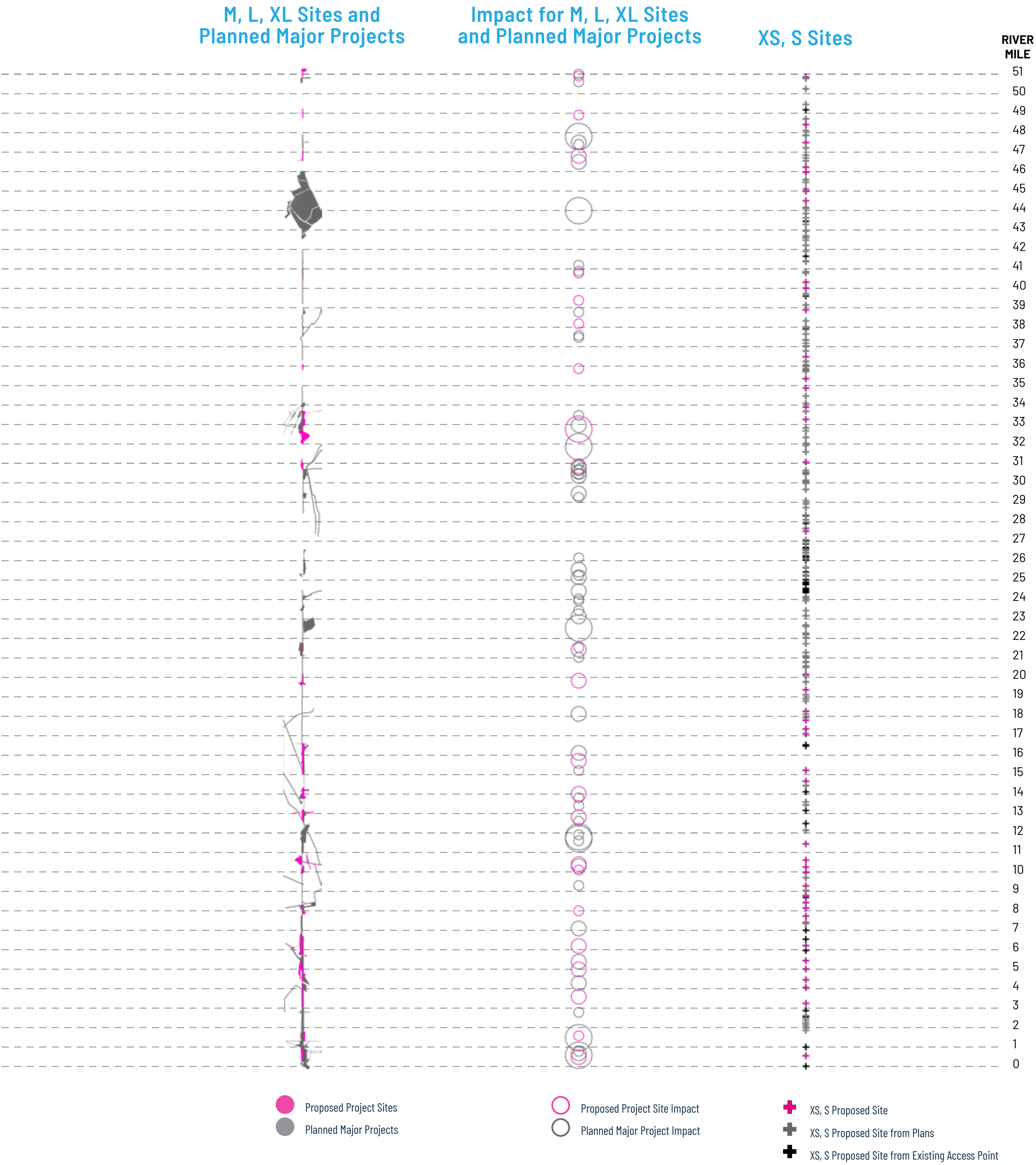
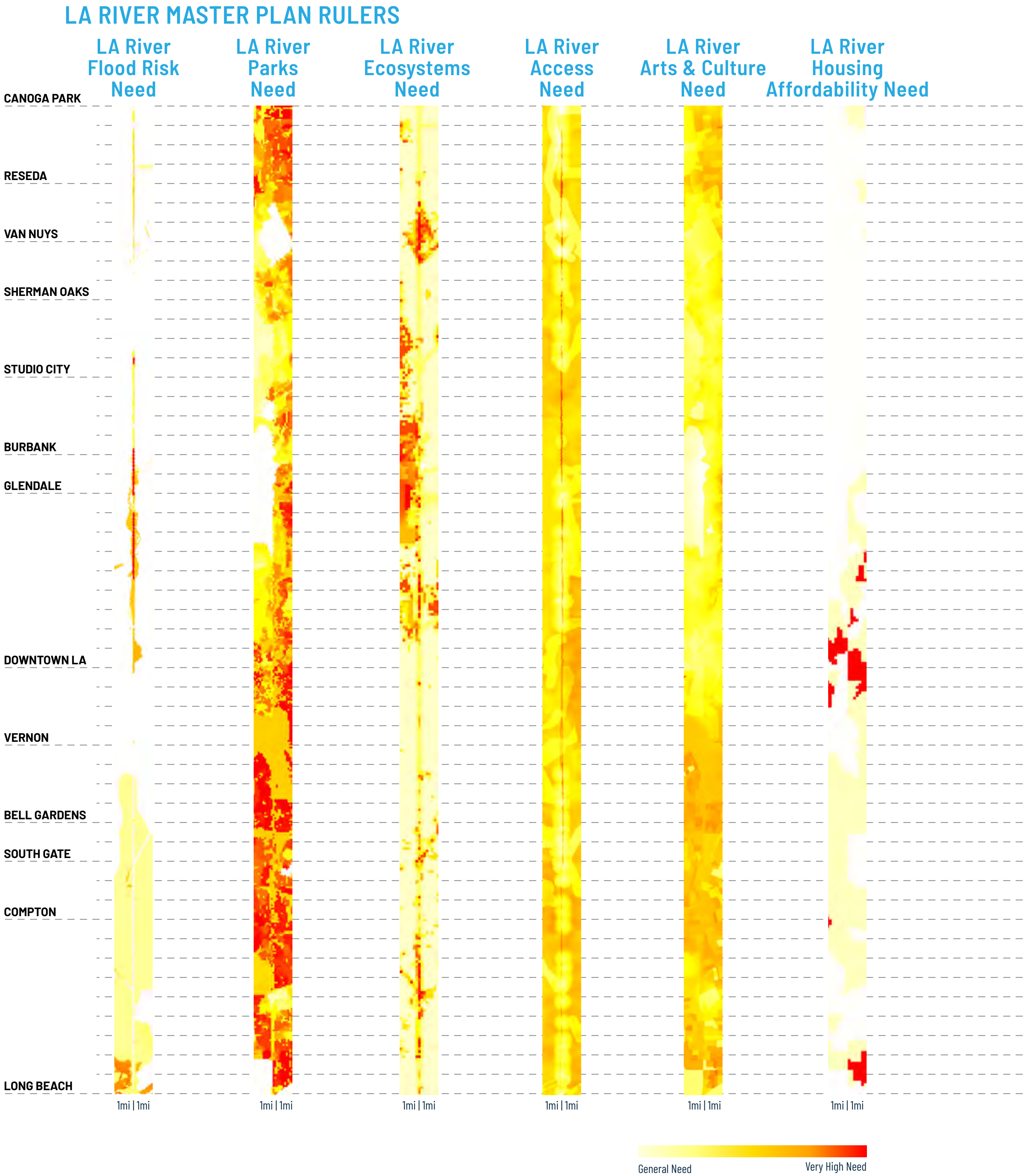


Figure 55. **See Chapter 5 in this document for the M, L, XL and XS, S sites index.** Source: See table of figures on page 286 for all source information related to ruler data.


LA RIVER MASTER PLAN RULERS
LA River Flood Risk Need
LA River Parks Need
LA River Ecosystems Need
LA River Access Need
LA River Arts & Culture Need
LA River Housing Affordability Need
CANOGA PARK
RESEDA
VAN NUYS
SHERMAN OAKS
STUDIO CITY
BURBANK
GLENDALE
DOWNTOWN LA
VERNON
BELL GARDENS
SOUTH GATE
COMPTON
LONG BEACH
1mi | 1mi
1mi | 1mi
1mi | 1mi
1mi | 1mi
1mi | 1mi
1mi | 1mi
General Need
Very High Need

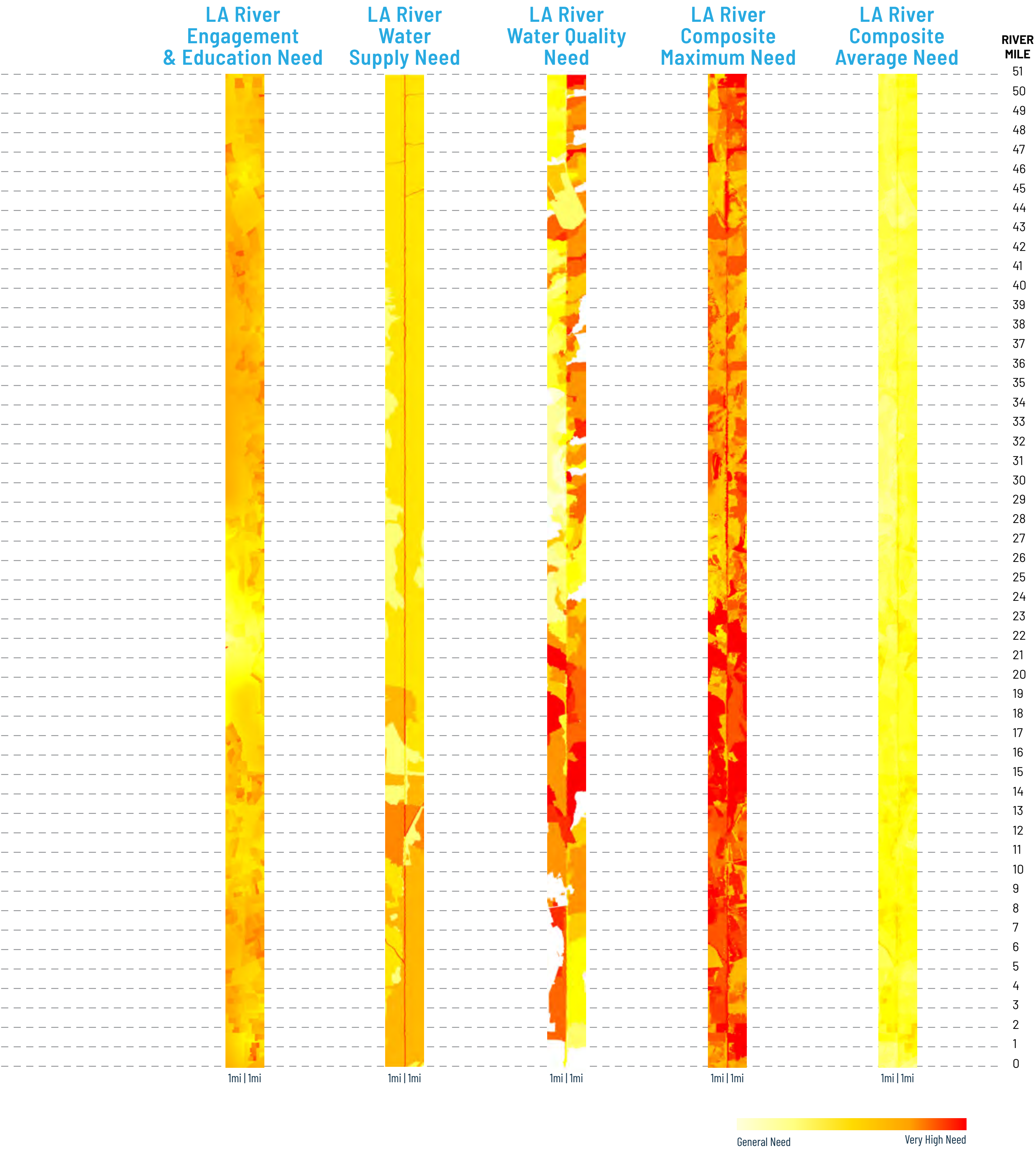


Figure 56. For more about the LARMP needs analysis, see the LA RIver Master Plan, Chapter 6 and Chapter 4 (Needs Weighting and Mapping) in this document. Source: See table of figures on page 286 for all source information related to ruler data.

Figure 57. The LA River near Washington Boulevard Bridge at river mile 19.7 shortly after a storm. Source: OLIN, 2019.

3.
HYDROLOGY AND HYDRAULICS

HYDROLOGIC AND HYDRAULIC ANALYSES AND MODELING ARE REQUIRED TO ASSESS SUITABILITY AND APPLICABILITY OF POSSIBLE STRATEGIES ALONG THE LA RIVER AND WITHIN THE LA RIVER WATERSHED

The LA River Master Plan identifies a flood risk reduction goal to provide conveyance capacity for the "1% flood" along the entire LA River. Deficient reaches along the channel have been identified where this goal is not currently met, including portions in the upper river above Sepulveda Flood Control Basin and most notably within the Glendale Narrows reach (also known as the ARBOR reach, river miles 22 to 33).

There are a range of possible strategies and combinations of strategies that may be used to achieve the goal. Hydrologic and hydraulic analyses and modeling are required to assess suitability and applicability of possible strategies along the LA River and in the LA River watershed. These strategies and technical analyses are described in the following chapter, including a definition of the "1% flood," a description of the existing flood risk reduction system, descriptions of available strategies, and results of hydrologic and hydraulic modeling and calculations.

Many of the ideas and much of the analyses in the following chapter were developed as part of an in-depth workshop conducted by the LARMP Team in March 2019. The workshop had the goals of informing the LARMP subcommittee members on the hydrology and hydraulics of the LA River with specific focus on the challenges of flood risk reduction, soliciting input regarding ideas and opportunities for flood risk reduction, and robustly and scientifically evaluating potential solutions and opportunities.

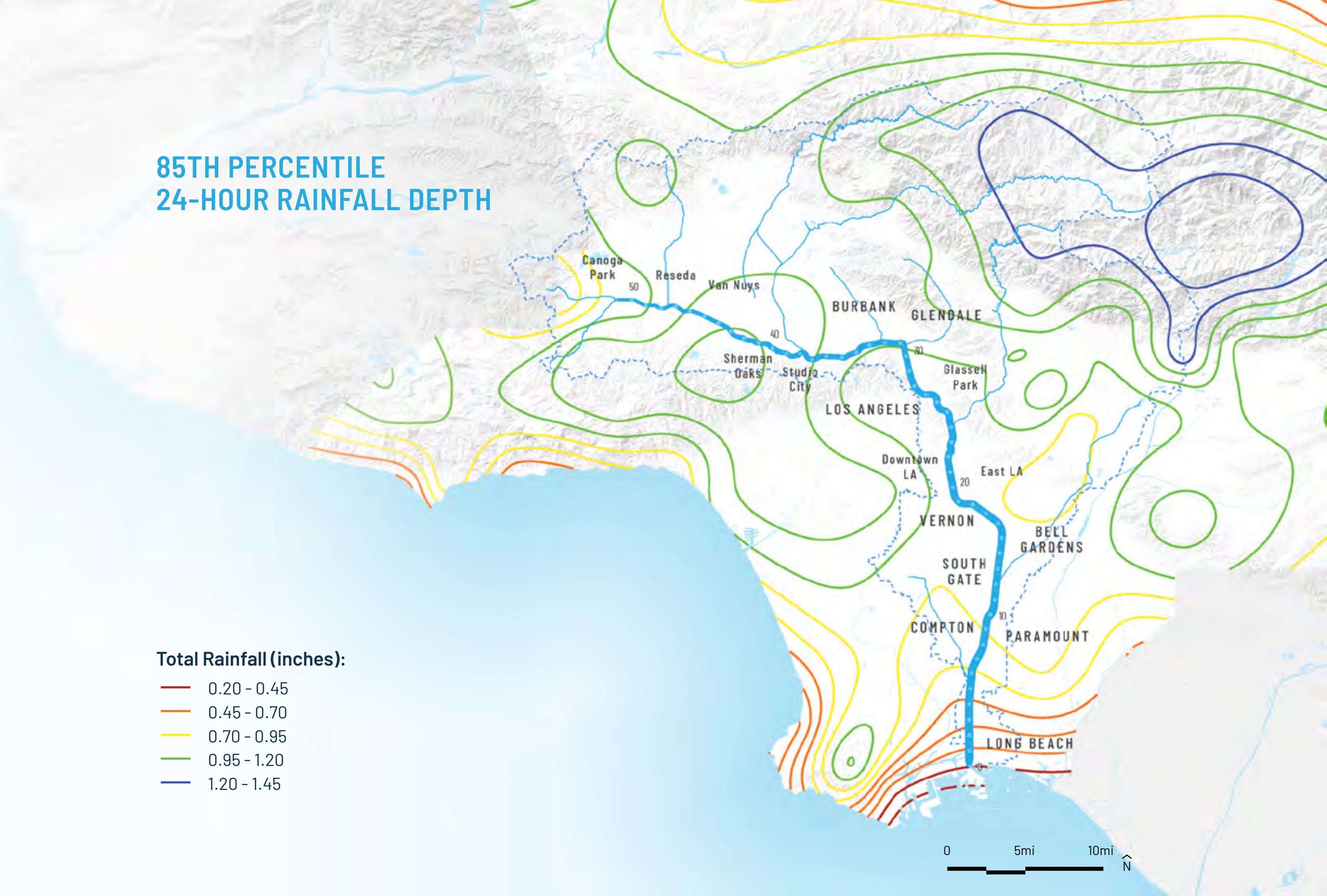


Figure 58. 85th Percentile 24-hour Rainfall Depth. Precipitation in the LA River watershed over 24 hours for an 85th percentile storm. The 1% storm event is approximately an order of magnitude (i.e., 10 times) larger than the typical storm events that are experienced several times per year. Source: Los Angeles County GIS Data Portal, 85th and 95th Percentile Rainfall, 2016, Los Angeles County GIS Data Portal, Rainfall Intensity, 2011; Geosyntec, OLIN, 2019.

THE 1% FLOOD EVENT EXPLAINED

The 1% flood, which is often referred to as the 100-year flood, is a flood event that has a 1 in 100 chance of being equaled or exceeded in any given year. A common misunderstanding is that the 100-year flood is likely to occur only once in a 100-year period. In fact, there is approximately a 63% chance of one or more 100-year floods occurring in any 100-year period, and about a 25% chance of occurring during a 30-year period. The 1% terminology used in the LARMP is to recognize that the time between two 100-year events is generally not 100 years(e.g., two 100-year events could occur in consecutive years or even in the same year). Similarly, the 2% flood is synonymous with the 50-year event and the 0.2% flood is synonymous with the 500-year event (Figure 59).

Recurrence Interval (years)	Annual Exceedance Probability (%)
2	50
5	20
10	10
25	4
50	2
100	1
200	0.5
500	0.2

Figure 59. Recurrence Interval and Annual Exceedance Probability. Source: USGS, 2019.

100-YEAR STORM PRECIPITATION OVER 24 HOURS

Figure 60. 100-year Storm Precipitation Over 24 Hours. Precipitation in the LA River watershed over 24 hours for a 1% storm event. The 1% storm event is approximately an order of magnitude (i.e., 10 times) larger than the typical storm events that are experienced several times per year. Source: Los Angeles County GIS Data Portal, 85th and 95th Percentile Rainfall, 2016, Los Angeles County GIS Data Portal, Rainfall Intensity, 2011; Geosyntec, OLIN, 2019.

For the LA River watershed, the 1% storm event corresponds to a large multiple-day precipitation event where the watershed becomes saturated and then culminates with peak 24-hour rain totals in excess of 6 inches in Downtown LA and almost 15 inches at Mt. Wilson (Figure 58). The 6 inches falling in Downtown LA during a 1% event compares to the approximately 0.75 inches of rain during an 85th percentile storm[6] that water quality projects (e.g., LID and BMPs) are typically designed to capture and/or infiltrate (Figure 59). The 1% storm event is approximately an order of magnitude (i.e., 10 times) larger than the typical storm events that are experienced several times per year. The 1% flood risk reduction goal aims to protect lives and property from flood and inundation for storms at a minimum of up to the 1% event.

THE 1% STORM EVENT IS APPROXIMATELY AN ORDER OF MAGNITUDE (I.E., 10 TIMES) LARGER THAN THE TYPICAL STORM EVENTS THAT ARE EXPERIENCED SEVERAL TIMES PER YEAR

LA RIVER WATERSHED

Figure 61. This diagram shows the LA River watershed, including major flood risk reduction infrastructure. Source: LA County GIS Data Portal, Google Earth, Geosyntec, OLIN.

EXISTING FLOOD RISK REDUCTION SYSTEM

The LA River watershed is comprised of natural streams and channels in the mountainous areas that convey the large volumes of run-off down to the alluvial plain (Figure 61). Within the plain these channels are mostly engineered (i.e., concrete lined or stabilized with rock or rip-rap protection) and convey the run-off to the main LA River channel. Flow in some of these channels may be regulated by large-volume flood control basins, such as Big Tujunga and Hansen Dams, that serve to reduce peak flows. Spreading grounds, such as Tujunga Spreading Grounds, are designed to infiltrate water diverted from the channels into the ground during smaller, more frequent events. These are designed for water supply purposes and provide only limited reduction in peak storm flows. Debris basins are often located near the mouths of steep canyons and are designed primarily to stop mud and debris from flowing downstream.

The main LA River channel is mostly concrete lined, except the soft-bottom portions in the Sepulveda Flood Control Basin, the Glendale Narrows, and the estuary near the mouth of the LA River in Long Beach. One of the large in-line flood control basins, the Sepulveda Basin, provides more than 17,000 acre-feet (AF) of active flood storage that is used to reduce peak flows in the upper river. Additional flood risk reduction is provided by levees along the Glendale Narrows and the lower river below the Rio Hondo confluence. The primary purpose of the existing system of channels, levees, and flood control basins is to collect the runoff and convey it out to the ocean as quickly as possible.

The engineered system has substantially reduced flood risk since the devastating floods of the 1930s, but there are still portions that do not meet the 1% flood risk reduction goal. Most notably is the Glendale Narrows reach, upstream of Downtown LA as illustrated in Figure 62 which shows results of a HEC-HMS[7] model simulation of a 1% event.

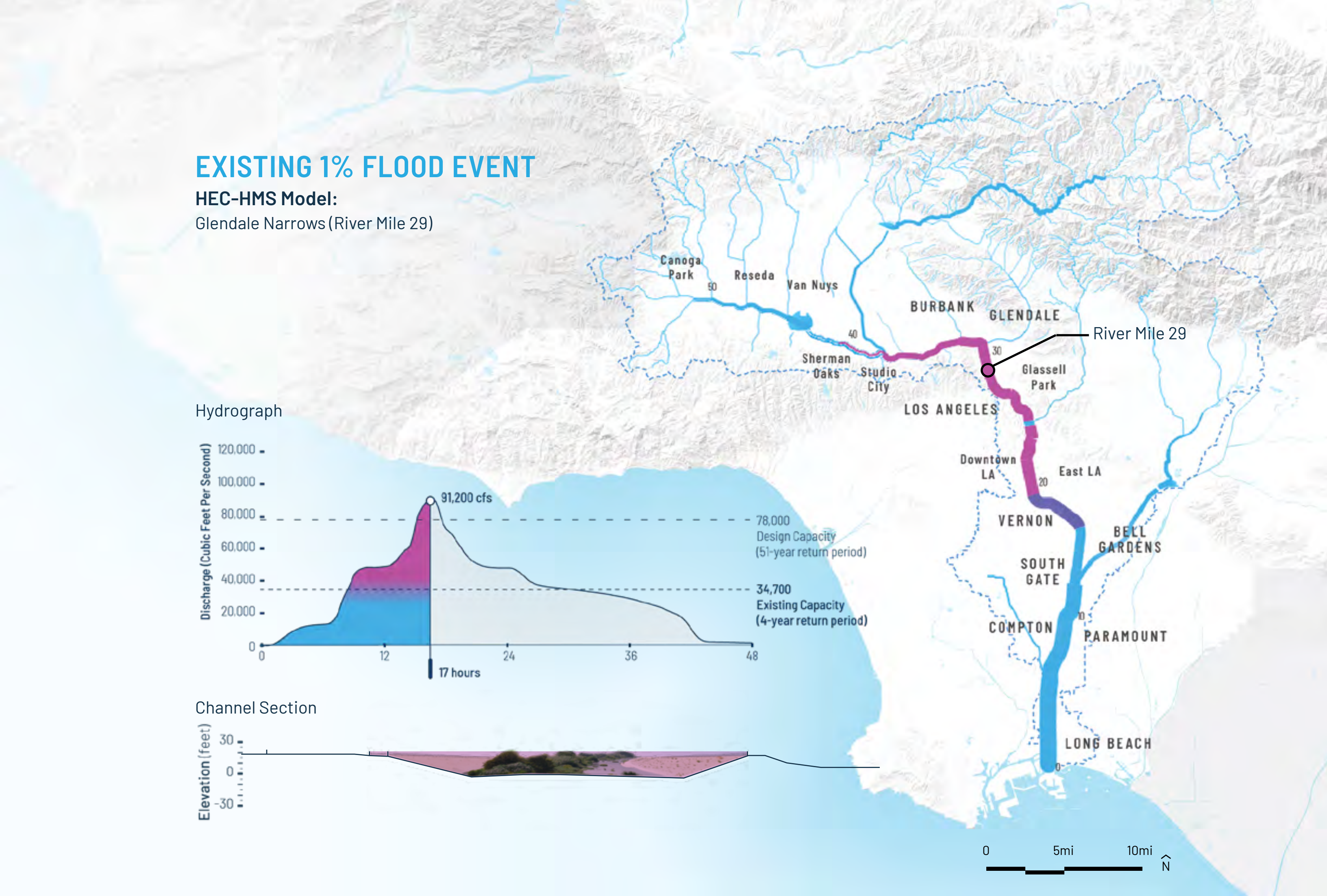


Figure 62. **Existing 1% Flood Event. HEC-HMS model simulation of a 1% precipitation event indicating sufficient channel capacity (blue); deficient (pink); or near deficient (purple) channel capacity. The Glendale Narrows reach has deficient channel capacity.** Source: LA County GIS Data Portal, Google Earth, Geosyntec, OLIN.

HYDROLOGIC MODEL

The HEC-HMS model is designed to model event-based precipitation (e.g., 50%, 1%, 0.2% storms) and includes infiltration into pervious surfaces (e.g., soils), excess surface run-off from subwatersheds, routing through flood control basins, and routing through channels. The output from the model is a prediction of flow rates throughout the channelized system for the entire duration of the storm (i.e., hydrographs at all locations in the channels). Comparison of these flow rates against available channel capacity, as determined by hydraulic models or calculations, can then be made to assess the ability of the system or portions of the system to safely convey floods.

The plan view of Figure 62 illustrates the flow state during the peak of the hydrograph at river mile 29, in the Glendale Narrows. The thickness of the lines indicates relative flow rates (i.e., thicker lines denote higher flow rates). Blue lines indicate flow rates within the local channel capacity, pink lines indicate flow rates that exceed capacity, while the purple lines indicate flow rates near (within approximately ± 10%) capacity. The hydrograph (i.e., plot of flow rate versus time) at river mile 29 is also illustrated with the same color coding to indicate whether flow is below, above, or near the estimated existing channel capacity of 34,700 cubic feet per second (cfs). Finally, a cross section indicates the depth of the water in the channel. The modeling results clearly indicate deficient channel capacity throughout the Glendale Narrows, as has been noted in other studies[8] where a protection level below the 25% event has been estimated. A range of different strategies can be considered to bring this portion of the channel up to meet the 1% flood risk reduction goal.

REDUCE FLOWS TO THE CHANNEL	INCREASE CHANNEL CAPACITY
• Low Impact Development	• Increase Channel Width
• Best Management Practices	• Increase Levee Height
• Distributed Storage	• Diversions or Bypass Tunnels
• Increase Capacity of Sepulveda and Hansen Flood Control Basins	• Refurbishment
• Additional Flood Control Basins	• Concrete Bottom

Figure 63. Strategies to improve flood risk reduction for the LA River.

FLOOD RISK REDUCTION STRATEGIES

Fundamentally, there are two categories of strategies to improve flood risk reduction, and details are shown in Figure 63.

- Reduce flows to the channel
- Increase channel capacity

Reducing flows to the channel may be achieved through widespread implementation of low impact development (LID), best management practices (BMP), and distributed storage. These strategies may reduce the run-off by enabling increased infiltration and/or storage that locally removes a portion of the total rainfall from running into the channels and ultimately the LA River. These distributed approaches may also provide water quality and water supply (i.e., groundwater recharge) benefits. An alternative strategy to the distributed approach is to provide larger-scale regional storage facilities, such as the Sepulveda and Hansen Flood Control Basins. Increasing the size of existing basins, and/or providing additional new basins may assist in peak flow reduction.

Increasing the capacity of the channel may be achieved through widening, adding levees or increasing height of existing levees, decreasing hydraulic roughness (e.g., removing vegetation), or constructing a bypass (e.g., a tunnel).

The effectiveness of the different approaches, and whether they are feasible to make meaningful improvements in flood risk reduction, were evaluated through hydrologic and hydraulic modeling and analyses as described below.

REDUCE FLOWS TO THE LA RIVER

In the following sections, the HEC-HMS model was used to evaluate the effectiveness of the different ways to reduce flows to the LA River.

Widespread Implementation of LID/BMP/Distributed Storage

The widespread implementation of LID/BMP/ distributed storage each have the effect of locally removing a portion of the total rainfall (e.g., by enabling direct infiltration or temporary storage and infiltration) from running into channels that feed the LA River. This will generally decrease

NARROWS 1% FLOOD EVENT

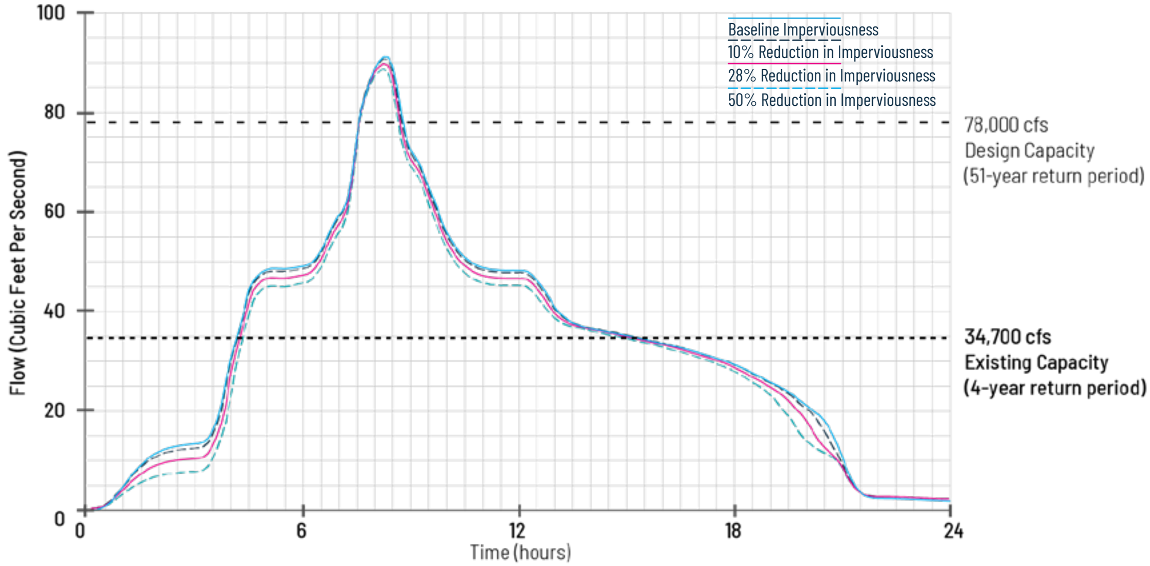


Figure 64. Hydrographs for 1% flood at river mile 29 from HEC-HMS simulations with baseline (existing) impervious area and reductions in impervious area of 10%, 28% (to meet 2037 EWMP goals), and 50%. Model results indicate some flow rate reduction early in the hydrograph, but minimal reduction of the peak flow. Source: Geosyntec, OLIN, 2019.

flows to the river. These measures are typically implemented and designed to meet water quality objectives in terms of removing mandated loads of pollutants of concern. For example, the Upper LA River (ULAR) Enhanced Water Quality Management Plan (EWMP) calls for an additional 5,186 AF of stormwater to be detained and infiltrated for each design storm event by year 2037 to meet the goals for metals, toxics, and bacteria.[9] To model this implementation in HEC-HMS, the percent of impervious area throughout the watershed was decreased to enable more rainfall to infiltrate into the ground. Through iterative HEC-HMS simulations, it was determined that decreasing the imperviousness in the urbanized areas by 28% would result in an additional 5,186 AF of water being infiltrated into the ground during a typical 50% rain event (i.e., a 2-year event). Therefore, the 2037 EWMP goals can be modeled in HEC-HMS by applying a 28% reduction in impervious area to represent the widespread implementation of LID/BMP/distributed storage.

Results of the modeling, including additional simulations with 10% and 50% reductions in imperviousness, are presented as hydrographs in Figure 64. The modeling indicates that widespread implementation of LID/BMP/distributed storage may result in flow rate reduction early in the storm (i.e., the separation between the curves within the first few hours), but has minimal effect on reducing the peak flows. This is due to the LID/BMP/distributed storage throughout the watershed filling up or becoming close to fully saturated within the first few hours of the storm, so that by the time the peak rainfall occurs there is only a minimal reduction in run-off. Fundamentally, the 1% storm event is approximately an order of magnitude (i.e., 10 times) larger than the typical storm events that the LID/BMP/distributed storage are designed for, and as such these green infrastructures become overwhelmed during extreme storm events.

STATISTICAL PEAK FLOW ANALYSES

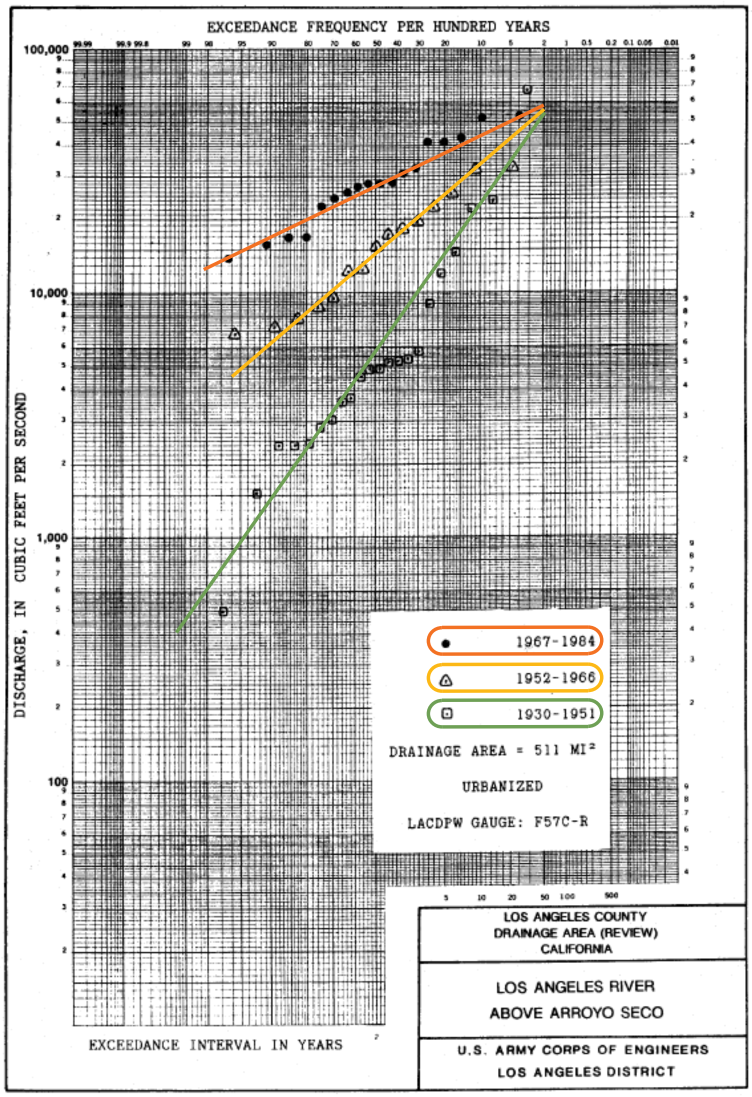


Figure 65. 1991 USACE Statistical Peak Flow Analysis. Source: US Army Corps of Engineers: Los Angeles District. 1991. Los Angeles County Drainage Area: Review, Part I, Hydrology Technical Report, Base Conditions, Geosyntec, OLIN.

The modeling results are supported by historical data that indicate that urbanization (i.e., increased impervious area) has not resulted in substantial changes to the magnitude of the 1% flows in the LA River. Figure 65 and Figure 66 presents a statistical peak flow analysis of historical flow data in the LA River above the Arroyo Seco inflow (i.e., immediately downstream of the Glendale Narrows). The figure indicates three different lines corresponding to three different time periods and three different levels of development (e.g., imperviousness). For frequent events (e.g., the 50% storm that occurs on average every two years) the increased urbanization (i.e., increased imperviousness) over time has resulted in peak flows that are approximately 5 times higher (i.e., an increase from approximately 6,000 cfs in 1930-1951 to approximately 29,000 cfs in 1967-1983). By contrast, the three lines converge and indicate much lower relative differences for the larger, less frequent events. For example, the statistics indicate minimal change in the peak flow for the 1% event as a result of increased imperviousness. This is due to the pervious portions of the watershed becoming saturated (i.e., full of water) and behaving like an impervious surface during the large, multi-day storm event. This indicates that the implementation of LID/BMP/distributed storage, which aims to make the watershed behave in a more pervious manner, is not an effective flood risk mitigation strategy.

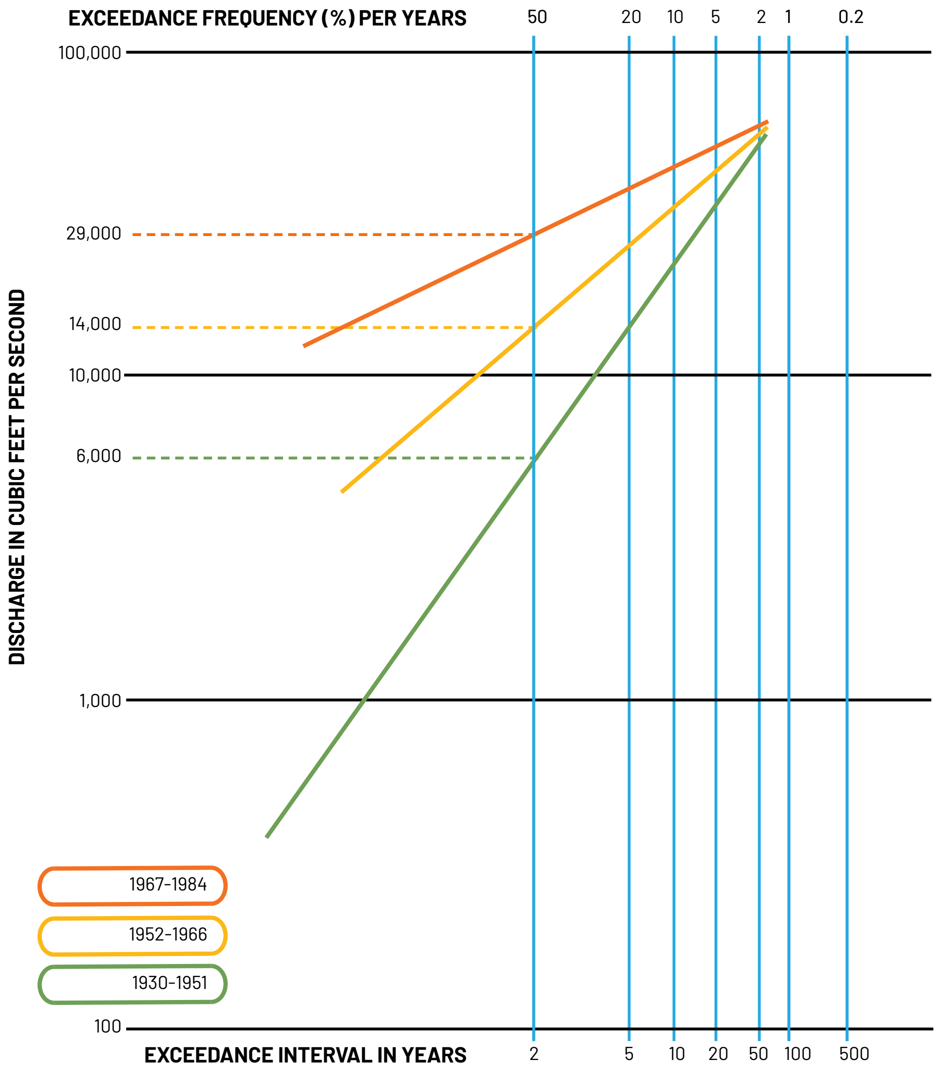


Figure 66. Statistical Peak Flow Analyses of Historical Flow Data in LA River Above Arroyo Seco. The Green line represents 1930 to 1951 (least developed, least imperviousness), orange line represents 1952 to 1966, and red line represents 1967 to 1984 (most developed, most imperviousness). Lower horizontal axis represents the exceedance interval in years, upper horizontal axis represents exceedance frequency per 100 years (and is the same as the annual percent chance of exceedance), and the vertical axis represents the peak discharge. These lines indicate that imperviousness in the watershed has substantial effect on smaller, more frequent storms but much less effect on larger, less frequent storms. Source: US Army Corps of Engineers: Los Angeles District. 1991. Los Angeles County Drainage Area: Review, Part I, Hydrology Technical Report, Base Conditions, Geosyntec, OLIN.

Despite the minimal effect of the LID/BMP/distributed storage measures on reducing peak flows to the LA River during extreme events, they do provide substantial water quality benefits, and some water supply benefits, during smaller rain events that occur more frequently (i.e., several times per year).

THE MODELING INDICATES THAT WIDESPREAD IMPLEMENTATION OF LID/BMP/DISTRIBUTED STORAGE MAY RESULT IN FLOW RATE REDUCTION EARLY IN THE STORM, BUT IT HAS MINIMAL EFFECT ON REDUCING THE PEAK FLOWS

SEPULVEDA BASIN

HANSEN BASIN

BURBANK-VERDUGO, MODELED BASIN AREA

SEPULVEDA AND HANSEN FLOOD CONTROL BASINS PROVIDE 10 TIMES MORE STORAGE THAN THE 2037 EWMP GOALS, AND THIS STORAGE MAY BE ACTIVELY MANAGED FOR MAXIMUM BENEFIT

Larger Flood Control Basins

There are several flood control basins within the LA River watershed, though two of them are much larger and play more significant roles than the others. Sepulveda and Hansen Flood Control Basins (Figure 67) collectively provide more than 51,000 AF of active flood control storage and play key roles in flood risk management for the LA River. In addition to relatively large storage volumes (e.g., 10 times more storage than the 2037 EWMP goals), the timing of releases from these basins can be controlled by raising and lowering gates within the dams. For example, during the early part of a storm, gates can be kept open to allow water to pass through the basin, thereby maintaining available storage until it is needed during the peak of the storm. This active management is more effective than the passive management that would be provided by widespread implementation of LID/ BMP/distributed storage that saturates or fills up during the early part of the storm, prior to the peak of the event.

Expanding the size of the existing flood control basins(e.g., increasing footprint and/or excavating and/or raising the dams and levees) may be one approach to increase flood risk reduction. The HEC-HMS model was modified to set the outflows of both Sepulveda and Hansen basins to zero. This effectively represents basins that are sized large enough to contain all the inflow to the basins during a storm event. Results are plotted in Figure 8 and indicate only a modest reduction in the peak flow of the 1% flood. This indicates that the current basins are appropriately sized for the region's hydrology and suggests that the main flood peak originates in watersheds downstream of Sepulveda and Hansen Basins. The expense to increase the size of these basins is likely not worth the marginal benefits in terms of reducing the peak flow rate for the 1% flood.

Figure 67. Scale of existing Sepulveda and Hansen Basins, respectively providing 18,000 AF and 33,000 AF of active flood control storage, and hypothetical location of a Burbank-Verdugo Basin. There is unlikely to be room for new basins at appropriate locations in the heavily urbanized region without significant land acquisition.
Source: Google Earth, Image Landsat / Copernicus, 2018.

NARROWS 1% FLOOD EVENT WITH LARGER BASINS

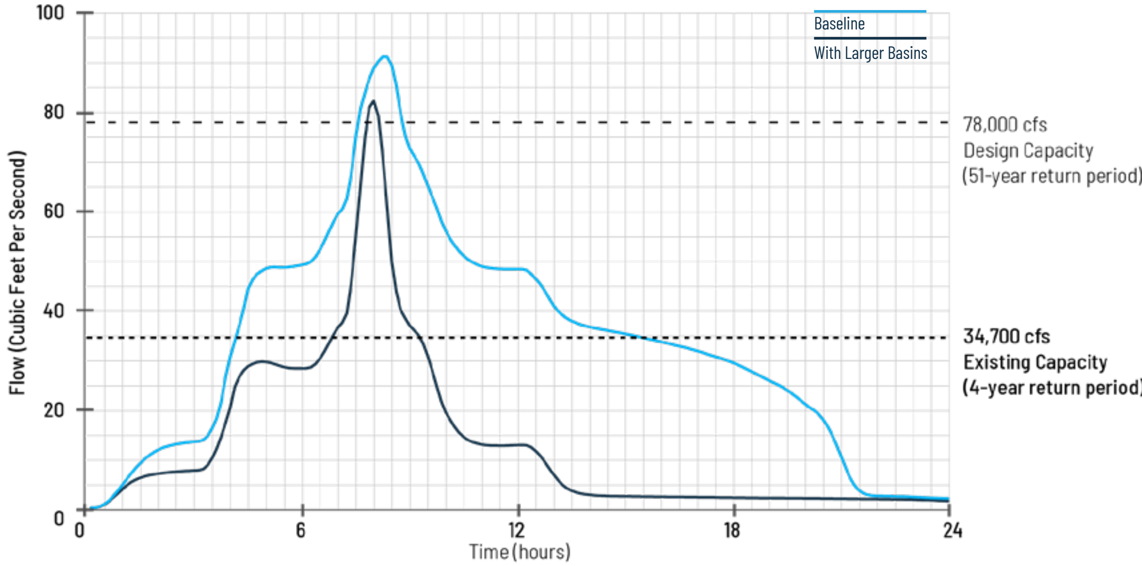


Figure 68. **Hydrographs for 1% flood at river mile 29 from HEC-HMS simulations for baseline (existing conditions) and Sepulveda and Hansen Basins expanded to contain all upstream inflows (i.e., maintain zero outflow). The hydrograph indicates substantial reduction of flows and volume in the Glendale Narrows pre and post peak, but much less reduction of the major peak flow.** Source: Geosyntec, OLIN, 2019.

NARROWS 1% FLOOD EVENT WITH EXTRA BASINS

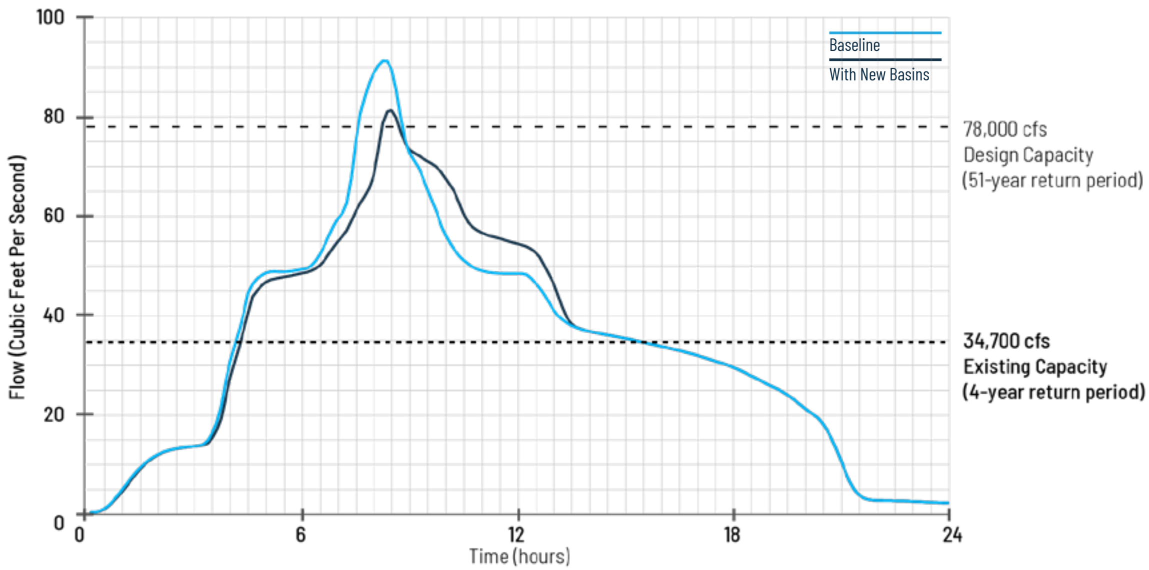


Figure 69. **Hydrographs for 1% flood at river mile 29 from HEC-HMS simulations for baseline (existing conditions) and a new hypothetical Burbank-Verdugo Basin to regulate flows from Burbank and Verdugo Washes. The hydrograph indicates only modest reduction in peak flows in the Glendale Narrows, although it is possible that operations of the basin may need to be optimized.** Source: Geosyntec, OLIN, 2019.

New Burbank-Verdugo Flood Control Basin?

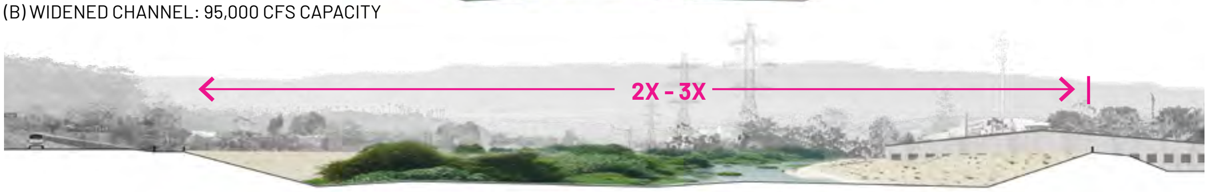
Analyses of the HEC-HMS model results used to assess the benefits of expanding Sepulveda and Hansen Basins indicated that the peak flow largely came from uncontrolled run-off from Burbank and Verdugo Washes. Adding a flood control basin to manage these flows is another approach that may be used to increase flood risk reduction of the LA River. A hypothetical Burbank-Verdugo Basin was added to the HEC-HMS model to regulate flows in the Burbank and Verdugo Washes. The size and operations of the new hypothetical basin were the same as those used in Sepulveda Basin.

Results are plotted in Figure 69 and indicate only a modest reduction in the peak flow of the 1% flood, although it is noted that the operation of the new basin has not been optimized. Even if the basin operations could be better optimized there is unlikely to be room to construct a new basin capable of intercepting flows from Burbank and Verdugo Washes in the heavily urbanized region (Figure 67).

CHANNEL STRATEGIES: GLENDALE NARROWS

(A) EXISTING SECTION: 34,700 CFS CAPACITY
N=0.06

(B) WIDENED CHANNEL: 95,000 CFS CAPACITY



(C) RAISED LEVEE/WALL: 95,000 CFS CAPACITY

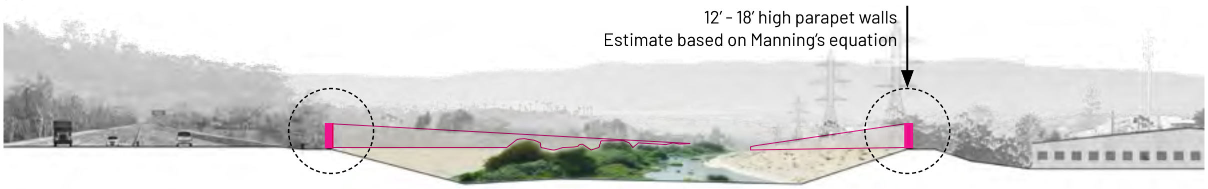


Figure 70. Section schematics of approaches to increase capacity of the LA River channel in the Glendale Narrows: (a) existing channel, (b) widened channel, (c) raised levee/wall. Estimated channel capacities are provided in each sub-caption and range from 34,700 cfs in the existing condition to approximately 95,000 cfs for a raised levee/wall. The estimated peak flow rate for the 1% flood is approximately 95,000 cfs. Source: Geosyntec, OLIN, 2019.

INCREASE CHANNEL CAPACITY OF THE LA RIVER

There are a range of approaches to increase the channel capacity of the LA River in the Glendale Narrows, as illustrated in Figure 70. These approaches are analyzed and discussed below.

Channel Widening

Widening the existing river channel would increase capacity and improve flood risk mitigation. Approximate calculations (excluding the effects of bridges and transitions) indicates that the width would need to be widened approximately 2 to 3 times to convey the 1% flood (Figure 70). This approach has many challenges, including acquisition of surrounding land, the need to lengthen numerous bridges and realign associated roads, and the requirement that widening would need to be continued for relatively long reaches and/or require careful design of the transition back to existing channel downstream.

Increase Levee Height / Parapet Walls

Increasing the height of the existing levees and/or adding parapet walls to the existing river channel would increase capacity and improve flood risk mitigation. Approximate calculations (excluding the effects of bridges and transitions) indicates that parapet walls would need to be approximately 12 to 18 feet high to convey the 1% flood (Figure 70). This approach has many challenges, including the need to raise several bridges, reduced connectivity to the river for both wildlife and people, and visual impairment.

Bypass Tunnel

Construction of a bypass tunnel to divert a portion of the flow from the channel upstream of the Glendale Narrows to downstream of the Glendale Narrows would increase overall capacity and improve flood risk mitigation (Figure 71). As an example, a 40-feet-diameter concrete tunnel running from river mile 33 directly to river mile 22 was evaluated. Approximate hydraulic calculations indicate the tunnel could convey approximately 20,000 cfs. This approach alone would not be enough to meet the 1% flood risk capacity goal, although larger and/or multiple tunnels could be explored.

The hydraulics of the intake and outtake structures may present a challenge for this approach. For example, a very long overflow weir from the main river channel into the tunnel or tunnel forebay may require a large footprint. If designed appropriately, the bypass tunnel may provide ancillary water supply and water quality benefits through enabling storage of water in the tunnel for subsequent treatment and use during and after smaller storms.

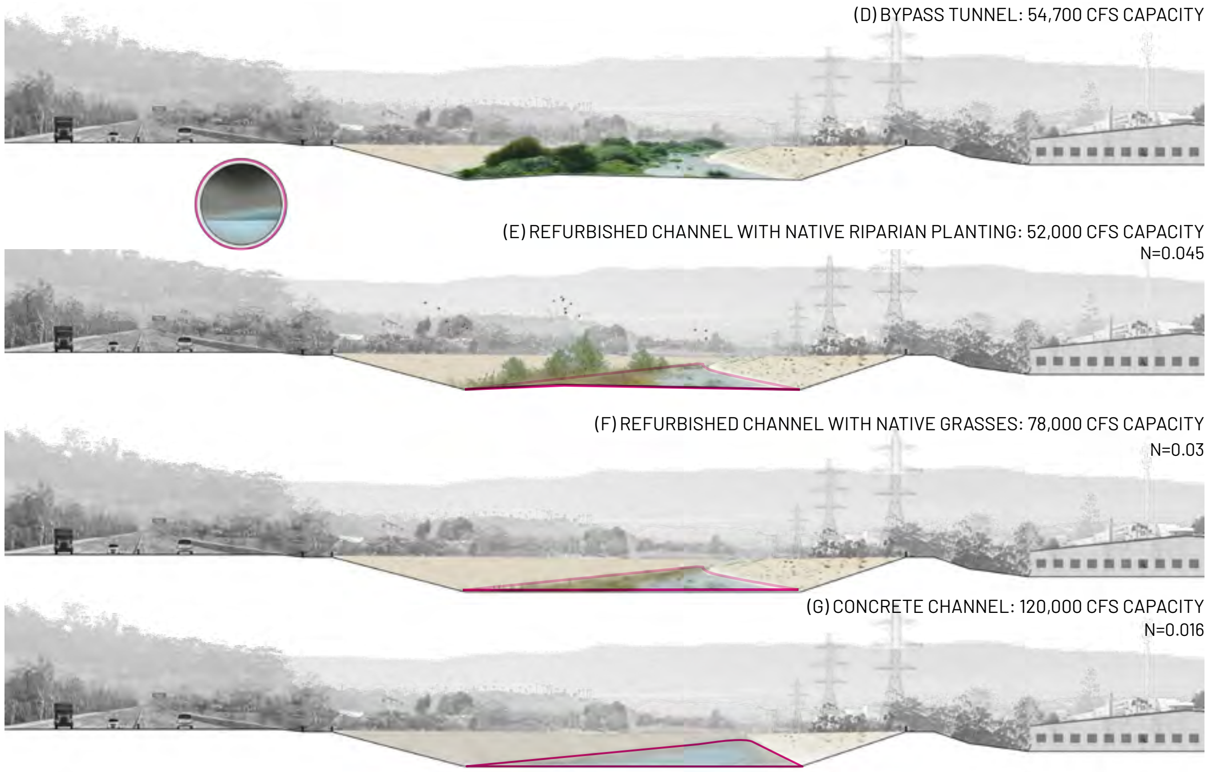


Figure 71. Section schematics of approaches to increase capacity of the LA River channel in the Glendale Narrows: (d) bypass tunnel, (e) refurbished channel with native riparian planting, (f) refurbished channel with native grasses, and (g) concrete channel. Estimated channel capacities are provided in each sub-caption and range from 54,700 cfs in the bypass tunnel to approximately 120,000 cfs for a concrete channel. The estimated peak flow rate for the 1% flood is approximately 95,000 cfs. Source: Geosyntec, OLIN, 2019.

Channel Refurbishment (Grasses)

Since construction of the original channel, the Glendale Narrows reach has become heavily vegetated and built up with sediment, resulting in decreased hydraulic capacity. Refurbishment of the channel to something nearer to the original as-built condition would increase capacity and improve flood risk mitigation. Refurbishment would involve removing invasive vegetation (i.e., vegetation, such as Arundo, that would not be present without the constant supply of waste water) from the channel, removing sediment from the channel bottom, replacing vegetation with native grasses, and ongoing maintenance (Figure 71). Approximate calculations indicate that this would substantially improve flood risk mitigation, to approximately the 2% protection level, but would not meet the 1% protection level goal. Additionally, it is noted that under these conditions many of the bridges and bridge piers behave as constrictions, and may have to be redesigned (e.g., clear-span).

Channel Refurbishment (Riparian)

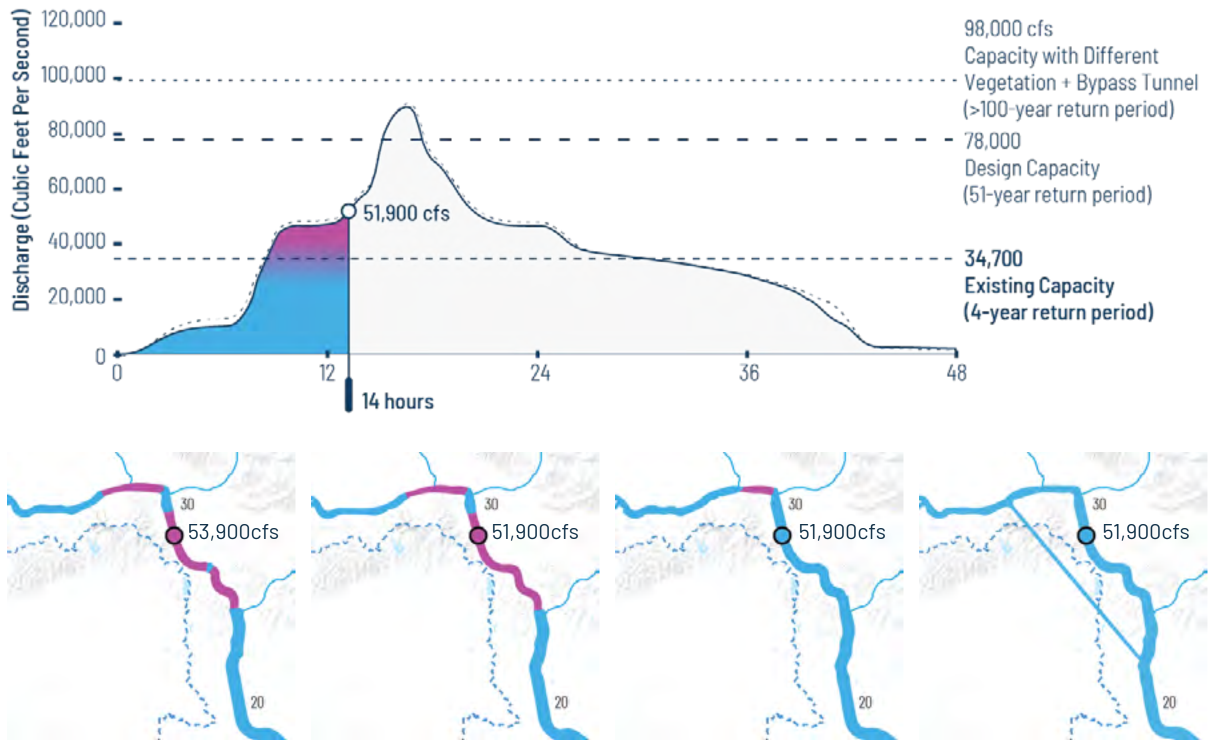
Planting with native riparian trees (Figure 71) can be considered as an alternative to replacement with grasses. This will provide enhanced habitat compared to current conditions, and if carefully implemented over several years utilizing a 'patchwork' approach, this would enable a range of existing wildlife to be maintained in the Glendale Narrows. Provided appropriate tree species are selected and managed to keep appropriate density (i.e., less dense than current), and excess sediment and Arundo hummocks are removed, the channel capacity may be increased by approximately 50% from current conditions. This would improve capacity from worse than 20% protection level to better than 10% protection level.

Concrete Bottom

Placement of concrete on the channel bottom (Figure 71) would reduce friction and substantially increase channel capacity. Approximate hydraulic calculations indicate that this strategy would exceed the 1% flood risk protection goal. This approach would also require many bridges to be redesigned (e.g., clear span). Additionally, the rising groundwater in the region of the Glendale Narrows, which prevented laying of concrete during the original construction, would have to be mitigated (e.g., through continuous and managed groundwater pumping).

INCREASED CAPACITY: 1% FLOOD EVENT

HEC-HMS Model:
Glendale Narrows (River Mile 29)



Baseline Imperviousness | 28% Imperviousness Reduction | 28% Imperviousness Reduction + Refurbishment | 28% Imperviousness Reduction + Refurbishment + Bypass Tunnel

Figure 72. HEC-HMS model simulation prior to the peak of a 1% precipitation event at the Glendale Narrows for existing conditions and combinations of different flood risk mitigation strategies. Colors indicate sufficient (blue), deficient (pink), or near deficient (purple) channel capacity. Source: Geosyntec, OLIN, 2019.

COMBINATIONS OF APPROACHES

Many of the above approaches improve flood risk reduction, but do not meet the 1% capacity level goal on their own. Combinations of approaches were evaluated as an illustrative example. The approaches evaluated include full implementation of the 2037 EWMP goals (i.e., 28% imperviousness reduction) based on the assumption that these will be implemented for water quality benefits, channel refurbishment, and a bypass tunnel.

Results of the analyses reinforce the minimal effect that LID/BMP/distributed storage has on flood risk management (compare first two frames of Figure 72) but does indicate substantial benefit from channel refurbishment and bypass tunnel (last two frame of Figure 73) for flow rates below the peak. For the peak flow rate of the 1% event, the effect of channel refurbishment on its own does not provide adequate capacity throughout the Glendale Narrows (third frame of Figure 73). A combination of channel refurbishment and a bypass tunnel provides enough capacity to meet the 1% flood risk reduction goal throughout much of the Glendale Narrows, except for a short reach immediately upstream of Verdugo Wash (Figure 73). This region is adjacent to Ferraro Fields, and the available open space there may provide opportunities to implement other local strategies to reduce flood risk, such as construction of a dry arroyo around

INCREASED CAPACITY: 1% FLOOD EVENT

HEC-HMS Model:
Glendale Narrows (River Mile 29)

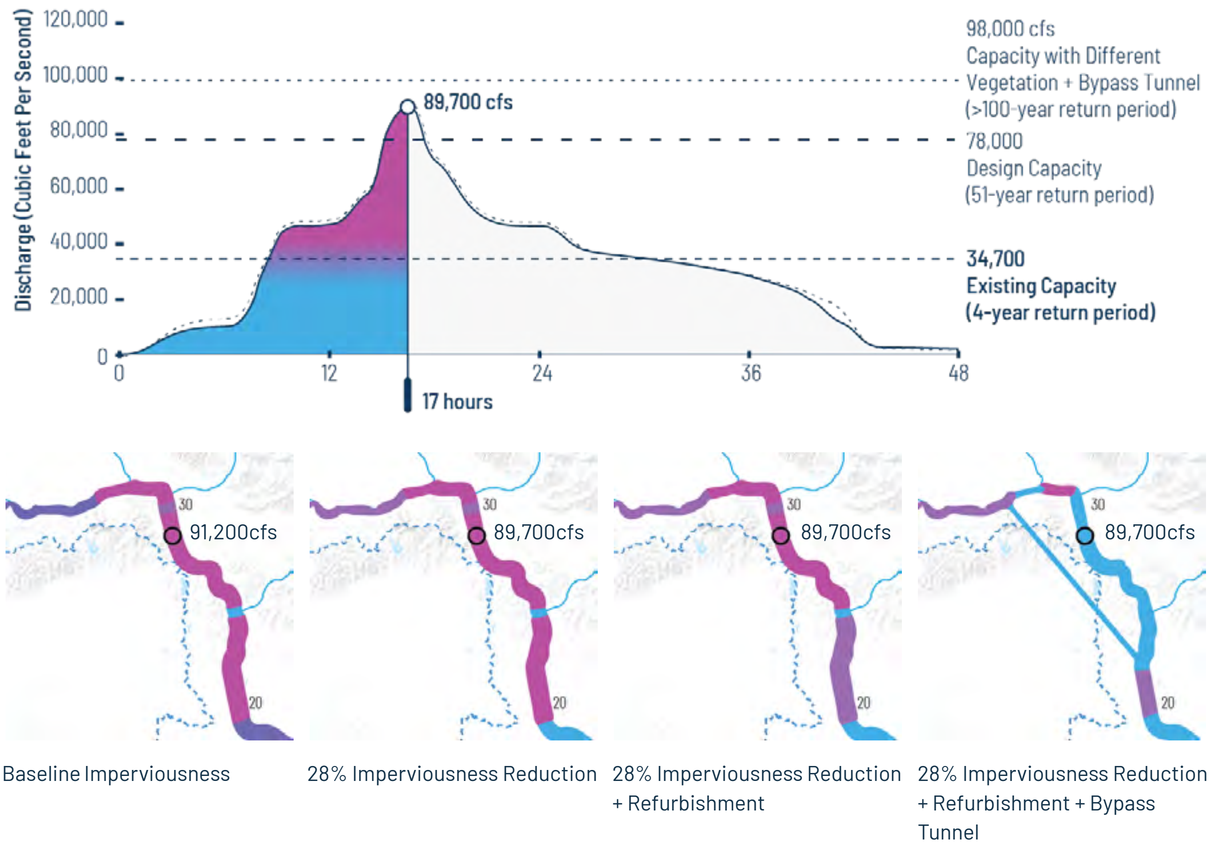


Figure 73. HEC-HMS model simulation at the peak of a 1% precipitation event at the Glendale Narrows for existing conditions and combinations of different flood risk mitigation strategies. Colors indicate sufficient (blue), deficient (pink), or near deficient (purple) channel capacity.
Source: Geosyntec, OLIN, 2019.

the fields to provide additional conveyance during extreme events. The figure also indicates that the channel is near capacity immediately upstream and downstream of the diversion tunnel (fourth frame of Figure 73), and this should be accounted for in the hydraulic design of the tunnel intake and outtake structures.

OTHER CONSIDERATIONS

These hydrologic and hydraulic analyses demonstrate that flood risk reduction remains a high need in various locations along the LA River, and specifically in the Glendale Narrows where channel capacity is estimated to be exceeded by the 25% event. There are many strategies that can be used to improve the capacity and reduce peak flows in the river and move towards the 1% flood risk reduction goal. These strategies need to be robustly and scientifically evaluated for effectiveness (e.g., hydrological and hydraulic analyses) and also need to be balanced with other needs and goals for the river.

Figure 74. Environmental art combines ecological information with community expression along the Glendale Narrows River Walk at river mile 31.2. Source: LA County Public Works, 2018.

4.
NEEDS WEIGHTING AND MAPPING

CRITERIA FOR EVALUATING THE MAGNITUDE AND SPATIAL DISTRIBUTION OF NEEDS WERE ESTABLISHED USING THE MOST APPLICABLE DATASETS COLLECTED AS PART OF THE MASTER PLAN INVENTORY AND ANALYSIS

The LA River Master Plan's existing conditions inventory and analysis revealed that conditions in and along the LA River vary widely, with some areas experiencing unique vulnerabilities and others containing a variety of desirable assets. To evaluate which portions of the LA River are most in need when it comes to fulfilling the goals of the Master Plan, a GIS-based need analysis was conducted for each goal.

For each LA River Master Plan goal, criteria for evaluating the magnitude and spatial distribution of need were established using the most applicable datasets collected as part of the inventory and analysis process. Individual datasets were rasterized to a common 1-acre grid cell, reclassified from general need to highest need, and then weighted and combined to produce a relative need assessment for each goal.

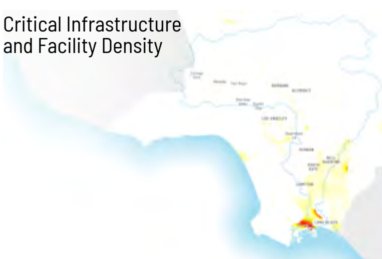
Figure 75. See the LA River Master Plan, Chapter 6 for a description of each of the needs and their associated goals and actions.

Datasets were converted into a need assessment based on either score, density, or proximity that rank conditions across LA County. A scale of general need to very high need was assigned based on the relevant goal. For example, for flood risk reduction need, areas not in a floodplain were assigned general need, areas in the 0.2% floodplain were assigned moderate need, and areas in the 1% floodplain were assigned very high need.

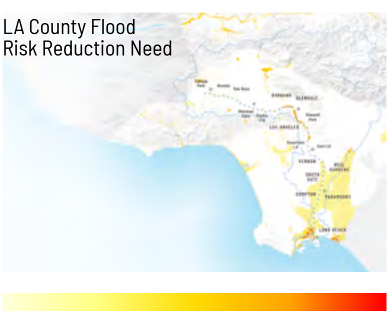
Existing score-based datasets were reclassified to match the same general to high need scale. For example, CalEnviroScreen scores were reclassified so that areas with better environmental conditions had general need and areas with worse environmental conditions had very high need. For some datasets, a density or proximity analysis was used for assessing need. A density analysis evaluated the number of positive or negative assets in an area relative to LA County as a whole. Proximity was used for datasets where need was relative to an area's distance from a particular asset.

Chapter 6 in the LA River Master Plan includes full maps and river rulers for each goal. The information in this technical backup document describes each criteria and the specific weighting.

LA COUNTY FLOOD RISK REDUCTION NEED CRITERIA

Criteria	Criteria Type	Description	Assessment	Weight
LA River Channel Capacity 	LARMP Composite Metric; Score	Where the river channel has a 1% or greater annual chance of exceedance, there is a higher need for flood risk reduction.	High Need = 10% or worse protection Moderate Need = worse than 1% protection General Need = 1% or better protection, or non-channelized areas	40%
Floodplains 	Existing Data; Score	Areas within the 1% floodplain have a higher need for flood risk reduction. Areas within the 0.2% annual chance of exceedance floodplain may also have a need for flood risk reduction.	High Need = 1% floodplain General Need = 0.2% floodplain No Need = area not in a floodplain	40%
Sea Level Rise 	Existing Data; Proximity	Areas subject to sea level rise, including approximately the lower 3 miles of the channel, have a higher need for flood risk reduction.	High Need = maximum inundation General Need = minimum inundation No Need = not within 1.41 m of sea level rise	10%
Critical Infrastructure and Facility Density 	LARMP Composite Metric; Density	Floodplain areas with higher density of critical infrastructure and facilities have a higher need for flood risk reduction.	High Need = high density General Need = low density No Need = area not in a floodplain	10%

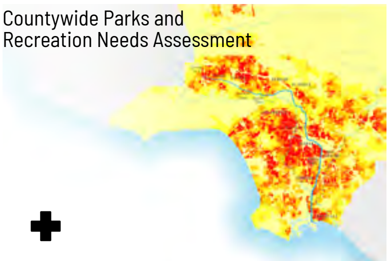
LA County Flood Risk Reduction Need



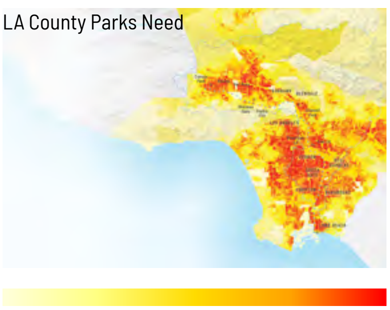
FLOOD RISK REDUCTION NEED

Flood risk is related to both the capacity of the LA River channel to convey water in large storms, but also the area outside of the channel impacted by flooding. To evaluate needs related to flooding along the LA River corridor, the level of existing channel capacity was analyzed and combined with the floodplains directly associated with the LA River. Areas that may be subjected to sea level rise inundation and areas with high amounts of critical infrastructure and facilities in the floodplain were also assessed. See the LA River Master Plan, Chapter 6 for full size map and ruler.

LA COUNTY PARKS NEED CRITERIA

Criteria	Criteria Type	Description	Assessment	Weight
Countywide Parks and Recreation Needs Assessment 	LA County Composite Dataset	Park Need was evaluated by examining park acre need, distance to park, and population density within each study area.	High Need = very high score General Need = very low score No Need = no value (not participating)	50%
CalEnviroScreen 4.0	State of California Composite Dataset	CalEnviroScreen is a science-based dataset identifying California communities affected by pollution, and vulnerable to pollution's effects.	High Need = 100% score General Need = 0% score No Need = no value	50%

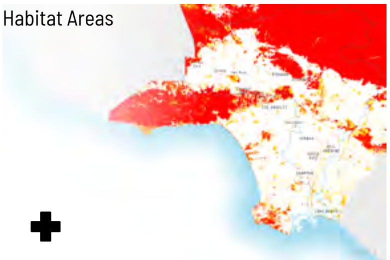
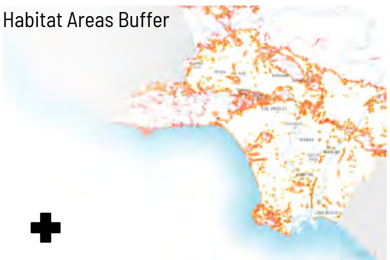
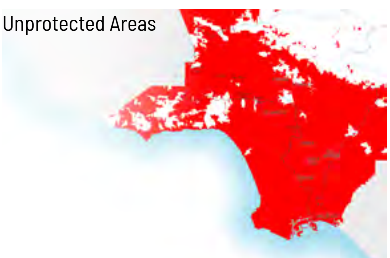
LA County Parks Need



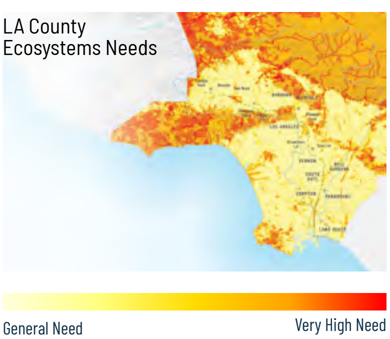
PARKS NEED

The LA River Master Plan evaluates park need based on park access and availability, but also by considering an area's level of exposure to poor environmental conditions where access to open space and recreation can have the greatest impact on multiple needs. The Los Angeles County Department of Parks and Recreation's Los Angeles Countywide Comprehensive Parks and Recreation Needs Assessment was combined with the California Office of Environmental Health Hazard Assessment's CalEnviroScreen 4.0 to assess both where park need was highest, and where communities would benefit most from environmental and recreational improvements. See the LA River Master Plan, Chapter 6 for full size map and ruler.

LA COUNTY ECOSYSTEMS NEED CRITERIA

Criteria	Criteria Type	Description	Assessment	Weight
Habitat Areas 	State of California/ LARMP Data	CALVEG Regional Dominance types were used to classify existing areas as predominantly urban/ barren, invasive vegetation, or native/ natural (habitat areas).	High Need = native/ natural General Need = agriculture/barren	50%
Habitat Areas Buffer 	LARMP Data	Areas closest to existing protected habitat areas that could help further buffer core protected habitat areas.	Very High Need = 1 ft area buffer General Need = > 1000 ft area buffer	20%
Linkages and Confluences 	State of California/ LARMP Data	Missing linkages are areas without connectivity but have been identified as critical based on location. Tributaries and confluences can also provide connectivity. Areas near linkages received a higher need designation.	High Need = missing linkage, tributary, confluence General Need = < 5000 ft linkage	15%
Unprotected Areas 	Existing Data	Unprotected areas are vulnerable to development and are less likely to sustain habitat areas over time. Ecosystems that are in areas that are unprotected have high need.	Very High Need = unprotected area General Need = protected area	15%

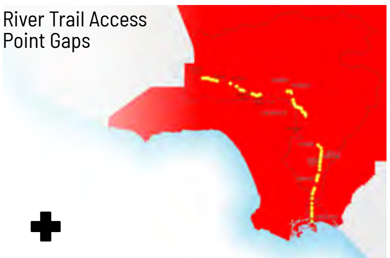
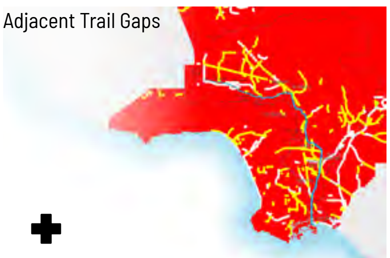
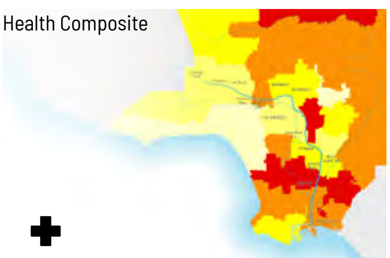
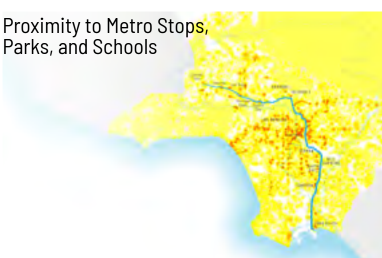
LA County Ecosystems Needs



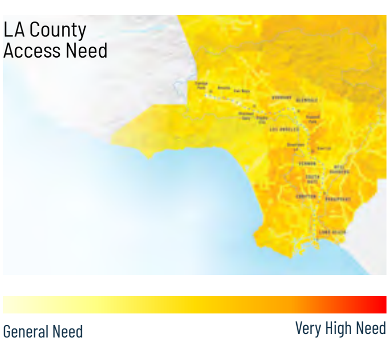
ECOSYSTEMS NEED

In an urban environment like the LA Region, maintaining healthy ecosystems requires protecting areas with high biodiversity and also expanding habitat at strategic locations. Need for ecosystems was evaluated by combining the need to protect and manage existing habitat areas with the need to expand existing habitat areas and improve linkages between these habitat areas across the unprotected urban areas of LA. See the LA River Master Plan, Chapter 6 for full size map and ruler.

LA COUNTY ACCESS NEED CRITERIA

Criteria	Criteria Type	Description	Assessment	Weight
River Trail Gaps 	City of Los Angeles/ LARMP Data	Locations on either bank of the river without a trail. Areas without a river trail or a proposed river trail have a higher need for access and trails.	High Need = no existing river trail General Need = existing river trail	30%
River Trail Access Point Gaps 	City of Los Angeles / LARMP Data	Areas greater than a half mile from an existing river trail access point have a higher need for access and trails.	High Need = > half a mile from A river trail access point General Need = adjacent to a mile from a river trail access point	30%
Adjacent Trail Gaps 	Los Angeles County Data	Connecting to adjacent trails improves access to the LA River and regional connectivity. Areas without adjacent trails have a higher need.	High Need = no existing trail within 1/4 mile General Need = existing trail within a 1/4 mile	20%
Health Composite 	Los Angeles County / LARMP Data	Trails also provide recreation, exercise, and open space, which can improve health. Areas with a higher health composite score (poorer health conditions) have a higher need for access and trails.	High Need = high health composite score General Need = low health composite score	10%
Proximity to Metro Stops, Parks, and Schools 	Los Angeles County / LARMP Data	Connecting public facilities to the LA River is vital for ensuring an effective connectivity system. Areas closest to existing Metro stops, parks, and schools have a higher need for access and trails.	High Need = < half a mile from a Metro rail, bus rapid transit, or rapid bus stop; park; or school General Need = > half a mile from a Metro stop, park, or school	10%

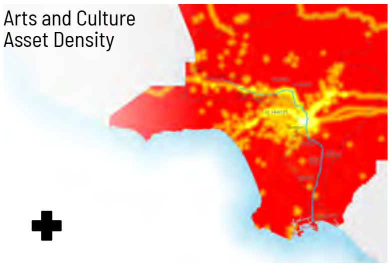
LA County Access Need



ACCESS NEED

Access to the LA River means a continuous 51 mile river trail with frequent access points and a network of lateral trail connections that improve access to outdoor space and opportunities for recreation. The need for improved access along the river starts by evaluating the status of the 51 mile river trail and identifying gaps where the trail or access to the trails is not continuous. Communities adjacent to the river trail that lack additional connecting trails, or lack trail connections to public facilities were also evaluated. See the LA River Master Plan, Chapter 6 for full size map and ruler.

LA COUNTY ARTS AND CULTURE NEED CRITERIA

Criteria	Criteria Type	Description	Assessment	Weight
Arts and Culture Asset Density 	LARMP Composite Dataset	Given the lack of detail about the size of specific assets, the relative density of assets was used to evaluate areas with a relatively low density of assets.	High Need = low density of assets General Need = high density of assets	33.3%
Population Density 	U.S. Census Bureau Data	Population density was used to compare the relative number of assets in a given location to the number of people at that location.	High Need = high density General Need = low density	33.3%
Household Income 	U.S. Census Bureau Data	Household Income was used to identify areas where a household's financial constraints may limit access to art and cultural facilities.	High Need = low income General Need = high income	33.3%

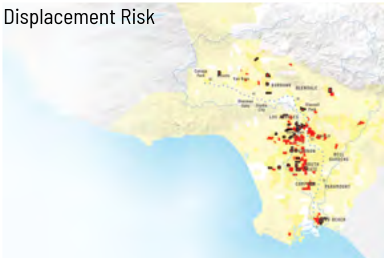
LA County Arts and Culture Need

General Need Very High Need

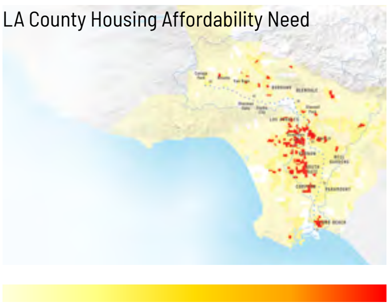
ARTS AND CULTURE NEED

Communities should have art and cultural facilities proportional to their population density. Also, it is important to prioritize access to arts and culture for communities with lower household income to improve equitable access to arts and cultural opportunity. Art and culture need were evaluated by comparing the number of known art and culture assets at a given location with population density and household income to assess a community's relative access to art and cultural facilities. See the LA River Master Plan, Chapter 6 for full size map and ruler.

LA COUNTY HOUSING AFFORDABILITY NEED CRITERIA

Criteria	Criteria Type	Description	Assessment	Weight
Displacement Risk 	LARMP Composite Metric	Combines a variety of socioeconomic indicators to measure the risk of displacement based on research by the Urban Displacement Project.	Very High Need = ongoing displacement / at risk of displacement General Need = lower risk of displacement / not vulnerable	100%

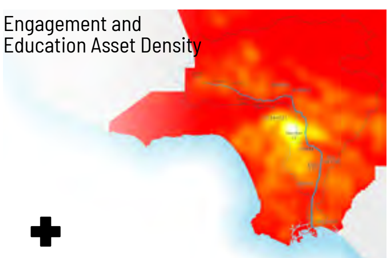
LA County Housing Affordability Need



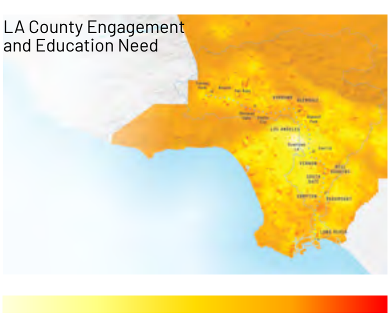
HOUSING AFFORDABILITY NEED

Areas with a high displacement risk have a high need for affordable housing. While affordable housing is needed through LA County, the need for affordable housing at a given location was evaluated by analyzing that community's existing risk of displacement. The mapping of housing affordability need should only be used as a reference to determine appropriate housing strategies after sites for new infrastructure or parks projects are known. See the LA River Master Plan, Chapter 6 for full size map and ruler.

LA COUNTY ENGAGEMENT AND EDUCATION NEED CRITERIA

Criteria	Criteria Type	Description	Assessment	Weight
Engagement and Education Asset Density 	LARMP Composite Dataset	Given the lack of detail about the size of specific assets, the relative density of assets was assessed.	High Need = low density of assets General Need = high density of assets	50%
Population Density 	U.S. Census Bureau Data	Population density was used to compare the relative number of assets in a given location to the number of people at that location.	High Need = high density General Need = low density	50%

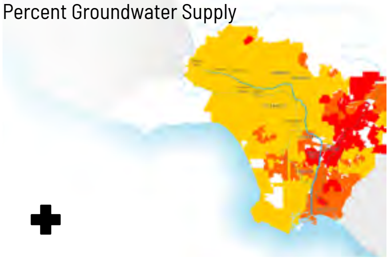
LA County Engagement and Education Need



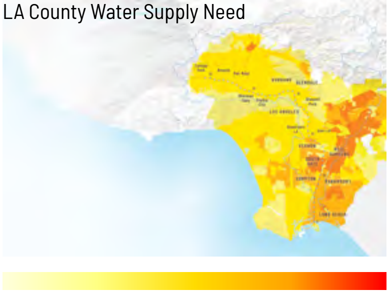
ENGAGEMENT AND EDUCATION NEED

Neighborhoods should have educational opportunities proportional to their population density. Engagement and Education need was evaluated by comparing the number of education assets at a given location such as schools, libraries, and adult education programs, with that location's population density to evaluate the number of educational assets relative to the number of people in the surrounding community. See the LA River Master Plan, Chapter 6 for full size map and ruler.

LA COUNTY WATER SUPPLY NEED CRITERIA

Criteria	Criteria Type	Description	Assessment	Weight
Habitat and Recreation Beneficial Uses 	LARMP Composite Dataset	The occurrences of Beneficial Uses related to Recreation or Habitat were identified in order to indicate where in-channel water supply is needed.	High Need = recreation and habitat beneficial use General Need = no recreation or habitat beneficial use	33.3%
Percent Groundwater Supply 	Existing Composite Data	Areas with groundwater sourcing a significant portion of water supply are in high need of consistent replenishment of groundwater replenishment supply.	High Need = > 90% groundwater General Need = < 10% groundwater	33.3%
Groundwater Basins 	LARMP Data	Locations overlaying groundwater basins have need for additional replenishment of groundwater basins to enhance municipal water supply.	High Need = areas over groundwater basins General Need = areas not over groundwater basins	33.3%

LA County Water Supply Need

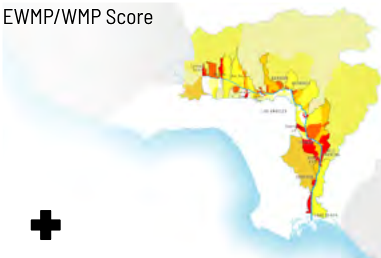
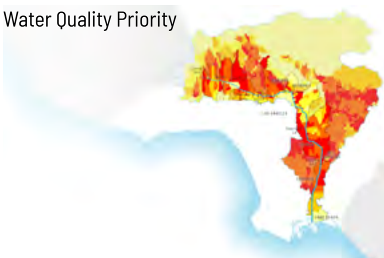


General Need   Very High Need

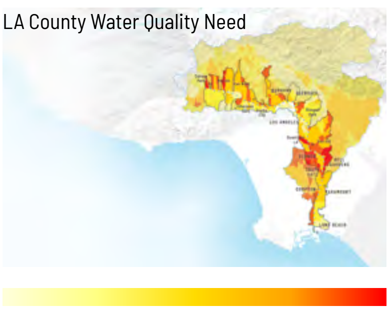
WATER SUPPLY NEED

Water in the LA River provides important uses for recreation and habitat, but also plays a role in recharging the region's groundwater and lowering the demand for imported water. The need for water supply reliability was assessed by evaluating the need to maintain water in streams for particular beneficial uses and through evaluating areas where municipal water supply overlays and is most dependent on groundwater replenishment. See the LA River Master Plan, Chapter 6 for full size map and ruler.

LA COUNTY WATER QUALITY NEED CRITERIA

Criteria	Criteria Type	Description	Assessment	Weight
EWMP/WMP Score 	LA Regional Water Quality Control Board	Reflects the weighted difference of target BMP volume (75%) versus planned BMP volume (25%) for areas to comply with water quality regulations.	Very High Need = high EWMP/WMP score General Need = low EWMP/WMP score	50%
Water Quality Priority 	Greater Los Angeles Region Data	An integrated evaluation of dry- and wet-weather runoff quality based on receiving water body impairments, identified beneficial uses, and land-use-based pollutant loading.	Very High Need = high water quality priority General Need = low water quality priority	50%

LA County Water Quality Need



General Need Very High Need

WATER QUALITY NEED

Water picks up pollutants and absorbs heat as it drains more impervious paved areas on its way to the LA River, reducing water quality and the beneficial uses water provides. The need for water quality improvements evaluated sub-watersheds within the LA River watershed that directly drain to the LA River (not its tributaries) and compared their current water quality conditions with planned efforts to improve those conditions to comply with water quality regulations. See the LA River Master Plan, Chapter 6 for full size map and ruler.

Figure 76. Community members utilizing the LA River Trail at river mile 26.5. Source: LA County Public Works, 2018.

SECTION III: **SITES**

Figure 77. The Dominguez Gap Wetlands near river mile 5. Source: OLIN, 2019.

5.
M, L, XL SITES

THE MASTER PLAN INCLUDES 78 MEDIUM, LARGE, AND EXTRA-LARGE SITES THAT ARE SUITABLE FOR LARGE MULTI-BENEFIT INTERVENTIONS

Following a review of existing plans and the creation of the Known Projects Database, the Master Plan identified a suite of projects and sites that together have the potential to transform the LA River, its right-of-way, and adjacent land from an infrastructural necessity to a vibrant, multi-benefit corridor. These sites and projects and related terminology are introduced in the LA River Master Plan, Chapter 7. This technical backup document provides more detailed information.

A total of 78 project sites were named, 56 derived from existing plans and 22 newly proposed. The 22 newly proposed sites were selected through a desktop analysis of opportunity parcels including all publicly owned land, vacant land, and underutilized land within one mile of the LA River, with a particular focus on land within and immediately adjacent to the LA River right-of-way. In stretches of the river where projects had not already been planned, parcels falling into these categories were combined to create new project sites. The overall cadence of sites was considered to ensure an equitable distribution of project sizes along all 51 miles of the LA River.

The following pages provide a detailed view into each of the 78 opportunity sites included in the Master Plan. Information on location, size, impact, land ownership, and political districts is included. For planned major projects, the source or plan of origin is also listed. Tables display need levels for the nine Master Plan goals, allowing for comparison across all projects.

Figure 78. The process for identifying planned major projects and newly proposed sites on the LA River is introduced in the LA River Master Plan, Chapter 7.

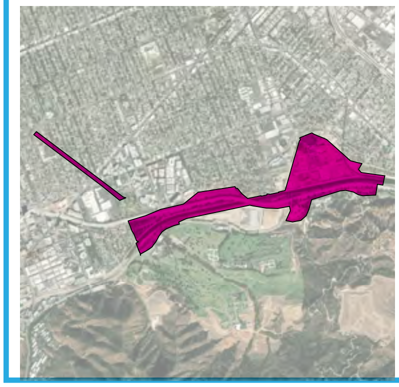
M, L, XL SITES INDEX KEY

RM 32.8

Headworks Connector

LARMP Proposed Project Site

XL / 225.7 acres

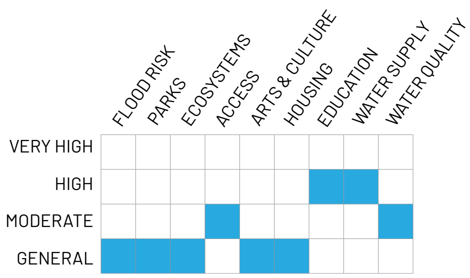


Frame 7 - Los Angeles, Burbank

Land Ownership:
68% Public (Non-County)
30% Unclassified
1% Private
1% County

Political Districts:
Congressional: 30
Supervisorial: 5
LA City Council: 4
State Senate: 20, 25, 26
State Assembly: 44, 51

Needs:



RM 31.9

Burbank Western Green Network

ULART

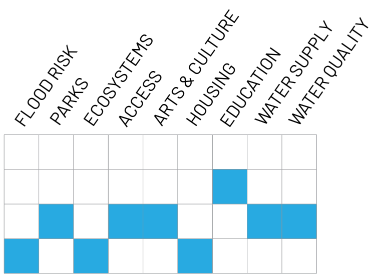
XL / 218.2 acres

Frame 6,7 - Los Angeles, Glendale, Burbank

Land Ownership:
47% Unclassified
36% Public (Non-County)
10% Private
7% County

Political Districts:
Congressional: 30
Supervisorial: 5
LA City Council: 4
State Senate: 20, 25, 26
State Assembly: 44, 51

Needs:



GENERAL INTRO

River mile location, name, acreage, and impact (M, L, XL) for each project. Italicized text indicates a source, if project originates from a previously published plan. A magenta title designates that the project is newly proposed for the Master Plan.

FRAME AND CITY

Planning frame and city for each project.

LAND OWNERSHIP

Percentage of project land owned by LA County, other public institutions, and private holders. Unclassified land includes roads and road rights-of-way. Utility rights-of-way are classified as public or private depending on whether they are owned by a public entity or a private entity.

BOUNDARIES

Political jurisdictions for each project.

NEED ANALYSIS

Describes the need level (general to very high) associated with a site based on the Master Plan goals. The analysis is based on comparing need within a project boundary to the need across LA County.

ABBREVIATIONS USED IN SITES INDEX KEY

ATSP	Active Transportation Strategic Plan (2016)
FoLAR	Friends of the LA River
LAC Public Works	LA County Public Works
LARMP	LA River Master Plan
LARRMP	LA River Revitalization Master Plan (2007)
LLARRP	Lower LA River Revitalization Plan (2018)
MRCA	Mountains Recreation & Conservation Authority
RMC	San Gabriel and Lower LA Rivers and Mountains Conservancy
TNC	The Nature Conservancy
TPL	Trust for Public Land
ULART	Upper LA River Tributaries Revitalization Plan (2020)

Figure 79. Planned major projects and proposed project sites. Seventy-eight planned or potential projects have been identified and included in the Master Plan. Source: OLIN, 2021.

M, L, XL SITES INDEX: RIVER MILE 51.0-47.5

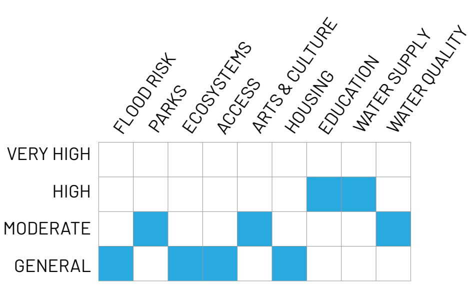
RM 51.0
River Origin Park
LARRMP
M / 6.7 acres

Frame 9 - Los Angeles

Land Ownership:
97% Public (Non-County)
1% Private
1% County
1% Unclassified

Political Districts:
Congressional: 32
Supervisorial: 3
LA City Council: 3
State Senate: 20
State Assembly: 46

Needs:



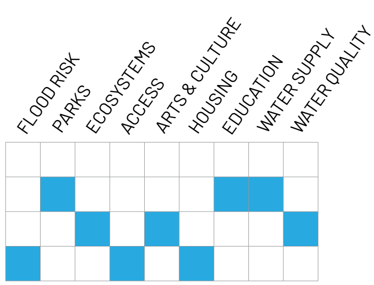
RM 50.9
Canoga Park High School
LARMP Proposed Project Site
M / 32.7 acres

Frame 9 - Los Angeles

Land Ownership:
76% Public (Non-County)
20% County
4% Unclassified

Political Districts:
Congressional: 32
Supervisorial: 3
LA City Council: 3
State Senate: 20
State Assembly: 46

Needs:



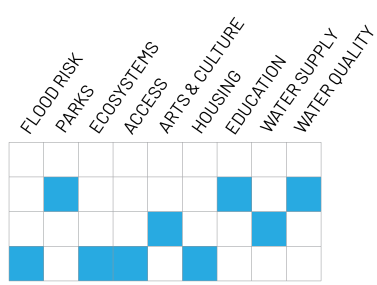
RM 50.6
Canoga Park River Park
LARRMP
M / 28.3 acres

Frame 9 - Los Angeles

Land Ownership:
54% County
23% Private
13% Unclassified
10% Public (Non-County)

Political Districts:
Congressional: 32
Supervisorial: 3
LA City Council: 3
State Senate: 20
State Assembly: 46

Needs:



RM 48.9

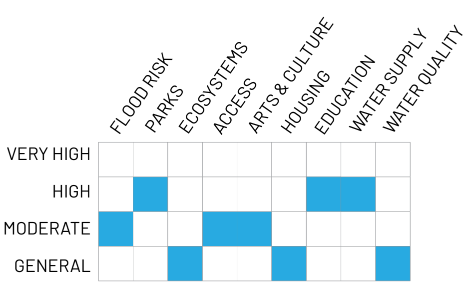
Pierce College Connector
LARMP Proposed Project Site
M / 13.9 acres

Frame 9 - Los Angeles

Land Ownership:
86% County
10% Public (Non-County)
4% Private

Political Districts:
Congressional: 32
Supervisorial: 3
LA City Council: 3
State Senate: 20, 27
State Assembly: 46

Needs:



RM 47.8

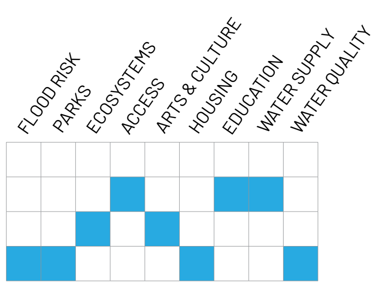
LA River Valley Bikeway and Greenway
City of LA Bureau of Engineering
XL / 12.8 miles

Frame 9 - Los Angeles, Burbank, Universal City (Unincorporated)

Land Ownership:
38% County
37% Public (Non-County)
16% Private
9% Unclassified

Political Districts:
Congressional: 29, 30, 32
Supervisorial: 3, 5
LA City Council: 3, 4, 6
State Senate: 20, 24, 26, 27
State Assembly: 44, 46, 51

Needs:



RM 47.5

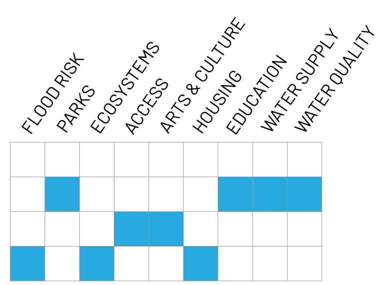
Southern Aliso Green Network
LA City Mobility Plan, ULART
L / 112.7 acres

Frame 9 - Los Angeles

Land Ownership:
64% Public (Non-County)
21% County
9% Unclassified
6% Private

Political Districts:
Congressional: 32
Supervisorial: 3
LA City Council: 3, 4, 12
State Senate: 20
State Assembly: 40, 46

Needs:



M, L, XL SITES INDEX: RIVER MILE 47.4-40.9

RM 47.4

Aliso Creek Confluence Park/ Resida River Loop
LARRMP - M / 26.9 acres

Frame 9 - Los Angeles

Land Ownership:
66% County
21% Private
13% Unclassified

Political Districts:
Congressional: 32
Supervisorial: 3
LA City Council: 3
State Senate: 20
State Assembly: 46

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									
HIGH		X			X		X	X	
MODERATE	X			X					X
GENERAL			X			X			

RM 46.8

Reseda Expansion
LARMP Proposed Project Site
L / 19 acres

Frame 9 - Los Angeles

Land Ownership:
87% County
13% Unclassified

Political Districts:
Congressional: 29, 32
Supervisorial: 3
LA City Council: 3, 4
State Senate: 20, 27
State Assembly: 46

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH				X					
HIGH					X			X	X
MODERATE	X	X	X				X		
GENERAL						X			

RM 46.5

Caballero Creek Confluence Park
LARRMP, MRCA
L / 1.5 acres

Frame 9 - Los Angeles

Land Ownership:
80% Public (Non-County)
20% County

Political Districts:
Congressional: 32
Supervisorial: 3
LA City Council: 3
State Senate: 27
State Assembly: 46

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH								X	
HIGH				X					
MODERATE	X	X			X		X		
GENERAL			X			X			X

RM 44.0

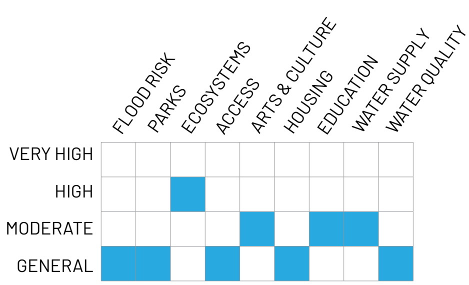
Sepulveda Basin
LARRMP
XL / 1884.2 acres

Frame 9 - Los Angeles

Land Ownership:
100% Public (Non-County)

Political Districts:
Congressional: 29, 32
Supervisorial: 3
LA City Council: 4, 6
State Senate: 20, 27
State Assembly: 44, 46

Needs:



RM 41.2

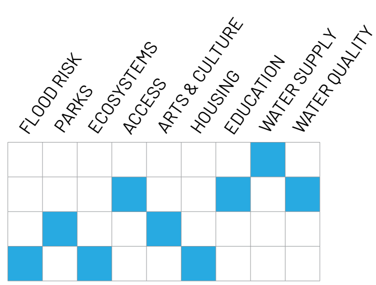
Hazeltine River Edge Park
LARRMP
M / 3.5 acres

Frame 8 - Los Angeles

Land Ownership:
51% Unclassified
43% County
6% Private

Political Districts:
Congressional: 32
Supervisorial: 3
LA City Council: 4
State Senate: 27
State Assembly: 44

Needs:



RM 40.9

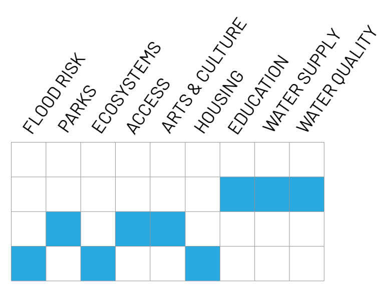
Hazeltine Avenue
LARRMP
M / 1.1 acres

Frame 8 - Los Angeles

Land Ownership:
91% Unclassified
9% County

Political Districts:
Congressional: 32
Supervisorial: 3
LA City Council: 4
State Senate: 27
State Assembly: 44

Needs:



M, L, XL SITES INDEX: RIVER MILE 40.8-37.5

RM 40.8

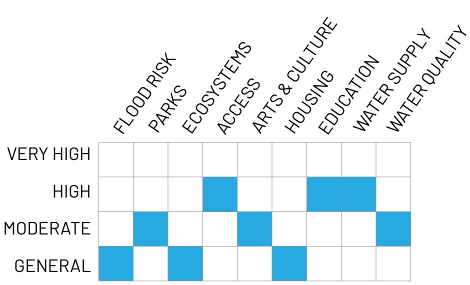
Van Nuys Blvd
LARMP Proposed Project Site
M / 19.6 acres

Frame 8 - Los Angeles

Land Ownership:
57% County
41% Unclassified
2% Private

Political Districts:
Congressional: 32
Supervisorial: 3
LA City Council: 4
State Senate: 27
State Assembly: 44

Needs:



RM 39.4

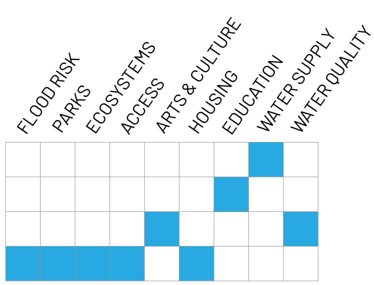
West of Coldwater
LARMP Proposed Project Site
M / 7.6 acres

Frame 8 - Los Angeles

Land Ownership:
94% County
6% Unclassified

Political Districts:
Congressional: 32
Supervisorial: 3
LA City Council: 4
State Senate: 27
State Assembly: 44

Needs:



RM 38.8

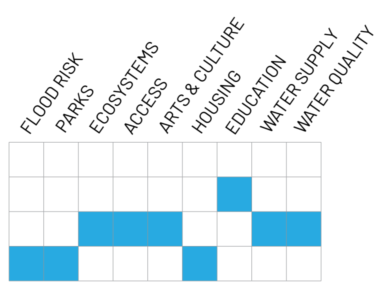
Harvard Westlake River Park
Harvard Westlake School
M / 17.2 acres

Frame 8 - Los Angeles

Land Ownership:
94% Private
6% Public (Non-County)

Political Districts:
Congressional: 32
Supervisorial: 3
LA City Council: 4
State Senate: 27
State Assembly: 44

Needs:



RM 38.2

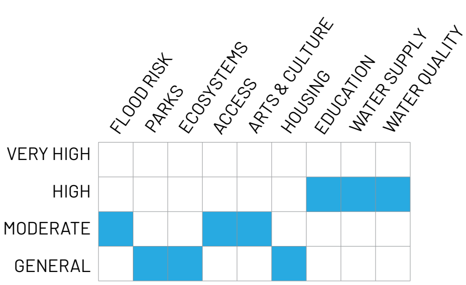
Upstream from Tujunga Confluence
LARMP Proposed Project Site
M / 15.7 acres

Frame 8 - Los Angeles

Land Ownership:
81% County
19% Unclassified

Political Districts:
Congressional: 32
Supervisorial: 3, 5
LA City Council: 4
State Senate: 27
State Assembly: 44

Needs:



RM 37.6

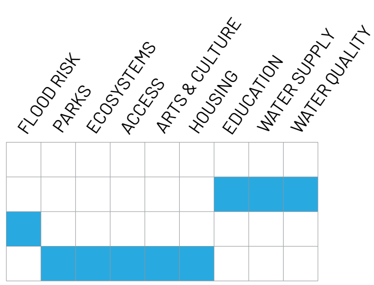
Tujunga Wash Confluence Park
LARRMP
M /1.4 acres

Frame 7 - Los Angeles

Land Ownership:
100% Private

Political Districts:
Congressional: 32
Supervisorial: 5
LA City Council: 4
State Senate: 27
State Assembly: 44

Needs:



RM 37.5

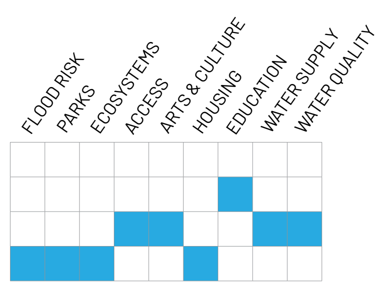
Tujunga Wash Path
LA City Mobility Plan
M / 1.3 miles

Frame 7, 8 - Los Angeles

Land Ownership:
50% County
29% Private
21% Unclassified

Political Districts:
Congressional: 32
Supervisorial: 3, 5
LA City Council: 2, 4
State Senate: 27
State Assembly: 44

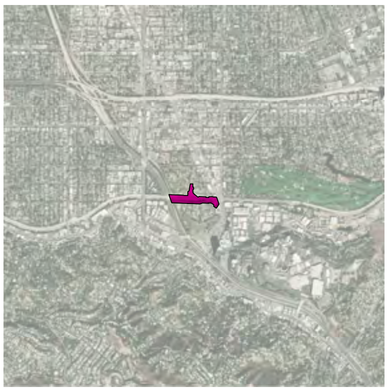
Needs:



M, L, XL SITES INDEX: RIVER MILE 35.9-31.0

RM 35.9

101 Freeway Crossing
LARMP Proposed Project Site
M / 11.5 acres

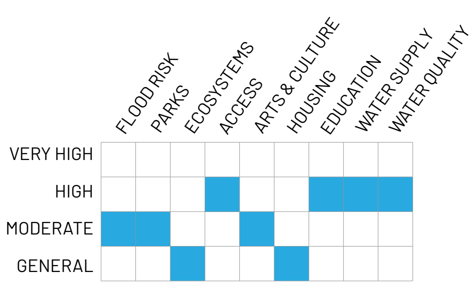


Frame 7 - Los Angeles

Land Ownership:
60% County
22% Unclassified
18% Private

Political Districts:
Congressional: 32
Supervisorial: 5
LA City Council: 2
State Senate: 27
State Assembly: 44

Needs:



RM 33.5

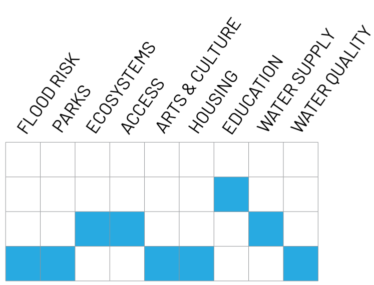
Sennett Creek
FoLAR, NE Trees, MRCA
M / 16.7 acres

Frame 7 - Los Angeles

Land Ownership:
54% Public (Non-County)
31% Private
15% Unclassified

Political Districts:
Congressional: 30
Supervisorial: 5
LA City Council: 4
State Senate: 20, 26
State Assembly: 44, 51

Needs:



RM 33.0

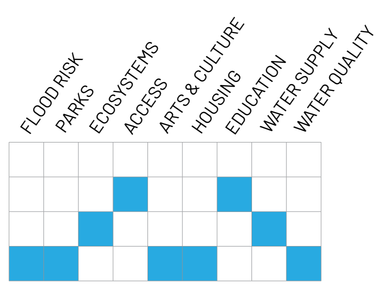
Headworks Park
LARRMP, ARBOR Study
L / 52.8 acres

Frame 7 - Los Angeles

Land Ownership:
83% Public (Non-County)
17% Unclassified

Political Districts:
Congressional: 30
Supervisorial: 5
LA City Council: 4
State Senate: 20, 26
State Assembly: 44, 51

Needs:



RM 32.8

Headworks Connector
LARMP Proposed Project Site
XL / 225.7 acres

Frame 7 - Los Angeles, Burbank

Land Ownership:
68% Public (Non-County)
30% Unclassified
1% Private
1% County

Political Districts:
Congressional: 30
Supervisorial: 5
LA City Council: 4
State Senate: 20, 25, 26
State Assembly: 44, 51

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									
HIGH							■	■	
MODERATE				■					■
GENERAL	■	■	■		■	■			

RM 31.9

Burbank Western Green Network
ULART
XL / 218.2 acres

Frame 6,7 - Los Angeles, Glendale, Burbank

Land Ownership:
47% Unclassified
36% Public (Non-County)
10% Private
7% County

Political Districts:
Congressional: 30
Supervisorial: 5
LA City Council: 4
State Senate: 20, 25, 26
State Assembly: 44, 51

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									
HIGH							■		
MODERATE		■		■	■			■	■
GENERAL	■		■			■			

RM 31.0

Glendale Riverwalk Non-Motorized Bridge
LARRMP
M / 2.2 acres

Frame 6 - Los Angeles, Glendale

Land Ownership:
82% Public (Non-County)
13% Unclassified
5% County

Political Districts:
Congressional: 30
Supervisorial: 5
LA City Council: 4
State Senate: 25, 26
State Assembly: 44, 51

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									
HIGH	■						■	■	
MODERATE			■						
GENERAL		■		■	■	■			■

M, L, XL SITES INDEX: RIVER MILE 30.9-30.5

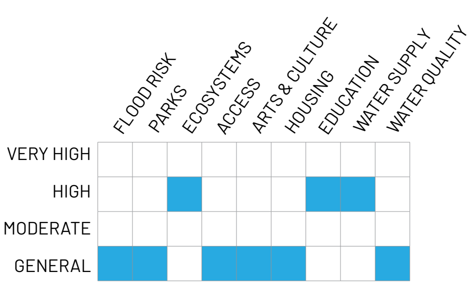
RM 30.9
Ferraro Fields Side Channel
LARMP Proposed Project Site
L / 52.2 acres

Frame 6 - Los Angeles, Glendale

Land Ownership:
77% Public (Non-County)
14% Unclassified
9% County

Political Districts:
Congressional: 30
Supervisorial: 5
LA City Council: 4
State Senate: 25, 26
State Assembly: 44, 51

Needs:



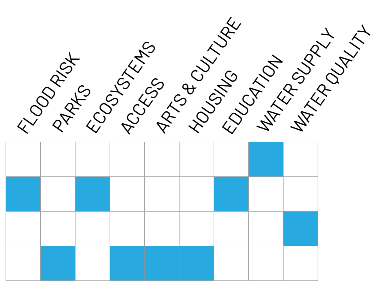
RM 30.8
Glendale Narrows Riverwalk
City of Glendale
L / 2.3 acres

Frame 6 - Los Angeles, Glendale

Land Ownership:
60% Public (Non-County)
38% County
2% Private

Political Districts:
Congressional: 30
Supervisorial: 5
LA City Council: 4
State Senate: 25, 26
State Assembly: 44, 51

Needs:



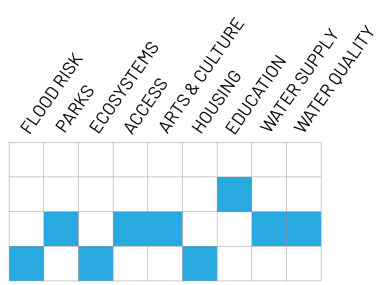
RM 30.7
San Fernando Railroad
Glendale Bike Plan
M / 4.5 miles

Frame 6 - Glendale

Land Ownership:
69% Private
27% County
4% Unclassified

Political Districts:
Congressional: 30
Supervisorial: 5
LA City Council: 13
State Senate: 20, 25
State Assembly: 44, 52

Needs:



RM 30.65

San Fernando Path
Burbank Bicycle Master Plan
L / 5.5 miles

Frame 6 - Glendale, Burbank

Land Ownership:
100% Unclassified

Political Districts:
Congressional: 30
Supervisorial: 5
LA City Council: n/a
State Senate: 20, 25
State Assembly: 44, 52

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									
HIGH		X					X		X
MODERATE				X	X			X	
GENERAL	X		X			X			

RM 30.6

Verdugo Wash
Glendale Bike Plan
L / 7.3 miles

Frame 6 - Glendale

Land Ownership:
41% County
28% Private
24% Public (Non-County)
7% Unclassified

Political Districts:
Congressional: 30
Supervisorial: 5
LA City Council: n/a
State Senate: 25, 26
State Assembly: 44, 51

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									
HIGH							X		
MODERATE		X	X	X	X			X	X
GENERAL	X					X			

RM 30.5

River Glen Wetlands
LARRMP, ARBOR Study
M / 4.6 acres

Frame 6 - Los Angeles

Land Ownership:
91% Private
9% Unclassified

Political Districts:
Congressional: 30
Supervisorial: 1
LA City Council: 13
State Senate: 26
State Assembly: 52

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									X
HIGH							X		
MODERATE		X	X					X	
GENERAL	X			X	X	X			

M, L, XL SITES INDEX: RIVER MILE 30.4-25.3

RM 30.4

River Glen Wetlands
ULART
L / 57.6 acres

Frame 6 - Los Angeles, Glendale

Land Ownership:
72% Private
13% County
11% Unclassified
4% Public (Non-County)

Political Districts:
Congressional: 30
Supervisorial: 1, 5
LA City Council: 4, 13
State Senate: 25, 26
State Assembly: 44, 51, 52

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									■
HIGH							■		
MODERATE		■	■					■	
GENERAL	■			■	■	■			

RM 29.5

Atwater Village East Bank Riverway
City of LA Bureau of Engineering
L / 2.2 miles

Frame 6 - Los Angeles

Land Ownership:
64% Public (Non-County)
18% County
16% Private
2% Unclassified

Political Districts:
Congressional: 30
Supervisorial: 1
LA City Council: 13
State Senate: 26
State Assembly: 52

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH	■								
HIGH				■			■	■	■
MODERATE		■	■						
GENERAL					■	■			

RM 29.3

Central Service Yard
City of LA
M / 26.1 acres

Frame 6 - Los Angeles

Land Ownership:
100% Public (Non-County)

Political Districts:
Congressional: 30
Supervisorial: 1
LA City Council: 13
State Senate: 26
State Assembly: 52

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									
HIGH									
MODERATE	■	■		■			■	■	
GENERAL			■		■	■			■

RM 26.2

G1 Bowtie
ARBOR Study, State Parks, TNC
M/20.4 acres

Frame 6 - Los Angeles, Glendale, Burbank

Land Ownership:
93% Public (Non-County)
7% Private

Political Districts:
Congressional: 34
Supervisorial: 1
LA City Council: 1
State Senate: 26
State Assembly: 52

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									
HIGH		■							
MODERATE			■	■	■		■	■	■
GENERAL	■					■			

RM 25.6

G2 Taylor Yard
LARRMP, ARBOR Study, City of LA, MRCA
L / 41.6 acres

Frame 6 - Glendale

Land Ownership:
100% Public (Non-County)

Political Districts:
Congressional: 34
Supervisorial: 1
LA City Council: 1
State Senate: 26
State Assembly: 52

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									
HIGH		■							
MODERATE			■		■		■	■	
GENERAL	■			■		■			■

RM 25.3

Dorris Place Sanitation Yard
LARRMP
M / 7.5 acres

Frame 6 - Los Angeles

Land Ownership:
87% Public (Non-County)
12% Private
1% Unclassified

Political Districts:
Congressional: 30
Supervisorial: 1
LA City Council: 13
State Senate: 26
State Assembly: 52

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									
HIGH									
MODERATE	■	■	■		■		■	■	
GENERAL				■		■			■

M, L, XL SITES INDEX: RIVER MILE 25.2-23.2

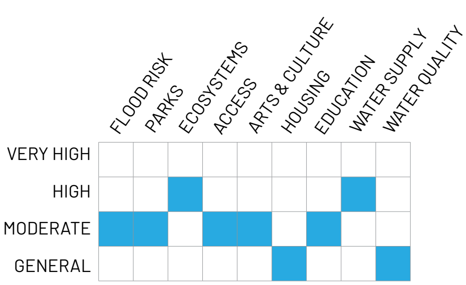
RM 25.2
Taylor Yard Non-Motorized Bridge
LLARRP
L / 0.9 acres

Frame 6 - Los Angeles

Land Ownership:
78% Public (Non-County)
22% Private

Political Districts:
Congressional: 30, 34
Supervisorial: 1
LA City Council: 1, 13
State Senate: 26
State Assembly: 52

Needs:



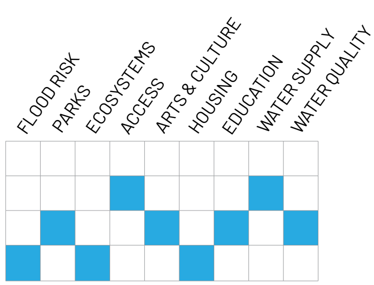
RM 24.5
Metro LA River Path
Metro
L / 7.9 miles

Frame 4, 5 - Los Angeles, Vernon, Bandini Islands (Unincorporated)

Land Ownership:
56% Public (Non-County)
26% County
12% Private
6% Unclassified

Political Districts:
Congressional: 30, 34, 42
Supervisorial: 1, 4
LA City Council: 1, 13, 14
State Senate: 26
State Assembly: 52, 54

Needs:



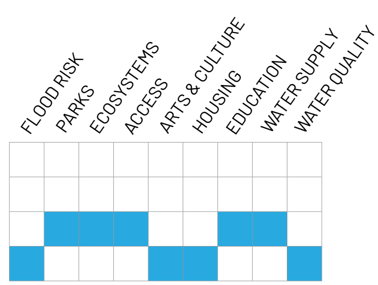
RM 24.1
Arroyo Seco Confluence
LARRMP, ARBOR Study, MRCA
M / 22.3 acres

Frame 5 - Los Angeles

Land Ownership:
37% Public (Non-County)
54% Unclassified
7% Private
2% County

Political Districts:
Congressional: 30, 34
Supervisorial: 1
LA City Council: 1
State Senate: 26
State Assembly: 52, 54

Needs:



RM 24.0

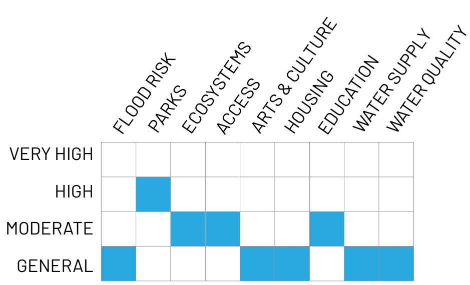
Arroyo Seco Greenway
Arroyo Seco Foundation
M / 2.5 miles

Frame 5 - Los Angeles

Land Ownership:
73% Public (Non-County)
25% Unclassified
1% County

Political Districts:
Congressional: 34
Supervisorial: 1
LA City Council: 1
State Senate: 26
State Assembly: 52, 54

Needs:



RM 23.5

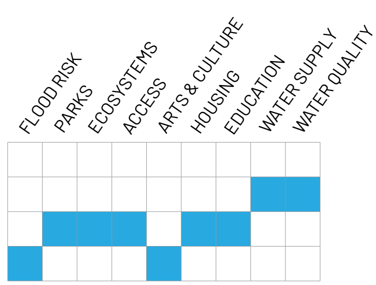
Bending the River Back into the City
Lauren Bon & The Metabolic Studio
M / 21.7 acres

Frame 5 - Los Angeles

Land Ownership:
41% Public (Non-County)
27% Private
21% County
11% Unclassified

Political Districts:
Congressional: 34
Supervisorial: 1
LA City Council: 1
State Senate: 26
State Assembly: 54

Needs:



RM 23.2

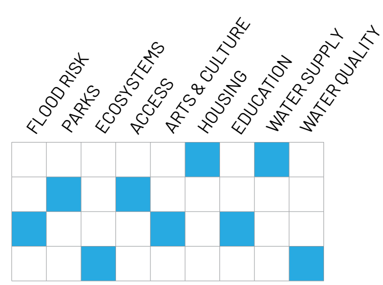
Main Street Terrace
ARBOR Study
L / 1.5 acres

Frame 5 - Los Angeles

Land Ownership:
100% Public (Non-County)

Political Districts:
Congressional: 34
Supervisorial: 1
LA City Council: 1
State Senate: 26
State Assembly: 54

Needs:



M, L, XL SITES INDEX: RIVER MILE 22.6-18.2

RM 22.6

Piggyback Yard
LARRMP, ARBOR Study
XL / 162.4 acres

Frame 5 - Los Angeles

Land Ownership:
97% Private
2% Unclassified
1% County

Political Districts:
Congressional: 34
Supervisorial: 1
LA City Council: 14
State Senate: 26
State Assembly: 54

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH						■			
HIGH		■		■					
MODERATE								■	■
GENERAL	■		■		■		■		

RM 21.6

Downtown Train Yard
LARMP Proposed Project Site
M / 15.1 acres

Frame 5 - Los Angeles

Land Ownership:
80% Public (Non-County)
20% County

Political Districts:
Congressional: 34
Supervisorial: 1
LA City Council: 14
State Senate: 26
State Assembly: 54

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									
HIGH		■		■		■		■	
MODERATE					■				■
GENERAL	■		■				■		

RM 21.5

First Street to Sixth Street River Loop
LARRMP - L / 63.5 acres

Frame 5 - Los Angeles

Land Ownership:
58% County
25% Private
8% Public (Non-County)
9% Unclassified

Political Districts:
Congressional: 34
Supervisorial: 1
LA City Council: 14
State Senate: 26
State Assembly: 54

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									
HIGH		■							■
MODERATE				■				■	
GENERAL	■		■		■	■	■		

RM 21.1

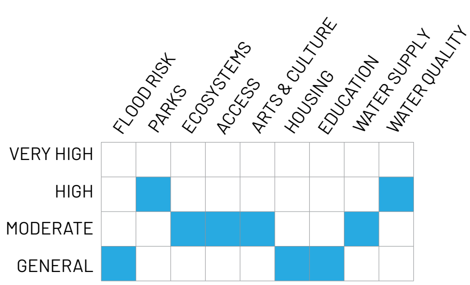
6th Street Viaduct
City of LA
M / 6.5 acres

Frame 5 - Los Angeles

Land Ownership:
37% Unclassified
29% Private
28% Public (Non-County)
6% County

Political Districts:
Congressional: 34
Supervisorial: 1
LA City Council: 14
State Senate: 26
State Assembly: 54

Needs:



RM 19.9

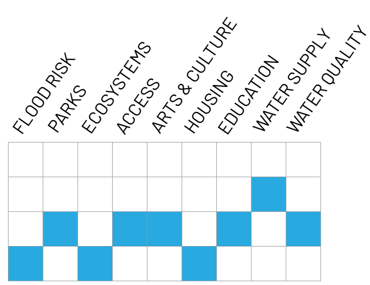
East Washington Blvd
LARMP Proposed Project Site
L / 45.6 acres

Frame 5 - Los Angeles

Land Ownership:
63% Public (Non-County)
20% Private
12% Unclassified
5% County

Political Districts:
Congressional: 34
Supervisorial: 1
LA City Council: 14
State Senate: 26
State Assembly: 54

Needs:



RM 18.2

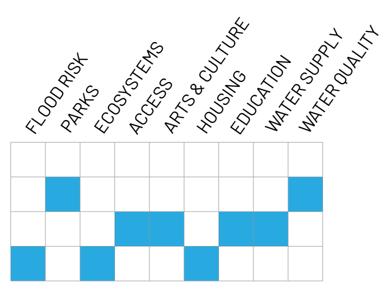
W. Santa Ana Branch Bikeway
Gateway Cities Strategic Transportation Plan
L / 9.8 miles

Frame 3,4 - Bell, Huntington Park, Downey, Cudahy, South Gate, Paramount, Vernon, Maywood, Bandini Islands (Unincorporated)

Land Ownership:
78% Public (Non-County) 14% County, 5% Unclassified, 3% Private

Political Districts:
Congressional: 34, 42, 44
Supervisorial: 1, 4
LA City Council: 14
State Senate: 26, 30, 33
State Assembly: 54, 62, 64

Needs:



M, L, XL SITES INDEX: RIVER MILE 16.2-13.5

RM 16.2

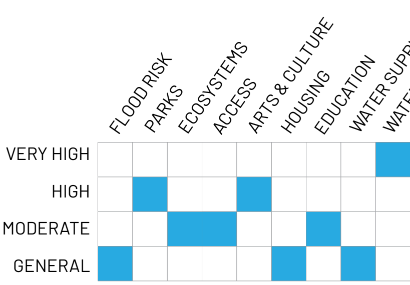
Upper Segment Multiuse Easement and Atlantic Blvd Area
LLARRP - L / 61.4 acres

Frame 4 - Vernon, Bell, Maywood, Cudahy, South Gate

Land Ownership:
66% Public (Non-County)
14% Private
14% Unclassified
6% County

Political Districts:
Congressional: 42, 44
Supervisorial: 4
LA City Council: n/a
State Senate: 26, 33
State Assembly: 54, 62, 64

Needs:



RM 15.8

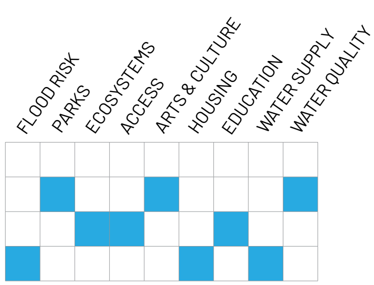
Maywood Park Bend
LARMP Proposed Project Site
L / 126.7 acres

Frame 4 - Maywood, Vernon, Bell

Land Ownership:
72% County
11% Public (Non-County)
9% Private
8% Unclassified

Political Districts:
Congressional: 42
Supervisorial: 4
LA City Council: n/a
State Senate: 26, 33
State Assembly: 54, 62, 64

Needs:



RM 15.3

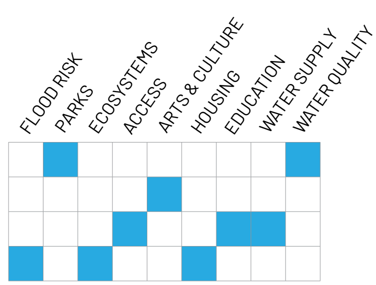
Rail to River Corridor: Randolph Street
Metro ATSP - M / 3.9 miles

Frame 4 - Bell, Huntington Park, Vernon

Land Ownership:
93% Private
7% Unclassified

Political Districts:
Congressional: 42
Supervisorial: 4
LA City Council: n/a
State Senate: 26, 33
State Assembly: 54, 62, 64

Needs:



RM 14.1

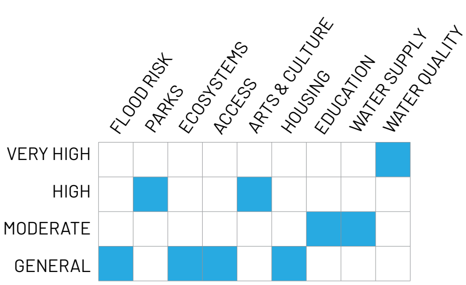
Clara Street
LARMP Proposed Project Site
L / 54.7 acres

Frame 3 - Cudahy, Bell, Bell Gardens

Land Ownership:
60% County
23% Public (Non-County)
10% Unclassified
7% Private

Political Districts:
Congressional: 42
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 64

Needs:



RM 13.9

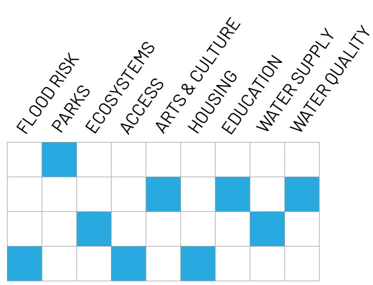
Cudahy River Park
LLARRP
M / 32 acres

Frame 3 - Cudahy, Bell Gardens, South Gate

Land Ownership:
51% Public (Non-County)
29% Private
18% Unclassified
2% County

Political Districts:
Congressional: 42, 44
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 62, 64

Needs:



RM 13.5

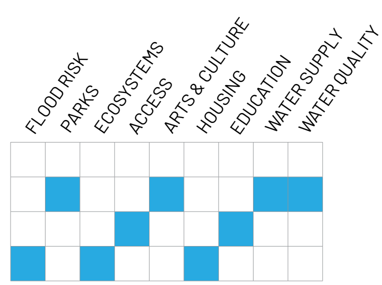
U.P.R.R. Spur Line
South Bay Master Bike Plan
M / 3 miles

Frame 3 - South Gate, Florence-Firestone (Unincorporated)

Land Ownership:
97% Private
3% Unclassified

Political Districts:
Congressional: 42, 44
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 62

Needs:



M, L, XL SITES INDEX: RIVER MILE 12.9-11.7

RM 12.9

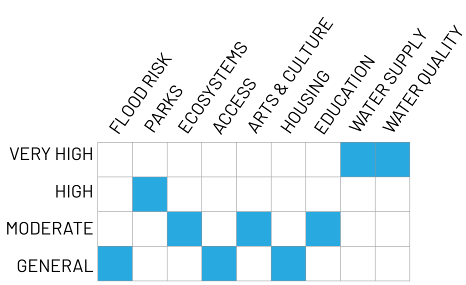
Firestone Blvd
LARMP Proposed Project Site
L / 56 acres

Frame 3 - South Gate

Land Ownership:
52% County
26% Public (Non-County)
16% Private
6% Unclassified

Political Districts:
Congressional: 44
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 62

Needs:



RM 12.7

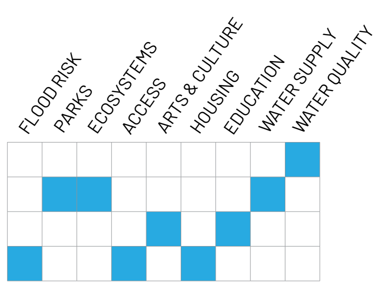
South Gate Orchard
TPL, City of South Gate, LLARRP, RMC
M / 27.8 acres

Frame 3 - South Gate

Land Ownership:
56% Public (Non-County)
29% Private
10% County
5% Unclassified

Political Districts:
Congressional: 44
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 62

Needs:



RM 12.0

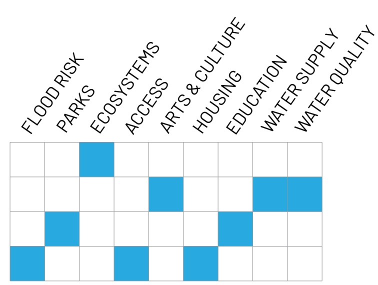
Parque Dos Rios
City of South Gate
M / 6.9 acres

Frame 3 - South Gate

Land Ownership:
100% Private

Political Districts:
Congressional: 44
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 62

Needs:



RM 11.9

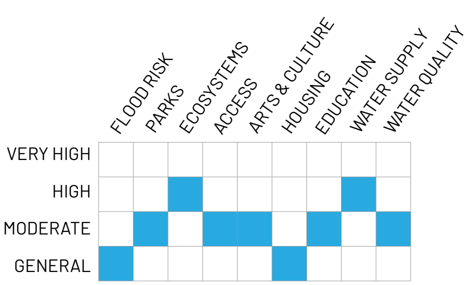
I-710 Corridor Bike Path Project: Western LA River Levee Bike Path
Metro - XL / 11.6 miles

Frame 1,2,3 - Long Beach, Compton, Paramount, Lynwood Island (Unincorporated)

Land Ownership:
68% County
18% Private
9% Unclassified
5% Public (Non-County)

Political Districts:
Congressional: 42, 43, 44
Supervisorial: 2, 4
LA City Council: n/a
State Senate: 33, 35
State Assembly: 62, 65, 69

Needs:



RM 11.8

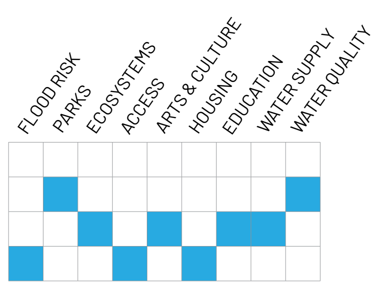
Rio Hondo Confluence
LLARRP, LAC Public Works
XL / 164.6 acres

Frame 3 - South Gate, Lynwood

Land Ownership:
38% Private
33% Public (Non-County)
16% County
13% Unclassified

Political Districts:
Congressional: 44
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 62

Needs:



RM 11.7

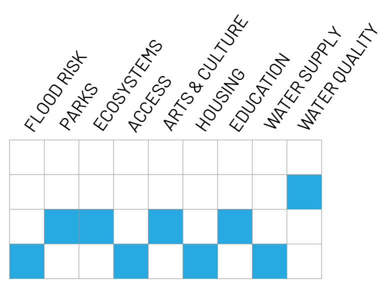
SELA Cultural Center
LLARRP, RMC
M / 10 acres

Frame 3 - Lynwood Island (Unincorporated)

Land Ownership:
98% County
2% Unclassified

Political Districts:
Congressional: 44
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 62

Needs:



M, L, XL SITES INDEX: RIVER MILE 10.5-7.2

RM 10.5

Highway 105
LARMP Proposed Project Site
L / 105.9 acres

Frame 3 - Paramount, Lynwood

Land Ownership:
54% Unclassified
20% Private
16% Public (Non-County)
10% County

Political Districts:
Congressional: 44
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 62

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									
HIGH		■							
MODERATE				■	■		■	■	■
GENERAL	■		■			■			

RM 10.4

I-710 Corridor Bike Path Project: Terminal Island to Rio Hondo
Metro - L / 5.9 miles

Frame 1, 3 - Long Beach, Paramount, Compton, South Gate

Land Ownership:
60% Unclassified
27% Private
10% Public (Non-County)
3% County

Political Districts:
Congressional: 43, 44
Supervisorial: 2, 4
LA City Council: n/a
State Senate: 33, 35
State Assembly: 62, 65, 69

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									
HIGH		■			■		■	■	■
MODERATE				■					
GENERAL	■		■			■			

RM 10.2

E Rosecrans Ave
LARMP Proposed Project Site
M / 34.4 acres

Frame 3 - Paramount

Land Ownership:
42% Private
38% County
20% Unclassified

Political Districts:
Congressional: 44
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 62

Needs:

	FLOOD RISK	PARKS	ECOSYSTEMS	ACCESS	ARTS & CULTURE	HOUSING	EDUCATION	WATER SUPPLY	WATER QUALITY
VERY HIGH									
HIGH		■	■		■			■	
MODERATE				■			■		■
GENERAL	■					■			

RM 9.4

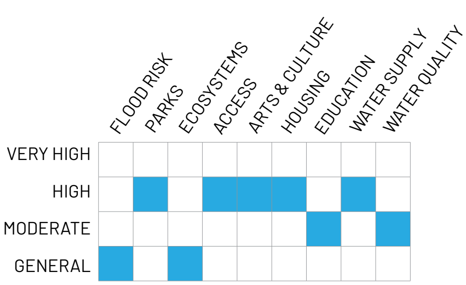
I-710 Corridor Bike Path Project: Compton Blvd
Metro - M / 2.2 miles

Frame 3 - Compton, Paramount, East Rancho Dominguez (Unincorporated)

Land Ownership:
100% Unclassified

Political Districts:
Congressional: 43, 44
Supervisorial: 2, 4
LA City Council: n/a
State Senate: 33, 35
State Assembly: 62, 65

Needs:



RM 8.1

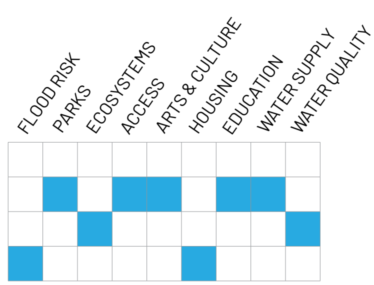
Connectivity Corridor
LARMP Proposed Project Site
M / 37.1 acres

Frame 2 - Long Beach

Land Ownership:
56% County
35% Private
5% Public (Non-County)
4% Unclassified

Political Districts:
Congressional: 43, 44
Supervisorial: 2, 4
LA City Council: n/a
State Senate: 33, 35
State Assembly: 65

Needs:



RM 7.2

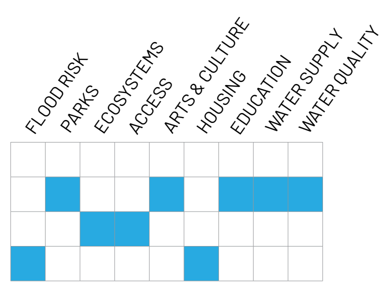
Middle Segment Multiuse Easement and Crossover
LLARRP - L / 148.1 acres

Frame 2 - Long Beach

Land Ownership:
80% Private
10% Public (Non-County)
6% County
4% Unclassified

Political Districts:
Congressional: 43, 44
Supervisorial: 2, 4
LA City Council: n/a
State Senate: 33, 35
State Assembly: 65, 69

Needs:



M, L, XL SITES INDEX: RIVER MILE 6.3-2.9

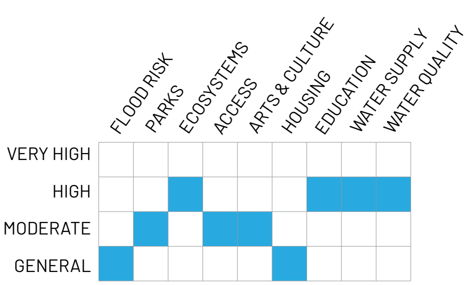
RM 6.3
Sutter Bend at Del Amo Blvd
LARMP Proposed Project Site
L / 113 acres

Frame 2 - Long Beach, Rancho Dominguez (Unincorporated)

Land Ownership:
57% County
35% Unclassified
5% Private
3% Public (Non-County)

Political Districts:
Congressional: 44
Supervisorial: 2, 4
LA City Council: n/a
State Senate: 33, 35
State Assembly: 65, 69

Needs:



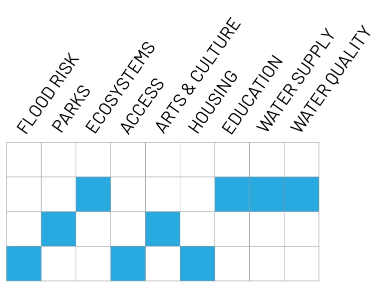
RM 5.5
Compton Creek Confluence Area
LLARRP
L / 87.9 acres

Frame 2 - Long Beach, Rancho Dominquez (Unincorporated), Carson

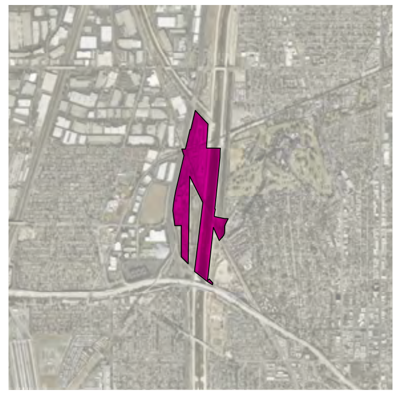
Land Ownership:
52% County
44% Private
4% Unclassified

Political Districts:
Congressional: 44
Supervisorial: 2, 4
LA City Council: n/a
State Senate: 33, 35
State Assembly: 65, 69

Needs:



RM 5.1
W 47th St / Rancho Los Cerritos
LARMP Proposed Project Site
L / 117.8 acres

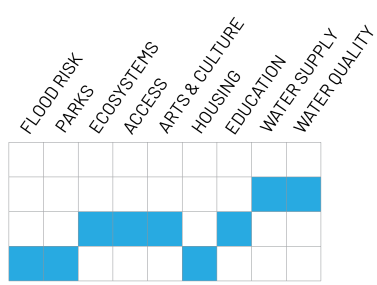


Frame 2 - Long Beach

Land Ownership:
62% County
35% Private
2% Unclassified
1% Public (Non-County)

Political Districts:
Congressional: 44
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 69

Needs:



RM 4.4

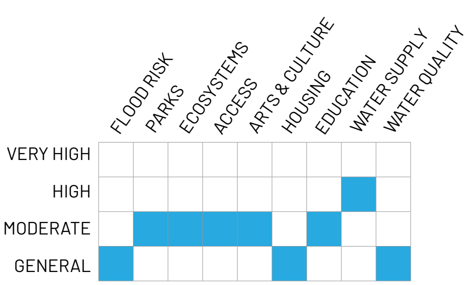
Wrigley Heights River Park
Long Beach Riverlink, LLARRP
L / 63.7 acres

Frame 2 - Long Beach

Land Ownership:
60% Private
25% County
10% Unclassified
5% Public (Non-County)

Political Districts:
Congressional: 44
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 69

Needs:



RM 3.7

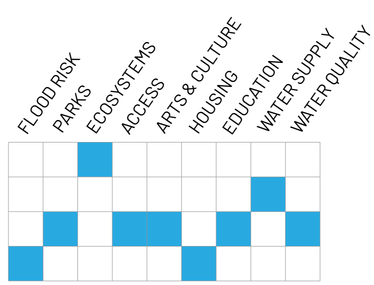
W 28th St to 405 Freeway
LARMP Proposed Project Site
L / 82.2 acres

Frame 1 - Long Beach

Land Ownership:
97% County
3% Unclassified

Political Districts:
Congressional: 44
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 69

Needs:



RM 2.9

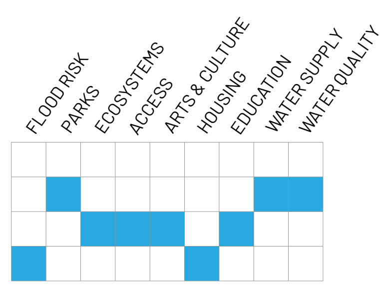
Willow Street
LLARRP
M / 11.8 acres

Frame 1 - Long Beach

Land Ownership:
98% Unclassified
1% Public (Non-County)
1% Private

Political Districts:
Congressional: 44
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 69

Needs:



M, L, XL SITES INDEX: RIVER MILE 1.7-0.6

RM 1.7

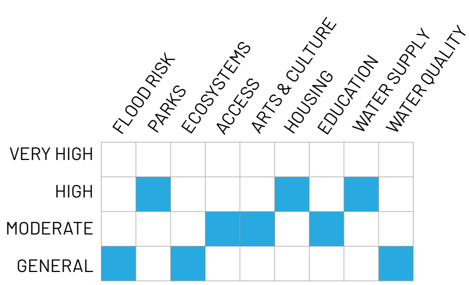
Middle Long Beach
LARMP Proposed Project Site
M / 39.9 acres

Frame 1 - Long Beach

Land Ownership:
40% Private
28% County
22% Unclassified
10% Public (Non-County)

Political Districts:
Congressional: 42, 44
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 69

Needs:



RM 1.6

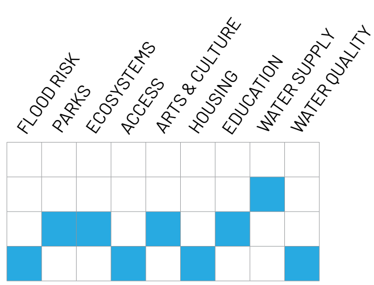
South of Willow Street
LLARRP
XL / 258.7 acres

Frame 1 - Long Beach

Land Ownership:
62% County
26% Unclassified
12% Private

Political Districts:
Congressional: 42, 44
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 69

Needs:



RM 0.9

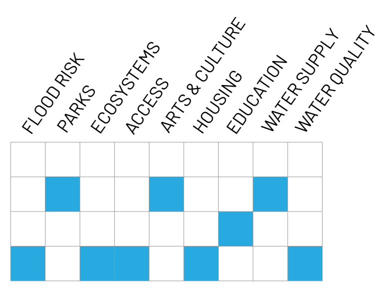
Long Beach Municipal Urban Stormwater Treatment
City of Long Beach - M / 9.5 acres

Frame 1 - Long Beach

Land Ownership:
73% Public (Non-County)
10% County
8% Private
9% Unclassified

Political Districts:
Congressional: 42
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 69

Needs:



RM 0.8

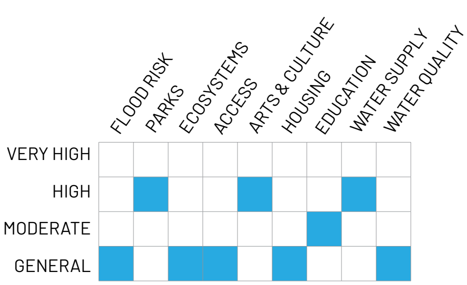
Drake Chavez Park
Drake Chavez Vision Plan
L / 53 acres

Frame 1 - Long Beach

Land Ownership:
84% Public (Non-County)
4% County
4% Private
8% Unclassified

Political Districts:
Congressional: 42
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 69

Needs:



RM 0.7

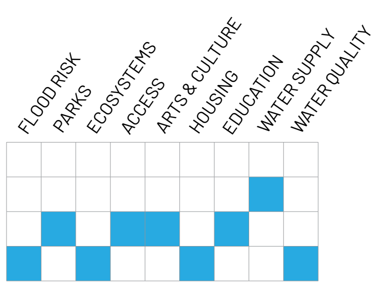
Shoemaker Bridge Replacement
I-710 Corridor Improvement Project
XL / 179.9 acres

Frame 1 - Long Beach

Land Ownership:
54% Unclassified
26% Public (Non-County)
11% County
9% Private

Political Districts:
Congressional: 42
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 69

Needs:



RM 0.6

Cesar Chavez Park Connector
LARMP Proposed Project Site
L / 65.4 acres

Frame 1 - Long Beach

Land Ownership:
61% County
22% Public (Non-County)
13% Private
4% Unclassified

Political Districts:
Congressional: 42
Supervisorial: 4
LA City Council: n/a
State Senate: 33
State Assembly: 69

Needs:

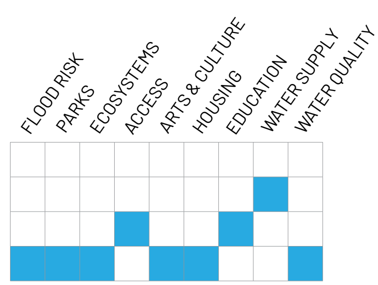


Figure 80. Stone columns mark the LA River Trail access point to the North Valleyheart Riverwalk at river mile 39.5. Source: OLIN, 2019.

6. XS, S SITES INDEX

THE MASTER PLAN INCLUDES OVER 200 EXTRA-SMALL AND SMALL SITES THAT ARE SUITABLE FOR INTERVENTIONS SUCH AS ACCESS POINTS, PAVILIONS, AND COMMON ELEMENTS

Working in tandem with M, L, and XL projects, a regular cadence of XS and S projects ensures that access to amenities and services is consistent and reliable along the river's 51 miles. The Master Plan has identified over 200 sites for XS and S projects, distributed evenly from Long Beach to Canoga Park. Like planned major projects, many of these sites originated from existing plans.

One-hundred and twenty-three of those sites have been informed by projects proposed in the Lower Los Angeles River Revitalization Plan and Los Angeles River Revitalization Master Plan, as well as proposed access points from Metro's LA River Path Project. Forty-two sites correspond to existing access points along the river that, due to location or extremely poor condition, warrant significant improvements. The remaining 43 sites are newly proposed in this Master Plan, closing any remaining gaps and establishing, on average, an XS or S project every quarter mile.

The index that follows outlines information about XS and S sites including their location and source. Projects originating from other existing plans list the original project name and project status, if known.

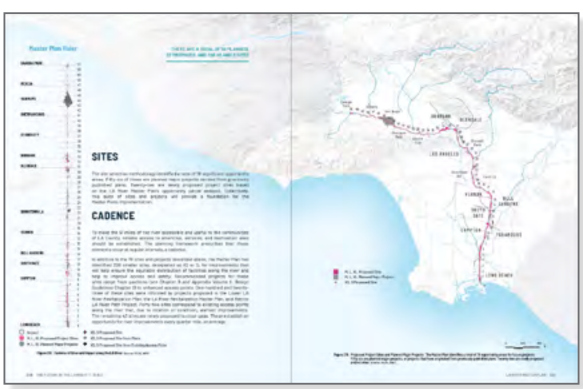


Figure 81. The cadence and methodology for the designation of sites is explained in the LA RIver Master Plan, Chapter 7.

XS, S SITES INDEX KEY

SOURCE

Plan where the associated site originated

EXISTING ACCESS POINT TO IMPROVE

Whether or not the site has an access point that needs improvement

HEADER

River mile range for the projects in the table on the page

XS, S SITES INDEX: RIVER MILE 51.00 - 45.58

RM	Name and Location	Frame	City	Source	Existing Access Points To Improve	Newly Proposed
51.00	**Project 2: Canoga Park High School Outdoor Classroom** Canoga Park High School	9	Los Angeles	LARRMP		
50.85	**Bassett St & Alabama Ave** Bassett St & Alabama Ave	9	Los Angeles			X
50.78	**Project 5: Canoga Park Regional Gateway** Bassett St & Canoga Ave	9	Los Angeles	LARRMP		
50.24	**De Soto Ave South** De Soto Ave South	9	Los Angeles	LARRMP		

CITY

City in which the project is located

FRAME

Geographic frame in which the project is located

NAME AND LOCATION

The name of the project and where it is located

NEWLY PROPOSED

Whether or not the project is newly proposed in the LA River Master Plan

RIVER MILE

River mile where the project is located

ABBREVIATIONS USED IN SITES INDEX KEY

LARRMP LA River Revitalization Master Plan (2007)
LLARRP Lower LA River Revitalization Plan (2018)
Metro Metro LA River Path Project (2019)

XS, S LA RIVER MASTER PLAN SITES

Figure 82. XS, S LA River Master Plan Sites. The Master Plan identifies over 200 sites for XS and S projects such as pavilions and improved access facilities.

XS, S SITES INDEX: RIVER MILE 51.00 - 45.45

RM	Name and Location	Frame	City	Source	Existing Access Points To Improve	Newly Proposed
51.00	**Project 2: Canoga Park High School Outdoor Classroom** Canoga Park High School	9	Los Angeles	LARRMP		
50.85	**Bassett St & Alabama Ave** Bassett St & Alabama Ave	9	Los Angeles			X
50.78	**Project 5: Canoga Park Regional Gateway** Bassett St & Canoga Ave	9	Los Angeles	LARRMP		
50.24	**De Soto Ave South** De Soto Ave South	9	Los Angeles	LARRMP		
49.44	**Project 18: Acquisition of Property between Oso Avenue and Vanowen Street** Archwood St & Oso Ave	9	Los Angeles	LARRMP		
49.17	**Winnetka** Winnetka Ave / River Right	9	Los Angeles		X	
48.70	**Project 22: Acquisition of Property between Corbin Avenue and the River** Corbin Ave, north of Hamlin St	9	Los Angeles	LARRMP		
48.41	**Shirley Ave & Kittridge St** Shirley Ave & Kittridge St	9	Los Angeles			X
48.10	**Project 24: Acquisition of Property at Tampa Avenue and the River** Tampa Ave, north of LA River	9	Los Angeles	LARRMP		
48.09	**Project 23: Tampa Avenue and Victory Boulevard Enhanced Intersection** Victory Blvd & Tampa Ave	9	Los Angeles	LARRMP		
47.86	**Vanalden** Vanalden Ave / River Right	9	Los Angeles		X	
47.85	**Vanalden Avenue Pocket Park** Vanalden Ave, north of LA River	9	Los Angeles	LARRMP		
47.50	**Aliso Connector** Aliso Connector	9	Los Angeles			X
47.22	**Project 32: Amigo Avenue Pocket Park** Amigo Ave, north of LA River	9	Los Angeles	LARRMP		
46.84	**Project 37: Reseda Park River Park Buffer** Etiwanda Ave at Reseda High School	9	Los Angeles	LARRMP		
46.70	**Project 40: Reseda High School Outdoor Classroom** Etiwanda Ave at Reseda High School	9	Los Angeles	LARRMP		
46.56	**Project 43: Caballero Creek Non-Motorized Bridge** Caballero Creek Confluence	9	Los Angeles	LARRMP		
46.22	**Zelzah Ave & Duncan St** Zelzah Ave & Duncan St	9	Los Angeles			X
45.97	**Project 44: White Oak Avenue and Victory Boulevard Enhanced Intersection** Victory Blvd & White Oak Ave	9	Los Angeles	LARRMP		
45.97	**White Oak Ave & LA River** White Oak Ave & LA River	9	Los Angeles			X
45.59	**Project 46: Encino Velodrome Wetlands Park** West of Sepulveda Basin	9	Los Angeles	LARRMP		
45.58	**LA River Veteran Tribute Park** South of Victory Blvd, north of Sepulveda Basin	9	Los Angeles	LARRMP		
45.45	**Project 48: Orange Line Bridge Non-Motorized Bridge** Southern Railroad and LA River, north of Sepulveda Basin	9	Los Angeles	LARRMP		

XS, S SITES INDEX: RIVER MILE 45.05 - 39.62

RM	Name and Location	Frame	City	Source	Existing Access Points To Improve	Newly Proposed
45.05	**Project 51: Sepulveda Basin Regional Gateway** Victory Blvd & Balboa Blvd	9	Los Angeles	LARRMP		
44.99	**West of Balboa Blvd** West of Balboa Blvd	9	Los Angeles			X
44.50	**Balboa & Encino Golf Course** Balboa & Encino Golf Course	9	Los Angeles			X
44.17	**Sepulveda Basin Boating** South of Woodley Lakes Golf Course	9	Los Angeles	LARRMP		
44.11	**Project 53: Sepulveda Basin River Park Buffer** Balboa & Encino Golf Course	9	Los Angeles	LARRMP		
43.85	**Project 57: Sepulveda Basin Non-Motorized Bridge** West of Burbank Blvd, south of Woodley Ave	9	Los Angeles	LARRMP		
43.61	**Project 54: Sepulveda Basin Wetlands** West of Burbank Blvd, south of Woodley Ave	9	Los Angeles	LARRMP		
43.45	**Burbank** Burbank Blvd / River Right	9	Los Angeles		X	
43.32	**Project 56: Hjelte to Dam Wetlands Park** Encino Creek Confluence	9	Los Angeles	LARRMP		
42.94	**Project 58: Sepulveda Spillway Park** North of San Diego Fwy & Ventura Fwy Intersection	8	Los Angeles	LARRMP		
42.70	**Project 59: 405 Underpass** San Diego Fwy & LA River	8	Los Angeles	LARRMP		
42.60	**Project 63: Castle Family Park** Otsego St & Sepulveda Blvd	8	Los Angeles	LARRMP		
42.49	**Project 61: Sepulveda Boulevard River Bridge** Valley Heart Dr & Sepulveda Blvd	8	Los Angeles	LARRMP		
42.22	**Noble Ave** Noble Ave	8	Los Angeles	LARRMP		
41.92	**Project 64: Kester Avenue under 101 Freeway Portal** Valley Heart Dr & Kester Ave	8	Los Angeles	LARRMP		
41.66	**Valleyheart / Cedros** Valleyheart Dr & Cedros Ave / River Left	8	Los Angeles		X	
41.41	**Van Nuys Boulevard River Bridge** Riverside Dr & Van Nuys Blvd	8	Los Angeles	LARRMP		
41.40	**Van Nuys Boulevard under 101 Freeway Portal** Riverside Dr & Van Nuys Blvd	8	Los Angeles	LARRMP		
40.86	**Project 74: 101 Underpass** Ventura Fwy & Hazeltine Ave	8	Los Angeles	LARRMP		
40.80	**Fashion Square River Park** NE of Ventura Fwy & Hazeltine Ave	8	Los Angeles	LARRMP		
40.34	**Valleyheart Dr & Woodman Ave** Valleyheart Dr & Woodman Ave	8	Los Angeles			X
40.03	**Valleyheart Dr & Sunnyslope Ave** Valleyheart Dr & Sunnyslope Ave	8	Los Angeles			X
39.74	**Project 77: Moorpark Street Local Gateway** Bloomfield St & Fulton Ave	8	Los Angeles	LARRMP		
39.62	**Longridge / Valleyheart** Longridge Ave & Valleyheart Drive / River Right	8	Los Angeles		X	

XS, S SITES INDEX: RIVER MILE 39.17 - 33.94

RM	Name and Location	Frame	City	Source	Existing Access Points To Improve	Newly Proposed
39.17	**Project 80: Ventura Boulevard and Coldwater Canyon Boulevard Enhanced Intersection** Ventura Blvd & Coldwater Canyon Ave	8	Los Angeles	LARRMP		
38.91	**Bellaire Ave & Valleyheart Dr** Bellaire Ave & Valleyheart Dr	8	Los Angeles			X
38.35	**Project 83: Laurelgrove Avenue Pocket Park** Valleyheart Dr & Laurelgrove Ave	8	Los Angeles	LARRMP		
38.10	**Project 92: Ventura Boulevard and Laurel Canyon Boulevard Enhanced Intersection** Ventura Blvd & Laurel Canyon Blvd	8	Los Angeles	LARRMP		
38.03	**Project 86: Laurel Canyon Boulevard River Bridge** Laurel Canyon Blvd & LA River	8	Los Angeles	LARRMP		
37.93	**Valleyheart / Guerin** Guerin St / River Right	8	Los Angeles		X	
37.67	**Project 93: CBS Studios Underpass** Tujunga Wash Confluence at Studio City	8	Los Angeles	LARRMP		
37.38	**Colfax Ave North** Colfax Ave North	7	Los Angeles	LARRMP (Recommended underpass)		
37.20	**Project 91: Colfax Avenue Outdoor Classroom** Kelsey St	7	Los Angeles	LARRMP		
37.06	**Project 99: Beck Avenue Local Gateway** Beck Ave	7	Los Angeles	LARRMP (Recommended underpass)		
36.79	**Tujunga Ave North** Tujunga Ave North	7	Los Angeles	LARRMP (Recommended bridge crossing)		
36.51	**Dilling St & Fair Avenue** Dilling St & Fair Avenue	7	Los Angeles			X
36.27	**Vineland Ave North** Vineland Ave North	7	Los Angeles	LARRMP		
36.09	**Project 100: 101 Freeway Underpass at Weddington Park** Hollywood Fwy & LA River	7	Los Angeles	LARRMP		
36.02	**Project 101: Weddington Park Expansion with Non-Motorized Bridge** Tujunga Wash Confluence near South Weddington Park	7	Los Angeles	LARRMP		
35.90	**Project 102: Weddington Park Regional Gateway** Brookview Dr & Caratwright Ave	7	Los Angeles	LARRMP		
35.82	**Lankershim Boulevard and Cahuenga Boulevard Enhanced Intersection** Hollywood Fwy & Lankershim Blvd	7	Los Angeles	LARRMP		
35.76	**Project 107: Lankershim Boulevard River Bridge** Lankershim Blvd & LA River	7	Los Angeles	LARRMP		
35.39	**Universal Studios West** Universal Studios West	7	Unincorporated			X
34.90	**Universal Studios** Universal Studios	7	Unincorporated			X
34.50	**Olive Ave North** Olive Ave North	7	Los Angeles	LARRMP (Recommended underpass)		
34.12	**Warner Brothers Studio** Warner Brothers Studio	7	Los Angeles	LARRMP (Recommended underpass)		
33.94	**Valleyheart Dr** Valleyheart Dr	7	Burbank			X

XS, S SITES INDEX: RIVER MILE 33.71 - 28.15

RM	Name and Location	Frame	City	Source	Existing Access Points To Improve	Newly Proposed
33.71	**Project 111: Bob Hope Drive Non-Motorized Bridge** Bob Hope Dr	7	Burbank	LARRMP		
33.29	**Forest Lawn Cemetery** Forest Lawn Cemetery	7	Los Angeles			X
32.86	**Project 119: 134 Freeway Underpass / Overpass at Spreading Grounds** Ventura Fwy W & LA River	7	Burbank	LARRMP		
32.71	**Project 121: South Mariposa Street Pocket Park** Valleyheart Dr & Mariposa St	7	Burbank	LARRMP		
32.38	**Burbank Equestrian Center** Los Angeles Equestrian Center at Griffith Park	7	Los Angeles	LARRMP		
32.06	**Project 118: Griffith Park River Park Buffer** Between Ventura Fwy & Zoo Dr	7	Los Angeles	LARRMP		
31.97	**Project 117: Burbank Western Channel Non-Motorized Bridge** Burbank Western Channel Confluence	7	Los Angeles	LARRMP		
31.64	**Riverside Dr North** Riverside Dr North	6	Los Angeles	LARRMP		
31.12	**Ferraro Fields** Ferraro Fields	6	Los Angeles			X
30.68	**Project 133: River Glen Opportunity Area Outdoor Classroom** Verdugo Wash Confluence, north of Ventura Fwy	6	Glendale	LARRMP		
30.56	**Project 127: Doran Street and San Fernando Road Enhanced Intersection** Ventura Fwy & San Fernando Rd	6	Glendale	LARRMP		
30.56	**Zoo Drive** Zoo Dr / River Right	6	Los Angeles		X	
30.49	**Project 131: River Glen Non-Motorized Bridge** Verdugo Wash Confluence	6	Los Angeles	LARRMP		
30.17	**Project 137: Brazil Street Paseo** Brazil Street	6	Los Angeles	LARRMP		
30.06	**Project 135: Brazil Street and San Fernando Road Enhanced Intersection** Brazil St & San Fernando Rd	6	Glendale	LARRMP		
30.03	**Electronics Street Paseo** Electronics Pl	6	Los Angeles	LARRMP		
29.71	**Project 142: Colorado Boulevard Non-Motorized Bridge** SE of Colorado St Fwy & Golden State Fwy Intersection	6	Los Angeles	LARRMP		
29.13	**Project 145: North Atwater Park (River Vista Expansion)** West of North Atwater Park	6	Los Angeles	LARRMP		
28.96	**Equestrian Center** Rigali Ave	6	Los Angeles	LARRMP		
28.77	**Rigali Ave** Rigali Ave	6	Los Angeles	LARRMP (Proposed non-motorized bridge)		
28.39	**Project 149: Los Feliz Boulevard River Bridge** Los Feliz Blvd & LA River	6	Los Angeles	LARRMP		
28.36	**Los Feliz South** Los Feliz Blvd at Golden State Fwy / River Right	6	Los Angeles		X	
28.15	**Project 150: Legion Lane Park** Legion Ln	6	Los Angeles	LARRMP		

XS, S SITES INDEX: RIVER MILE 27.97 - 25.18

RM	Name and Location	Frame	City	Source	Existing Access Points To Improve	Newly Proposed
27.97	**Sunnynook Pedestrian Bridge** Sunnynook Dr / River Right	6	Los Angeles		X	
27.71	**Red Car Park** Ferncroft Rd & Glendale Blvd	6	Los Angeles	LARRMP		
27.71	**Glendale Blvd South** Glendale Blvd at Golden State Fwy / River Right	6	Los Angeles		X	
27.56	**Ferncroft Rd & Tyburn St** Ferncroft Rd & Tyburn St	6	Los Angeles			X
27.13	**Project 153: Silver Lake Boulevard Pocket Park** Silver Lake Blvd	6	Los Angeles	LARRMP		
27.08	**LA River Bicycle Park at Crystal St** Crystal St / River Right	6	Los Angeles		X	
26.94	**Project 156: Fletcher Drive River Bridge** Fletcher Dr & LA River	6	Los Angeles	LARRMP		
26.91	**Clearwater** Crystal St & Clearwater St / River Right	6	Los Angeles		X	
26.74	**Gilroy** Gilroy St at Glendale Fwy / River Right	6	Los Angeles		X	
26.70	**Ripple** Ripple Pl at Glendale Fwy / River Right	6	Los Angeles		X	
26.60	**Lewis MacAdams Riverfront Park** Near Gleneden St / River Right	6	Los Angeles		X	
26.58	**Project 154: Fletcher Avenue and San Fernando Road Enhanced Intersection** Fletcher Dr & San Fernando Rd	6	Los Angeles	LARRMP		
26.45	**Project 160: Edward Avenue Paseo** San Fernando Rd & Media Center Dr	6	Los Angeles	LARRMP		
26.42	**Project 163: Media Center Drive Paseo** Media Center Dr	6	Los Angeles	LARRMP		
26.29	**Coolidge** Coolidge Ave / River Right	6	Los Angeles		X	
26.21	**Denby** Denby Ave / River Right	6	Los Angeles		X	
26.04	**Newell** Newell St / River Right	6	Los Angeles		X	
25.89	**Project 168: Newell Street under 5 Freeway Portal** Newell St under Golden State Fwy	6	Los Angeles	LARRMP		
25.74	**Project 172: Riverside Park** Between Landa St and Riverside Dr	6	Los Angeles	LARRMP		
25.72	**Project 169: Blimp Street Paseo** Blimp St & Blake Ave	6	Los Angeles	LARRMP		
25.71	**Project 167: Taylor Yard Outdoor Classroom** Perlita Ave, east of LA River	6	Los Angeles	LARRMP		
25.47	**Dallas** Dallas St / River Right	6	Los Angeles		X	
25.29	**Project 174: Dorris Place Pocket Park** Dorris Pl & Crystal St	6	Los Angeles	LARRMP		
25.18	**Project 178: San Fernando Road and Elm Street Enhanced Intersection** Elm St & San Fernando Rd	6	Los Angeles	LARRMP		

XS, S SITES INDEX: RIVER MILE 25.09 - 20.85

RM	Name and Location	Frame	City	Source	Existing Access Points To Improve	Newly Proposed
25.09	**Riverdale** Riverdale Ave / River Right	6	Los Angeles		X	
24.97	**Shoredale Ave** Shoredale Ave / River Right	6	Los Angeles		X	
24.90	**Harwood Street** Harwood St / River Right	6	Los Angeles		X	
24.84	**Gatewood Street** Gatewood St / River Right	6	Los Angeles		X	
24.64	**Duvall Street** Duvall St / River Right	6	Los Angeles		X	
24.56	**Oros Street** Oros St / River Right	6	Los Angeles		X	
24.48	**Barclay Street** Barclay St / River Right	6	Los Angeles		X	
24.42	**Egret Park** Arnold St / River Right	5	Los Angeles		X	
24.19	**Project 183: Confluence Park** Figueroa St & San Fernando Rd	5	Los Angeles	LARRMP		
24.11	**Project 182: Railroad Bridge Underpass/Overpass** Figueroa St & Santa Fe Railway	5	Los Angeles	LARRMP		
24.00	**Project 186: Elysian Park Non-Motorized Bridge** Arroyo Seco Confluence	5	Los Angeles	LARRMP		
23.50	**Project 194: Cornfields Non-Motorized Bridge** North of Spring St & LA River	5	Los Angeles	LARRMP		
23.23	**Main St West** Main St West	5	Los Angeles	LARRMP (Recommended underpass)		
23.22	**Project 205: North Main Street under 5 Freeway Portal** Main St & Golden State Fwy	5	Los Angeles	LARRMP		
22.90	**Project 209: Mission Yard River Park** North of Mission Rd	5	Los Angeles	LARRMP		
22.68	**Project 208: Mission Yard River Loop** Lamar St	5	Los Angeles	LARRMP		
22.33	**Project 210: East Side Soccer Fields Complex** Mission Rd & Cesar E Chavez Ave	5	Los Angeles	LARRMP		
22.31	**Union Station** Cesar E. Chavez Ave & Keller St	5	Los Angeles	Metro		
22.11	**Project 212: Commercial Street Pocket Park** Commercial St & Santa Fe Railroad	5	Los Angeles	LARRMP		
21.80	**Project 215: First Street River Bridge** 1st St & LA River	5	Los Angeles	LARRMP		
21.35	**Project 218: Fourth Street River Bridge** 4th St & LA River	5	Los Angeles	LARRMP		
21.17	**Project 226: Downtown / Industrial Non-Motorized Bridge** North of 6th St & LA River	5	Los Angeles	LARRMP		
21.06	**Project 228: Hollenbeck Park / Inex Street Paseo** 6th St & Clarence St	5	Los Angeles	LARRMP		
20.85	**7th Street East** 7th Street & Mission Road	5	Los Angeles	Metro		

XS, S SITES INDEX: RIVER MILE 20.85 - 14.20

RM	Name and Location	Frame	City	Source	Existing Access Points To Improve	Newly Proposed
20.85	**7th Street / Jesse St. Park** 7th Street & LA River / Santa Fe Railway	5	Los Angeles	Metro		
20.64	**Project 232: Seventh Street River Park** Mission Rd	5	Los Angeles	LARRMP		
20.59	**Project 235: Bay Street and Sacramento Street Pocket Park** Sacramento St & Santa Fe Railroad	5	Los Angeles	LARRMP		
20.24	**Olympic Blvd & Santa Fe Railway** Olympic Blvd & Santa Fe Railway	5	Los Angeles			X
20.16	**Project 236: Rio Vista Blufftop Park** Olympic Blvd & Rio Vista Ave	5	Los Angeles	LARRMP		
19.84	**Project 239: Crown River Gateway and Ecological Park** West of Perrino Pl at LA River	5	Los Angeles	LARRMP		
19.43	**26th St West of Soto St** 26th St West of Soto St	4	Vernon			X
19.17	**Soto St** Soto St	4	Vernon	LLARRP (102 - Soto Street)		
18.99	**Bandini Blvd West** Bandini Blvd West	4	Vernon	LLARRP (103 - Bandini Boulevard)		
18.85	**Bandini Blvd, northeast of LA River** Bandini Blvd, northeast of LA River	4	Vernon	LLARRP (103 - Bandini Boulevard)		
18.34	**Bandini Islands** Bandini Islands	4	Unincorporated			X
18.33	**Vernon Ave & Union Pacific Railroad** Vernon Ave & Union Pacific Railroad	4	Vernon			X
18.18	**Downey Rd North** Downey Rd North	4	Unincorporated	LLARRP (104 - Downey Road)		
18.01	**Bandini Blvd, north of LA River** Bandini Blvd, north of LA River	4	Vernon	LLARRP (121 - Bandini WQ / Riverside Park)		
17.88	**Charter St & Santa Fe Railway** Charter St & Santa Fe Railway	4	Vernon			X
17.42	**Bandini Blvd, west of Atlantic Interchange** Bandini Blvd, west of Atlantic Interchange	4	Vernon			X
17.19	**District Blvd & Gifford Avenue** District Blvd & Gifford Avenue	4	Vernon			X
16.62	**Atlantic** Atlantic Blvd / River Right	4	Vernon		X	
16.55	**District** District Blvd / River Right	4	Vernon		X	
15.32	**Casitas Ave & Randolph St** Casitas Ave & Randolph St	4	Bell			X
14.75	**Southall Lane & River Dr** Southall Lane & River Dr	4	Bell			X
14.52	**Florence Ave, east of Long Beach Fwy** Florence Ave, east of Long Beach Fwy	4	Bell	LLARRP (Gateway)		
14.52	**Florence** Florence Ave / River Right	4	Bell		X	
14.20	**Clara** Clara St / River Right	3	Cudahy		X	

XS, S SITES INDEX: RIVER MILE 13.69 - 6.06

RM	Name and Location	Frame	City	Source	Existing Access Points To Improve	Newly Proposed
13.69	**Fostoria St & Jaboneria Rd** Fostoria St & Jaboneria Rd	3	Bell Gardens	LLARRP (67 - Shull Park)		
13.53	**Long Beach Fwy & Southern Pacific Railroad** Long Beach Fwy & Southern Pacific Railroad	3	South Gate	LLARRP (145 - Greenway)		
13.53	**Jaboneria Rd & Southern Pacific Railroad** Jaboneria Rd & Southern Pacific Railroad	3	South Gate	LLARRP		
13.25	**Firestone** Firestone Blvd / River Right	3	South Gate		X	
12.58	**Tweedy / Burtis** Tweety Blvd & Burtis St / River Right	3	South Gate		X	
12.23	**Blumont Rd** Blumont Rd	3	South Gate	LLARRP (Multiuse bridge)		
11.54	**Gardendale St at Hollydale Park** Gardendale St at Hollydale Park	3	South Gate			X
10.70	**Cloverlawn Dr** Cloverlawn Dr	3	Paramount			X
10.35	**De Bie Dr & Orane Ave** De Bie Dr & Orane Ave	3	Paramount			X
10.05	**Whitehall Way & LA River** Whitehall Way & LA River	3	Paramount			X
9.82	**San Juan St at Ralph C. Dills Park** San Juan St at Ralph C. Dills Park	3	Paramount	LLARRP (64 - Compton Golf Course and Park)		
9.38	**Somerset Blvd at Long Beach Fwy** Somerset Blvd at Long Beach Fwy	3	Paramount			X
9.15	**Dominguez High School** Dominguez High School	3	Compton	LLARRP (64 - Extend green area)		
8.89	**Alondra Blvd & Long Beach Fwy** Alondra Blvd & Long Beach Fwy	3	Compton			X
8.79	**Rancho Portillo** West of Atlantic Pl / River Left	3	Paramount		X	
8.53	**71st St, west of Atlantic Pl** 71st St, west of Atlantic Pl	3	Compton			X
8.25	**68th St & Atlantic Ave** 68th St & Atlantic Ave	2	Long Beach			X
7.83	**Artesia Blvd at Long Beach Fwy** Artesia Blvd at Long Beach Fwy	2	Long Beach			X
7.51	**63rd St & De Forest Ave** 63rd St & De Forest Ave	2	Long Beach			X
7.44	**Adams St & White Ave, at Coolidge Park** Adams St & White Ave, at Coolidge Park	2	Long Beach	LLARRP (22 - Gateway)		
7.10	**DeForest Park** De Forest Ave near Osgood St / River Left	2	Long Beach		X	
6.65	**Long Beach Blvd** Long Beach Blvd near 56th St / River Left	2	Long Beach		X	
6.33	**Market St** Market St	2	Long Beach			X
6.06	**De Forest Ave / E Osgood** De Forest Ave & 52nd St / River Left	2	Long Beach		X	

XS, S SITES INDEX: RIVER MILE 5.55 - 0.13

RM	Name and Location	Frame	City	Source	Existing Access Points To Improve	Newly Proposed
5.55	**48th St & Virginia Vista Ct** 48th St & Virginia Vista Ct	2	Long Beach			X
5.12	**Virginia Vista Ct** Virginia Vista Ct	2	Long Beach			X
4.57	**Rancho Rio Verde** Rancho Rio Verde Riding Club	2	Long Beach			X
4.18	**Baker St** Baker St	2	Long Beach			X
3.36	**Spring St & De Forest Ave** Spring St & De Forest Ave	1	Long Beach			X
2.99	**De Forest / 26th** De Forest Ave & 27th St / River Left	1	Long Beach		X	
2.72	**25th St & De Forest Ave** 25th St & De Forest Ave	1	Long Beach	LLARRP (Multiuse path access point)		
2.67	**De Forest / 25th** De Forest Ave between Bumett St and 25th St / River Left	1	Long Beach		X	
2.59	**Burnett St & De Forest Ave** Burnett St & De Forest Ave	1	Long Beach	LLARRP (Multiuse path access point)		
2.50	**23rd St & De Forest Ave** 23rd St & De Forest Ave	1	Long Beach	LLARRP (Multiuse path access point)		
2.36	**Hill St West** Hill St West	1	Long Beach	LLARRP (88 - Multiuse bridge)		
2.34	**Hill St East** Hill St East	1	Long Beach	LLARRP (88 - Multiuse bridge)		
2.23	**21st St & De Forest Ave** 21st St & De Forest Ave	1	Long Beach	LLARRP (Multiuse path access point)		
2.12	**20th St & Long Beach Fwy** 20th St & Long Beach Fwy	1	Long Beach	LLARRP (Multiuse path access point)		
1.98	**19th St & De Forest Ave** 19th St & De Forest Ave	1	Long Beach	LLARRP (Multiuse path access point)		
1.98	**19th Street** 19th St & De Forest Ave / River Left	1	Long Beach		X	
1.12	**De Forest** De Forest Ave near Loma Vista Dr / River Left	1	Long Beach		X	
0.67	**5th St & Long Beach Fwy** 5th St & Long Beach Fwy	1	Long Beach			X
0.13	**South of Golden Shore RV Resort** Near Shoreline Dr / River Left	1	Long Beach		X	

XS, S MASTER PLAN PROJECT EXAMPLES

Figure 83. (Top) This example design for a site near river mile 50.9 includes a Tier II rest pavilion at a typical condition in the San Fernando Valley. (See the LA RIver Master Plan, Chapter 9 for full description.)

Figure 84. (Middle) Near river mile 28.4, a Tier III gathering pavilion could embrace a central courtyard. (See the LA RIver Master Plan, Chapter 9 for full description.)

Figure 85. (Bottom) Another example design for a site near river mile 14.7 shows a Tier I shade pavilion at a typical lower river condition. (See the LA RIver Master Plan, Chapter 9 for full description.)

Figure 86. Sites with a history of industrial land uses, like Taylor Yard at river mile 25.6, often require remediation due to contamination. Source: OLIN, 2021.

7.
CLEANUP OF CONTAMINATED SITES

CLEANUP OF CONTAMINATED SITES ALONG THE RIVER IS NECESSARY TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT FROM THE HAZARDOUS EFFECTS OF CHEMICALS SPILLED AND RELEASED INTO THE ENVIRONMENT FROM PAST LAND USE

The LA River Master Plan identifies contaminated sites along the LA River corridor that may require cleanup (remediation) to reduce environmental and human health risks associated with potential future site uses or projects. The extent and type of contamination varies depending on past land use on these sites. Land contamination can result from a variety of activities and events, such as industrial manufacturing, waste disposal, accidental spills, illegal dumping, leaking underground storage tanks, and pesticide use. Contaminant distribution can range from localized hot-spots where chemical handling activities were common to lower levels of widespread distribution.

Contaminated sites can fall into two primary categories: 1) sites where there is a known party that caused a release and is responsible for the cleanup; and 2) sites where a responsible party is not identified or is no longer solvent. Sites in this second category are commonly referred to as Brownfield Properties.

There are a range of possible strategies and combinations of strategies that may be used to clean up these sites and/or reduce risk from contaminant exposure. The first step is to identify if there is a known responsible party or whether the site is a Brownfield Property. If there is a known responsible party, the developer would contact the responsible party and regulatory agency, as appropriate, to coordinate the cleanup activity with the intended redevelopment land uses. If the site is a Brownfield Property, the developer would contact the appropriate regulatory agency and discuss a plan for cleaning up the site to support the intended redevelopment land use. As discussed in the LA River Master Plan, Chapter 7, there are several funding mechanisms available to support the investigation and cleanup of Brownfield Properties.

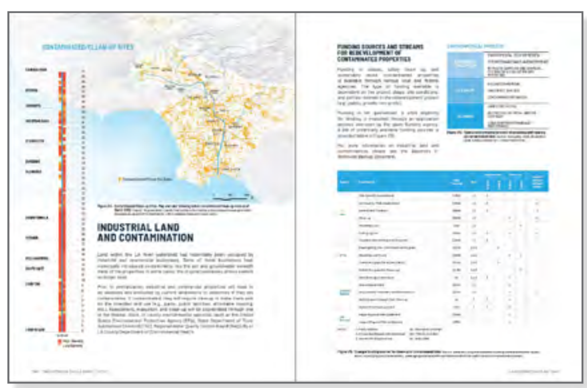


Figure 87. Specific infromation regarding Industrial and Land Contamination in LA County and along the LA River can be found in the LA River Master Plan, Chapter 7.

CONCEPTUAL SITE MODEL FOR CONTAMINATED SITE

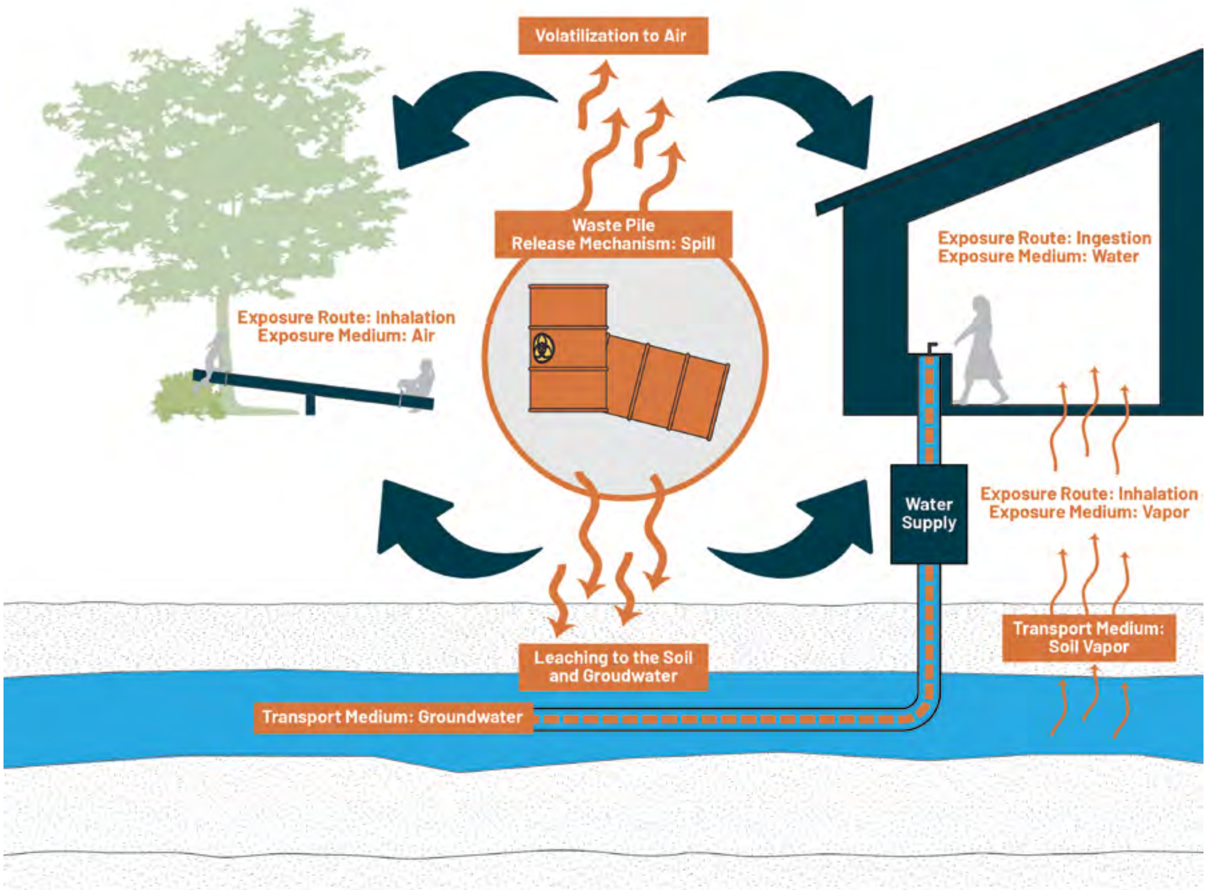


Figure 88. Conceptual Site model for Contaminated Site. Figure shows an example conceptual site model (CSM) for a contaminated site. The CSM identifies the contaminated media and potential routes of exposure. Source:Geosyntec Consultants/OLIN, 2021; Image adapted from State of Alaska, Guidance on Developing Conceptual Site Models, January 2017.

TYPICAL CONTAMINANTS

The contaminants of concern (COCs) at sites located along the LA River corridor vary depending on past land use. A list of typical COCs and their likely sources is summarized on the next page.

The level of potential risk to human health and the environment will be different at each site depending on the nature of COCs that are present, the media that are affected (soil, groundwater, soil vapor, surface water, sediment, etc.), and the end use of the property. Developing a conceptual site model (also known as a CSM) is a key first step in understanding the level of risk posed and the level of cleanup that may be necessary. The CSM defines the nature, extent, exposure pathways, and corresponding health risk of each COC in each medium.

TYPICAL CONTAMINANTS OF CONCERN ALONG THE LA RIVER CORRIDOR

Common Contaminants	Typical Compounds	Typical Sources
Metals	mercury, arsenic, chromium, copper, cadmium, and lead	pesticide production and use, manufacturing, building materials, metal plating
Chlorinated Solvents	freon, tetrachloroethene (PCE), and tricholoroethene (TCE), vinyl chloride, CIS/ trans-1, 2-dichloroenthene, 111-trichloroethane	dry cleaning facilities, septic systems, wastewater treatment plants, past manufacturing that required the use of de-greasing agents
Petroleum Hydrocarbons	total petroleum hydrocarbons (TPH) as gasoline, diesel, or motor oil; hydrogen sulfide; benzene; xylene; naphthalene; and alkanes	underground storage tanks (USTs), fuel storage, spills
Per- and polyfluoroalkyl substances (PFAS)	PFOA, PFOS, GenX	fire fighting foams and retardants, facilities or industries (e.g., chrome plating, electronics manufacturing or oil recovery)
PCBs	polychlorinated biphenyls, and aroclor isomers	leaks from electrical equipment such as transformers and capacitors; scrap yards; and outdated landfills
PAHs	acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and pyrene	crude oil, petroleum, coal tar products, vehicle exhaust, diesel exhaust, and manufacturing emissions
Herbicides/Pesticides	1,2,3-trichloropropene, sulfur, nitrogen, chlorine, carbon, phosphate, ferrum, mercury, zinc, benzene, arsenic, o-chlordane, y-chlordane, bromophos, diazinon, fenitrothion, hexachlorobenzene, heptachlor, iprobenfos, isocarbophos, parathion-methyl, and phenthoate	agriculture, weed abatement

Figure 89. Typical Contaminants of Concern Along the LA River Corridor. There are a number of contaminants of concern that could be encountered when costructing projects based on historical land uses along the LA River Corridor Source: Geosyntec, 2021; Regional Water Quality Control Board Geotracker, https://geotracker.waterboards.ca.gov/.

THE CLEANUP APPROACH THAT IS SELECTED DEPENDS UPON THREE FACTORS: THE TYPE OF CONTAMINATION, THE MEDIA THAT IS IMPACTED, AND THE PROPOSED END USE OF THE PROPERTY

CLEANUP PROCESS

The presence of contamination on a site can be known based on documented past releases, or identified during a property transaction or construction activity. In either of these cases, the cleanup of these sites will be overseen by one of several regulatory agencies, including: the California Environmental Protection Agency (CalEPA), Department of Toxics Substances Control (DTSC), Regional Water Quality Control Board (RWQCB), or Los Angeles Fire Department (LAFD). The oversight agency selected for the site will depend on the contaminant of concern, the type of media that is contaminated (soil, water, soil vapor), extent of contamination, and regional jurisdiction.

Once contamination is identified, the site will go through a general series of phases to accomplish cleanup and reach “regulatory closure.” A typical first step following the discovery of contamination on a property is to reach out to an environmental consultant or environmental attorney to determine which regulatory agencies should be involved in the cleanup process. The general process for this is shown in Figure 90. Implementation of a cleanup strategy will take place after the site has been fully characterized, the CSM developed, and a remediation strategy has been approved by the regulating agency. In many cases the public is provided the opportunity to review the information and provide comments on the cleanup approach before it is finalized.

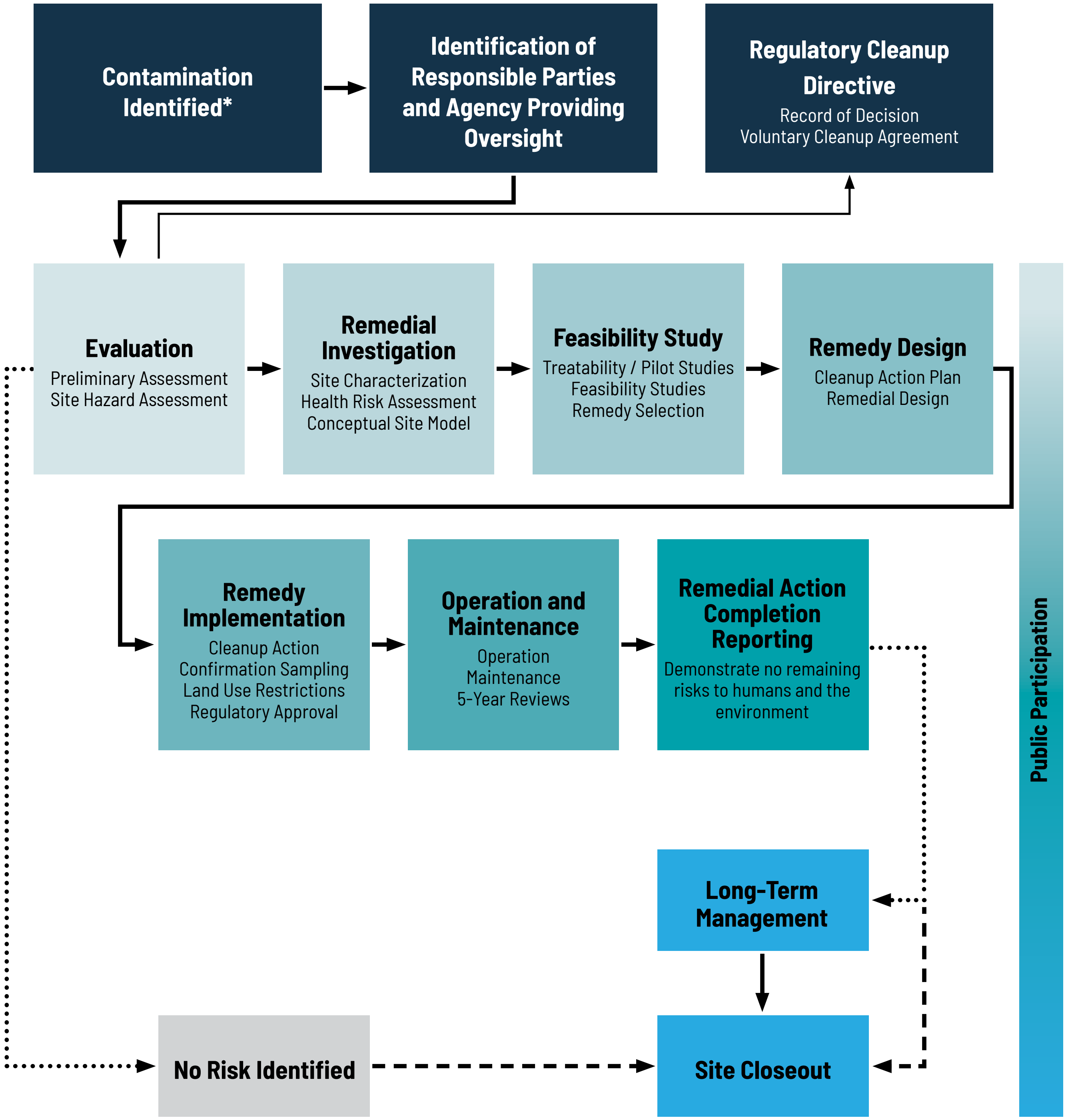
CLEANUP TECHNOLOGIES

The cleanup technology selected for a site is dependent on several factors, including:

- Type of contaminated media (i.e., soil, groundwater, or soil vapor)
- Type of contaminant/COCs present
- Concentration of contaminants
- Depth/location of contamination (buried vs. ground surface; hot spots vs. widespread)
- Site access restrictions
- Associated human and environmental health risks
- End use of the property

Depending on the nature of the site, the cleanup technology may be as simple as planting appropriate vegetation (phytoremediation) or more complex, requiring the implementation of several different technologies. Cleanup technologies have advanced significantly in recent years and continue to improve. Many cleanup technologies can be implemented in place without removing large volumes of contaminated soil or groundwater. A general overview of common cleanup technologies that can be implemented in-place (in situ) is provided on the following pages. Additional descriptions of the technologies can be found on the Environmental Protection Agency’s (EPA) website: https://www.epa.gov/remedytech/remediation-technology-descriptions-cleaning-contaminated-sites.

TYPICAL CLEANUP PROCESS



***Interim cleanup actions may occur throughout the process to minimize risk**

Figure 90. **Typical Cleanup Process. General process to accomplish cleanup and reach "regulatory closure" once contamination is identified.**
Source: Geosyntec, 2021; Adapted from Department of Toxic Substances Control (ca.gov) Brownfields website - https://dtsc.ca.gov/brownfields/

IN SITU GROUNDWATER REMEDIATION TECHNOLOGIES

Acronyms and Abbreviations:

°C = Celsius
BTEX = benzene, toluene, ethylbenzene, and xylenes
COC = contaminants of concern
DCE = cis-1,2-dichloroethylene
DNAPL = dense non-aqueous phase liquid
ERH = electrical resistance heating
Fe = iron
H2O2 = hydrogen peroxide
ISCO = in situ chemical oxidation
ISCR = in situ chemical reduction
ITSD = in situ thermal desorption
MTBE = methyl tert-butyl ether

TECHNOLOGY	OVERVIEW		
	Definition	Types	General Description
Bioremediation	Biological degradation of contaminants by microbial metabolism	Enhanced in situ bioremediation	Amendments (biostimulation) and/or microbial cultures (bioaugmentation) are delivered to the subsurface using various technologies to enhance biological degradation (aerobic or anaerobic)
		Biosparging	Injection of air into the saturated zone of the aquifer to stimulate biological degradation (aerobic) of contaminants
Phytoremediation	Use of plants to facilitate the reduction of volume, mobility, or toxicity of COCs in soil, groundwater, or other contaminated media	Traditional	Installation of phytoremediation systems consisting of either plant trees (e.g., poplar and willow trees), shrubs, or both to facilitate the reduction of COCs in shallow groundwater
		Treewell	Installation of engineered phytoremediation systems using patented and proprietary systems that facilitate greater root penetration and promote stronger remedial effects than convention planting methodologies
In Situ Chemical Reduction (ISCR)	Chemical degradation of contaminants by reducing chemicals	Direct injection	Injection of reducing agent (e.g., zero valent metals, most commonly zero valent iron [ZVI]) into contaminated groundwater to chemically reduce the COC. Zero valent metals (after being ground into micro- and nano-scale sized particles) are typically mixed with water or vegetable oil prior to injection
		Permeable Reactive Barrier (PRB)	Installation of a permeable wall built below ground via trenching or horizontal fracturing. Trenched PRBs usually constructed with iron filings (large sized particles of ZVI). Groundwater that passes through the permeable wall is treated
In Situ Chemical Oxidation (ISCO)	Chemical degradation of contaminants by oxidizing chemicals	Various oxidants (H2O2/Fe, Ozone, Ozone/H2O2, Permanganate, Activate Persulfate, etc.)	Injection of oxidizing agent (hydrogen peroxide, sodium or potassium permanganate, sodium persulphate or ozone) into contaminated soil or groundwater to oxidize the COC
In Situ Thermal Treatment	Use of thermal heat to remove contamination from soil and/ or groundwater by volatilizing or destroying contaminant	Electrical Resistance Heating (ERH)	An electrical current flows between electrodes installed in the soil. Groundwater and steam conduct electricity, soil and rock produce electrical resistance. Resistance to flow generates heat ~100°C. Vacuum extraction or multi-phase extraction removes steam and mobile contaminants for treatment
		In Situ Thermal Desorption (ITSD)/Thermal Conductive Heating (TCH)	TCH consists of heating elements placed in vertical wells within the contaminated aquifer. The heating elements operate at up to 1,000°C to heat the surrounding soil via conduction and through advection (via flowing groundwater or flowing steam). Extraction wells may be part of or separate from the heating wells. A vacuum applied to the manifold removes air and contaminants for aboveground treatment. The ground surface is covered by an insulating vapor barrier
		Steam Enhanced Extraction (SEE)	Steam is injected into the subsurface to transfer heat to the groundwater and aquifer matrix. With continued steam injection, hot water begins to move through the aquifer, driving cooler formation water and contaminants ahead of the hot water front. With continued steam injection, steam itself enters the formation. Steam, water, and NAPL are collected in multi-phase extraction wells
		In Situ Smoldering	Ignition in COC outside well screen, then travels outwards with self propagating reaction until radius of influenced is met. Air is needed to support the reaction along with a vapor collection system
Monitored Natural Attenuation	Reliance on natural processes (sorption, dispersion, volatilization, abiotic degradation, and biotic degradation) to attenuate the concentrations of contaminants in groundwater		Monitoring groundwater to show 1) reduction in concentration(s); 2) geochemistry supports attenuation process(es) active at site; 3) field/ microcosms demonstrate occurrence of natural attenuation process(es)

NAPL = non-aqueous phase liquid
PAH = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
PCE = tetrachloroethylene
TCE = trichloroethylene
TCH = thermal conductive heating

TTZ = target treatment zone
VC = vinyl chloride
ZVI = zero valent iron

CONTAMINANTS OF CONCERN (COCS)	CONSIDERATIONS	
	Pros	Cons
Chlorinated solvents, petroleum hydrocarbons, and some pesticides	Proven technology. Practical to implement. Effective treatment for COCs at moderate to high concentrations. Generally cost effective. In-situ application creates minimal disturbance to site	Only effective for pH between 5.5 and 8.0. Requires favorable redox conditions. May not be suitable at low temperatures. Additional treatments may be required when the amendment has been expended. Delivery can be limited in tight and/or heterogenous formations. Methanogenesis may be a perceived concern
Petroleum hydrocarbons and some pesticides	Proven technology. Practical to implement. Effective treatment for COCs at low to moderate concentrations. Generally cost effective	Very high concentrations of COCs may limit biological activity. Only effective for pH between 5.5 and 8.0. May not be suitable at low temperatures. Air injection limited in low permeability formations. Vapors may enter buildings
Chlorinated solvents, 1,4-dioxane, BTEX and other hydrocarbons, metals	Potentially less invasive or disruptive than other technologies. Provides a low-cost, long-term treatment option	Trees are expected to take approximately 3 to 5 years before achieving maximum effectiveness. Phytoremediation is most effective during the growing season. Long-term presence of trees covering a substantial portion of the site may limit property redevelopment options
Chlorinated solvents, 1,4-dioxane, BTEX and other hydrocarbons, metals	Provides an effective, long-term treatment option	Trees are expected to take approximately 3 to 5 years before achieving maximum effectiveness. Technology is proprietary. Phytoremediation is most effective during the growing season. Long-term presence of trees covering a substantial portion of the site may limit property redevelopment options
Chromium, chlorinated solvents (TCE, PCE, DCE, VC), DNAPL (free product, not dissolved)	Relatively rapid treatment with (usually) a single application. Works in saturated and unsaturated zones	Ideal for low to moderate concentrations of chlorinated solvents; however, higher concentrations and free product may take multiple applications to address. Tighter lithologies, such as rock and clay, are difficult to treat and may required fracturing prior to injections
Chromium, chlorinated solvents (TCE, PCE, DCE, VC), DNAPL (free product, not dissolved)	Proven technology. Practical to implement. Can be cost effective depending on treatment depth and required barrier thickness	Slow groundwater flow will lead to slow treatment time. Fast groundwater flow may require infeasibly thick PRB. The permeable wall can only treat the groundwater that flows through it. Does not treat soil contamination
BTEX and other hydrocarbons, MTBE, Chlorinated solvents, Phenols, Chlorinated benzenes PAHs, PCBs, organic pesticides	Large volume of waste material is not usually generated. Treatment commonly implemented over shorter time frame. May be used with other technologies with ISCO being used first to rapidly reduce high concentrations in soil and groundwater and a longer term, less expensive technology to treat areas of lower concentrations. Mature technology	May not be cost-effective due to total volume of oxidant required, especially for cases of mobile and residual NAPL. Limited ability to penetrate low permeability zones. May need pilot-scale studies and validate technology. Multiple rounds of injections may be required to achieve remedial objectives. Health and safety when handling and storing strong oxidizing agents needs to be considered
Chlorinated solvents, volatile DNAPLs, fuels and heavy hydrocarbons (partial removal) and 1,4-dioxane	Heating stops immediately when system switched off. Well suited to relatively low permeability sites (clays and silts). When combined with SEE can be used on Sites with substantial groundwater flow	Contamination outside of TTZ will not be remediated. May mobilize contamination off-site if hydraulic containment system fails. Very high energy demand, unsustainable option unless renewable energy is available
Chlorinated solvents, NAPLs, tar, PCBs, pesticides, PAHs, mercury, dioxins, fuels and heavy hydrocarbons, and 1,4-dioxane	Flexibility of technology allows for wide range of treatment temperatures for COCs. More uniform heating of subsurface than injection and resistance based technologies in complex and heterogeneous sites	Turning off system does not immediately reduce temperatures and therefore contaminant mobility. Potential for rebound of contaminants following cool down. Very high energy demand (electricity or gas)
Chlorinated solvents, NAPLs, fuels and heavy hydrocarbons, and 1,4-dioxane	Treatment can be completed over a short time frame (2 to 12 months). Can be used above and below water table. May be used with other technologies (ERH and ISTD) to improve contaminant removal from low permeability zones	Steam does not penetrate low permeability zones. Design and location of injection and extraction wells is critical. Not a destructive remediation process effluent recovery and treatment required. Technology relies on mobilization of NAPL
NAPLs, fuels, and heavy hydrocarbons		
Chlorinated solvents, Petroleum hydrocarbons, Metals and metalloids	Low cost. Can typically utilize monitoring network already at site, passive technology, low environmental impact	Time to remediation often longer than active remedies. Perception of "do nothing" remedy to some regulators and stakeholders

IN SITU SOIL REMEDIATION TECHNOLOGIES

Acronyms and Abbreviations:

°C = Celsius
COC = chemicals of concern
DCE = cis-1,2-dichloroethylene
DNAPL = dense non-aqueous phase liquid
ISCR = in situ chemical reduction
ISSM = in situ soil mixing
NAPL = non-aqueous phase liquid
PCE = tetrachloroethylene
SVE = soil vapor extraction

TECHNOLOGY	OVERVIEW		
	Definition	Types	General Description
Bioremediation	Biological degradation of contaminants by microbial metabolism	Bioventing	Injection of air into the vadose zone to stimulate biological degradation (aerobic) of contaminants
Soil Vapor Extraction (SVE)	Vacuum extraction of vapor-phase volatile contaminants from contaminated soils	SVE	SVE extracts vapors from vadose zone soil by applying a vacuum. A treatment system may be implemented to treat extracted vapors prior to discharge to atmosphere. May be combined with air sparging to extract vapors from groundwater and saturated soil beneath the water table
In Situ Chemical Reduction (ISCR)	Chemical degradation of contaminants by reducing chemicals	Direct injection	Injection of reducing agent (e.g., zero valent metals, most commonly zero valent iron [ZVI]) into contaminated groundwater to chemically reduce the COC. Zero valent metals (after being ground into micro- and nano-scale sized particles) are typically mixed with water or vegetable oil prior to injection
		In Situ Soil Mixing (ISSM)	Mixing of reducing agent into soil via large diameter augers or excavator bucket to chemically reduce the COC. Zero valent metals (typically micro- and nano-scale sized particles) may be mixed with clay to help disperse DNAPL and reduce the flow of groundwater
In Situ Thermal Treatment	Use of thermal heat to remove contamination from soil and or groundwater by volatilizing or destroying contaminant	Smoldering	Air is forced through the contaminated material to propagate a low-temperature, flameless form of combustion, the reaction is self sustaining provided adequate air flow and propagates through the contaminated media from each ignition point. Most NAPL is destroyed and the rest is recovered as vapor and treated
		Vitrification	An electrical current heats contaminated soil to temperatures up to 2000°C. Once cooled, the vitrified soil is a chemically stable, leach resistant glass or crystalline material. High temperatures also destroy organic materials

SVOC = semi-volatile organic compounds
TCE = trichloroethylene
VC = vinyl chloride
VOC = volatile organic compounds
ZVI = zero valent iron

CONTAMINANTS OF CONCERN (COCS)	CONSIDERATIONS	
	Pros	Cons
petroleum hydrocarbons and some pesticides	Proven technology. Practical to implement. Effective treatment for COCs at low to moderate concentrations. Generally cost effective.	Very high concentrations of COCs may limit biological activity. Only effective for pH between 5.5 and 8.0. May not be suitable at low temperatures. Not suitable for sites with low-permeability soils, soils with high organic content, or shallow water table. Vapors may enter buildings.
VOCs and SVOCs	Proven technology. Practical to implement. Effective source area treatment for VOCs in high-permeability soils. Treatment time typically between 1 and 3 years. May be paired with additional technologies such as air sparging, multi-phase extraction, and thermal treatment to enhance mass removal. May stimulate bioremediation of nonvolatile contaminants in vadose zone by increasing air flow.	Less suitable for sites with low-permeability soils, soils with high organic content, or shallow groundwater. High soil moisture and entrained water vapor may reduce effectiveness. Preferential pathways may reduce effectiveness. Effectiveness decreases over time to asymptotic conditions. Noise may be a concern during system operation.
chromium, chlorinated solvents (TCE, PCE, DCE, VC), DNAPL (free product, not dissolved) within the pore spaces of more permeable lithologies	Relatively rapid treatment with (usually) a single application. Works in saturated and unsaturated zones.	Ideal for low to moderate concentrations of chlorinated solvents; however, higher concentrations and free product may require multiple applications to address. Tighter lithologies, such as rock and clay, are difficult to treat and may required fracturing prior to injections.
chromium, chlorinated solvents (TCE, PCE, DCE, VC), DNAPL (free product, not dissolved): excels at treatment in any lithology, so long as proper mixing can occur	Provides a rapid treatment time of weeks to months after mixing. Works in saturated and unsaturated zones.	VOC emissions must be treated during and after mixing (can be combined with SVE and smoldering [hot air injection]). Requires surface access where soils are contaminated. Mixing deeper impacts (greater than 20 feet below surface) can become relatively expensive.
low volatility NAPLs (coal tar, crude oil sludge)	Over 98% of NAPL removed is destroyed with remaining 2% captured as vapors. Suitable for highly contaminated sites as no upper limit on NAPL concentration to be treated. Relatively quick process. Can be used to treat above and below the water table.	Not appropriate for materials with low air permeability (fractured rock or clay). Requires a minimum amount of NAPL to propagate a self-sustaining reaction. Complete removal of organic material from soil - sterile and inhospitable to life. Can produce carbon monoxide. May require a bench scale feasibility study. Requires significant aboveground infrastructure.
Heavy metals and radionuclides		

Figure 91. **A stretch of constructed wetlands extend adjacent to the river at the Dominguez Gap Wetlands in Long Beach at river mile 4.9.**
Source: OLIN, 2018.

SECTION IV: **DESIGN**

Figure 92. A cyclist rides on the LA River Trail adjacent to DeForest Park around river mile 7.2, just north of the Long Beach Boulevard Bridge.
Source: LA County Public Works, 2018.

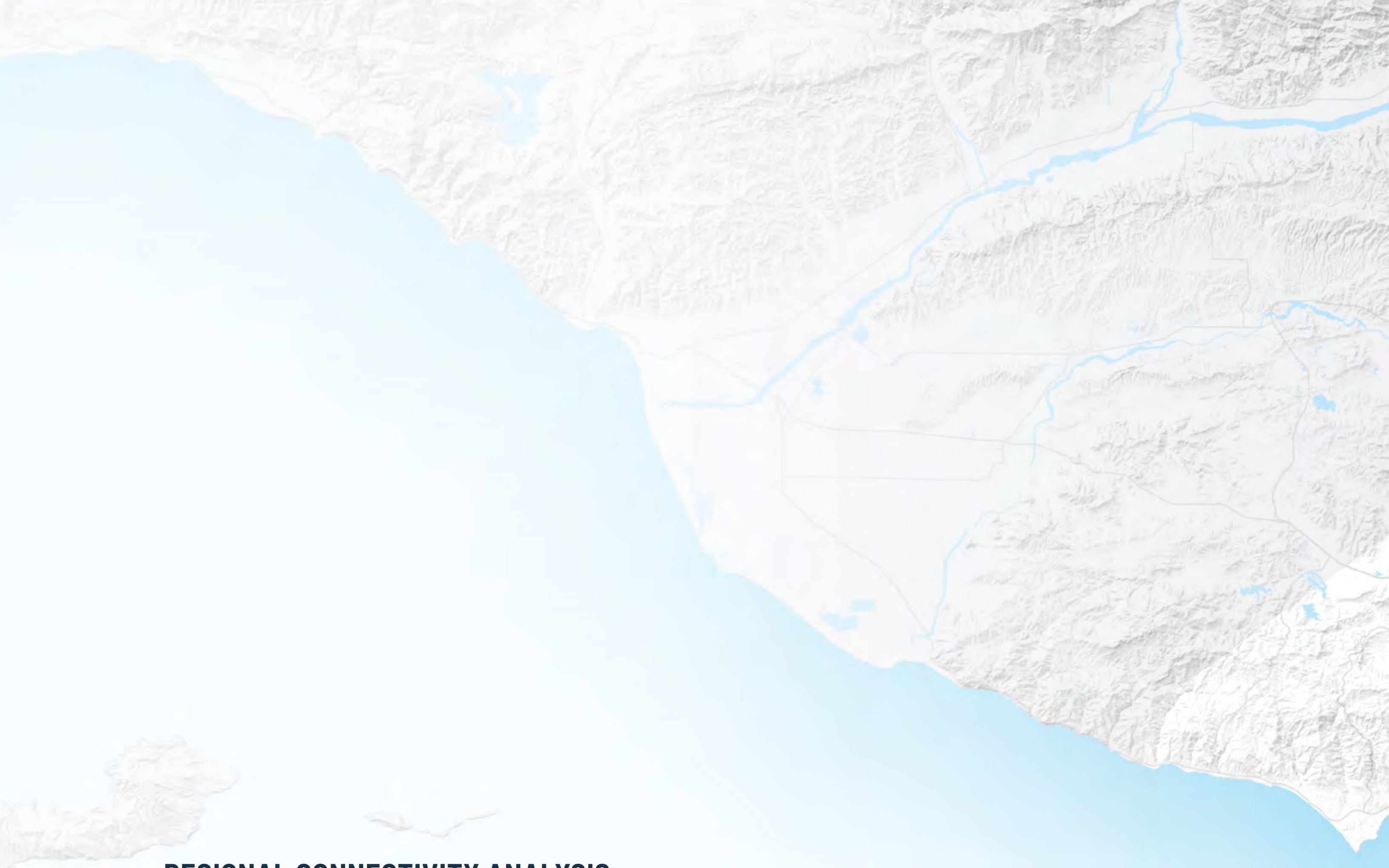
8.
CONNECTIVITY

THE LA RIVER CAN SERVE AS A BACKBONE FOR RECREATION AND ACTIVE TRANSIT NETWORKS THAT CONNECT THE CITIES AND NEIGHBORHOODS ALONG ITS COURSE

One of the nine goals of the Master Plan is to enhance opportunities for equitable access to the river corridor. To make this possible, the reimagined river must integrate seamlessly with its surrounding context. The following maps envision and provide documentation for a complete, connective network of multiuse trails, bikeways, and greenways that stitch together the river with adjacent communities. This network reflects existing as well as planned connections, and proposes additional links where gaps have been identified.

Three scales of connectivity are considered. At the regional scale, proposed connections take the form of countywide active transit loops that build upon major trails and bikeways. More information on regional connectivity loops can be found in the LA River Master Plan, Chapter 9, where they are presented as a system-based project. The second scale, that of the neighborhood, emphasizes direct connections between the river and local resources such as parks and schools. The third and smallest scale considers the interface of the river and the street grid, ensuring that approaches to existing river trail access points and proposed XS and S project sites are visible and accessible.

Figure 93. The actionable goals related to equitable access to the river are described in the LA River Master Plan, Chapter 6 and the loops of regional connectivity in the LA River Master Plan, Chapter 9.



REGIONAL CONNECTIVITY ANALYSIS

Today, trails provide access to 32 of the 51 river miles, or 60% of the corridor, and the county has hundreds of miles of proposed multiuse trails and bike paths.

A mapping of existing and proposed bike paths shows a range of conditions and options for closing the loop of accessibility for cyclists to the LA River. Class I bike paths, completely separate from a street or highway, are the prevailing typology within the LA River right-of-way. They provide a means for commuting and recreation for both cyclists and pedestrians. Class II and IV bike paths are tied into existing vehicular infrastructure and can provide accessible routes through the wider LA County urban street grid.

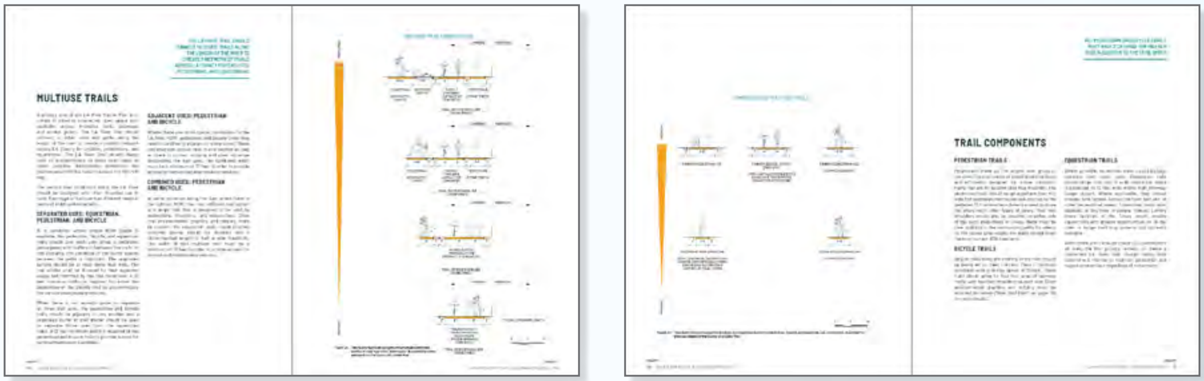

MULTIUSE TRAILS
TRAIL COMPONENTS

Figure 94. All trail combinations and typologies for the LA River are outlined in Appendix I: Design Guidelines, Chapter 3.

REGIONAL CONNECTIVITY LOOPS: ANALYSIS

Figure 95. Regional Connectivity Loop Analysis. Detailed breakdown of existing and proposed bike path and trail types that comprise regional loops. Source: OLIN, 2021; Based on LA County GIS Data Portal, Countywide Multiuse Trails, 2019; LA County GIS Data Portal, Bike Ways, 2017; LA Metro Active Transportation Strategic Plan, 2016.

EXISTING AND PROPOSED REGIONAL TRAILS

#	Name	Walking	Biking	Hiking	Inline Skating	Horseback Riding	Wheelchair Accessible	Start Point/End Point	Length (mi)
1	LA River Trail	x	x			x	x	Shoreline Dr/Atlantic Blvd, Hwy 5/Riverside Dr at Bette Davis Picnic Area, Radford Ave/ Whitsett Ave, Coldwater Canyon Ave/Fulton Ave, Cedros Ave/Sepulveda Blvd, Burbank Blvd/Balboa Blvd, Vanalden/Owensmouth Ave	30.0 *(51.0 proposed)*
2	San Gabriel River Trail	x	x	x		x		Van Tassel Motorway/Seal Beach	37.8
3	Schabarum-Skyline Trail	x	x	x		x		Walnut Creek Rd/Peck Rd	29.9
4	The Strand (Marvin Braude Bike Trail)	x	x		x		x	Torrance Beach/Will Rogers Beach	22.0
5	Orange Line	x	x		x		x	Lankershim Blvd/Chandler Blvd, Lassen St/ Orange Line Busway	18.1
6	Rio Hondo River Trail	x	x	x		x		Santa Anita Ave./LA River at E Imperial Hwy	15.6
7	Coyote Creek Bikeway	x	x		x		x	Foster Rd/San Gabriel River Bike Trail at Coyote Creek	9.5
8	Ballona Creek Bike Path	x	x	x				National Blvd/Marina del Rey	6.7
9	Santa Anita Wash Trail		x	x		x		E Orange Grove Ave/Rio Hondo River at Santa Anita Ave	6.5
10	San Fernando Road Bike Path	x	x		x		x	Branford St at San Fernando Rd, Roxford St at San Fernando Rd	5.7
11	Palos Verdes Drive N	x	x					Roxford St at San Fernando Rd/Branford St at San Fernando Rd	4.8
12	Whittier Greenway	x	x		x		x	Mills Ave at Lambert Rd/ Pioneer Blvd	4.7
13	Compton Creek Bike Path	x	x		x		x	El Segundo Blvd at N Parmelee Ave/E Del Amo Blvd east of Santa Fe Ave	5.1
14	Shoreline Beach	x	x		x		x	Long Beach Shoreline Marina/54th Pl at E Ocean Blvd	4.1

EXISTING AND PROPOSED TRIBUTARY TRAILS

Name	Status	Walking	Biking	Hiking	Inline Skating	Horseback Riding	Wheelchair Accessible	Start Point/End Point	Length (mi)
Aliso Canyon Creek	Planned	x	x					LA River at Kittridge St/Ronald Reagan Fwy	6.6
Pacoima Wash Greenway	Planned	x	x					Gavina Ave/Foothill Blvd; Herrick Ave/Telfair Ave, Arieta Ave/Van Nuys Blvd north of Valerio St.	7.1
Tujunga Wash Greenway	Planned	x	x					Glenoaks Blvd/LA River near Whitsett Ave	1.3
Verdugo Wash	Planned	x	x					Crescenta Valley Park/LA River at Fairmont Ave	7.3
Arroyo Seco Bikeway	Planned	x	x					LA River near N Ave 19/Mosher Ave at E Ave 43	2.5
Rio Hondo River Trail	Existing		x	x		x		Santa Anita Ave/LA River at E Imperial Hwy	15.6
Compton Creek Bike Path	Existing	x	x		x		x	El Segundo Blvd at N Parmelee Ave/E Del Amo Blvd east of Santa Fe Ave	5.1

Figure 96. (Left) Existing and Proposed Regional Trails. The major existing regional trails and bikeways in LA County range from four to thirty miles in length and contribute significantly to proposed regional loops. Some Class I Bike Paths may incorporate multiuse segments. Source: OLIN, 2019; Based on LA County GIS Data Portal, Countywide Multiuse Trails, 2019; LA County GIS Data Portal, Bike Ways, 2017; LA Metro Active Transportation Strategic Plan, 2016.

Figure 97. (Above) Existing and Proposed Tributary Trails. Existing and planned tributary trails extend the potential for larger regional connectivity. Source: OLIN, 2019; Based on LA County GIS Data Portal, Countywide Multiuse Trails, 2019; LA County GIS Data Portal, Bike Ways, 2017; LA Metro Active Transportation Strategic Plan, 2016.

LOCAL CONNECTIVITY: FRAME 9

Existing Conditions

- Municipal Boundaries
- LA River Mile Point
- Tributaries and Streams
- LA River Trail
- Multiuse Trails and Class I Regional Trails
- Local/Protected Bike Lanes
- Local/On-Street Bike Lanes
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- School
- Existing Access Point to Remain Unchanged
- Metro Transit Station
- Arts and Cultural Point of Interest

LA River Master Plan Design Proposals

- XS, S Proposed Site from Plans
- XS, S Proposed Site
- Existing Access Point To Improve
- Metro Transit Station
- LA River Trail
- Multiuse Trails & Class I Regional Trails
- Local/Class IV Trails
- Local/Class II Trails
- Green Streets
- Proposed LARMP Connectivity
- Proposed Regional Connectivity Loops
- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site

Frame 9 Master Plan M, L, XL Sites

51.0	River Origin Park
50.9	Canoga Park High School
50.6	Canoga Park River Park
48.9	Pierce College Connector
47.8	LA River Valley Bikeway and Greenway
47.5	Southern Aliso Green Network
47.4	Aliso Creek Confluence Park/ Reseda River Loop
46.8	Reseda Expansion
46.5	Caballero Creek Confluence Park
44.0	Sepulveda Basin

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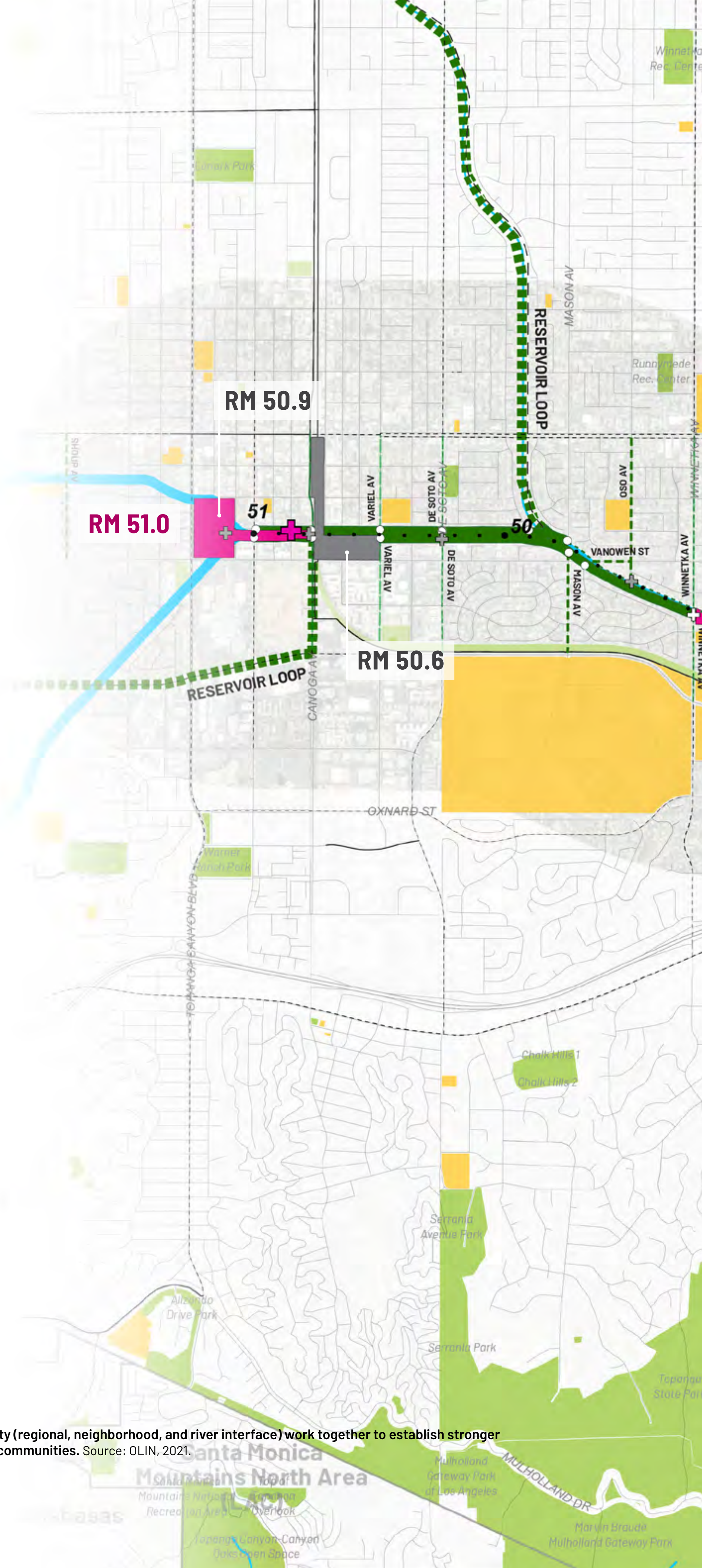
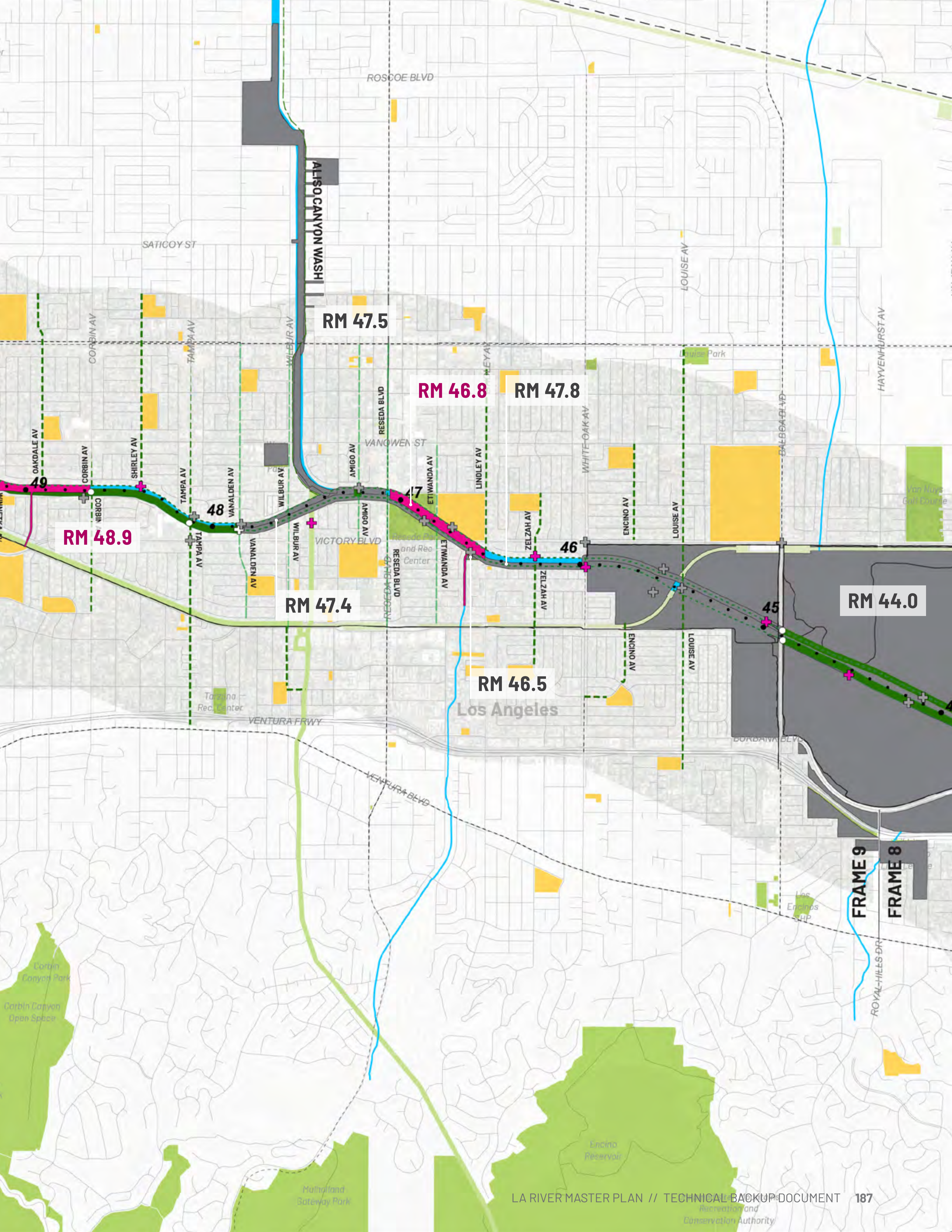


Figure 98. **Frame 9 Connectivity. Three scales of connectivity (regional, neighborhood, and river interface) work together to establish stronger connections between the LA River and adjacent communities.** Source: OLIN, 2021.



ROSCOE BLVD
ALISO CANYON WASH
SATICOY ST
RM 47.5
RM 46.8
RM 47.8
VANOWEN ST
RM 48.9
VICTORY BLVD
RM 47.4
RM 46.5
RM 44.0
Los Angeles
VENTURA FRWY
VENTURA BLVD
BURBANK BLVD
FRAME 9
FRAME 8
Encino Reservoir
Mulholland Gateway Park
Corbin Canyon Park
Corbin Canyon Open Space
Tarzana Rec. Center
Reseda Park and Rec Center
Louise Park
Van Nuys Golf Course
Los Encinos SHP
ROYAL HILLS DR
OAKDALE AV
CORBIN AV
SHIRLEY AV
TAMPA AV
VANALDEN AV
WILBUR AV
AMIGO AV
RESEDA BLVD
ETIWANDA AV
LINDLEY AV
ZELZAH AV
WHITE OAK AV
ENCINO AV
LOUISE AV
BALBOA BLVD
HAYVENHURST AV
49
48
47
46
45

LOCAL CONNECTIVITY: FRAME 8

Existing Conditions

- Municipal Boundaries
- LA River Mile Point
- Tributaries and Streams
- LA River Trail
- Multiuse Trails and Class I Regional Trails
- Local/Protected Bike Lanes
- Local/On-Street Bike Lanes
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- School
- Existing Access Point to Remain Unchanged
- Metro Transit Station
- Arts and Cultural Point of Interest

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- XS, S Proposed Site
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- Local/Class IV Trails
- Local/Class II Trails
- Green Streets
- Proposed LARMP Connectivity
- Proposed Regional Connectivity Loops
- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site

Frame 8 Master Plan M, L, XL Sites

47.8 LA River Valley Bikeway and Greenway
41.2 Hazeltine River Edge Park
40.9 Hazeltine Avenue
40.8 Van Nuys Blvd
39.4 West of Coldwater
38.8 Harvard Westlake River Park
38.2 Upstream from Tujunga Confluence
37.5 Tujunga Wash Path

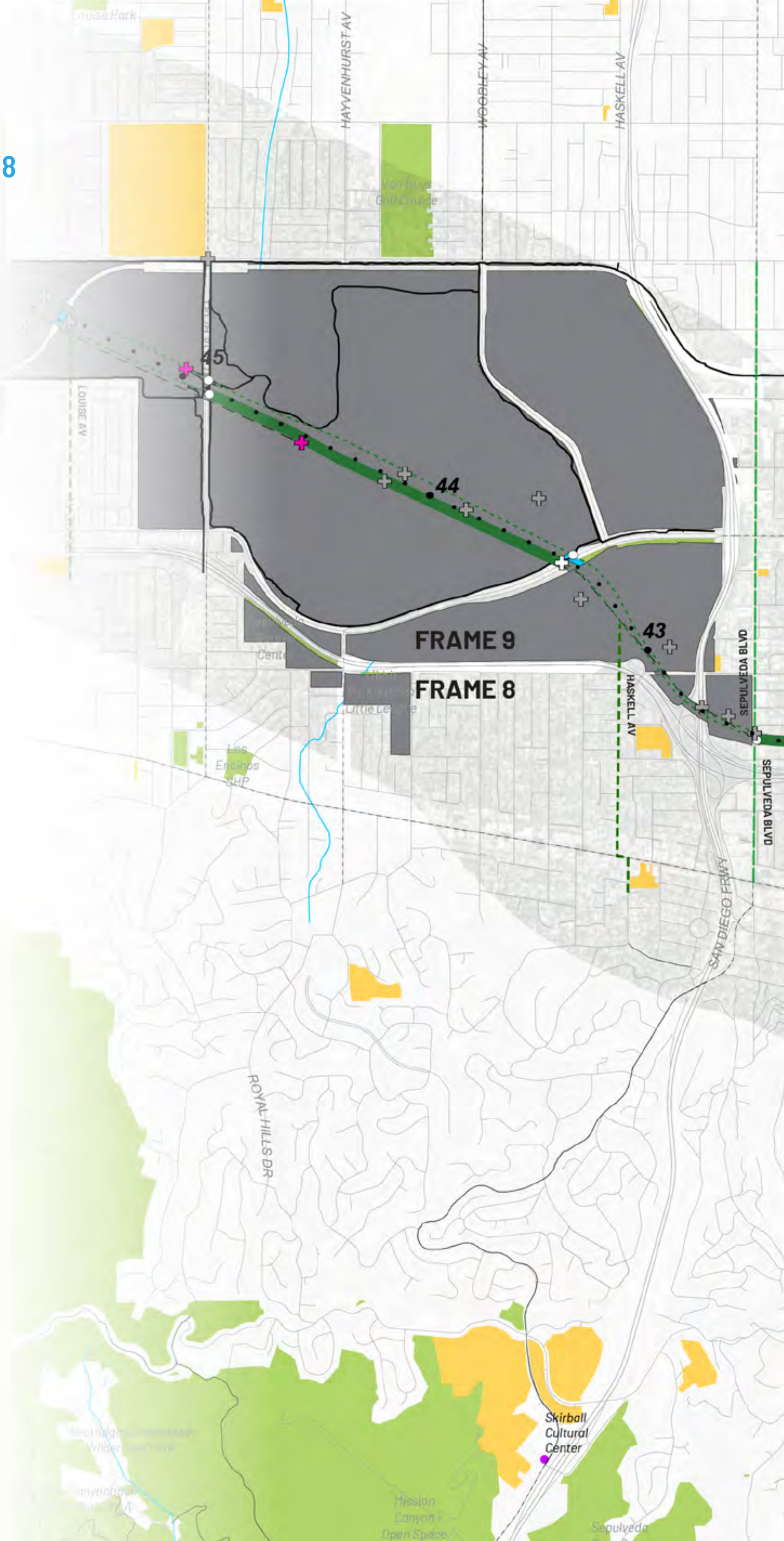

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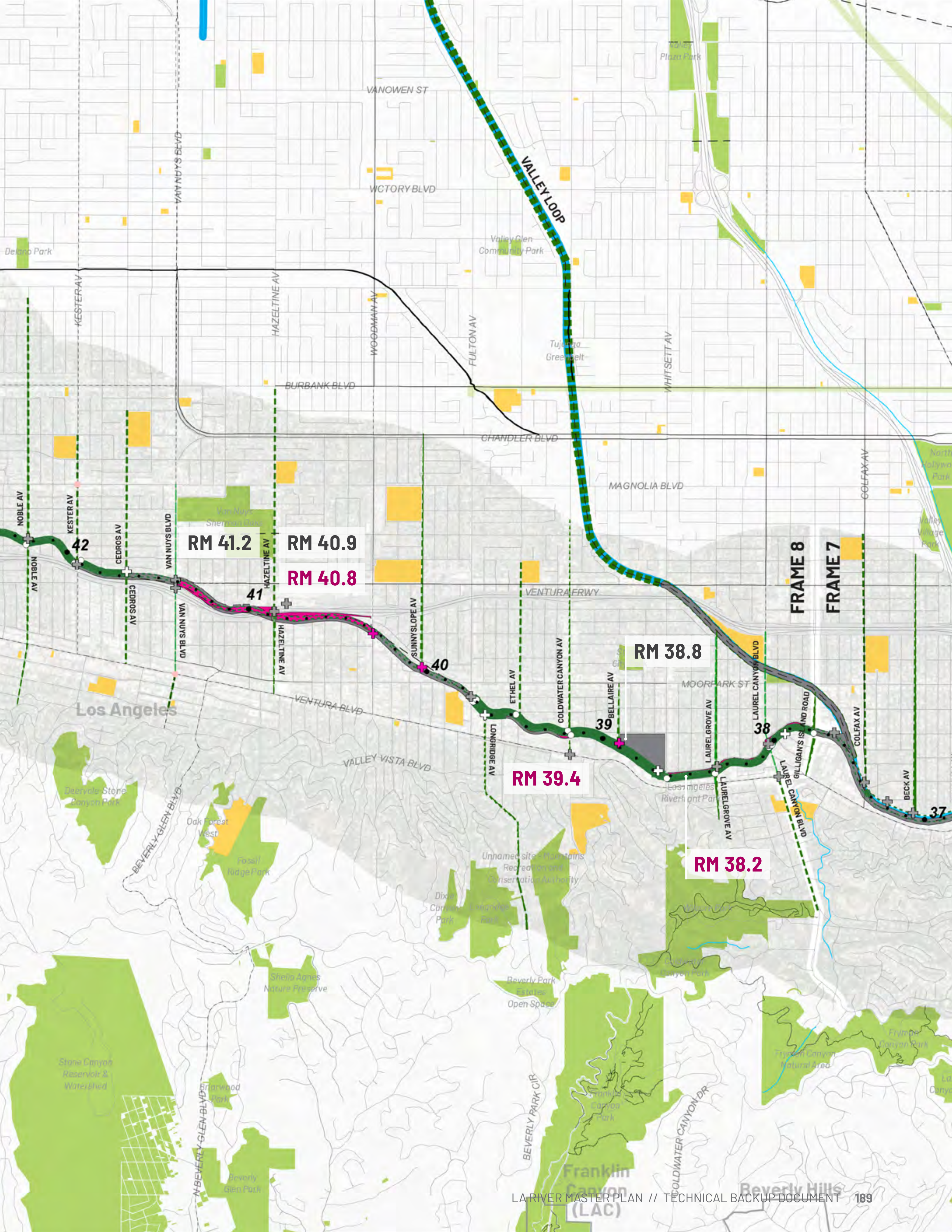
Figure 99. Frame 8 Connectivity. Three scales of connectivity (regional, neighborhood, and river interface) work together to establish stronger connections between the LA River and adjacent communities. Source: OLIN, 2021.


VANOWEN ST
VICTORY BLVD
VALLEY LOOP
Valley Glen Community Park
Delano Park
KESTER AV
VAN NUYS BLVD
HAZELTINE AV
WOODMAN AV
FULTON AV
WHITSETT AV
Tujunga Greenbelt
BURBANK BLVD
CHANDLER BLVD
MAGNOLIA BLVD
COLFAX AV
NOBLE AV
CEDROS AV
RM 41.2
RM 40.9
RM 40.8
42
41
40
39
38
37
SUNNYSLOPE AV
VENTURA FRWY
RM 38.8
FRAME 8
FRAME 7
MOORPARK ST
LAUREL CANYON BLVD
GILLIGAN'S ISLAND ROAD
ETHEL AV
COLDWATER CANYON AV
BELLAIRE AV
LAURELGROVE AV
BECK AV
VENTURA BLVD
Los Angeles
LONGRIDGE AV
VALLEY VISTA BLVD
RM 39.4
RM 38.2
BEVERLY GLEN BLVD
Oak Forest West
Fossil Ridge Park
Deervale-Stone Canyon Park
Stone Canyon Reservoir & Watershed
Sheila Agnes Nature Preserve
Beverly Park Estates Open Space
BEVERLY PARK CIR
COLDWATER CANYON DR
Franklin Canyon (LAC)
Beverly Hills
Briarwood Park
Beverly Glen Park
N BEVERLY GLEN BLVD

LOCAL CONNECTIVITY: FRAME 7

Existing Conditions

- Municipal Boundaries
- LA River Mile Point
- Tributaries and Streams
- LA River Trail
- Multiuse Trails and Class I Regional Trails
- Local/Protected Bike Lanes
- Local/On-Street Bike Lanes
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- School
- Existing Access Point to Remain Unchanged
- Metro Transit Station
- Arts and Cultural Point of Interest

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- Local/Class IV Trails
- Local/Class II Trails
- Green Streets
- Proposed LARMP Connectivity
- Proposed Regional Connectivity Loops
- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site

Frame 7 Master Plan M, L, XL Sites

47.8	LA River Valley Bikeway and Greenway
37.6	Tujunga Wash Confluence Park
37.5	Tujunga Wash Path
35.9	101 Freeway Crossing
33.5	Sennett Creek
33.0	Headworks Park
32.8	Headworks Connector
31.9	Burbank Western Green Network

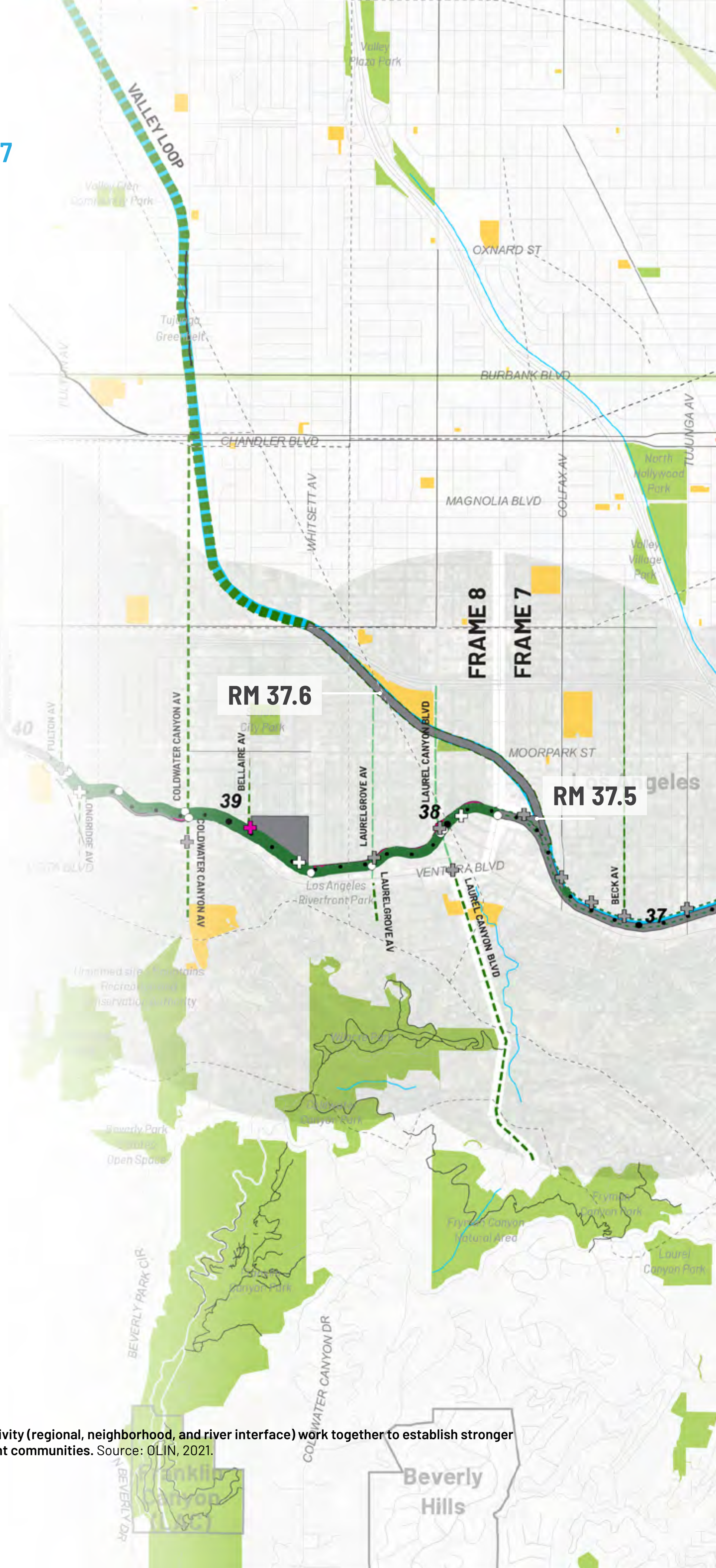
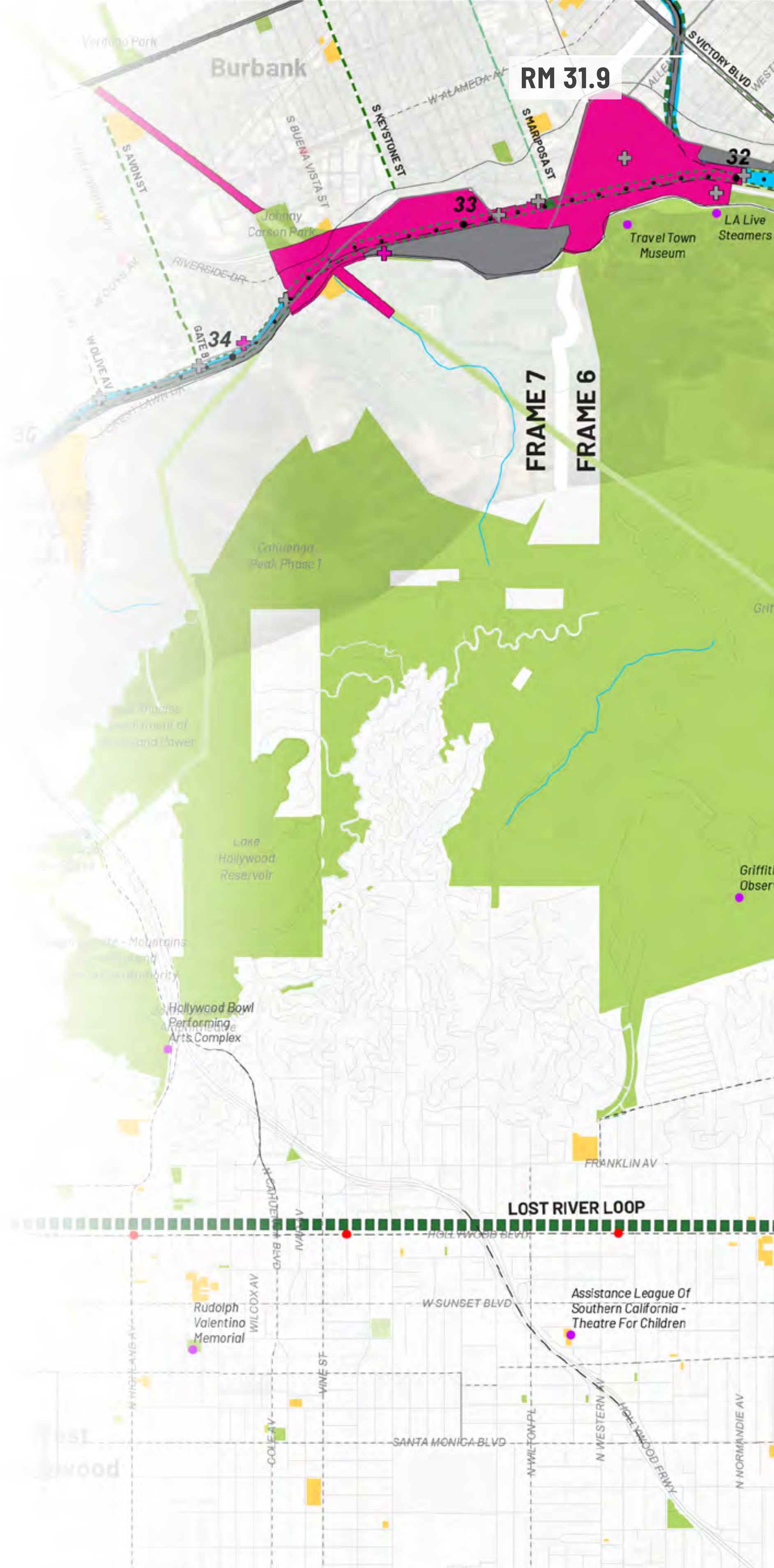


Figure 100. Frame 7 Connectivity. Three scales of connectivity (regional, neighborhood, and river interface) work together to establish stronger connections between the LA River and adjacent communities. Source: OLIN, 2021.


VALLEY LOOP
Burbank
RM 32.8
RM 31.9
RM 33.0
RM 33.5
RM 35.9
FRAME 7
FRAME 6
Universal City (LAC)
32
33
34
35
36
Celtic Arts Center
Travel Town Museum
LA Live Steamers
Griffith Observatory
Hollywood Bowl Performing Arts Complex
VENTURA FRWY
JOHNNY CARSON PARK CREEK
BOB HOPE DR
S BUENA VISTA ST
S KEYSTONE ST
POSA ST
GATE 8
TREE OF LIFE TRAIL
BARHAM BLVD
LANKERSHIM BLVD
CAHUENGA BLVD
FAIR AV
W MAGNOLIA BLVD
W BURBANK BLVD
VICTORY BLVD
N PASS AV
HOLLYWOOD WY
FORMAN AV
CAHUENGA BLVD W
HOLLYWOOD FRWY
N HIGHLAND AV

LOCAL CONNECTIVITY: FRAME 6



Existing Conditions

- Municipal Boundaries
- LA River Mile Point
- Tributaries and Streams
- LA River Trail
- Multiuse Trails and Class I Regional Trails
- Local/Protected Bike Lanes
- Local/On-Street Bike Lanes
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- School
- Existing Access Point to Remain Unchanged
- Metro Transit Station
- Arts and Cultural Point of Interest

LA River Master Plan Design Proposals

- XS, S Proposed Site from Plans
- XS, S Proposed Site
- Existing Access Point To Improve
- Metro Transit Station
- LA River Trail
- Multiuse Trails & Class I Regional Trails
- Local/Class IV Trails
- Local/Class II Trails
- Green Streets
- Proposed LARMP Connectivity
- Proposed Regional Connectivity Loops
- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site

Frame 6 Master Plan M, L, XL Sites

31.9	Burbank Western Green Network
31.0	Glendale Riverwalk Non-Motorized Bridge
30.9	Ferraro Fields Side Channel
30.8	Glendale Narrows Riverwalk
30.7	San Fernando Railroad
30.65	San Fernando Path
30.6	Verdugo Wash
30.5	River Glen Wetlands
30.4	River Glen Wetlands
29.5	Atwater Village East Bank Riverway
29.3	Central Service Yard
26.2	G1 Bowtie
25.6	G2 Taylor Yard
25.3	Dorris Place Sanitation Yard
25.2	Taylor Yard Non-Motorized Bridge

0 0.25mi 0.5mi N

Figure 101. Frame 6 Connectivity. Three scales of connectivity (regional, neighborhood, and river interface) work together to establish stronger connections between the LA River and adjacent communities. Source: OLIN, 2021.

AS PROJECTS ARE IMPLEMENTED, FURTHER OPPORTUNITITES FOR OFF-RIVER CONNECTIVITY BETWEEN SITES MAY ARISE

LOCAL CONNECTIVITY: FRAME 5

Existing Conditions

- Municipal Boundaries
- LA River Mile Point
- Tributaries and Streams
- LA River Trail
- Multiuse Trails and Class I Regional Trails
- Local/Protected Bike Lanes
- Local/On-Street Bike Lanes
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- School
- Existing Access Point to Remain Unchanged
- Metro Transit Station
- Arts and Cultural Point of Interest

LA River Master Plan Design Proposals

- XS, S Proposed Site from Plans
- XS, S Proposed Site
- Existing Access Point To Improve
- Metro Transit Station
- LA River Trail
- Multiuse Trails & Class I Regional Trails
- Local/Class IV Trails
- Local/Class II Trails
- Green Streets
- Proposed LARMP Connectivity
- Proposed Regional Connectivity Loops
- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site

Frame 5 Master Plan M, L, XL Sites

24.5	Metro LA River Path
24.1	Arroyo Seco Confluence
24.0	Arroyo Seco Greenway
23.5	Bending the River Back Into the City
23.2	Main Street Terrace
22.6	Piggyback Yard
21.6	Downtown Train Yard
21.5	First Street to Sixth Street River Loop
21.1	6th Street Viaduct
19.9	East Washington Blvd

0 0.25mi 0.5mi N

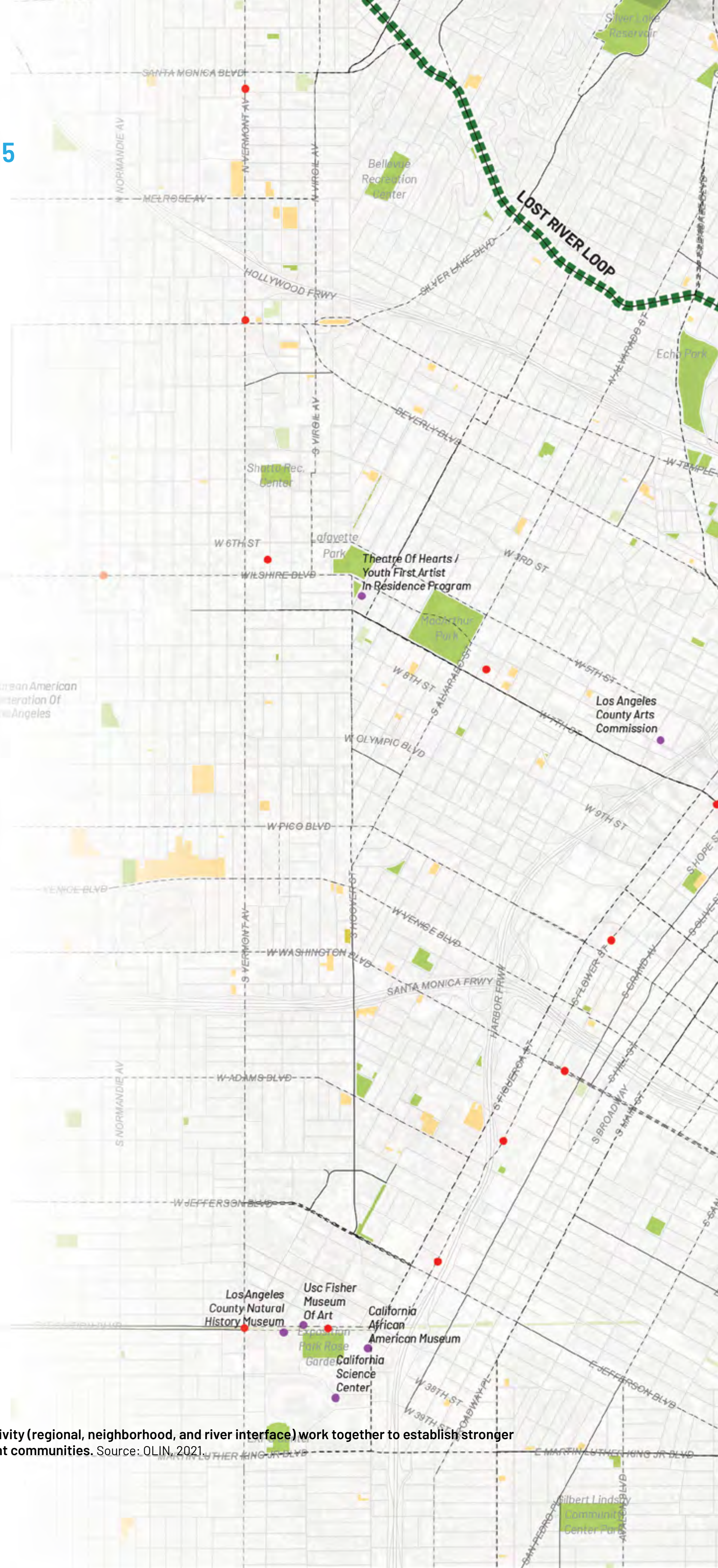


Figure 102. Frame 5 Connectivity. Three scales of connectivity (regional, neighborhood, and river interface) work together to establish stronger connections between the LA River and adjacent communities. Source: OLIN, 2021.


RM 24.0
RM 24.1
RM 23.5
RM 24.5
RM 23.2
RM 22.6
RM 21.5
RM 21.6
RM 21.1
RM 19.9
FRAME 6
FRAME 5
FRAME 5
FRAME 4
HIGHLANDS LOOP
HIGHLANDS LOOP
LOST RIVER, BASIN & RAIL-TO-RIVER LOOPS
Los Angeles
Vernon
Bandini Islands (LAC)
25
24
23
22
21
20
19
18
Los Angeles River & Trail
Heritage Square
Heritage Square Park and Museum
Montecito Heights Open Space
Ernest E Debs RP
Rose Hill Park
Mount Olympus Park
Arroyo Seco
L.A. Youth Athletic Club
Los Angeles River Center and Gardens
Cypress Recreation Center
Albion Riverside Park
Lincoln Park
El Sereno Rec. Center
Ascot Hills Park
Vista Hermosa Park
Music Center
Grand Park
Fort Moore Pioneer Memorial
Walt Disney Concert Hall
Colburn School
The Museum Of Contemporary Art
Chinese American Museum
The Geffen Contemporary At Moca
Japanese American National Museum
Wellness Center Park and Fitness Center
Hazard Park
Evergreen Rec. Center
Boyle Heights Sports Center Park
Ramon Garcia Rec. Center
Ruben Salazar Park
Eugene A. Obregon Park
City Terrace Park
Ross Snyder Rec. Center
ROSEVIEW AV
N FIGUEROA ST
N BROADWAY ST
N BROADWAY ST
ALBION ST
N SPRING ST
MERCURY AV
VALLEY BLVD
ALCAZAR ST
PLAYGROUND ST
MEDFORD ST
SAN BERNARDINO AV
MARENGO ST
WABASH AV
E CESAR E CHAVEZ AV
CESAR E CHAVEZ
E 1ST ST
E 1ST ST
4TH ST
4TH ST
E 4TH ST
INDUSTRIAL ST
JESSE ST
BAY ST
SACRAMENTO ST
POMONA FRWY
SANTA ANA FRWY
WHITTIER BLVD
E OLYMPIC BLVD
E WASHINGTON BLVD
E 26TH ST
BANDINI BLVD
E 38TH ST
E 41ST ST
S MISSION RD
N STATE ST
N BOYLE AV
N EVERGREEN AV
N INDIANA ST
S LOS ANGELES ST
WALL ST
LONG BEACH AV
HOOPER AV
COMPTON AV
S ALAMEDA ST
S SANTA FE AV
S SOTO ST
S LORENA ST
EUCLID AV
S DOWNEY RD
N GRIFFIN AV
PASADENA AV
HUNTINGTON DR
N HERBERT AV
CITY TERRACE DR
S BEAUDRY AV
N BEAUDRY AV
N GRAND AV
N HILL ST
W 4TH ST
CENTER ST
E 6TH ST
E 7TH ST
E PICO BLVD
E 16TH ST
E 25TH ST
MONTEREY RD
VIA MARISOL
GOLLIS AV
CARNEGIE ST

LOCAL CONNECTIVITY: FRAME 4

Existing Conditions

- Municipal Boundaries
- LA River Mile Point
- Tributaries and Streams
- LA River Trail
- Multiuse Trails and Class I Regional Trails
- Local/Protected Bike Lanes
- Local/On-Street Bike Lanes
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- School
- Existing Access Point to Remain Unchanged
- Metro Transit Station
- Arts and Cultural Point of Interest

LA River Master Plan Design Proposals

- XS, S Proposed Site from Plans
- XS, S Proposed Site
- Existing Access Point To Improve
- Metro Transit Station
- LA River Trail
- Multiuse Trails & Class I Regional Trails
- Local/Class IV Trails
- Local/Class II Trails
- Green Streets
- Proposed LARMP Connectivity
- Proposed Regional Connectivity Loops
- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site

Frame 4 Master Plan M, L, XL Sites

24.5	Metro LA River Path
18.2	West Santa Ana Branch Bikeway
16.2	Upper Segment Multiuse Easement and Atlantic Blvd Area
15.8	Maywood Park Bend
15.3	Rail to River Corridor: Randolph Street

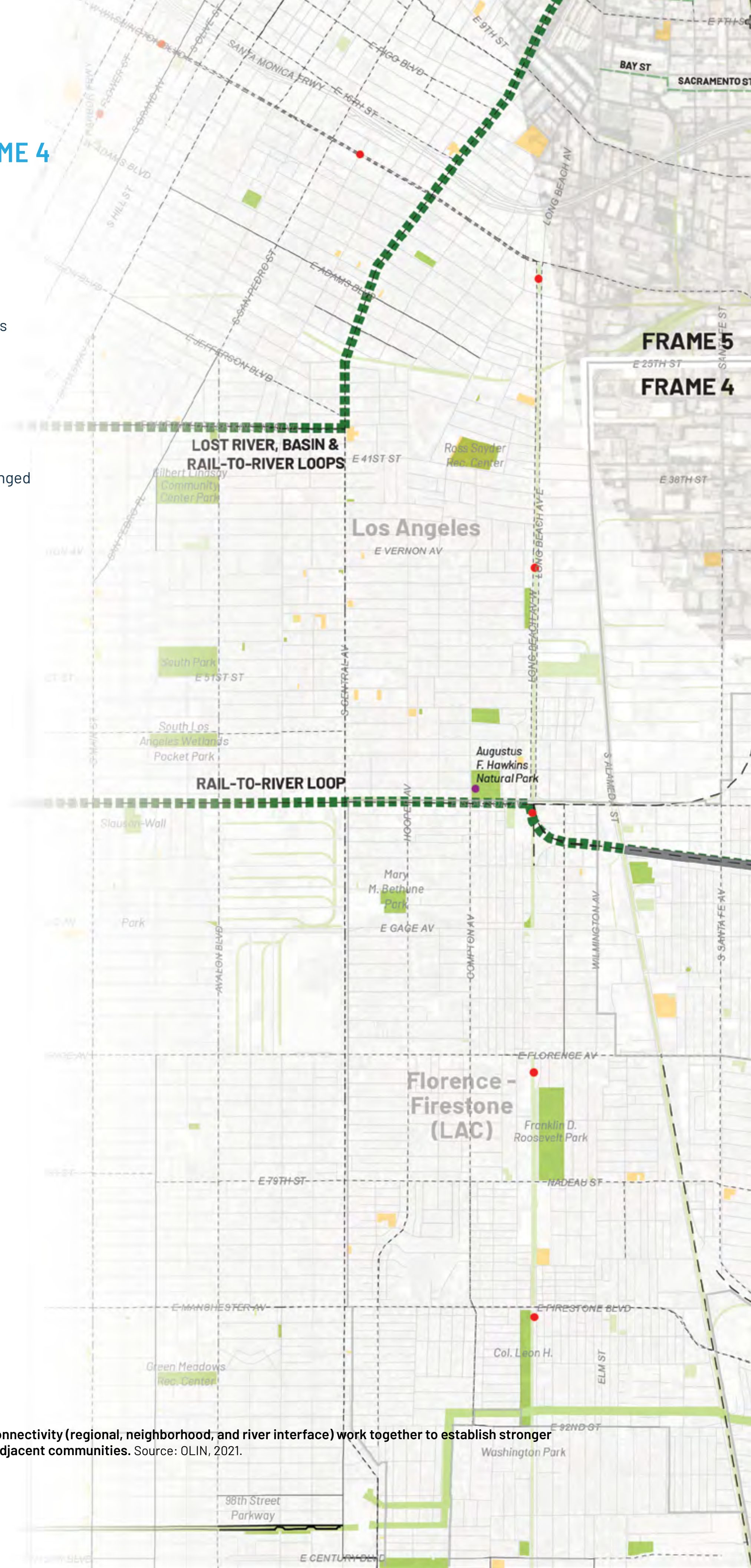
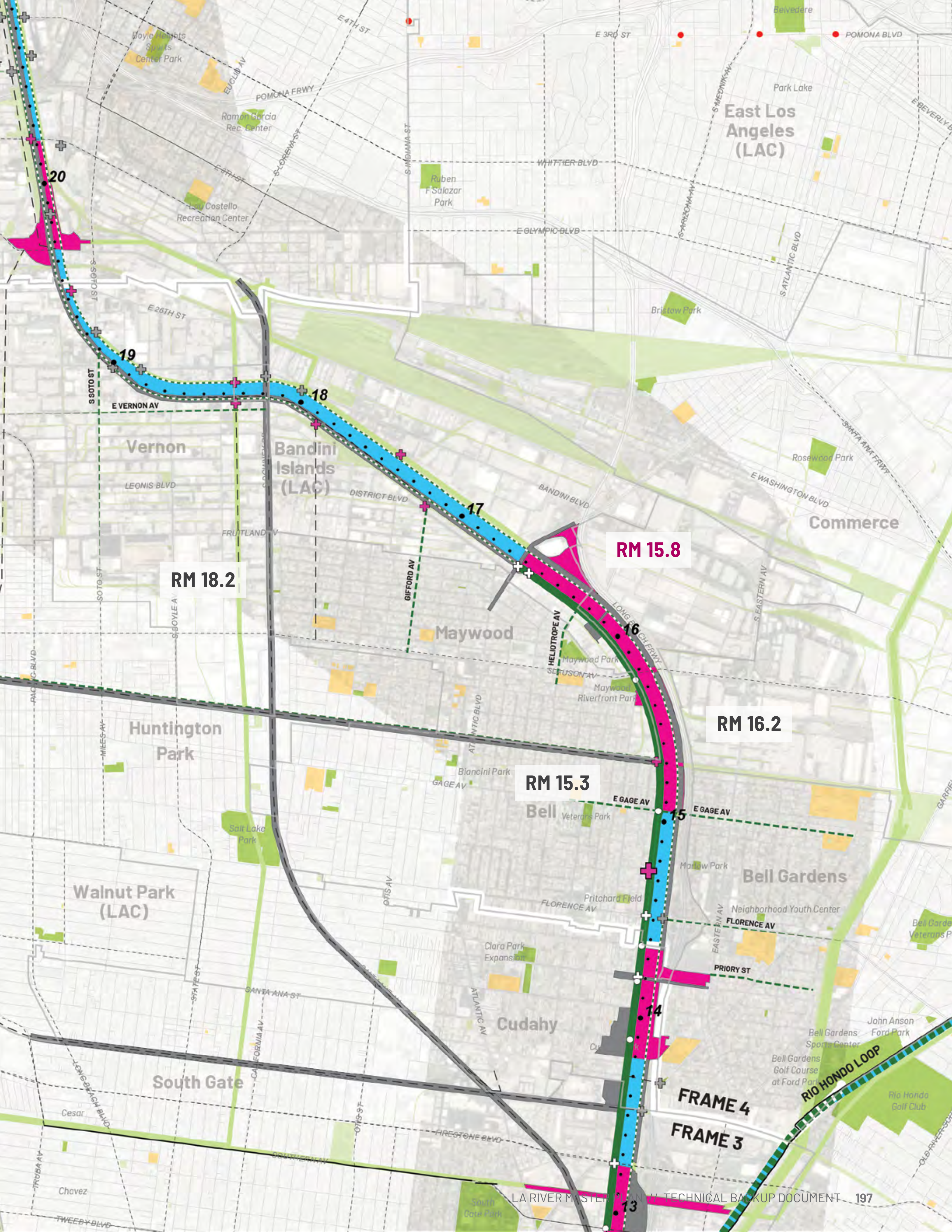


Figure 103. Frame 4 Connectivity. Three scales of connectivity (regional, neighborhood, and river interface) work together to establish stronger connections between the LA River and adjacent communities. Source: OLIN, 2021.


RM 18.2
RM 15.8
RM 16.2
RM 15.3
FRAME 4
FRAME 3
RIO HONDO LOOP
20
19
18
17
16
15
14
13
East Los Angeles (LAC)
Vernon
Bandini Islands (LAC)
Maywood
Commerce
Huntington Park
Bell
Bell Gardens
Walnut Park (LAC)
Cudahy
South Gate
Belvedere
Park Lake
Boyle Heights Sports Center Park
Ramon Garcia Rec. Center
Lou Costello Recreation Center
Ruben F Salazar Park
Bristow Park
Rosewood Park
Maywood Park
Maywood Riverfront Park
Biancini Park
Veterans Park
Salt Lake Park
Marlow Park
Pritchard Field
Neighborhood Youth Center
Clara Park Expansion
John Anson Ford Park
Bell Gardens Sports Center
Bell Gardens Golf Course at Ford Park
Rio Hondo Golf Club
South Gate Park
E 4TH ST
E 3RD ST
POMONA BLVD
POMONA FRWY
EUCLID AV
S LORENA ST
S INDIANA ST
S MEDNIK AV
E BEVERLY BLVD
WHITTIER BLVD
E 8TH ST
E OLYMPIC BLVD
S ARIZONA AV
S ATLANTIC BLVD
S SOTO ST
E 26TH ST
E VERNON AV
SANTA ANA FRWY
E WASHINGTON BLVD
BANDINI BLVD
DISTRICT BLVD
LEONIS BLVD
FRUITLAND AV
GIFFORD AV
SOTO ST
S BOYLE AV
HELIOTROPE AV
SLAUSON AV
LONG BEACH FRWY
S EASTERN AV
PACIFIC BLVD
MILES AV
ATLANTIC BLVD
GAGE AV
E GAGE AV
FLORENCE AV
OTIS AV
EASTERN AV
PRIORY ST
SANTA ANA ST
STATE ST
CALIFORNIA AV
ATLANTIC AV
LONG BEACH BLVD
FIRESTONE BLVD
SOUTHERN AV
TRUBA AV
TWEEDY BLVD
Cesar
Chavez

LOCAL CONNECTIVITY: FRAME 3

Existing Conditions

- Municipal Boundaries
- LA River Mile Point
- Tributaries and Streams
- LA River Trail
- Multiuse Trails and Class I Regional Trails
- Local/Protected Bike Lanes
- Local/On-Street Bike Lanes
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- School
- Existing Access Point to Remain Unchanged
- Metro Transit Station
- Arts and Cultural Point of Interest

LA River Master Plan Design Proposals

- XS, S Proposed Site from Plans
- XS, S Proposed Site
- Existing Access Point To Improve
- Metro Transit Station
- LA River Trail
- Multiuse Trails & Class I Regional Trails
- Local/Class IV Trails
- Local/Class II Trails
- Green Streets
- Proposed LARMP Connectivity
- Proposed Regional Connectivity Loops
- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site

Frame 3 Master Plan M, L, XL Sites

18.2 West Santa Ana Branch Bikeway
14.1 Clara Street
13.9 Cudahy River Park
13.5 U.P.R.R. Spur Line
12.9 Firestone Blvd
12.7 South Gate Orchard
12.0 Parque Dos Rios
11.9 I-710 Corridor Bike Path Project: Western LA River Levee Bike Path
11.8 Rio Hondo Confluence
11.7 SELA Cultural Center
10.5 Highway 105
10.4 1-710 Corridor Bike Path Project: Terminal Island to Rio Hondo
10.2 E. Rosecrans Ave
9.4 I-710 Corridor Bike Path Project: Compton Blvd

Figure 104. **Frame 3 Connectivity. Three scales of connectivity (regional, neighborhood, and river interface) work together to establish stronger connections between the LA River and adjacent communities.** Source: OLIN, 2021.

LA RIVER TRAIL

The existing LA River Trail is an example of a multiuse trail that provides recreational opportunities for pedestrians, cyclists, and equestrians.

LOCAL CONNECTIVITY: FRAME 2

Existing Conditions

- Municipal Boundaries
- LA River Mile Point
- Tributaries and Streams
- LA River Trail
- Multiuse Trails and Class I Regional Trails
- Local/Protected Bike Lanes
- Local/On-Street Bike Lanes
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- School
- Existing Access Point to Remain Unchanged
- Metro Transit Station
- Arts and Cultural Point of Interest

LA River Master Plan Design Proposals

- XS, S Proposed Site from Plans
- XS, S Proposed Site
- Existing Access Point To Improve
- Metro Transit Station
- LA River Trail
- Multiuse Trails & Class I Regional Trails
- Local/Class IV Trails
- Local/Class II Trails
- Green Streets
- Proposed LARMP Connectivity
- Proposed Regional Connectivity Loops
- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site

Frame 2 Master Plan M, L, XL Sites

11.9 I-710 Corridor Bike Path Project: Western
LA River Levee Bike Path
10.4 I-710 Corridor Bike Path Project:
Terminal Island to Rio Hondo
8.1 Connectivity Corridor
Middle Segment Multiuse Easement and
7.2 Crossover
Sutter Bend at Del Amo Blvd
6.3 Compton Creek Confluence Area
5.5 W 47th Street/ Rancho Los Cerritos
5.1 Wrigley Heights River Park
4.4

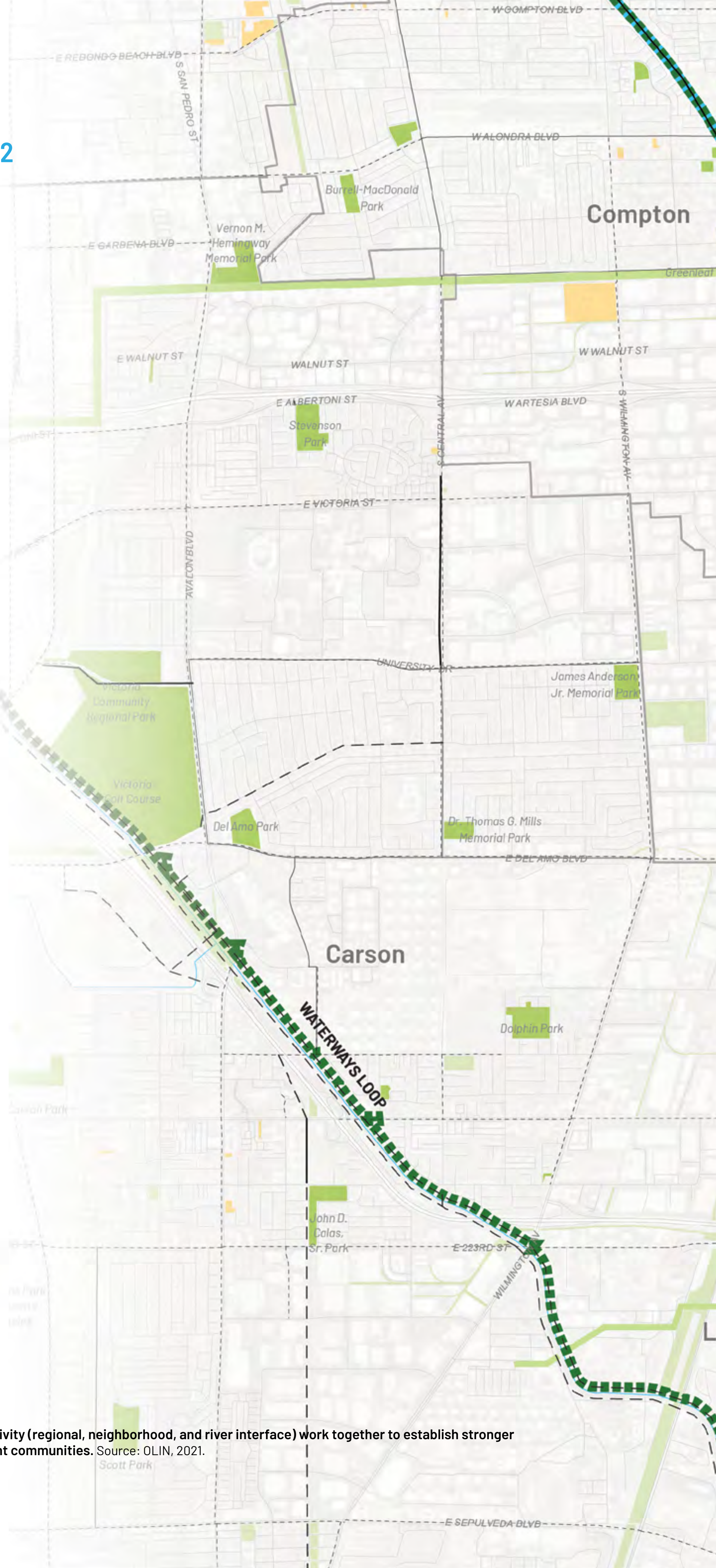
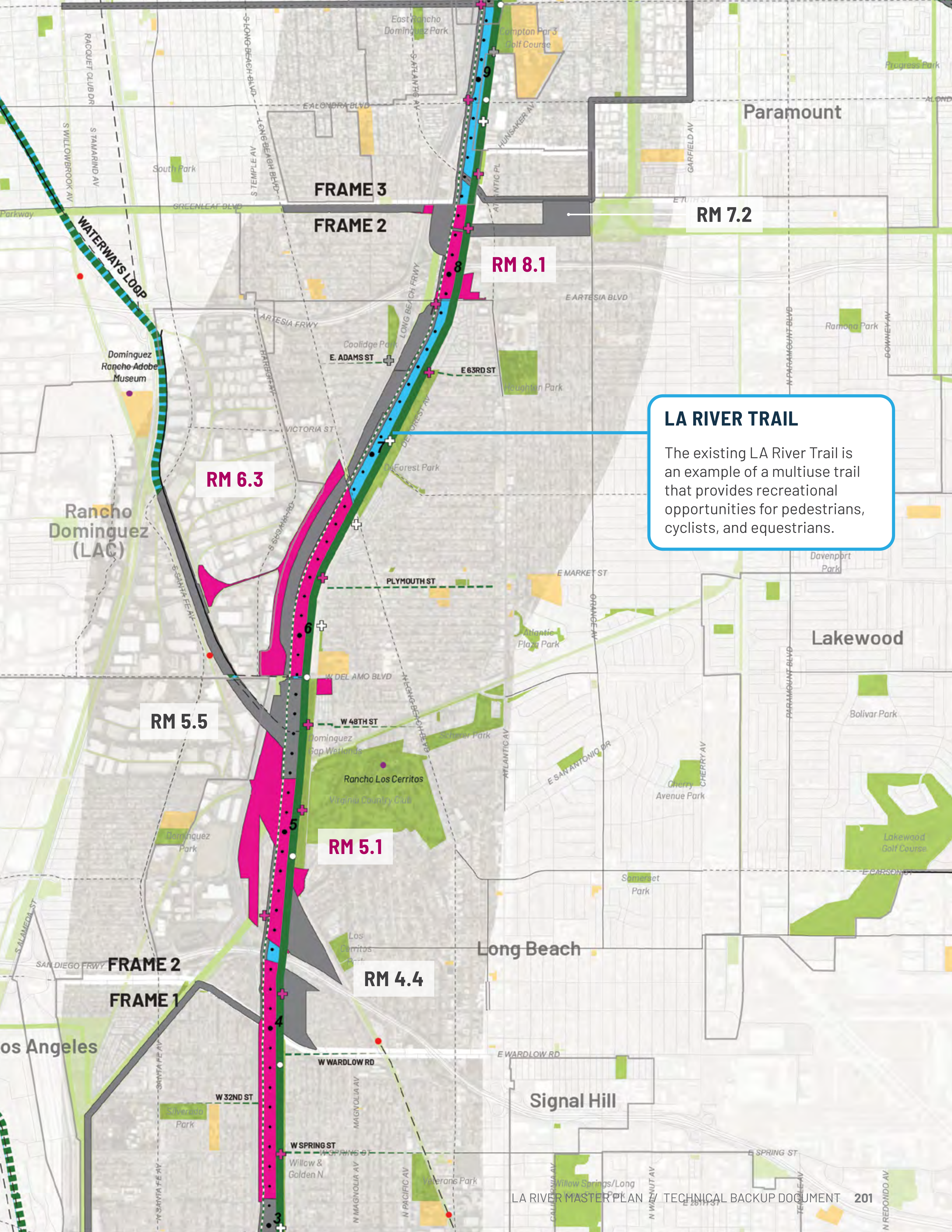


Figure 105. Frame 2 Connectivity. Three scales of connectivity (regional, neighborhood, and river interface) work together to establish stronger connections between the LA River and adjacent communities. Source: OLIN, 2021.


LA RIVER TRAIL
The existing LA River Trail is an example of a multiuse trail that provides recreational opportunities for pedestrians, cyclists, and equestrians.
FRAME 3
FRAME 2
FRAME 2
FRAME 1
RM 7.2
RM 8.1
RM 6.3
RM 5.5
RM 5.1
RM 4.4
WATERWAYS LOOP
Paramount
Lakewood
Long Beach
Signal Hill
Rancho Dominguez (LAC)
os Angeles
Dominguez Rancho Adobe Museum
Rancho Los Cerritos
E. ADAMS ST
E 63RD ST
PLYMOUTH ST
W 48TH ST
W WARDLOW RD
W 32ND ST
W SPRING ST
South Park
Coolidge Park
Houghton Park
DeForest Park
Atlantic Plaza Park
Dominguez Gap Wetlands
Virginia Country Club
Dominguez Park
Los Cerritos Park
Silverado Park
Willow & Golden N
Veterans Park
Ramona Park
Davenport Park
Bolivar Park
Cherry Avenue Park
Lakewood Golf Course
Somerset Park
Progress Park
Compton Par 3 Golf Course
East Rancho Dominguez Park
Scherer Park
Willow Springs/Long

LOCAL CONNECTIVITY: FRAME 1

Existing Conditions

- Municipal Boundaries
- LA River Mile Point
- Tributaries and Streams
- LA River Trail
- Multiuse Trails and Class I Regional Trails
- Local/Protected Bike Lanes
- Local/On-Street Bike Lanes
- Transmission Lines
- Existing Private Right-of-Way
- Existing Park
- School
- Existing Access Point to Remain Unchanged
- Metro Transit Station
- Arts and Cultural Point of Interest

LA River Master Plan Design Proposals

- XS, S Proposed Site from Plans
- XS, S Proposed Site
- Existing Access Point To Improve
- Metro Transit Station
- LA River Trail
- Multiuse Trails & Class I Regional Trails
- Local/Class IV Trails
- Local/Class II Trails
- Green Streets
- Proposed LARMP Connectivity
- Proposed Regional Connectivity Loops
- M, L, XL Planned Major Project
- M, L, XL Proposed Project Site

Frame 1 Master Plan M, L, XL Sites

11.9	I-710 Corridor Bike Path Project: Western LA River Levee Bike Path
10.4	I-710 Corridor Bike Path Project: Terminal Island to Rio Hondo
3.7	W 28th St to 405 Freeway
2.9	Willow Street
1.7	Middle Long Beach
1.6	South of Willow Street
0.9	Long Beach Municipal Urban Stormwater Treatment
0.8	Drake Chavez Park
0.7	Shoemaker Bridge Replacement
0.6	Cesar Chavez Park

0 0.25mi 0.5mi N

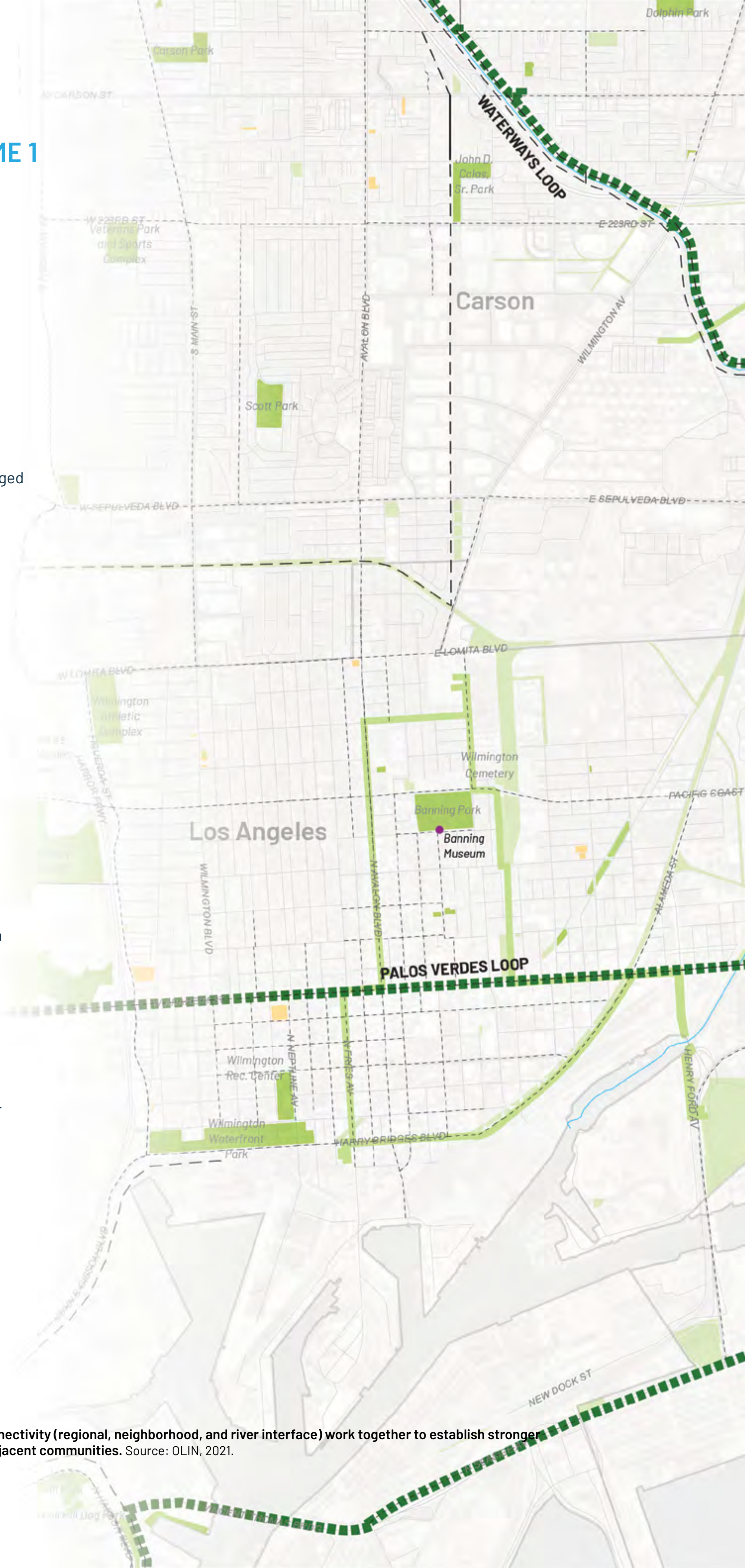
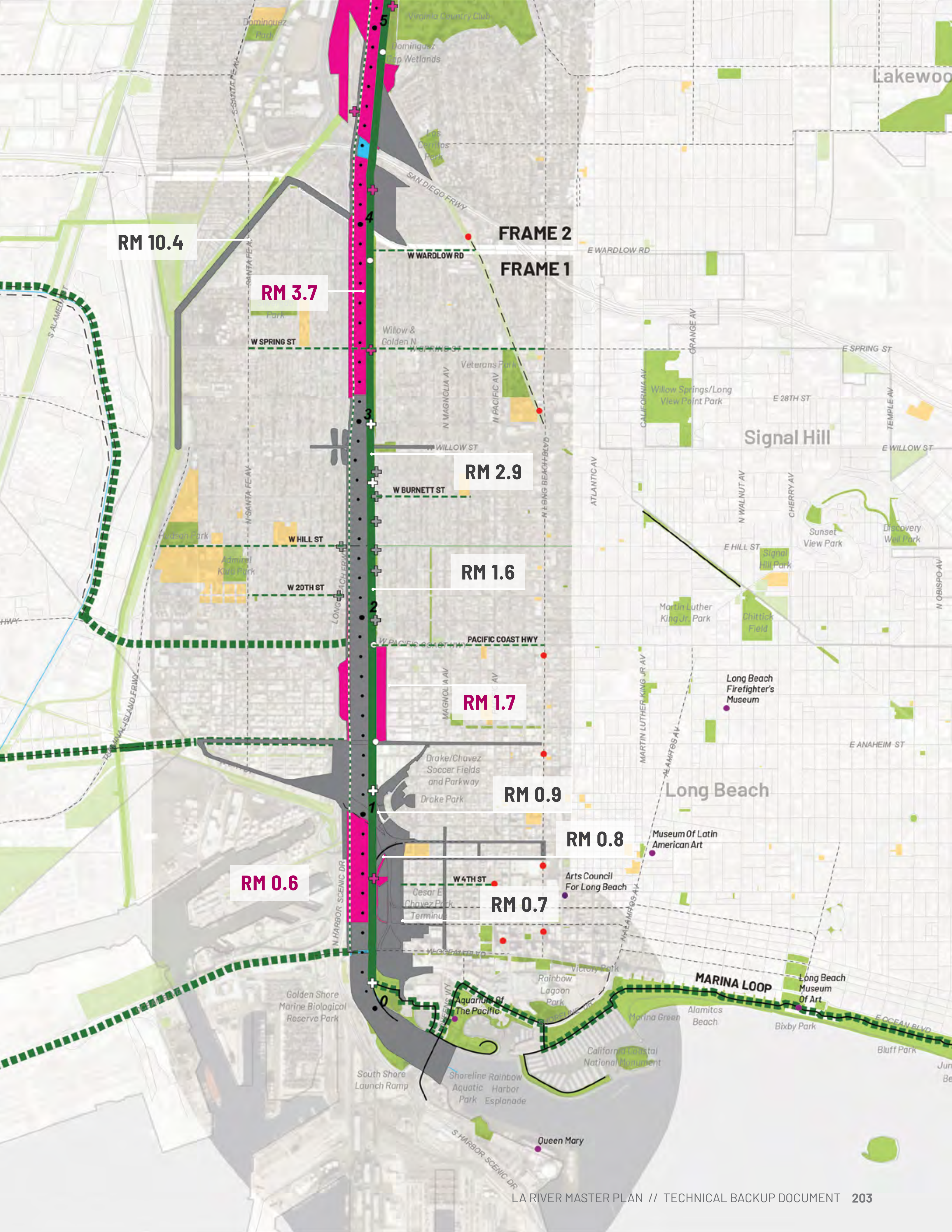


Figure 106. Frame 1 Connectivity. Three scales of connectivity (regional, neighborhood, and river interface) work together to establish stronger connections between the LA River and adjacent communities. Source: OLIN, 2021.



FRAME 2
FRAME 1
RM 10.4
RM 3.7
RM 2.9
RM 1.6
RM 1.7
RM 0.9
RM 0.8
RM 0.6
RM 0.7
MARINA LOOP
Lakewood
Signal Hill
Long Beach
Dominguez Park
Virginia Country Club
Dominguez Gap Wetlands
Los Cerritos Park
SAN DIEGO FRWY
W WARDLOW RD
E WARDLOW RD
W SPRING ST
E SPRING ST
Willow & Golden N
Veterans Park
Willow Springs/Long View Point Park
E 28TH ST
W WILLOW ST
E WILLOW ST
W BURNETT ST
W HILL ST
E HILL ST
W 20TH ST
Hudson Park
Admiral Kidd Park
Sunset View Park
Discovery Well Park
Signal Hill Park
Martin Luther King Jr. Park
Chittick Field
PACIFIC COAST HWY
Long Beach Firefighter's Museum
E ANAHEIM ST
Drake/Chavez Soccer Fields and Parkway
Drake Park
Museum Of Latin American Art
W 4TH ST
Arts Council For Long Beach
Cesar E Chavez Park
Golden Shore Marine Biological Reserve Park
Aquarium Of The Pacific
Rainbow Lagoon Park
Victory Park
Marina Green
Alamitos Beach
Long Beach Museum of Art
Bixby Park
Bluff Park
E OCEAN BLVD
California Coastal National Monument
South Shore Launch Ramp
Shoreline Aquatic Park
Rainbow Harbor Esplanade
Queen Mary
S HARBOR SCENIC DR
N HARBOR SCENIC DR
S SANTA FE AV
N SANTA FE AV
S ALAMEDA ST
ORANGE AV
CALIFORNIA AV
TEMPLE AV
N MAGNOLIA AV
N PACIFIC AV
N LONG BEACH BLVD
ATLANTIC AV
N WALNUT AV
CHERRY AV
MARTIN LUTHER KING JR AV
ALAMITOS AV
N OBISPO AV
LONG BEACH FRWY

Figure 107. In Studio City, near river mile 39, the LA River flows in a box channel condition. Source: LA County Public Works, 2019.

9.
KIT OF PARTS

THE KIT OF PARTS CONNECTS DESIGN COMPONENTS TO THE NINE MASTER PLAN GOALS

Within the LA River Master Plan, the kit of parts is a recommended collection of multi-benefit design components organized within six major infrastructure and urban river typologies. These include: trails and access gateways, channel modifications, crossings and platforms, diversions, floodplain reclamation, and off-channel land assets.

All projects should address community needs and build on the goals and site-specific opportunities. The kit of parts should be used as needed to address these needs. Each component in the kit of parts is correlated with the needs that strategy can address. This chapter provides a description for each design element associated with an individual kit of part typology. For more information on the kit of parts see the LA River Master Plan, Chapter 8.

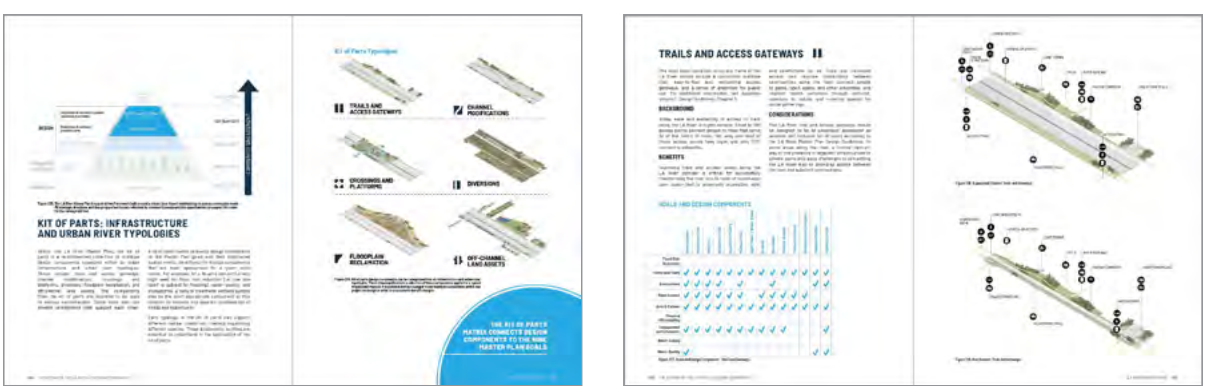


Figure 108. Learn more about the kit of parts typologies and how they address the nine goals of the Master Plan in the LA RIver Master Plan, Chapter 8.
Source: OLIN, 2019.

TRAILS AND ACCESS GATEWAYS

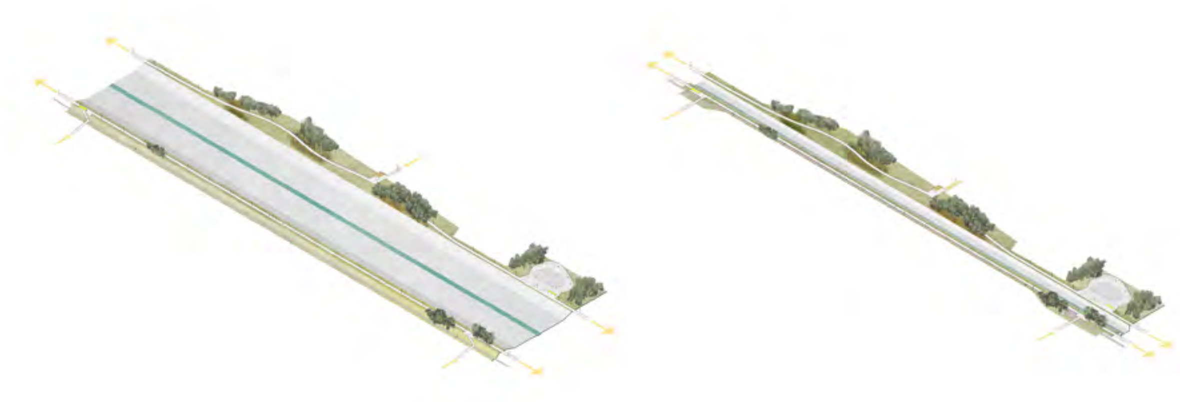


Figure 109. Trapezoidal and Box Channel: Trails and Gateways.

Component	Description
River Gateway	Significant access points at key moments along the river for adjacent communities. They call attention to the river through clear visual markers and are accompanied with other programming and amenities.
Pedestrian Trail	A trail which is intended for uses such as walking or jogging.
Bike Trail	A trail which is intended for use by cyclists.
Equestrian Trail	A trail which is intended for use by equestrians (horses and their riders). These trails are least often shared with other users.
Equestrian Facility	This component introduces amenities for the keeping, training, and caring of horses for use along equestrian trails.
Multiuse Trail	Trails which are shared and allow for many user types, such as pedestrians, cyclists, and equestrians.
Light Tower/ Water Tower	This typically vertical component offers critical amenities for light and water management along the river trail, while also serving as a visual marker for wayfinding.
Lookout	This component would be a type of observation deck or overlook designed to expose users to new views of the river, surrounding areas, or key wildlife.
Boadwalk	This component would be used to create pedestrian access to areas such as wetlands or other sensitive habitat areas.
Channel Access	This component provides access into the river channel itself and could be coordinated with stairs, ramps, or terraces.
Vehucular Access	This component would provide maintenance vehicle access along the channel (12' minimum width) and/or car access to parking areas.
Underpass and Overpass	These components allow for paths and trails along the channel to pass under or over streets and highways that intersect with the channel.
Vegetated Buffer	This component would be composed of a planted corridor adjacent to pedestrian, bike, equestrian, and multiuse trails as a means of separating high traffic zones from low traffic zones.
Habitat Corridor	A connection between large areas of habitat that is typically vegetated. Linkages are critical to provide sufficient habitat for wide-ranging animal species with large home territories as well as for other wildlife species.

CHANNEL MODIFICATIONS

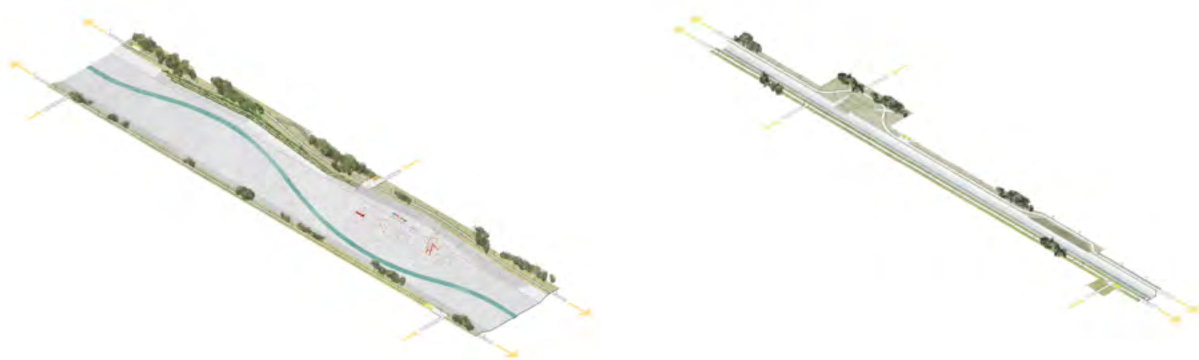


Figure 110. Trapezoidal and Box Channel: Channel Modifications.

Component	Description
Terraced Bank	This component reshapes the banks of the channel into a series of planes, such as stairs or plinths, that could allow access to the river at varying degrees of water volume or provide programmable or plantable space along the edges of the river.
Check Dam	This component is a small barrier, typically less than a few feet high, perpendicular to the flow of a channel that can reduce velocity, provide pooling, and aerate water, thereby improving water quality. These small structures, which could be made of many types of materials ranging from gabions or concrete, could be used along the LA River, particularly within the low flow channel if hydraulic studies permit to hold sediment, opportunistic vegetation, and create recreation and/or micro-habitat areas.
Deployable Barrier	A moveable device, such as a rubber dam or flood gate, that can be temporarily lifted or lowered to channel or detain water. These can be placed perpendicular to the flow of the channel to create impoundments or parallel to the flow of the channel to create different levee conditions.
Levee	An embankment whose primary purpose is to provide flood management from seasonal high water, and is, therefore, subject to water loading for periods of only a few days or weeks a year.
Armored Channel	Hardened bottom or sides of a channel, embankment, or levee that is primarily used to reduce the effects of erosion. This component can be developed on the riverside of a channel to make the channel more durable or on the landside of a levee to reduce scour and erosion in an overtopping situation.
Storm Drain Day-lighting	The replacement of underground drainage pipes with a channel that is above ground, open at the top. Typically this component is combined with planting to create a habitat or water quality benefit.
Vertical Wall	This component would create a vertical flood wall or channel wall out of a hard material, such as concrete, metal, or other retaining structure to direct the flow of water in a channel.
Reshape Low Flow	In portions of the LA River with an existing smaller low flow channel, this component would alter the low flow channel to create different effects such as improving hydraulics, creating in-stream habitat, creating an open area for program, improving recreation opportunities through deepening for kayaking, or creating experiential and ephemeral effects.
Channel Smoothing	Changes the material finish of the river channel to reduce friction and help increase velocities and hence the flow rate.
Textured or Grooving	Changes the material finish of the river to increase friction and decrease the velocities and hence flow rate or create an artistic imprint or design on the surface.
Concrete Bottom	This component uses concrete to create a smooth, less erodible bottom to a channel or basin.
Soft Bottom/ Concrete Removal	This component involves the removal of concrete along the bottom of the channel, encouraging processes of sedimentation and creating a planted riparian corridor.
Sediment Removal	The process by which an excess of sediment is manually removed from the channel in order to mitigate sediment buildup that would otherwise be a hazard to flood management, the free flow of water, public health, or the local ecology due to decreases in the natural filtration of harmful chemicals and biodiversity.
Bridge Pier Modification	Many vehicle, bicyclist, pedestrian, and equestrian bridges crossing the LA River have structural supports, or bridge piers, supporting the span. Changes can be made to these supports to help achieve other objectives such as adding pier nose extensions, reconfiguration, or complete removal for increased hydraulic capacity or increasing the extents of the supports for bridge widening.
Access Ramp	A sloped walkway that most often connects to multiuse trails along the channel. The latest requirements from the Americans with Disabilities Act (ADA) are encouraged, but not required depending on ramp use, to be followed for parameters such as maximum ramp slopes, cross slopes, length, and landing widths.

CROSSINGS AND PLATFORMS

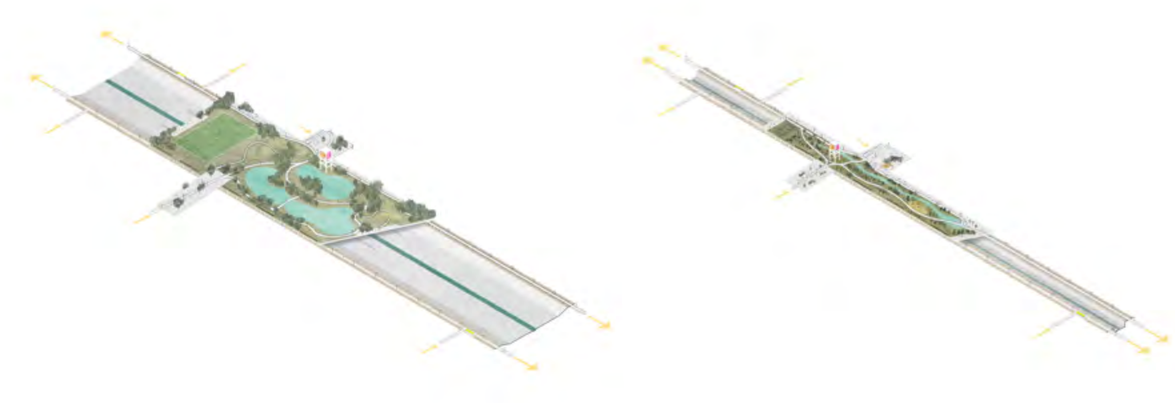


Figure 111. Trapezoidal and Box Channel: Crossings and Platforms.

Component	Description
Pedestrian Bridge	A type of crossing that allows walkers and joggers to cross over the channel or a highway. This would connect to a network of pedestrian trails on either side of the river and to communities along the river.
Bike Bridge	A type of crossing that allows cyclists to cross over the channel or a highway. This would connect to a network of bike trails on either side of the river and communities along the river.
Equestrian Bridge	A type of crossing that allows cyclists to cross over the channel or a highway. This would connect to a network of bike trails on either side of the river and communities along the river.
Multiuse Bridge	A trail which is intended for use by equestrians (horses and their riders). These trails are least often shared with other users.
Cantilever	A type of platform or trail that would be suspended over the channel, but would not cross, as a means of creating a lookout, connected trail network, or other unique user experience.
Platform	A structural deck that supports a park spanning over a space typically unsuitable for parkland, such as concrete channels of the LA River or an adjacent highway. This component is required to be public open space and cannot contain private development. Temporary leases for small cafes/concessions within pavilions may be allowed.
Habitat/Wildlife Bridge	The strategic placement of a bridge over the river and/or adjacent highways specifically for wildlife as a means of creating a habitat linkage for wide-ranging species that would otherwise not have a means of crossing the river in areas where the river is inhospitable to species.

DIVERSIONS

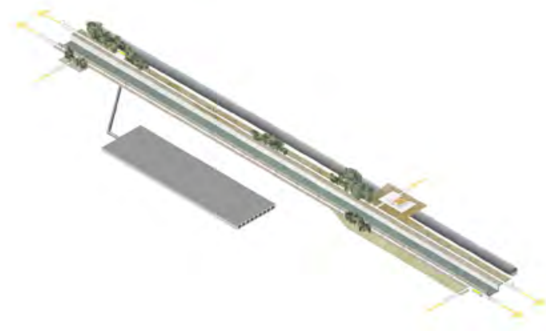


Figure 112. Trapezoidal and Box Channel: Diversions.

Component	Description
Pump	A pump is a mechanical device that can be used to remove water from the river and/or put water in the river from adjacent floodplains.
Diversion Pipe/ Tunnel	A pipe or tunnel can allow for the efficient conveyance of water through or around hydraulic restrictions.
Diversion Channel	An open channel with a cross-sectional shape that is more engineered (i.e., rectangular, trapezoidal) or naturalized allowing for the conveyance of water through or around hydraulic restrictions.
Overflow Weir	A purposeful low point along a levee or dam that allows for the flow of water into or out of a hydraulic system.
Underground Gallery	A large subsurface tank that holds water, or allows it to seep into the ground, while still allowing for passive land uses on top.
Side Channel	This is a specific type of diversion channel where the water is conveyed alongside the main channel for flood risk, habitat, or other purposes. The water is usually returned back to the main channel a short distance downstream.
Storm Drain Interceptors	These are off-channel devices that capture water for possible other uses, such as treatment and/or use prior to allowing the water to discharge into the channel.
Wetland	This component is an area intended to be saturated or partially saturated as water is diverted out of the LA River Channel to increase flood capacity, improve water quality, or increase water supply while creating a habitat area. Depending on the flow rate of the water from the river, various wetland types could be utilized. This component could easily be combined with a side channel to create a linear, vegetated wetland that conveys water during storm events to relieve pressure from the main channel.

FLOODPLAIN RECLAMATION

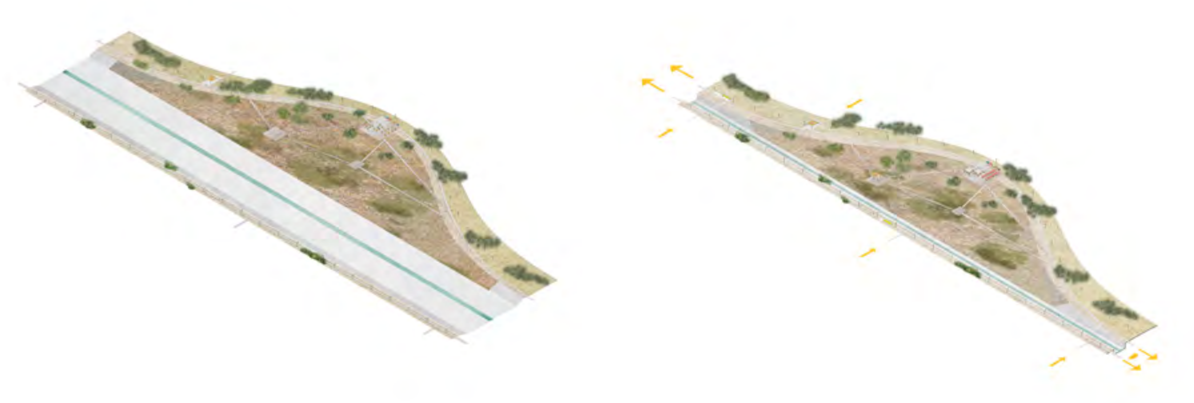


Figure 113. Trapezoidal and Box Channel: Floodplain Reclamation.

Component	Description
Wetland	Within the floodplain reclamation context, this component is tidal and non-tidal areas characterized by saturated or partially saturated soils that form an interface between the river and adjacent land. This component includes freshwater marshes and swamps along the channel and brackish and salt marshes near the river's mouth that are connected to the LA River.
Naturalized Bank	This component is a planted or otherwise "soft" edge to a channel or basin.
Braided Channel	This component reconfigures the low flow channel into a series of interweaving waterways for the purpose of improved ecological function through minor sediment buildup, for education on riverine systems, or for visual interest.
Field	Within the floodplain reclamation context, this component is an area of open land that is intended to flood. It may include low planting such as grasses or other groundcover and scrub. Its open-ended and adaptable use distinguishes it from the "Recreation Field" component.
Recreation Field	Within the floodplain reclamation context, this component refers to open areas that can be designated for specific sport uses as needed (e.g., soccer, baseball, softball, etc) but also flood when waters rise.
Surface Storage	This component refers to open basins, whether vegetated or lined, that store water, typically during rain events for the purpose of groundwater recharge or water conservation.
Side Channel	This component allows water to flow parallel to the existing river channel, typically through a vegetated channel.

OFF-CHANNEL LAND ASSETS

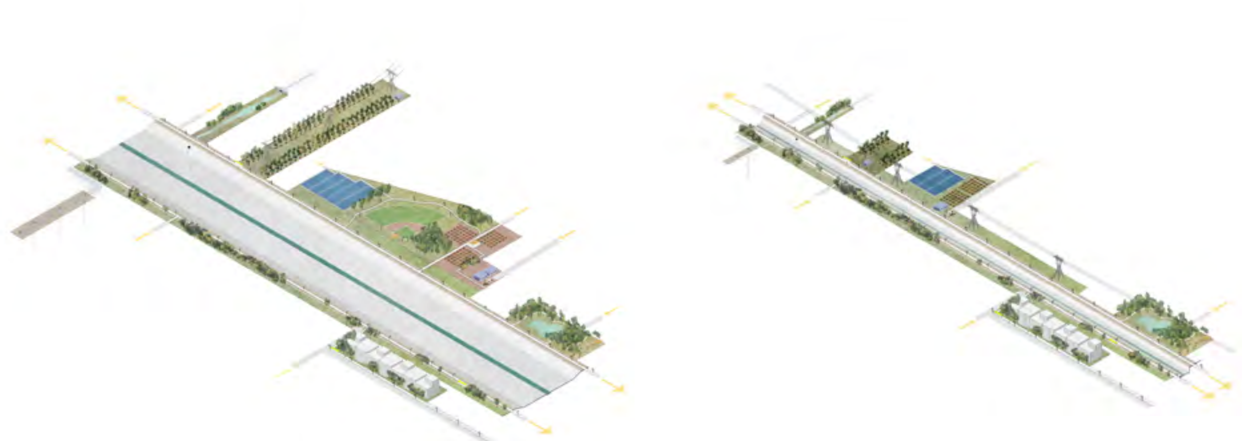


Figure 114. Trapezoidal and Box Channel: Off-Channel Land Assets.

Component	Description
Urban Agriculture	This component provides a community space where individuals may have garden allotments or where select organizations may establish nursery operations at varying scales of implementation.
Solar Power	This component designates space for solar panel installations to promote renewable energy production along the river. This component is easily combined with River Pavilions and other common elements at small scales or could be applied at a large scale as a continuous shade structure along a trail or solar field over a parking lot.
Composting	This component refers to facilities for the composting of organic waste from local community members and institutions. It can be coordinated with other components, such as urban agriculture.
Natural Treatment System	The process by which planted and organic materials filter water by absorbing harmful chemicals and nutrients. This type of system on adjacent lands is easily combined with wetlands, habitat corridors, and side channels to provide multiple benefits.
Wetland	Within the adjacent land uses context, this component includes tidal and non-tidal areas characterized by saturated or partially saturated soils. This component includes freshwater marshes and swamps and brackish and salt marshes which are on lands adjacent to the river, but separated from the river by levees or embankments. The Dominguez Gap Wetlands are an example of this type of component.
Recreation Field	This component refers to open areas that can be designated for specific sport uses (e.g., soccer, baseball, softball, etc.).
Subsurface Storage	This component refers to open basins, whether vegetated or lined, that store water, typically during rain events for the purpose of improved water quality, habitat, groundwater recharge or water conservation. These can be located in the watershed, capturing water before it reaches the channel, or alongside the channel where flows from within the channel are diverted.
Surface Storage	Subsurface storage is similar to surface storage except that these are covered so surficial land uses can be added, such as play fields, etc.
Injection Well	An injection well is a device that places fluid deep underground into porous rock formations, such as sandstone or limestone, or into or below the shallow soil layer. In the context of the LA River Master Plan, these wells are used to supplement local groundwater supply.
Water Treatment Facility	A treatment facility is a mechanized system to treat water to a specified level of quality, depending on the end use. Water treatment facilities usually require full time operations and maintenance staff, along with continuous monitoring.
Purple Pipe Connection	This type of connection allows for treated water to be pumped into and used within a local recycled water network, or can be used to tap into a local recycled water network for use at a project site.
Dry Well	Dry wells are engineered mechanisms installed vertically into the ground allowing for water to readily access subsurface aquifers.
Spreading Ground	This component is a broad land area that allows collected surface water (runoff) to percolate slowly into the ground. Because spreading grounds are quite large they are usually located higher up in the watershed where the soils are more conducive to recharge, situated above a potable groundwater aquifer, and located near large channels where access to surface water runoff is greatest.While mainly facilitating water conservation efforts, they can also help to control and improve water quality. It is used across LA County.
Storm Drain Daylighting	The replacement of underground drainage pipes leading to the LA River with a channel that is above ground, open at the top and often vegetated to create water quality and habitat multi-benefits.
Affordable Housing	This component establishes housing that will be accessible to lower than median income households threatened by displacement due to factors such as rent burden.
Arts and Culture Facility	This component introduces new opportunities for arts and culture to communities and can range in scale and permanence, encompassing museums or galleries as well as temporary outdoor installations.

Figure 115. An egret in the Glendale Narrows section of the LA River at river mile 31. Source: LA County Public Works, 2018.

10.
BIODIVERSITY

BIODIVERSITY PROFILES HIGHLIGHT OPPORTUNITIES FOR THE CREATION OF FUNCTIONING ECOSYSTEMS ALONG THE LA RIVER

One of the goals of the Master Plan is to support healthy, connected ecosystems. To make this possible, biodiversity must be considered in all aspects of future projects along the LA River.

Biodiversity Profiles are identified in LA River Master Plan, Chapter 8, and are an integral part of all projects utilizing the kit of parts projects. The profiles illustrate various existing and future cross sections of the river and the indicator wildlife species that can be supported in these conditions. In addition to wildlife species, biodiversity profiles also identify supported plant communities, which are described in detail in Appendix I: Design Guidelines, Chapter 5. Indicator species are called out through these main wildlife categories typical of functioning ecosystems: mammals (large and small), birds (large and small), fish, insects, and reptiles.

These lists are not meant to be limiting, as wildlife is adaptive and found in a variety of contexts beyond its native habitat ranges given the proper conditions. Further, a healthy and thriving soil biology and health is assumed in the biodiversity profiles. The profiles are meant as a starting point for understanding functioning ecosystems and can become more comprehensive with additional scientific research at specific sites as Master Plan projects are implemented.

The development of healthy ecosystems depends on smart design and adaptive management. Maintenance and thoughtful implementation of projects using the Kit of Parts is crucial for designed projects along the river to successfully support high biodiversity.

Figure 116. The Master Plan kit of parts describes biodiversity profiles in the LA RIver Master Plan, Chapter 8.

BIODIVERSITY PROFILES KEY

HABITAT TYPE

Upland
Upland habitats are characterized by drier, fast-draining soils, often found on slopes.

Riparian
Riparian habitats are characterized by slow-draining, often inundated soils that have a steady supply of water or sit close to the water table.

Algae mats
Algae mats form when water is warm enough and nutrient-rich to support algae growth.

VERTICAL HABITAT STRUCTURE

Biodiversity is supported with planting a diverse vertical vegetation structure that includes canopy, understory, and shrub layers.

SECTION PROFILES

A variety of LA River section profiles and are explored in the following pages.

SPECIES CALL-OUTS

Birds
Both large birds of prey and small birds thrive in a variety of habitats, from the shrub layer to canopy layer.

Mammals
Large and small mammals thrive in a variety of habitats, from the shrub layer to canopy layer.

Fish
Several species of native fish thrive where water is near riparian edges.

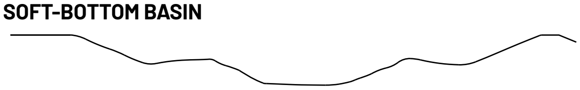
SPECIES LISTS

Insects
Insects and other microinvertebrate listed thrive in a variety of habitats, from underground in soil to the shrub layer.

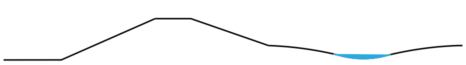
Reptiles
Reptiles listed thrive in a variety of habitats, from underground in soil to the shrub layer.

BASIN CONDITIONS

SOFT-BOTTOM BASIN

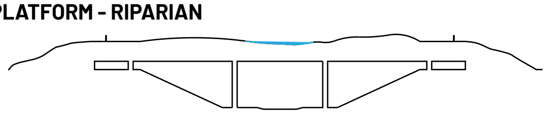


LANDSIDE RIGHT-OF-WAY- RIPARIAN

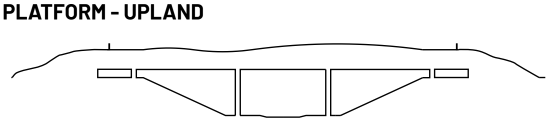


PLATFORM CONDITIONS

PLATFORM - RIPARIAN

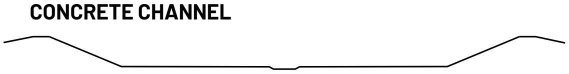


PLATFORM - UPLAND

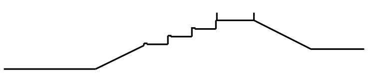


CHANNEL CONDITIONS

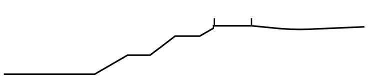
CONCRETE CHANNEL

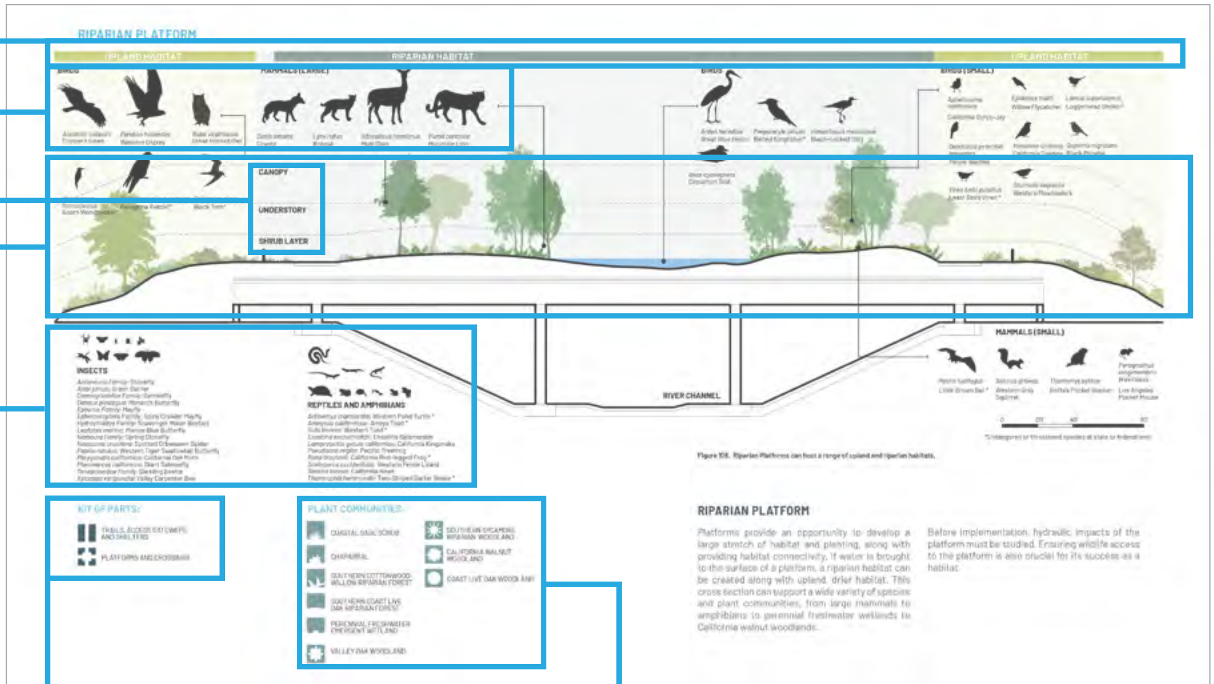


CONCRETE TERRACES



SOFT BOTTOM CHANNEL





KIT OF PARTS ICONS

The Kit of Parts associated with the section profile are displayed with the icons below.

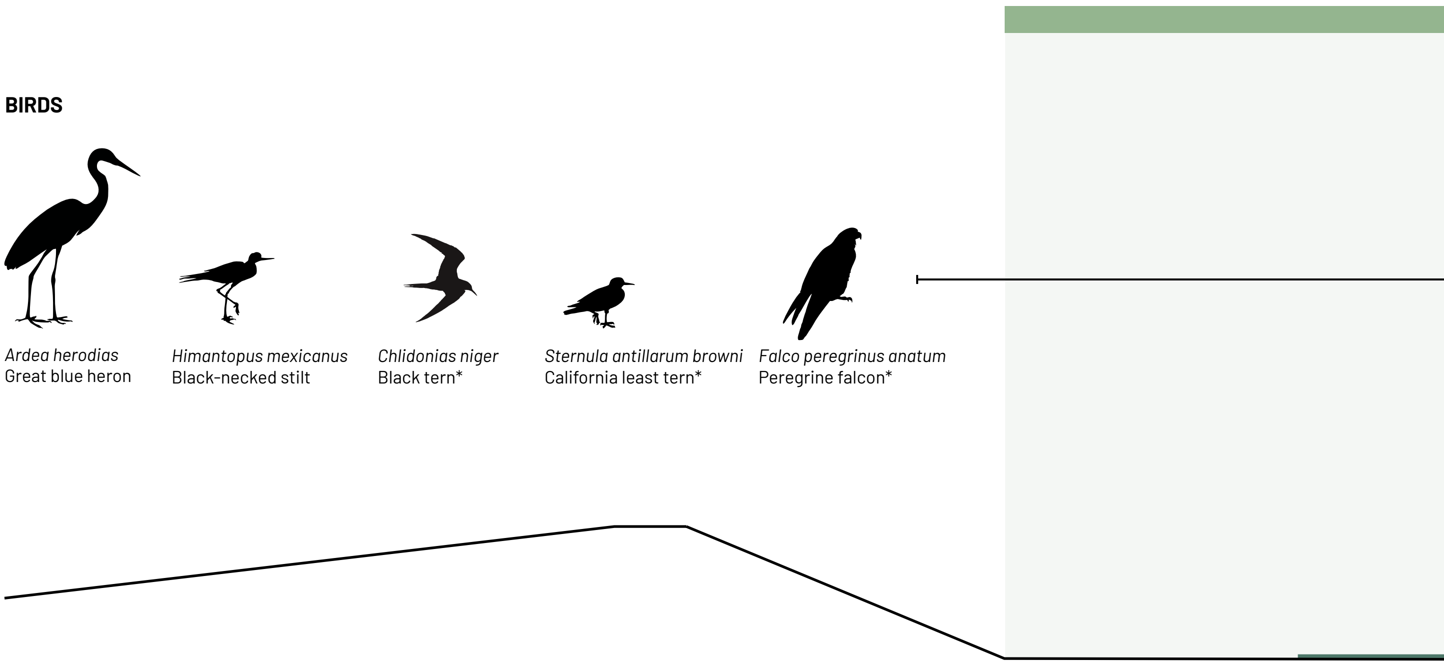
PLANT COMMUNITY ICONS

The plant communities associated with the section profile are displayed with the icons below. All species within the plant communities are listed in Appendix I: Design Guidelines, Chapter 5.

- TRAILS AND ACCESS GATEWAYS
- CHANNEL MODIFICATIONS
- CROSSINGS AND PLATFORMS
- DIVERSIONS
- FLOODPLAIN RECLAMATION
- OFF CHANNEL LAND ASSETS

- ALLUVIAL FAN SAGE SCRUB
- COASTAL SAGE SCRUB
- CHAPARRAL
- DESERT SCRUB
- SOUTHERN COTTONWOOD-WILLOW RIPARIAN FOREST
- SOUTHERN COAST LIVE OAK RIPARIAN FOREST
- PERENNIAL FRESHWATER EMERGENT WETLAND
- VALLEY OAK WOODLAND
- SOUTHERN SYCAMORE RIPARIAN WOODLAND
- CALIFORNIA WALNUT WOODLAND
- COAST LIVE OAK WOODLAND
- CLIMATE ADAPTED TREES

CONCRETE CHANNEL



INSECTS

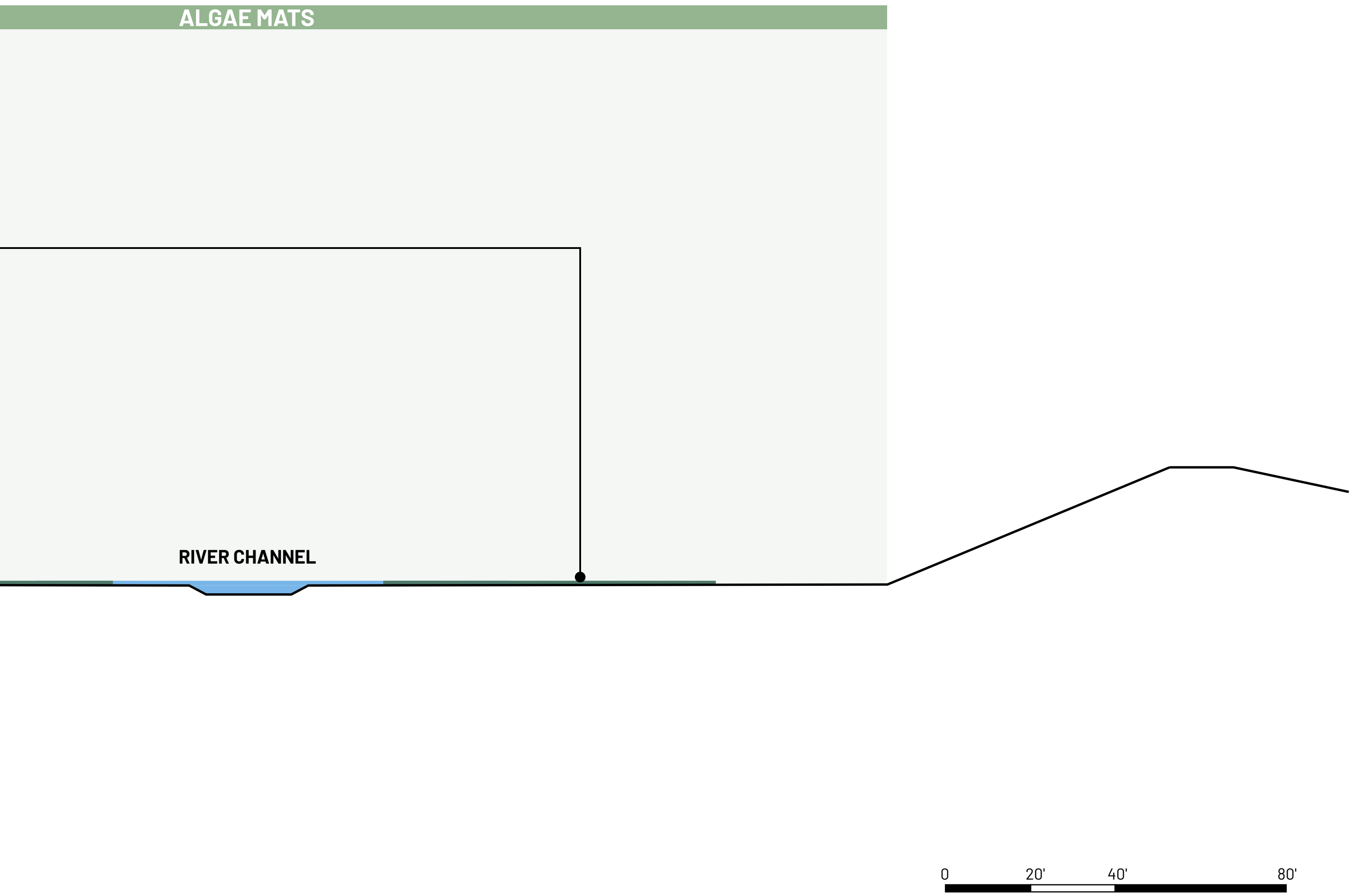
Anax junius
Green darner

KIT OF PARTS:

TRAILS, ACCESS GATEWAYS, AND SHELTERS

PLANT COMMUNITIES:

N/A



*Endangered or threatened species at state or federal level

Figure 117. The concrete channel supports algae mats, an important food source for a variety of shoreline birds.

CONCRETE CHANNEL

The concrete channel is a common existing condition of the LA River and features a trapezoidal or box shape channel with a low-flow channel in its center. While this condition does not support native plant communities, the concrete absorbs heat from the sun and warms the water in the channel enough to support abundant algal growth. Often water overflows the low flow channel or is intentionally spread across the channel and a mat of algae forms across the channel bottom.

This algae is a food source for many shoreline and other nesting birds, such as the great blue heron and black-necked stilt. This is especially important in the estuary area of the river near Long Beach, designated a Significant Ecological Area for bird habitat and migratory birds.

SOFT-BOTTOM CHANNEL

Currently no section of the LA River with this cross section meets flood design capacities, so it is important to balance ecosystem function and flood risk reduction.

MAMMALS | **BIRDS**

Eumops perotis
Western mastiff bat*

Myotis lucifugus
Little brown Bat *

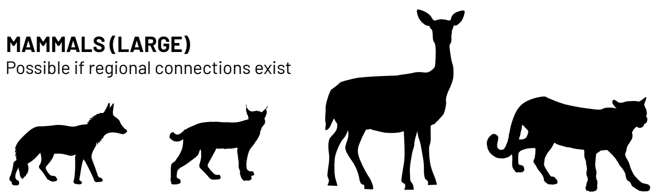
Accipiter cooperii
Cooper's hawk

Pandion haliaetus
Western osprey

Bubo virginianus
Great horned owl

Melanerpes formicivorus
Acorn woodpecker

MAMMALS (LARGE)
Possible if regional connections exist



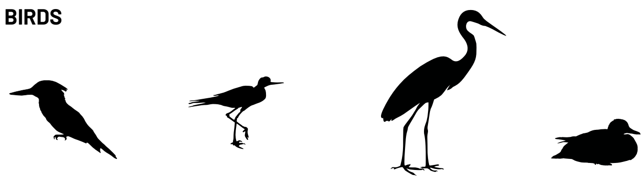
Canis latrans
Coyote

Lynx rufus
Bobcat

Odocoileus hemionus
Mule deer

Puma concolor
Mountain lion

BIRDS



Megaceryle alcyon
Belted kingfisher*

Himantopus mexicanus
Black-necked stilt

Ardea herodias
Great blue heron

Anas cyanoptera
Cinnamon teal

INSECTS

Acroneuria Family; Stonefly
Anax junius; Green darner
Coenagrionidae Family; Damselfly
Ephemeroptera Family; Spiny crawler mayfly
Hydrophilidae Family; Scavenger water beetles
Nemoura Family; Spring stonefly
Neoscona crucifera; Spotted orbweaver spider
Papilio rutulus; Western tiger swallowtail butterfly
Phryganidia californica; California oak moth
Pteronarcys californica; Giant salmonfly
Schistocerca nitens; Gray bird grasshopper
Xylocopa varipuncta; Valley carpenter bee

REPTILES

Actinemys marmorata; Western pond turtle *
Anaxyrus californicus; Arroyo toad *
Bufo boreas; Western toad *
Ensatina eschscholtzii; Ensatina salamander
Pseudacris regilla; Pacific treefrog
Rana draytonii; California red-legged frog *
Sceloporus occidentalis; Western fence lizard
Taricha torosa; California newt
Thamnophis hammondii; Two-striped garter snake *

KIT OF PARTS:

- TRAILS, ACCESS GATEWAYS, AND SHELTERS
- CHANNEL MODIFICATIONS
- DIVERSIONS

PLANT COMMUNITIES:

- ALLUVIAL FAN SAGE SCRUB
- SOUTHERN COTTONWOOD-WILLOW RIPARIAN FOREST
- SOUTHERN COAST LIVE OAK RIPARIAN FOREST
- PERENNIAL FRESHWATER EMERGENT WETLAND
- SOUTHERN SYCAMORE RIPARIAN WOODLAND
- CALIFORNIA WALNUT WOODLAND

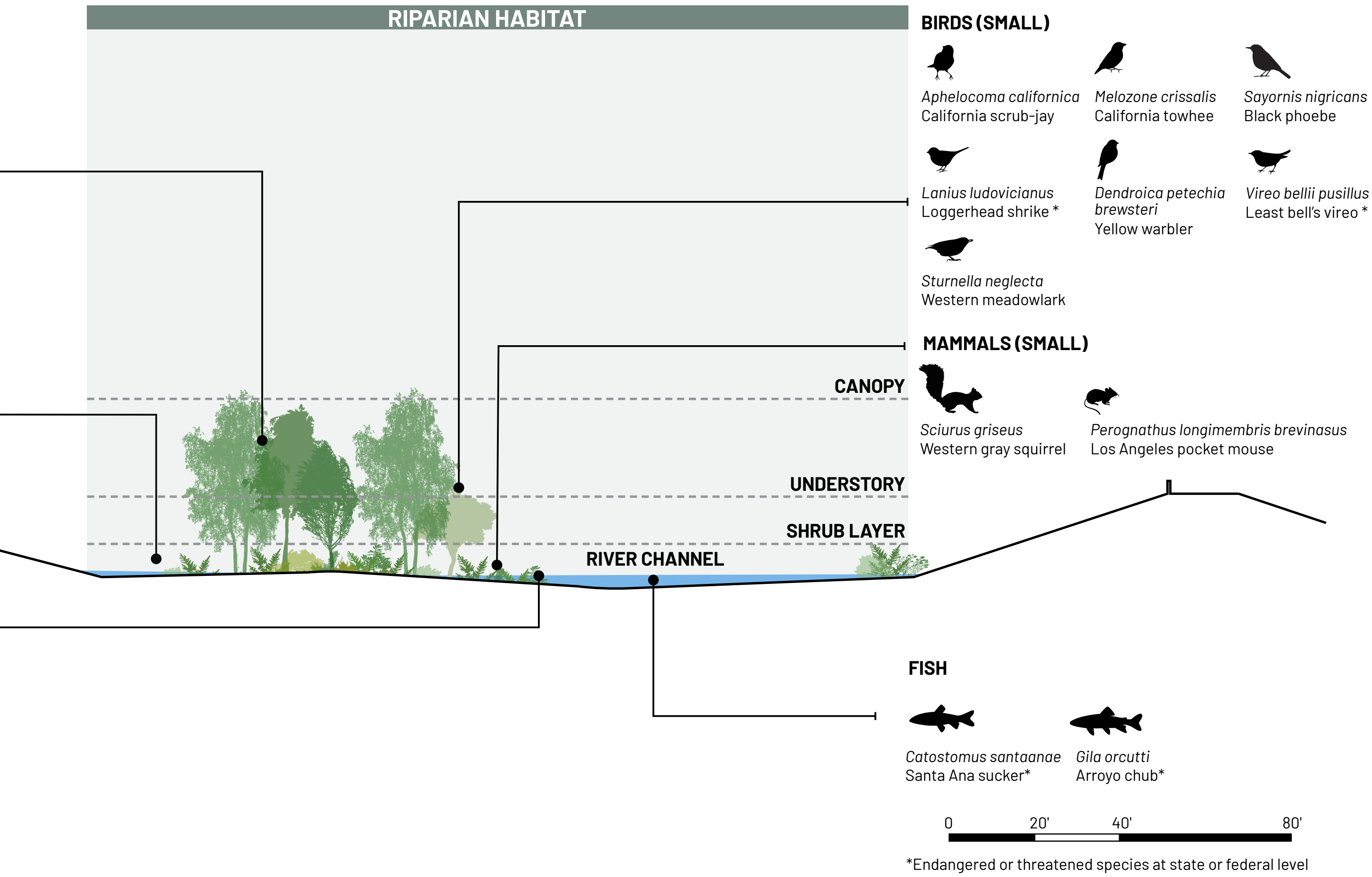


Figure 118. Soft-bottom channel portions of the LA River support a limited riparian habitat.

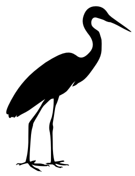
SOFT-BOTTOM CHANNEL

The soft-bottom channel condition is characterized by segments of the channel with concrete walls and gravelly and often inundated soils at the base. This existing condition is found along areas of the river such as the Narrows. However, areas of the river with this condition currently do not meet flood management design capacity.

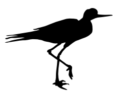
The soils in this condition allow for more riparian plant communities and greater vertical structure that provides habitat for species such as the belted kingfisher, western toad, and the Santa Ana sucker.

CONCRETE TERRACES

BIRDS



Ardea herodias
Great blue heron



Himantopus mexicanus
Black-necked stilt

Falco peregrinus anatum
Peregrine falcon*

RIVER CHANNEL

INSECTS

Anax junius; Green darner
Danaus plexippus; Monarch butterfly
Dasymutilla sackenii; Golden velvet ant
Glaucopsyche lygdamus paloverdesensis; Palos verdes blue butterfly *
Leptotes marina; Marine blue butterfly
Neoscona crucifera; Spotted orbweaver spider
Pogonomyrmex californicus; California harvester ant
Schistocerca nitens; Gray bird grasshopper
Tenebrionidae Family; Darkling beetle

REPTILES

Phrynosoma blainvillii; Blainville's horned lizard *
Sceloporus occidentalis; Western fence lizard
Uta stansburiana; Side-blotched lizard

KIT OF PARTS:

TRAILS, ACCESS GATEWAYS, AND SHELTERS

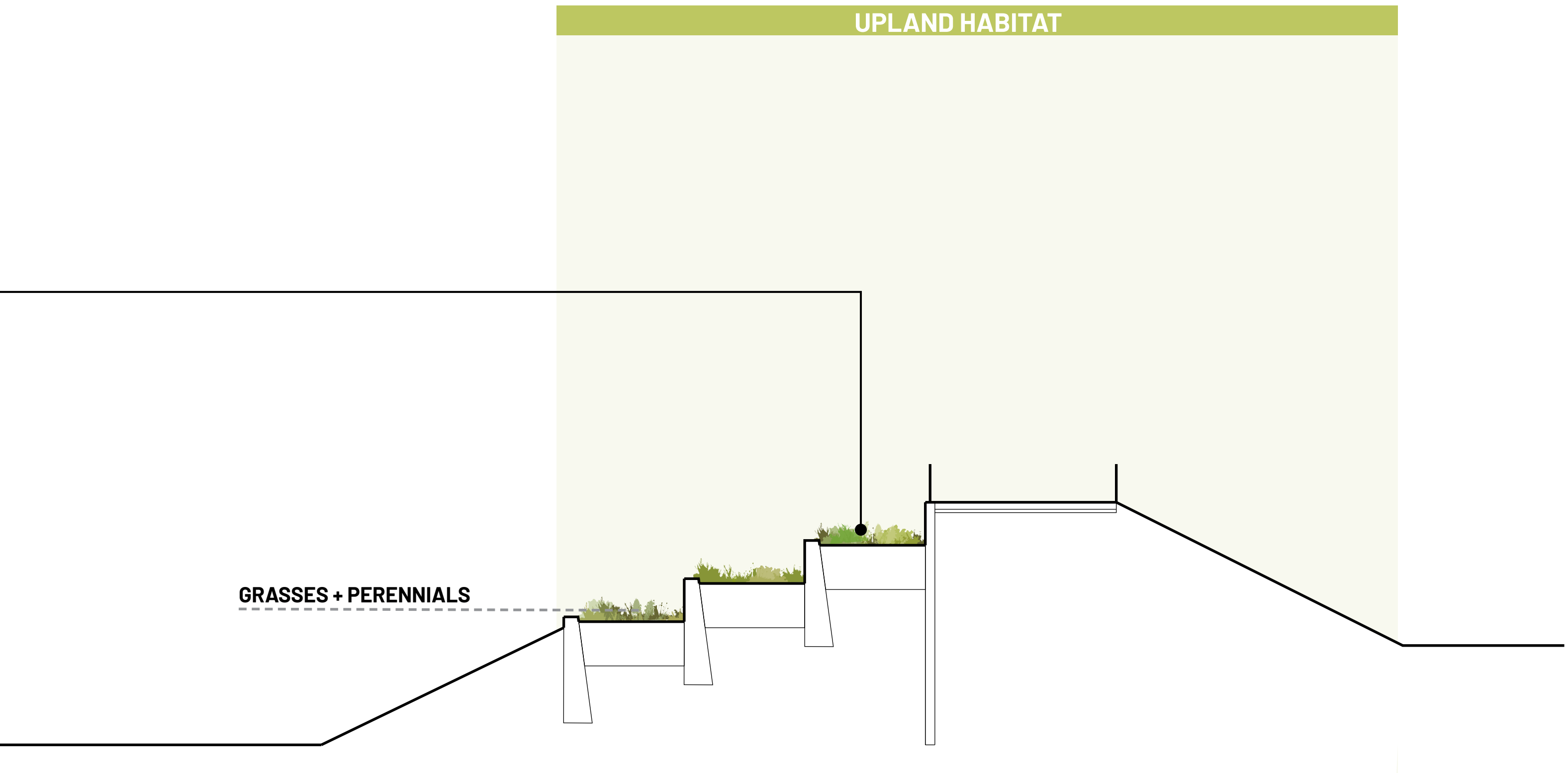
CHANNEL MODIFICATIONS

PLANT COMMUNITIES:

COASTAL SAGE SCRUB

CHAPARRAL

DESERT SCRUB



0 5' 10' 20'

*Endangered or threatened species at state or federal level

Figure 119. Concrete terraces support grasses and perennials from the Coastal Sage Scrub, Chaparral, and Desert Scrub plant communities.

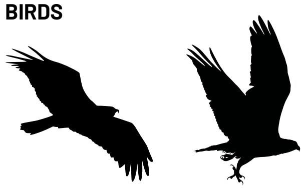
CONCRETE TERRACES

Concrete terraces are a levee modification which proposes staggered concrete planters along levee walls. As with all channel modifications, these need to be closely coordinated with the project engineer and tested for its hydraulic performance before implementation. It is important that the terraces be as wide as possible to reduce the amount of heat transferred for the soil through concrete. Because of their size and strong roots, tree planting in these terraces is not feasible, and planting is limited to grasses and perennials that can withstand heat.

Some of the insect species that could be supported in this habitat include the green darner, California harvester ant, and the darkling beetle.

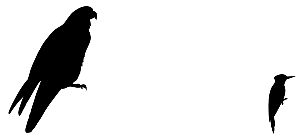
CHANNEL RAMP

BIRDS



Accipiter cooperii
Cooper's hawk

Pandion haliaetus
Western osprey



Falco peregrinus anatum
Peregrine falcon*

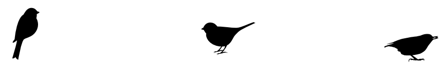
Melanerpes formicivorus
Acorn woodpecker

BIRDS (SMALL)

Aphelocoma californica
California scrub-jay

Psaltriparus minimus
Bushtit

Sayornis nigricans
Black Phoebe



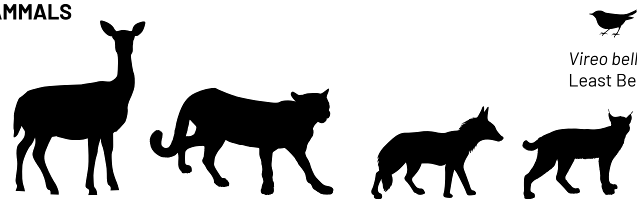
Dendroica petechia brewsteri
Yellow warbler

Lanius ludovicianus
Loggerhead shrike *

Sturnella neglecta
Western meadowlark

Vireo bellii pusillus
Least Bell's vireo *

MAMMALS



Odocoileus hemionus
Mule deer

Puma concolor
Mountain lion

Canis latrans
Coyote

Lynx rufus
Bobcat

RIVER CHANNEL

INSECTS

Anax junius; Green darner
Danaus plexippus; Monarch butterfly
Glaucopsyche lygdamus paloverdesensis; Palos verdes blue butterfly *
Leptotes marina; Marine blue butterfly
Neoscona crucifera; Spotted orbweaver spider
Phryganidia californica; California oak moth
Pogonomyrmex californicus; California harvester ant
Schistocerca nitens; Gray bird grasshopper
Tenebrionidae Family; Darkling beetle
Xylocopa varipuncta; Valley carpenter bee

REPTILES

Bufo boreas; Western toad *
Ensatina eschscholtzii; Ensatina salamander
Lampropeltis getula californiae; California kingsnake
Pseudacris regilla; Pacific treefrog
Rana draytonii; California red-legged frog *
Sceloporus occidentalis; Western fence lizard
Taricha torosa; California newt
Thamnophis hammondii; Two-stripedgarter snake *
Uta stansburiana; Side-blotched lizard

KIT OF PARTS:

TRAILS, ACCESS GATEWAYS, AND SHELTERS

CHANNEL MODIFICATIONS

PLANT COMMUNITIES:

COASTAL SAGE SCRUB

CHAPARRAL

SOUTHERN COAST LIVE OAK RIPARIAN FOREST

CALIFORNIA WALNUT WOODLAND

COAST LIVE OAK WOODLAND

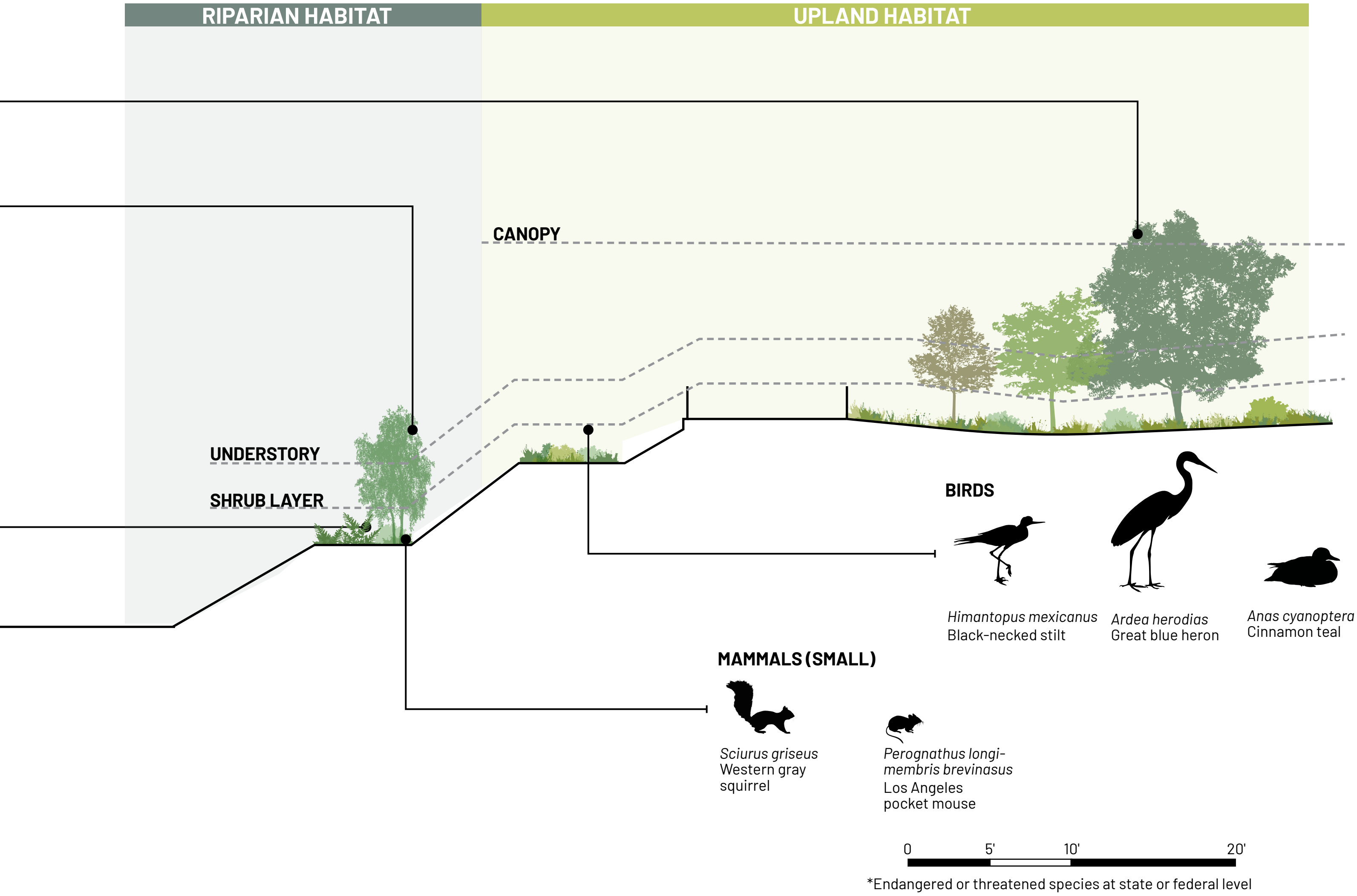


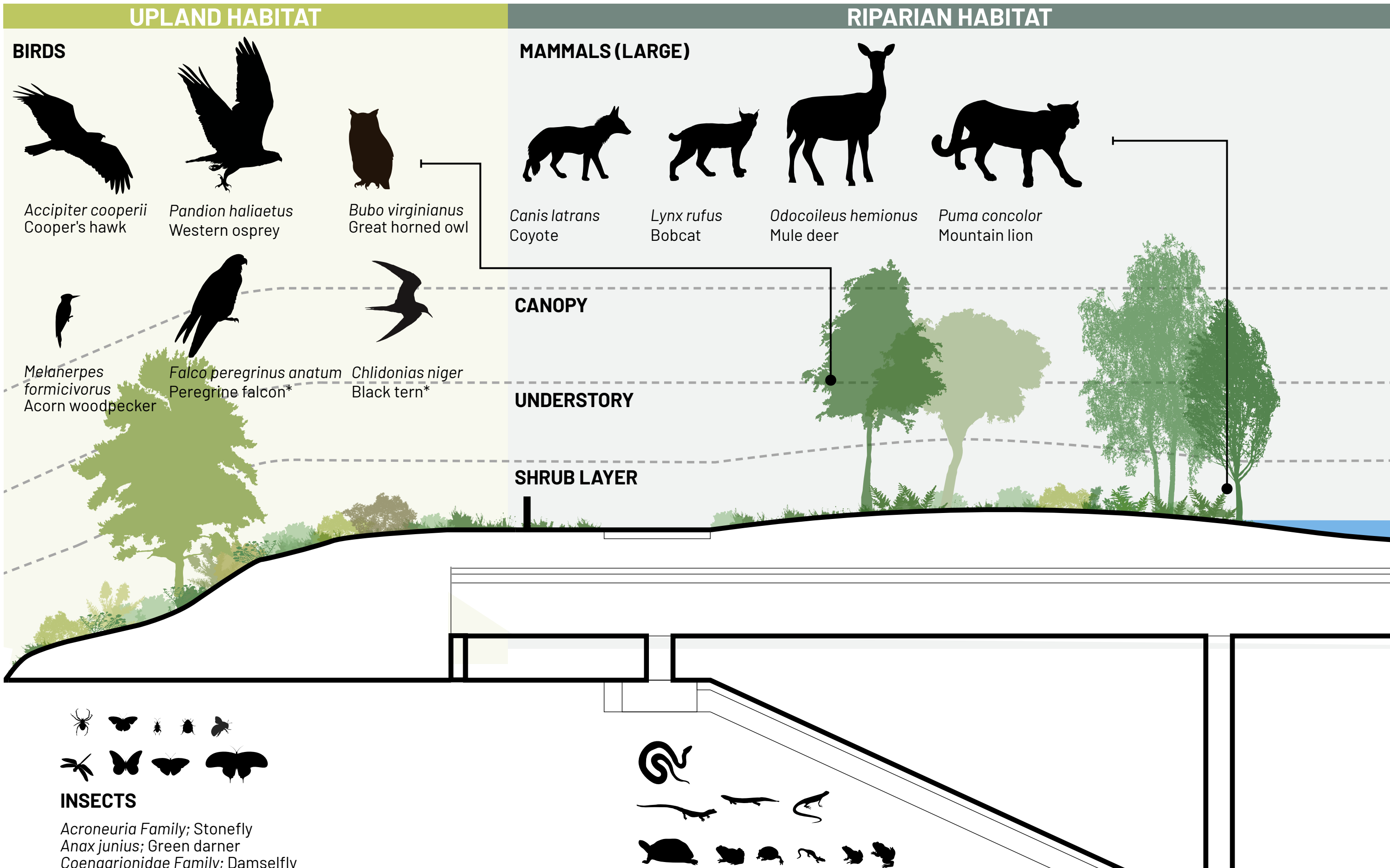
Figure 120. A channel habitat ramp provides wildlife access to difficult-to-reach box channel sections of the LA River.

CHANNEL RAMP

A channel habitat ramp is an entrenched box-channel modification which allows wildlife access to and exit from the box channel condition. This modification is further described in Appendix I: Design Guidelines, Chapter 5 and requires hydraulic testing and coordination with an engineer before implementation.

Since box channel segments of the river are characterized by long stretches of tall perpendicular concrete wall, this can often either exclude or trap wildlife attempting to reach the water. The benefit of the ramp is that it can allow access and support plant communities such as the coast live oak woodland, chaparral, and the southern coast live oak riparian forest.

RIPARIAN PLATFORM



INSECTS

Acroneuria Family; Stonefly
Anax junius; Green darner
Coenagrionidae Family; Damselfly
Danaus plexippus; Monarch butterfly
Epeorus Family; Mayfly
Ephemeroptera Family; Spiny crawler mayfly
Hydrophilidae Family; Scavenger water beetles
Leptotes marina; Marine blue butterfly
Nemoura Family; Spring stonefly
Neoscona crucifera; Spotted orbweaver spider
Papilio rutulus; Western tiger swallowtail butterfly
Phryganidia californica; California oak moth
Pteronarcys californica; Giant salmonfly
Tenebrionidae Family; Darkling beetle
Xylocopa varipuncta; Valley carpenter bee

REPTILES AND AMPHIBIANS

Actinemys marmorata; Western pond turtle *
Anaxyrus californicus; Arroyo toad *
Bufo boreas; Western toad *
Ensatina eschscholtzii; Ensatina salamander
Lampropeltis getula californiae; California kingsnake
Pseudacris regilla; Pacific treefrog
Rana draytonii; California Red-legged frog *
Sceloporus occidentalis; Western fence lizard
Taricha torosa; California newt
Thamnophis hammondii; Two-striped garter snake *
Uta stansburiana; Side-blotched lizard

KIT OF PARTS:

- TRAILS, ACCESS GATEWAYS, AND SHELTERS
- PLATFORMS AND CROSSINGS

PLANT COMMUNITIES:

- COASTAL SAGE SCRUB
- CHAPARRAL
- SOUTHERN COTTONWOOD-WILLOW RIPARIAN FOREST
- SOUTHERN COAST LIVE OAK RIPARIAN FOREST
- PERENNIAL FRESHWATER EMERGENT WETLAND
- VALLEY OAK WOODLAND
- SOUTHERN SYCAMORE RIPARIAN WOODLAND
- CALIFORNIA WALNUT WOODLAND
- COAST LIVE OAK WOODLAND

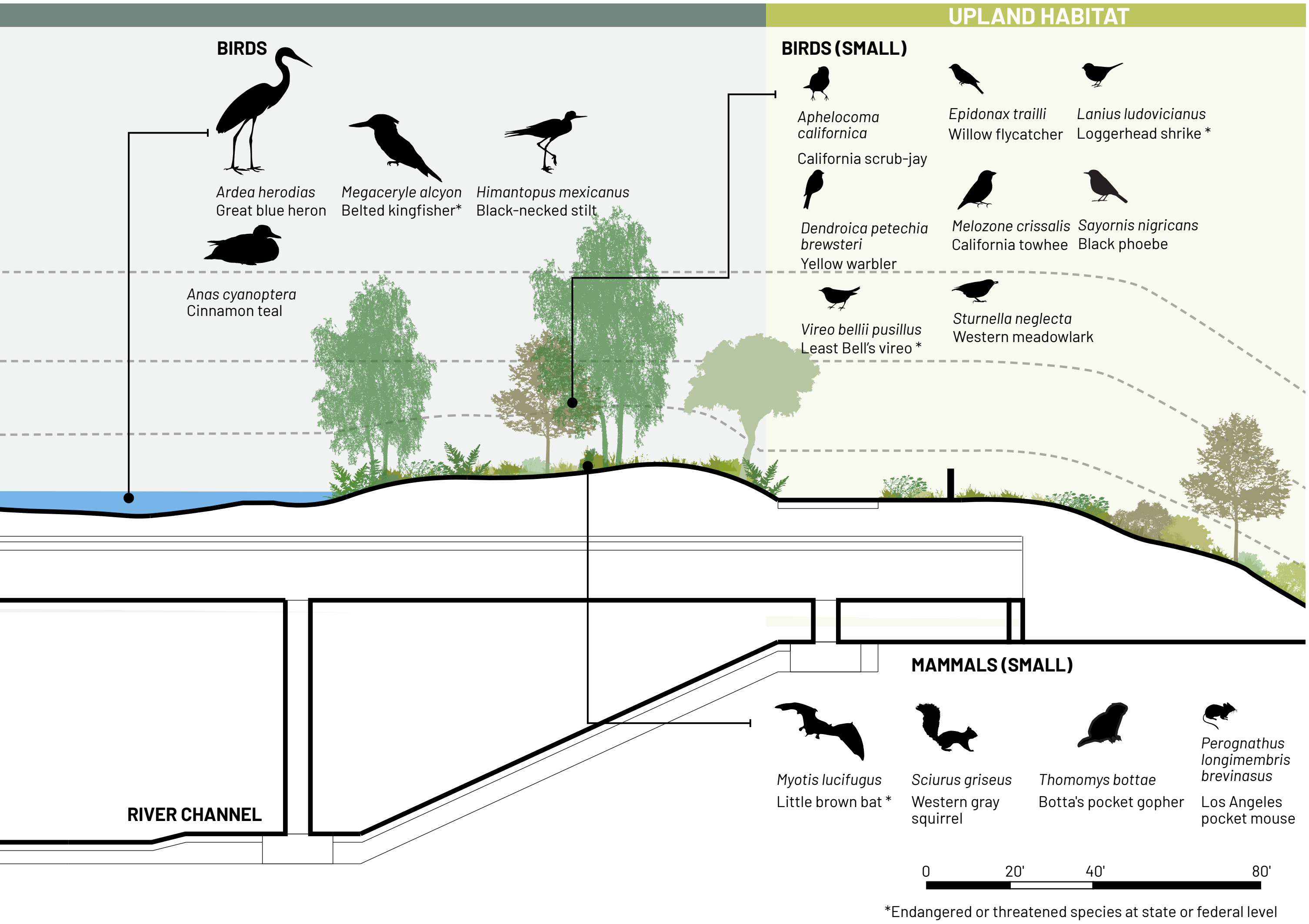


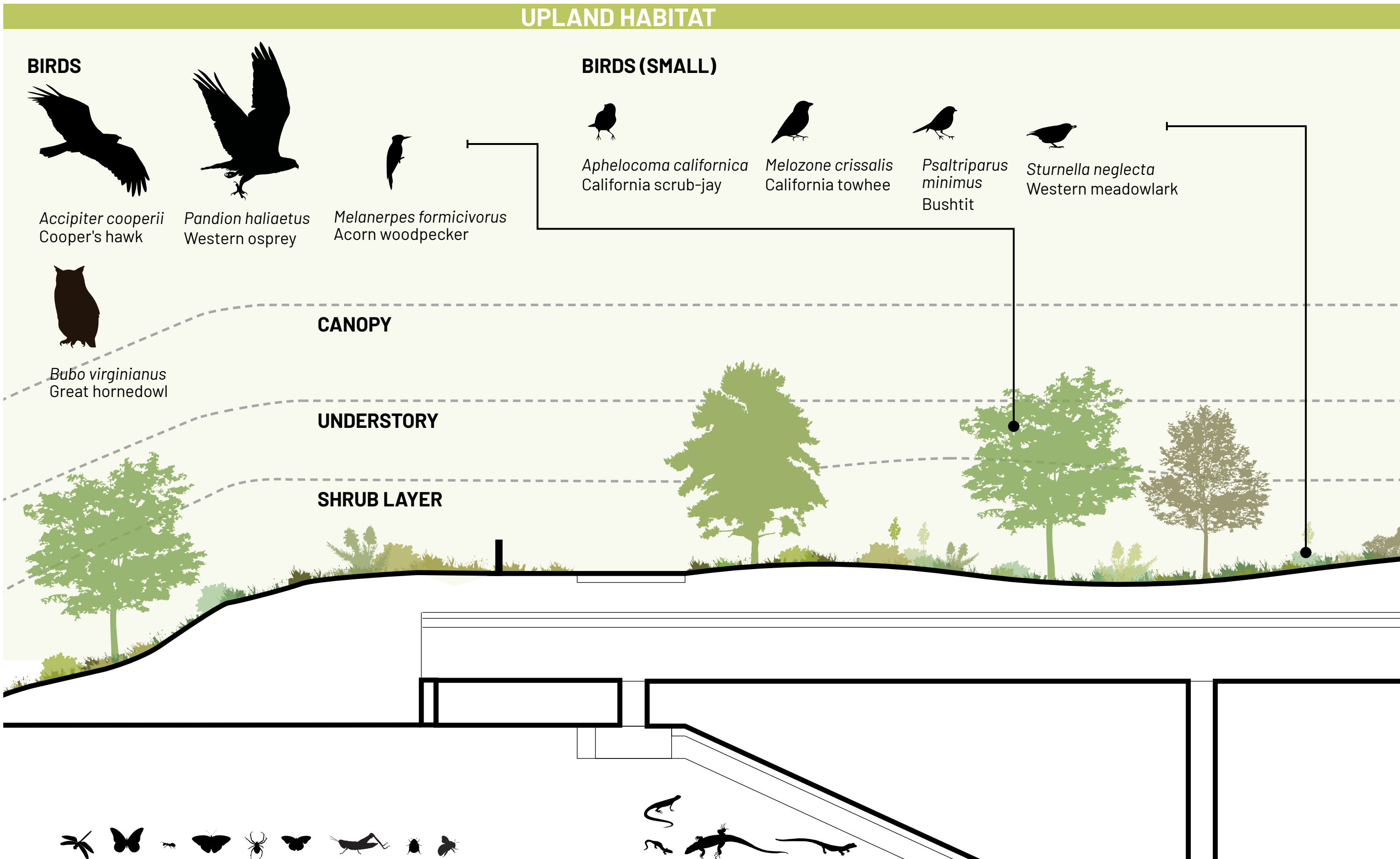
Figure 121. Riparian platforms parks can host a range of upland and riparian habitats.

RIPARIAN PLATFORM PARK

Platforms provide an opportunity to develop a large stretch of habitat and planting, along with providing habitat connectivity. If water is brought to the surface of a platform, a riparian habitat can be created along with upland, drier habitat. This cross section can support a wide variety of species and plant communities, from large mammals to amphibians to perennial freshwater wetlands to California walnut woodlands.

Before implementation, hydraulic impacts of the platform must be studied. Ensuring wildlife access to the platform is also crucial for its success as a habitat.

UPLAND PLATFORM



INSECTS

Danaus plexippus; Monarch butterfly
Dasymutilla sackenii; Golden velvet ant
Glaucopsyche lygdamus paloverdesensis; Palos verdes blue butterfly *
Leptotes marina; Marine blue butterfly
Neoscona crucifera; Spotted orbweaver spider
Phryganidia californica; California oak moth
Pogonomyrmex californicus; California harvester ant
Schistocerca nitens; Gray bird grasshopper
Tenebrionidae Family; Darkling beetle
Xylocopa varipuncta; Valley carpenter bee

REPTILES AND AMPHIBIANS

Ensatina eschscholtzii; Ensatina salamander
Lampropeltis getula californiae; California kingsnake
Phrynosoma blainvillii; Blainville's horned lizard *
Sceloporus occidentalis; Western fence lizard
Uta stansburiana; Side-blotched lizard

KIT OF PARTS:

- TRAILS, ACCESS GATEWAYS, AND SHELTERS
- PLATFORMS AND CROSSINGS

PLANT COMMUNITIES:

- COASTAL SAGE SCRUB
- CHAPARRAL
- DESERT SCRUB
- VALLEY OAK WOODLAND
- COAST LIVE OAK WOODLAND
- CLIMATE ADAPTED TREES

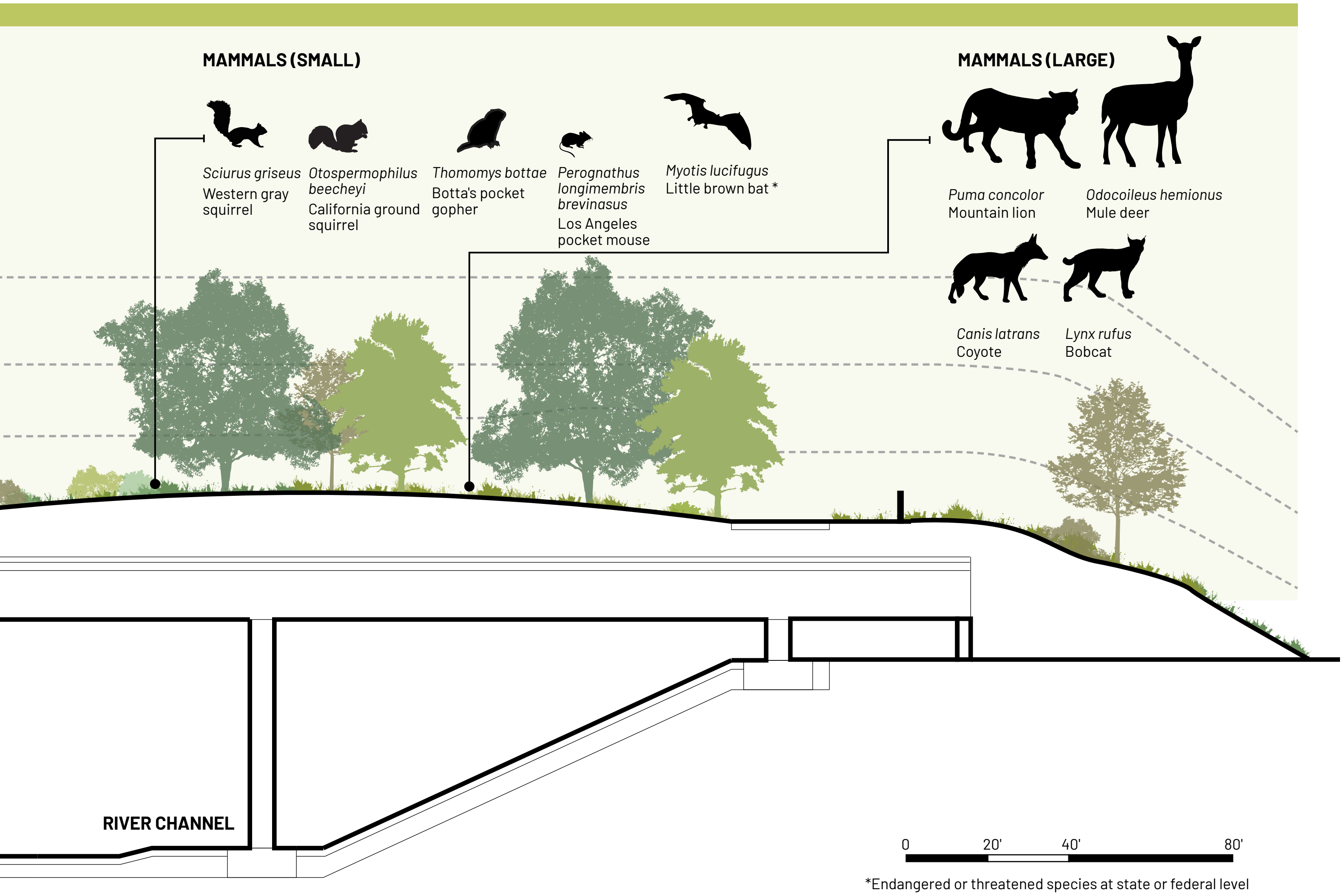


Figure 122. Upland platforms do not have water at their surface and can host plant communities that thrive in drier conditions.

UPLAND PLATFORM PARK

Platforms that do not include surface water can also provide extensive native upland habitat, featuring plant communities such as the valley oak woodland and chaparral and wildlife species such as western gray squirrels and California scrub-jays.

Before implementation, hydraulic impacts of the platform must be studied. Ensuring wildlife access to the platform is also crucial for its success as a habitat.

RIPARIAN LANDSIDE RIGHT-OF-WAY

BIRDS

Accipiter cooperii
Cooper's hawk

Bubo virginianus
Great horned owl

Pandion haliaetus
Western osprey

Falco peregrinus anatum
Peregrine falcon*

Chlidonias niger
Black tern*

Melanerpes formicivorus
Acorn woodpecker

RIVER CHANNEL

BIRDS (SMALL)

Aphelocoma californica
California scrub-jay

Melozone crissalis
California towhee

Sayornis nigricans
Black Phoebe

Dendroica petechia brewsteri
Yellow warbler

Lanius ludovicianus
Loggerhead shrike *

Empidonax traill
Willow flycatcher*

Sturnella neglecta
Western meadowlark

Vireo bellii pusillus
Least Bell's vireo *

INSECTS

Acroneuria Family; Stonefly
Anax junius; Green darner
Callibaetis ferrugineus; Speckled spinner mayfly
Coenagrionidae Family; Damselfly
Danaus plexippus; Monarch butterfly
Epeorus Family; Mayfly
Ephemeroptera Family; Spiny crawler mayfly
Glaucopsyche lygdamus paloverdesensis; Palos verdes blue butterfly *
Leptotes marina; Marine blue butterfly
Nemoura Family; Spring stonefly
Neoscona crucifera; Spotted orbweaver spider
Phryganidia californica; California oak moth
Pogonomyrmex californicus; California harvester ant
Pteronarcys californica; Giant salmonfly
Schistocerca nitens; Gray bird grasshopper
Tenebrionidae Family; Darkling beetle
Xylocopa varipuncta; Valley carpenter bee

REPTILES

Bufo boreas; Western toad *
Ensatina eschscholtzii; Ensatina salamander
Pseudacris regilla; Pacific treefrog
Rana draytonii; California red-legged frog *
Sceloporus occidentalis; Western fence lizard
Taricha torosa; California newt
Thamnophis hammondii; Two-striped garter snake *
Uta stansburiana; Side-blotched lizard

KIT OF PARTS:

TRAILS, ACCESS GATEWAYS, AND SHELTERS

OFF-CHANNEL LAND ASSETS

DIVERSIONS

PLANT COMMUNITIES:

SOUTHERN COTTONWOOD-WILLOW RIPARIAN FOREST

SOUTHERN COAST LIVE OAK RIPARIAN FOREST

PERENNIAL FRESHWATER EMERGENT WETLAND

SOUTHERN SYCAMORE RIPARIAN WOODLAND

CALIFORNIA WALNUT WOODLAND

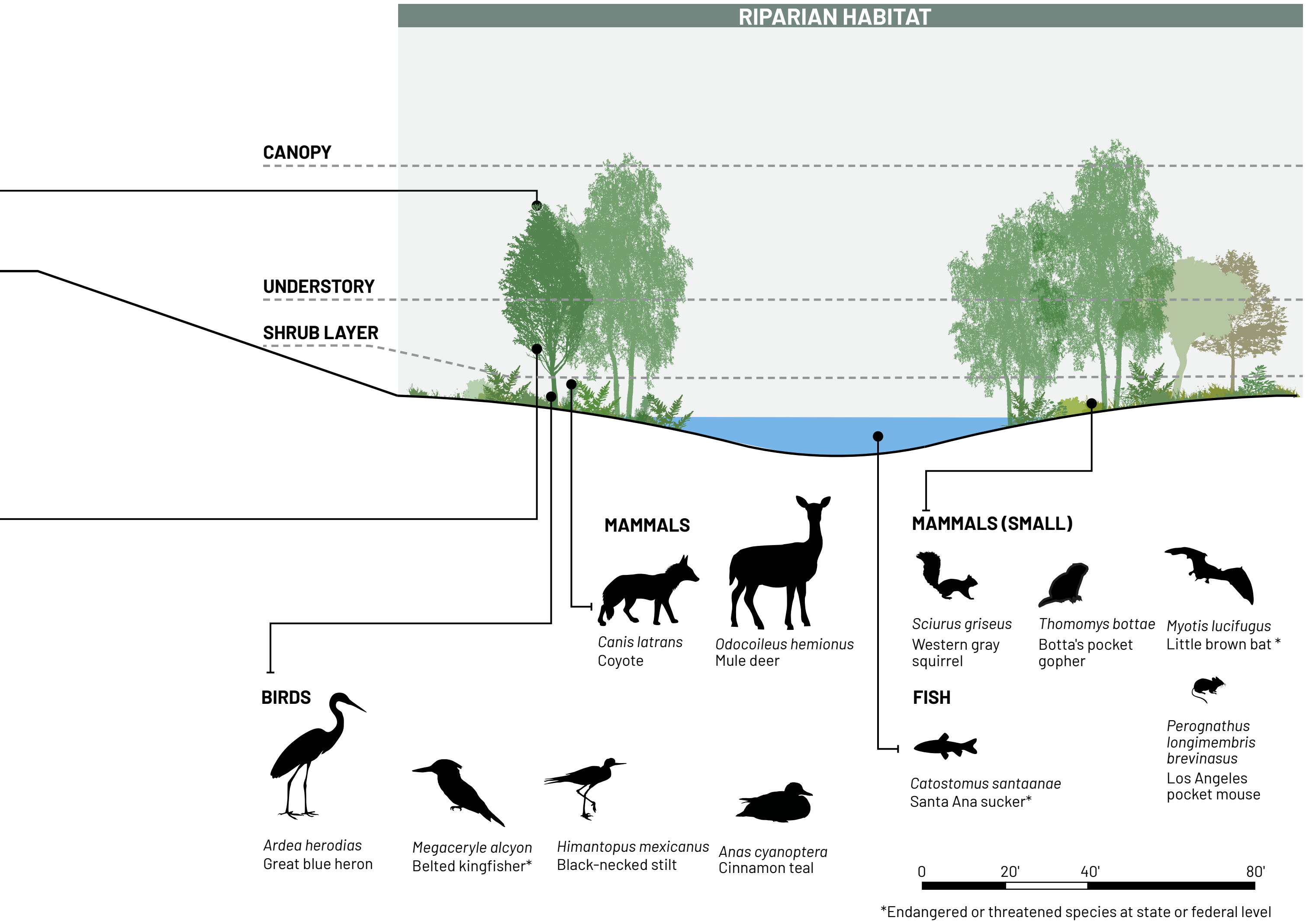


Figure 123. The creation of riparian habitat on the landside right-of-way can be achieved without channel modifications.

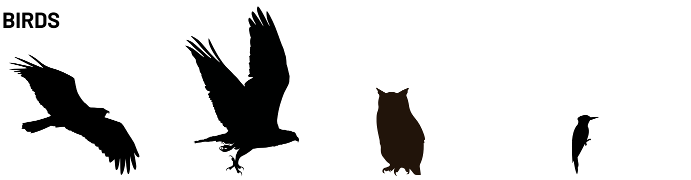
RIPARIAN LANDSIDE RIGHT-OF-WAY

Riparian habitat can be created on the landside of the right-of-way through grading and landform activities. This can be done without affecting the flood capacity of the channel because it does not require levee or channel wall modifications for implementation. Interventions should not negatively impact the structural integrity of the levee, and planting near levees should follow the most recent USACE guidelines. An example of this kind of habitat is the Dominguez Gap Wetlands in Long Beach. This cross section can greatly improve water quality if storm drains are daylighted and filtered through the wetland before reaching the river.

With regular access to water, this cross section supports riparian plant communities such as perennial freshwater wetlands and southern sycamore riparian woodlands. The ability to support trees as well as shrubs allows for wildlife habitat for species such as black terns and yellow warblers.

UPLAND LANDSIDE RIGHT-OF-WAY

BIRDS



Accipiter cooperii
Cooper's hawk

Pandion haliaetus
Western osprey

Bubo virginianus
Great horned owl

Melanerpes formicivorus
Acorn woodpecker

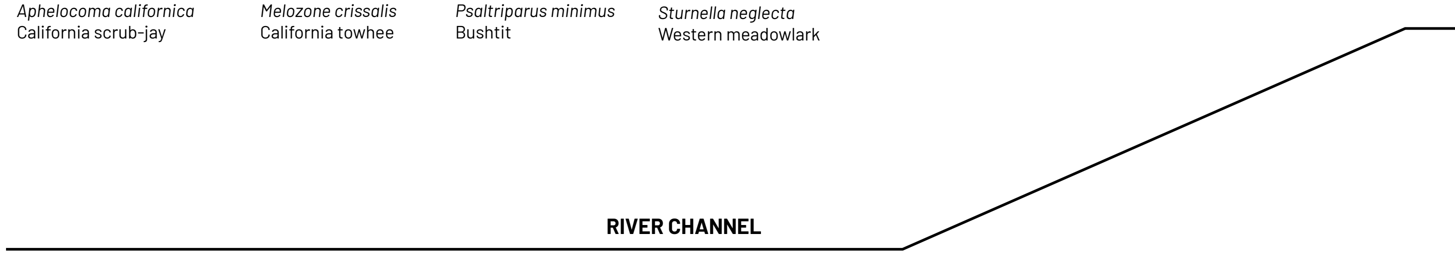
BIRDS (SMALL)

Aphelocoma californica
California scrub-jay

Melozone crissalis
California towhee

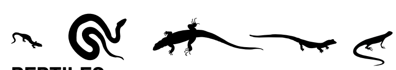
Psaltriparus minimus
Bushtit

Sturnella neglecta
Western meadowlark



INSECTS

Danaus plexippus; Monarch butterfly
Dasymutilla sackenii; Golden velvet ant
Glaucopsyche lygdamus paloverdesensis; Palos verdes blue butterfly *
Leptotes marina; Marine blue butterfly
Neoscona crucifera; Spotted orbweaver spider
Phryganidia californica; California oak moth
Pogonomyrmex californicus; California harvester ant
Schistocerca nitens; Gray bird grasshopper
Tenebrionidae Family; Darkling beetle
Xylocopa varipuncta; Valley carpenter bee



REPTILES

Ensatina eschscholtzii; Ensatina salamander
Lampropeltis getula californiae; California kingsnake
Phrynosoma blainvillii; Blainville's horned lizard *
Sceloporus occidentalis; Western fence lizard
Uta stansburiana; Side-blotched lizard

KIT OF PARTS:

- TRAILS, ACCESS GATEWAYS, AND SHELTERS
- OFF-CHANNEL LAND ASSETS

PLANT COMMUNITIES:

- COASTAL SAGE SCRUB
- CHAPARRAL
- DESERT SCRUB
- VALLEY OAK WOODLAND
- COAST LIVE OAK WOODLAND
- CLIMATE ADAPTED TREES

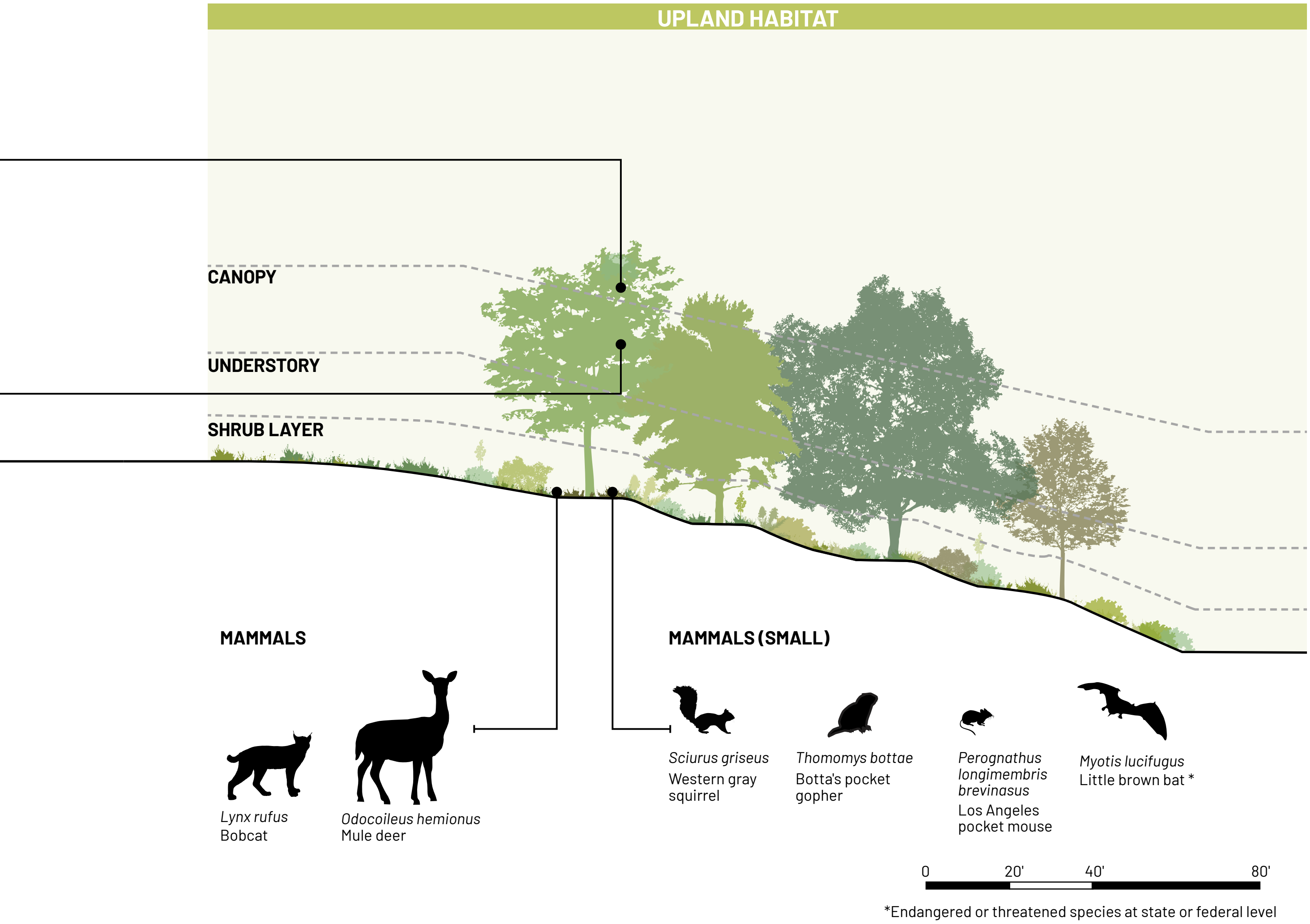


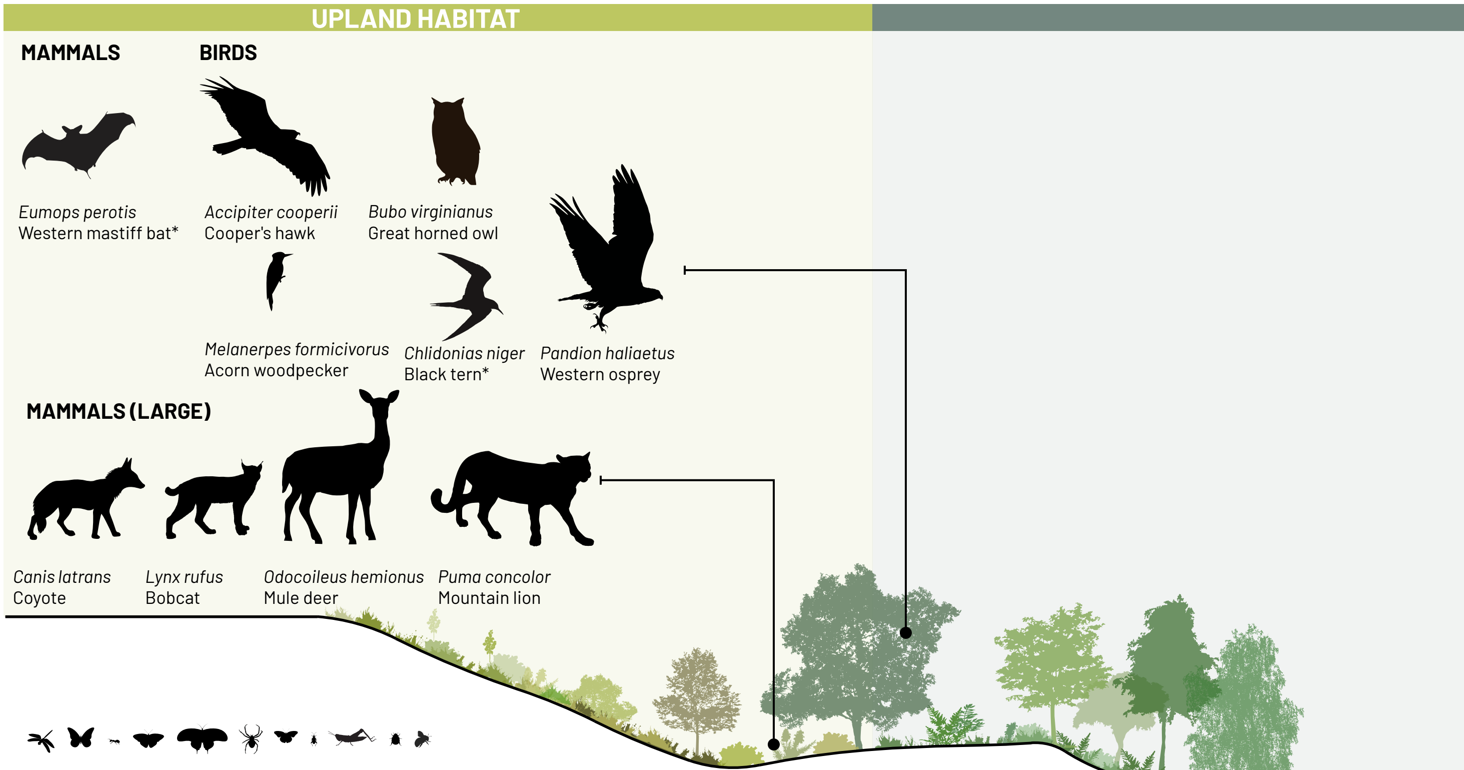
Figure 124. Upland habitat can be created on the landside right-of-way through the use of a planting berm.

UPLAND LANDSIDE RIGHT-OF-WAY

Upland habitat on the landside right-of-way can be created through a levee modification called a planting berm. This modification can strengthen the levee on the landside while allowing a root-free zone above it with planting soil bermed on top. This condition is shown with more detail in Appendix I: Design Guidelines, Chapter 5.

Planting on the landside slope can support trees, shrubs, and plant communities such as chaparral and desert scrub. The range in vertical structure in this habitat also encourages birds such as Cooper's hawks and California towhees.

SOFT-BOTTOM BASIN



INSECTS

Acroneuria Family; Stonefly
Anax junius; Green darner
Callibaetis ferrugineus; Speckled spinner mayfly
Coenagrionidae Family; Damselfly
Danaus plexippus; Monarch butterfly
Dasymutilla sackenii; Golden velvet ant
Epeorus Family; Mayfly
Ephemeroptera Family; Spiny crawler mayfly
Glaucopsyche lygdamus paloverdesensis; Palos verdes blue butterfly *
Hydrophilidae Family; Scavenger water beetles
Leptotes marina; Marine blue butterfly
Nemoura Family; Spring stonefly
Neoscona crucifera; Spotted orbweaver spider
Papilio rutulus; Western tiger swallowtail butterfly
Phryganidia californica; California oak moth
Pogonomyrmex californicus; California harvester ant
Pteronarcys californica; Giant salmonfly
Schistocerca nitens; Gray bird grasshopper
Tenebrionidae Family; Darkling beetle
Xylocopa varipuncta; Valley carpenter bee

REPTILES AND AMPHIBIANS

Actinemys marmorata; Western pond turtle *
Anaxyrus californicus; Arroyo toad *
Bufo boreas; Western toad *
Crotalus oreganus; Western rattlesnake
Ensatina eschscholtzii; Ensatina salamander
Lampropeltis getula californiae; California kingsnake
Phrynosoma blainvillii; Blainville's horned lizard *
Pseudacris regilla; Pacific treefrog
Rana draytonii; California red-legged frog *
Sceloporus occidentalis; Western fence lizard
Taricha torosa; California newt
Thamnophis hammondii; Two-striped garter snake *
Uta stansburiana; Side-blotched lizard

KIT OF PARTS:

- TRAILS, ACCESS GATEWAYS, AND SHELTERS
- FLOODPLAIN RECLAMATION
- DIVERSIONS

PLANT COMMUNITIES:

- ALLUVIAL FAN SAGE SCRUB
- COASTAL SAGE SCRUB
- CHAPARRAL
- DESERT SCRUB
- SOUTHERN COTTONWOOD-WILLOW RIPARIAN FOREST
- SOUTHERN COAST LIVE OAK RIPARIAN FOREST
- PERENNIAL FRESHWATER EMERGENT WETLAND
- VALLEY OAK WOODLAND
- SOUTHERN SYCAMORE RIPARIAN WOODLAND
- CALIFORNIA WALNUT WOODLAND
- COAST LIVE OAK WOODLAND
- CLIMATE ADAPTED TREES

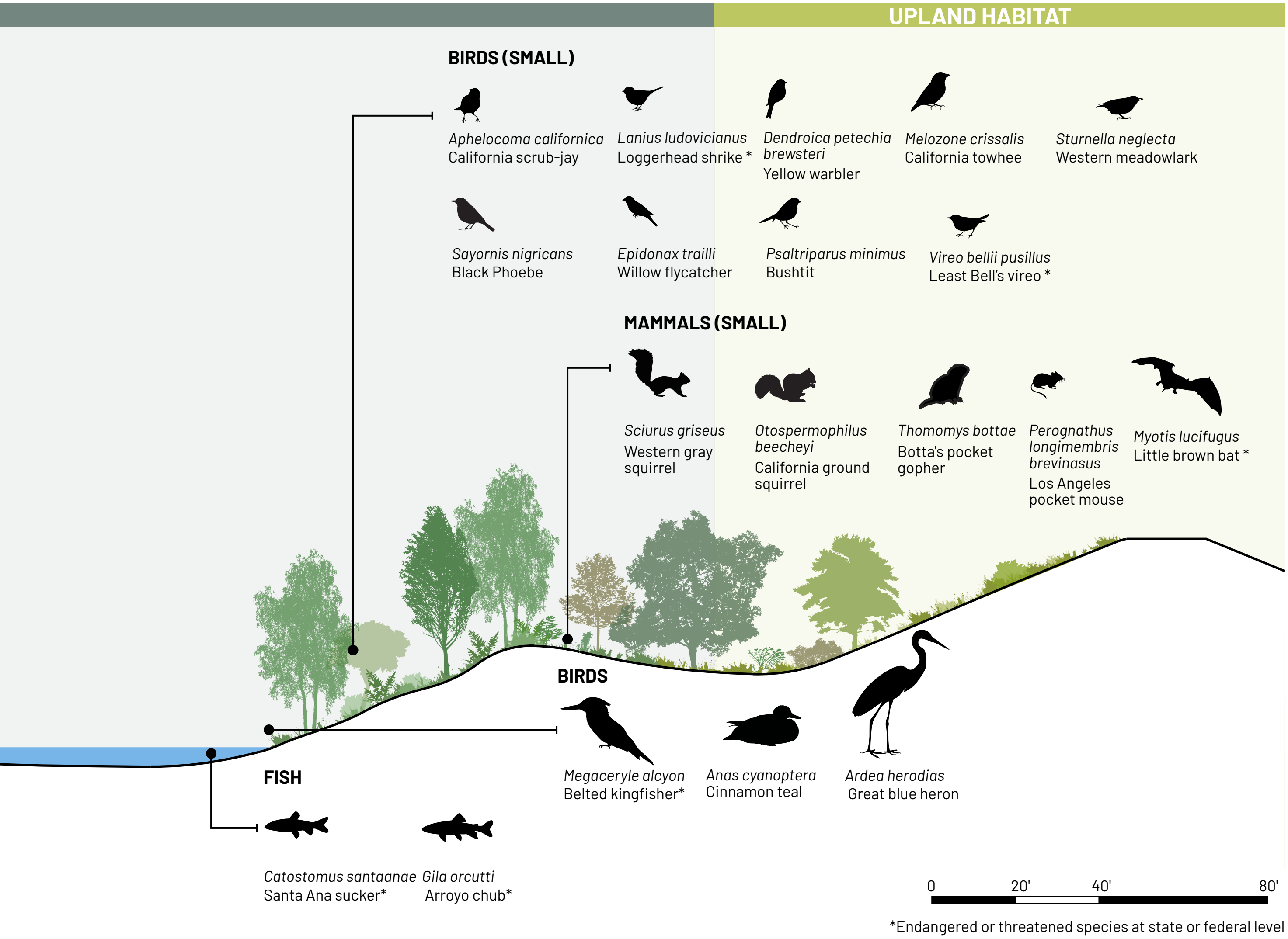


Figure 125. Soft-bottom basins require a large area but can host a wide range of plant communities and wildlife.

SOFT-BOTTOM BASIN

A soft bottom basin cross section allows for a wide variety of habitat types, from upland slopes to riparian edges. This varied and dense vertical structure in planting allows for plant communities ranging from coastal sage scrub to southern cottonwood-willow riparian forests and wildlife life species such as the mule deer, great horned owl, and arroyo chub. This cross section currently exists along the river at Sepulveda Basin.

Figure 126. This portion of the LA River near river mile 5.5 is serviced by the LA River Trail. Source: OLIN, 2018.

SECTION V: **REFERENCES**

Figure 127. Wetland park space adjacent to the LA River is one way to bring ecological function and programming into the same space as seen here at DeForest Park at river mile 7.2. Source: LA County Public Works, 2018.

11.
SPATIAL DATA LIBRARY

SPATIAL DATA WERE GATHERED FROM VARIOUS PUBLICLY AVAILABLE SOURCES OR DEVELOPED TO SUPPORT THE EVALUATION AND DEFINITION OF EXISTING CONDITIONS

The LA River Master Plan is data driven; therefore, the aggregation of a rich database of spatial data was essential to the process. This chapter includes data sources for spatial data referenced, used, or created during the Master Plan.

The Master Plan research and analysis relies on a watershed and community approach that required using a variety of existing data sources and new data sources created as a part of the Master Plan process. Data obtained from sources outside LA County were used in its original format. In some cases, historic maps or other data points were digitized.

SPATIAL DATA LIBRARY

Name	Theme	Source	Year	Extent	LARMP Data
California County Boundaries	**Administrative Boundaries**	California Department of Forestry and Fire Protection https://frap.fire.ca.gov/mapping/gis-data/	2019	California	No
Communities	**Administrative Boundaries**	LA County Internal Services Department https://data.lacounty.gov/	2021	LA County	No
State Conservancies	**Administrative Boundaries**	California Natural Resources Agency https://map.dfg.ca.gov/metadata/ds1754.html	2016	California	No
Free Concerts	**Arts, Culture, and History**	LA County Arts Commission https://data.lacounty.gov/	2021	LA County	No
ACS 2015-2019 5-Year Estimates by Block Group	**Demographics**	US Census Bureau https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-data.html	2021	California	No
ACS 2015-2019 5-Year Estimates by Tract	**Demographics**	US Census Bureau https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-data.html	2021	California	No
Census Block Groups	**Demographics**	US Census Bureau https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.2021.html	2021	California	No
Census Tracts	**Demographics**	US Census Bureau https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.2021.html	2021	California	No
Persons Experiencing Homelessness	**Demographics**	OLIN[10]	2020	LA County	Yes
Displacement Risk	**Economy and Finance**	OLIN, Street Level Advisors	2021	LA County	Yes
Housing Prices	**Economy and Finance**	LA County Assessor https://data.lacounty.gov/Parcel-/Assessor-Parcels-Data-2006-thru-2021/9trm-uz8i	2021	LA County	No
2019 Origin-Destination Employment Statistics	**Economy and Finance**	US Census Bureau https://lehd.ces.census.gov/data/lodes/LODES7/ca/	2021	California	No
California Assessment of Student Perfomance & Progress Test Results	**Education**	California Department of Education https://www.cde.ca.gov/ds/ad/assessmentdata.asp	2017	California	No
National Elevation Dataset (LA County)	**Elevation**	US Geological Survey https://apps.nationalmap.gov/downloader/#/	2013	United States	No
National Elevation Dataset (Region)	**Elevation**	US Geological Survey https://apps.nationalmap.gov/downloader/#/	2013	United States	No
Areas Subject to Inundation	**Environment**	OLIN[11]	2019	LA Basin	Yes
Beneficial Uses	**Environment**	Los Angeles Regional Water Quality Control Board https://gispublic.waterboards.ca.gov/portal/home/index.html	2018	LA County, Ventura County	No

SPATIAL DATA LIBRARY

Name	Theme	Source	Year	Extent	LARMP Data
Brownfield Sites	**Environment**	US Environmental Protection Agency https://www.epa.gov/cleanups/cleanups-my-community	2018	United States	No
CalEnviroScreen 4.0	**Environment**	California Office of Environmental Health Hazard Assessment https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40	2021	LA County	No
California Bioregions	**Environment**	Inter-Agency Natural Areas Coordinating Committee https://geodata.lib.berkeley.edu/	2015	California	No
California Essential Habitat Connectivity Project	**Environment**	CDFW and CalTrans https://www.wildlife.ca.gov/Data/BIOS	2010	California	No
California Fish Passage Assessment Database	**Environment**	CalFish https://www.calfish.org/	2017	California	No
California Geological Map Data: Faults	**Environment**	US Geological Survey https://mrdata.usgs.gov/geology/state/state.php?state=CA	2005	California	No
California Geological Map Data: Geologic Units	**Environment**	US Geological Survey https://mrdata.usgs.gov/geology/state/state.php?state=CA	2005	California	No
California Protected Areas	**Environment**	California Natural Resources Agency https://data.cnra.ca.gov/	2021	California	No
Cap & Trade Facilities' GHG emissions	**Environment**	UCLA Grand Challenge https://grandchallengesucla.carto.com/me	2017	LA County	No
Existing Vegetation: Region 5 - South Coast	**Environment**	US Department of Agriculture Forest Service https://data.fs.usda.gov/geodata/edw/datasets.php	2010	Pacific Southwest	No
Geological Map of California	**Environment**	US Geological Survey https://mrdata.usgs.gov/geology/state/state.php?state=CA	2010	California	No
Global Biodiversity Hotspots	**Environment**	Conservation International https://databasin.org/	2004	World	No
Greenhouse Gas Emissions of Residential Buildings	**Environment**	UCLA Grand Challenge https://grandchallengesucla.carto.com/me	2010	LA County	No
Historic River Course	**Environment**	OLIN[12]	2019	LA Basin	Yes
Historic Wetlands (historic and current line features)	**Environment**	UCLA, Charles Rairdan	1998	Los Angeles Basin	No
Historic Wetlands (historic line features)	**Environment**	UCLA, Charles Rairdan	1998	Los Angeles Basin	No
Historic Wetlands (historic polyline features)	**Environment**	UCLA, Charles Rairdan	1998	Los Angeles Basin	No
Historic Wetlands (historic and current polyline features)	**Environment**	UCLA, Charles Rairdan	1998	Los Angeles Basin	No
Invasive Plant Cover - Coastal Watersheds	**Environment**	California Natural Resources Agency https://wildlife.ca.gov/Data/GIS/IMAPS	2009	California	No
Invasive Plants (Species) - Central and So. Cal Coastal Watersheds	**Environment**	California Department of Fish & Wildlife https://apps.wildlife.ca.gov/bios/	2009	California	No

SPATIAL DATA LIBRARY

Name	Theme	Source	Year	Extent	LARMP Data
LEED Buildings	**Environment**	UCLA Grand Challenge https://grandchallengesucla.carto.com/me	2015	LA County	No
Level III Ecoregions	**Environment**	US Environmental Protection Agency https://www.epa.gov/eco-research/ecoregions	2017	North America	No
Level IV Ecoregions	**Environment**	US Environmental Protection Agency https://www.epa.gov/eco-research/ecoregions	2017	North America	No
Los Angeles Climate-Smart Cities Analysis Results	**Environment**	Trust for Public Land https://geohub.lacity.org/	2017	LA County	No
Los Angeles County Soils Properties Used in SBPAT	**Environment**	Geosyntec	2008	LA County	No
Los Angeles County Sunset Climate Zones Layer	**Environment**	Jimmy Singh https://www.arcgis.com/home/item.html?id=b25dec9bae7e4cb0a5c49e983361fd23	2016	LA County	No
Los Angeles Historical Boundaries	**Environment**	Atlas of Urban Expansion https://www.lincolninst.edu/research-data/data-toolkits	2010	LA County	No
Maximum Temperature	**Environment**	PRISM Climate Group http://prism.oregonstate.edu/normals/	2015	United States	No
Mean Temperature	**Environment**	PRISM Climate Group http://prism.oregonstate.edu/normals/	2015	United States	No
Minimum Temperature	**Environment**	PRISM Climate Group http://prism.oregonstate.edu/normals/	2015	United States	No
Natural Vegetation of California	**Environment**	OLIN[13]	2018	California	Yes
PEV's per Household	**Environment**	UCLA Grand Challenge https://grandchallengesucla.carto.com/me	2017	LA County	No
Shot Hole Borers	**Environment**	UC Cooperative Extension http://ucanr.maps.arcgis.com/apps/Viewer/index.html?appid=3446e311c5bd434eabae98937f085c80	2017	Southern California	No
Soil Types	**Environment**	LA County Public Works https://egis-lacounty.hub.arcgis.com/	2004	LA County	No
Solar Data Summarized to 2010 Parcels	**Environment**	UCLA https://grandchallengesucla.carto.com/tables/leed_buildings_2015/public	2015	LA County	No
Species Observations (eBird)	**Environment**	Cornell Lab of Ornithology https://secure.birds.cornell.edu/cassso/login?service=https%3A%2F%2Febird.org%2Flogin%2Fcas%3Fportal%3Debird&locale=en_US	2018	World	Yes
Species Observations (iNaturalist)	**Environment**	iNaturalist https://www.inaturalist.org/observations	2018	World	Yes
Superfund Sites	**Environment**	US Environmental Protection Agency https://www.epa.gov/cleanups/cleanups-my-community	2018	United States	No
Temperature Differential	**Environment**	OLIN	2015	United States	Yes

SPATIAL DATA LIBRARY

Name	Theme	Source	Year	Extent	LARMP Data
Threatened & Endangered Species Active Critical Habitat 1	**Environment**	US Fish & Wildlife Service https://ecos.fws.gov/ecp/report/table/critical-habitat.html?	2018	United States	No
Threatened & Endangered Species Active Critical Habitat 2	**Environment**	US Fish & Wildlife Service https://ecos.fws.gov/ecp/report/table/critical-habitat.html?	2018	United States	No
Tree Canopy (2006)	**Environment**	LAR-IAC https://egis3.lacounty.gov/dataportal/2010/12/23/tree-canopy-raster-2006-data/ (last accessed 2018, link no longer active)	2011	LA County	No
Urban Areas	**Environment**	US Census Bureau https://www.census.gov/geographies/mapping-files.html	2017	United States	No
Urban Boundary 1	**Environment**	SCAG GIS & DATA Services https://gisdata-scag.opendata.arcgis.com/	2007	LA County	No
Wildland Urban Intermix	**Environment**	US Department of Agriculture Forest Service https://www.fs.usda.gov/detail/r5/landmanagement/gis/?cid=STELPRDB5327836	2006	California	No
EPA Registered Sites	**Health**	US Environmental Protection Agency https://www.epa.gov/frs/geospatial-data-download-service	2018	United States	No
Estimated Prevalence of Serious Mental Illness	**Health**	LA County Department of Mental Health https://egis-lacounty.hub.arcgis.com/	2014	LA County	No
Gardens	**Health**	UC Global Food Initiative http://geodata.ucanr.edu/uala/uala_v2.00.html	2017	LA County	No
Health Districts	**Health**	LA County Department of Public Health https://egis-lacounty.hub.arcgis.com/	2012	LA County	No
ArcGIS World Imagery Basemap	**Imagery**	DigitalGlobe	2017	World	No
Transmission Lines	**Infrastructure**	California Energy Commission https://cecgis-caenergy.opendata.arcgis.com/	2018	California	No
Assessor Parcels	**Land Use and Planning**	LA County Assessor https://data.lacounty.gov/Parcel-/Assessor-Parcels-Data-2006-thru-2021/9trm-uz8i	2021	LA County	No
Debris Basin - Right of Way	**Land Use and Planning**	LA County Public Works https://egis-lacounty.hub.arcgis.com/	2005	LA County	No
Fernandeño Tataviam Villages	**Land Use and Planning**	Fernandeño Tataviam Band of Mission Indians	2015	LA County	No
Gabrielino Tongva Sites and Villages	**Land Use and Planning**	Los Angeles Times https://www.latimes.com/projects/la-me-tongva-map/	2019	LA County	No
Known Projects Database	**Land Use and Planning**	OLIN, Geosyntec	2019	LA County	Yes
LA River Right-of-Way	**Land Use and Planning**	OLIN	2018	LA County	Yes
LA River Trail	**Land Use and Planning**	OLIN	2019	LA County	Yes

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Name	Theme	Source	Year	Extent	LARMP Data
LA River Trail Access Points	**Land Use and Planning**	OLIN[14]	2021	LA County	Yes
LARMP Need Analysis	**Land Use and Planning**	OLIN, Geosyntec	2021	LA County	Yes
Los Angeles County Climate Action Plan Status	**Land Use and Planning**	The Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC) https://larc.carto.com/me	2017	LA County	No
Los Angeles County Storm Drain System and Maintenance Map	**Land Use and Planning**	LA County Public Works https://pw.lacounty.gov/	2018	LA County	No
Los Angeles County Sustainability Plan Status	**Land Use and Planning**	The Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC) https://larc.carto.com/me	2017	LA County	No
M, L, XL Planned Major Projects (Linear)	**Land Use and Planning**	OLIN	2021	LA County	Yes
M, L, XL Planned Major Projects and Proposed Project Sites (Polygon)	**Land Use and Planning**	OLIN, Geosyntec, Gehry Partners	2021	LA County	Yes
Overlays	**Land Use and Planning**	OLIN, Geosyntec	2019	LA County	Yes
Planning Frames (1-mile buffer)	**Land Use and Planning**	OLIN	2019	LA County	Yes
Proposed Connectivity Loops	**Land Use and Planning**	OLIN	2021	LA County	Yes
Proposed Major Project Zones	**Land Use and Planning**	OLIN	2021	LA County	Yes
Transit Oriented Districts	**Land Use and Planning**	LA County Department of Regional Planning https://egis-lacounty.hub.arcgis.com/	2005	LA County	No
XS and S Proposed Sites	**Land Use and Planning**	OLIN, Geosyntec, Gehry Partners	2021	LA County	Yes
Department of Parks and Recreation Trails	**Public Facilities**	LA County Department of Parks and Recreation https://egis-lacounty.hub.arcgis.com/	2015	LA County	No
DPR Trail Access Points	**Public Facilities**	LA County Department of Parks and Recreation https://lacounty.maps.arcgis.com/home/index.html	2016	LA County	No
Electric Utility Service Areas	**Public Facilities**	California Energy Commission https://gis.data.ca.gov/	2015	California	No
LACFCD Right-of-Way Parcels	**Public Facilities**	LA County Public Works https://egis-lacounty.hub.arcgis.com/	2018	LA County	No
Locations/Points of Interest (LMS Data)	**Public Facilities**	LA County Internal Services Department https://data.lacounty.gov/	2016	LA County	No
Park Acres Per Thousand	**Public Facilities**	LA County Department of Parks and Recreation http://lacountyparkneeds.org/interactive-maps-and-data/ (last accessed 2018, link no longer active)	2016	LA County	No
Park Amenities	**Public Facilities**	LA County Department of Parks and Recreation http://lacountyparkneeds.org/interactive-maps-and-data/ (last accessed 2018, link no longer active)	2016	LA County	No

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Name	Theme	Source	Year	Extent	LARMP Data
Park Need Overview	**Public Facilities**	LA County Department of Parks and Recreation https://lacounty.maps.arcgis.com/home/index.html	2016	LA County	No
River Recreation Zones	**Public Facilities**	LA Mountains Recreation & Conservation Authority http://lariverrecreation.org/	2018	LA County	No
Swim Areas	**Public Facilities**	LA County Department of Public Health http://www.publichealth.lacounty.gov/eh/safety/recreational-waters.htm	2018	LA County	No
Trail-Related Facilities	**Public Facilities**	LA County Department of Parks and Recreation https://lacounty.maps.arcgis.com/home/index.html	2016	LA County	No
Walkable Area (one half-mile from park)	**Public Facilities**	LA County Department of Parks and Recreation http://lacountyparkneeds.org/interactive-maps-and-data/ (last accessed 2018, link no longer active)	2016	LA County	No
1.41 meter Sea Level Rise	**Safety**	California Climate Change Assessment https://cal-adapt.org/tools/slr-calflod-3d/	2018	California	No
All Oil and Gas Wells	**Safety**	California Department of Conservation https://maps.conservation.ca.gov/	2018	California	No
Disaster Management Areas	**Safety**	LA County Office of Emergency Management https://data.lacounty.gov/	2015	LA County	No
Disaster Routes	**Safety**	LA County Office of Emergency Management https://data.lacounty.gov/	1998	LA County	No
Faults	**Safety**	California Department of Conservation https://gis.conservation.ca.gov/portal/home/index.html	2016	California	No
Fire Hazard Severity Zones (LRA)	**Safety**	CAL FIRE https://frap.fire.ca.gov/mapping/gis-data/	2012	California	No
Fire Hazard Severity Zones (SRA)	**Safety**	CAL FIRE https://frap.fire.ca.gov/mapping/gis-data/	2007	California	No
Fire Perimeters	**Safety**	CAL FIRE https://map.dfg.ca.gov/metadata/ds0396.html	2018	California	No
Flood Hazard data from FEMA	**Safety**	FEMA https://www.fema.gov/flood-maps/national-flood-hazard-layer	2018	United States	No
Historic Earthquakes	**Safety**	California Department of Conservation https://maps.conservation.ca.gov/	2016	California	No
Seismic Hazards – LA County (from State of CA)	**Safety**	LA County Department of Regional Planning https://www.conservation.ca.gov/cgs/shp	Varies	LA County	No
Tsunami Inundation Zones	**Safety**	LA County Office of Emergency Management https://egis-lacounty.hub.arcgis.com/	2011	LA Councy	No

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Name	Theme	Source	Year	Extent	LARMP Data
California Electric Utility Service Area	**Services**	California Energy Commission https://gis.data.ca.gov/	2015	California	No
Civil Rights Advocacy	**Services**	Gehry Partners	2020	LA County	Yes
Courts	**Services**	Gehry Partners	2019	LA County	Yes
Legal Services	**Services**	Gehry Partners	2021	LA County	Yes
Locations/Points of Interest (LMS Data)	**Services**	LA County GIS Data Portal https://data.lacounty.gov/	2016	LA County	No
Re-Entry Services	**Services**	Gehry Partners	2022	LA County	Yes
Specialized Services	**Services**	Gehry Partners	2023	LA County	Yes
Vector Control Districts	**Services**	Mosquito and Vector Control Association of California http://www.arcgis.com/home/webmap/viewer.html?webmap=604a0fe9f2b74e98a53b53d192b2ac67&extent=-131.4442,32.5803,-108.7025,41.6862,%202016	2017	California	No
2012 County of Los Angeles Bicycle Master Plan	**Transportation**	LA County Public Works https://pw.lacounty.gov/tpp/bike/	2012	LA County	No
Active Transportation Strategic Plan	**Transportation**	LA County Metropolitan Transportation Authority http://gis.fehrandpeers.com/metroatsp/ (last accessed 2019, link no longer active)	2014	LA County	No
Airport Boundaries	**Transportation**	California Department of Transportation https://gisdata-caltrans.opendata.arcgis.com/	2012	California	No
Airports	**Transportation**	LA County Department of Regional Planning https://egis-lacounty.hub.arcgis.com/	2015	LA County	No
All Metro Rail Stations	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2016	LA County	No
Bike-Share Stations	**Transportation**	US Department of Transportation Bureau of Transportation Statistics https://data-usdot.opendata.arcgis.com/	2018	United States	No
Bikeways	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2012	LA County	No
Blue Line (801) Stations	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2016	LA County	No
Blue Line (801) Track	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2016	LA County	No
Bridge Condition	**Transportation**	US Department of Transportation https://www.fhwa.dot.gov/bridge/nbi.cfm	2017	United States	No
Bus Lines	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2018	LA County	No

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Name	Theme	Source	Year	Extent	LARMP Data
Bus Stops on Lines	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2018	LA County	No
California Rail Network	**Transportation**	California Department of Transportation https://gis.data.ca.gov/	2013	California	No
Commuter & Circulator Bus Routes	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2017	LA County	No
Existing Bike Facilities	**Transportation**	LA County Metropolitan Transportation Authority https://www.dropbox.com/s/l71vh2h2n5iigyd/ATSPProjectData_Updated2016-5-24.gdb.zip?dl=0	2016	LA County	No
Existing Transit Lines	**Transportation**	LA County Metropolitan Transportation Authority https://www.dropbox.com/s/l71vh2h2n5iigyd/ATSPProjectData_Updated2016-5-24.gdb.zip?dl=3	2016	LA County	No
Expo Line (806) Stations	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2016	LA County	No
Expo Line (806) Track	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2016	LA County	No
Gold Line (804) Stations	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2016	LA County	No
Gold Line (804) Track	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2016	LA County	No
Green Line (803) Stations	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2016	LA County	No
Green Line (803) Track	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2016	LA County	No
LA County Roads	**Transportation**	US Census Bureau https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.html	2017	LA County	No
LA County Streets and Addresses	**Transportation**	LA County Internal Services Department https://egis-lacounty.hub.arcgis.com/	2011	LA County	No
Limited Express Bus Routes	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2017	LA County	No
Local CBD Bus Routes	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2017	LA County	No
Local Non-CBD Bus Routes	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2018	LA County	No
Metro Right-of-Way	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2014	California	No

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Name	Theme	Source	Year	Extent	LARMP Data
Metrolink Lines	**Transportation**	SCAG GIS & DATA Services https://gisdata-scag.opendata.arcgis.com/	2006	LA County	No
Metrolink Stations	**Transportation**	LA County Metropolitan Transportation Authority https://geohub.lacity.org/	2016	LA County	No
Planned Transit Lines	**Transportation**	LA County Metropolitan Transportation Authority https://www.dropbox.com/s/l71vh2h2n5iigyd/ATSPProjectData_Updated2016-5-24.gdb.zip?dl=4	2016	LA County	No
Proposed Bike Facilities	**Transportation**	LA County Metropolitan Transportation Authority https://www.dropbox.com/s/l71vh2h2n5iigyd/ATSPProjectData_Updated2016-5-24.gdb.zip?dl=1	2016	LA County	No
Railroad Bridges	**Transportation**	Homeland Infrastructure Foundation-Level Data https://hifld-geoplatform.opendata.arcgis.com/	2009	United States	No
Rapid & Transitway Bus Routes	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2017	LA County	No
Red Purple Line (802/805) Stations	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2016	LA County	No
Red Purple Line (802/805) Track	**Transportation**	LA County Metropolitan Transportation Authority https://developer.metro.net/gis-data/	2016	LA County	No
Ridership by Stop	**Transportation**	LA County Metropolitan Transportation Authority https://www.dropbox.com/s/l71vh2h2n5iigyd/ATSPProjectData_Updated2016-5-24.gdb.zip?dl=2	2016	LA County	No
100-Year Storm 24-Hour Precip Raster	**Water**	LA County Public Works http://egis3.lacounty.gov/dataportal/wp-content/uploads/2011/01/Rainfall-Intensity.zip	2011	LA County	No
10-Year Storm 24-Hour Precip Raster	**Water**	LA County Public Works http://egis3.lacounty.gov/dataportal/wp-content/uploads/2011/01/Rainfall-Intensity.zip	2011	LA County	No
1-Year Storm 24-Hour Precip Raster	**Water**	LA County Public Works http://egis3.lacounty.gov/dataportal/wp-content/uploads/2011/01/Rainfall-Intensity.zip	2011	LA County	No
25-Year Storm 24-Hour Precip Raster	**Water**	LA County Public Works http://egis3.lacounty.gov/dataportal/wp-content/uploads/2011/01/Rainfall-Intensity.zip	2011	LA County	No
2-Year Storm 24-Hour Precip Raster	**Water**	LA County Public Works http://egis3.lacounty.gov/dataportal/wp-content/uploads/2011/01/Rainfall-Intensity.zip	2011	LA County	No
30-yr Normal Precipitation: Annual	**Water**	PRISM Climate Group http://prism.oregonstate.edu/normals/	2015	United States	No

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Name	Theme	Source	Year	Extent	LARMP Data
30-yr Normal Precipitation: February	**Water**	PRISM Climate Group http://prism.oregonstate.edu/normals/	2015	United States	No
30-yr Normal Precipitation: July	**Water**	PRISM Climate Group http://prism.oregonstate.edu/normals/	2015	United States	No
500-Year Storm 24-Hour Precip Raster	**Water**	LA County Public Works http://egis3.lacounty.gov/dataportal/wp-content/uploads/2011/01/Rainfall-Intensity.zip	2011	LA County	No
50-Year Storm 24-Hour Precip Raster	**Water**	LA County Public Works http://egis3.lacounty.gov/dataportal/wp-content/uploads/2011/01/Rainfall-Intensity.zip	2011	LA County	No
50-Year, 24-Hour Precip Isohyet	**Water**	LA County Public Works http://egis3.lacounty.gov/dataportal/wp-content/uploads/2011/01/Rainfall-Intensity.zip	2011	LA County	No
5-Year Storm 24-Hour Precip Raster	**Water**	LA County Public Works http://egis3.lacounty.gov/dataportal/wp-content/uploads/2011/01/Rainfall-Intensity.zip	2011	LA County	No
85th Percentile, 24-Hour Rainfall Isohyet	**Water**	LA County Public Works https://egis-lacounty.hub.arcgis.com/	2016	LA County	No
95th Percentile, 24-Hour Rainfall Isohyet	**Water**	LA County Public Works https://egis-lacounty.hub.arcgis.com/	2016	LA County	No
ALERT Rain Gauges	**Water**	LA County Public Works http://ladpw.org/wrd/Precip/alertlist.cfm	2006	LA County	No
ARBOR Reach Channel Capacity and Level of Protection Return Period	**Water**	Geosyntec	2019	LA County	Yes
Hydraulic Design Reaches with Channel Material, Shape, and Width	**Water**	Geosyntec	2016	LA County	No
CIMP Water Quality Monitoring Sites	**Water**	Upper LA River Watershed Management Group; LA River Upper Reach 2 Watershed Management Group; Lower Los Angeles River Watershed Management Group https://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/watershed_management/los_angeles/lower_losangeles/LLAR_CIMP_Draft_Revised_12-21-17.pdf https://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/watershed_management/los_angeles/upper_reach2/2016-01-22ApprovedLARUR2WMACIMP.pdf https://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/watershed_management/los_angeles/upper_losangeles/UpperLARiverFinalCIMP.pdf	2017; 2016; 2015	LA County	Yes
Concentration Point Channel Capacity	**Water**	Geosyntec	2019	LA County	Yes
Concentration Point Level of Protection Return Period	**Water**	Geosyntec	2019	LA County	Yes
Confined Aquifer	**Water**	Geosyntec	2015	LA County	No
Dam Lines	**Water**	Homeland Infrastructure Foundation-Level Data https://hifld-geoplatform.opendata.arcgis.com/	2009	United States	No

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Name	Theme	Source	Year	Extent	LARMP Data
Depth to Groundwater	**Water**	Geosyntec	2016	LA County	No
Geophysical Categories	**Water**	Geosyntec	2015	LA County	No
Groundwater Basins	**Water**	LA County Public Works https://egis-lacounty.hub.arcgis.com/	2014	LA County	No
Groundwater Aquifer	**Water**	California Department of Water Resources https://egis-lacounty.hub.arcgis.com/	2011	California	No
Groundwater Production Wells Location	**Water**	California Water Boards https://gamagroundwater.waterboards.ca.gov/gama/datadownload.asp	2018	California	No
Hydraulic Conductivity	**Water**	Geosyntec	2017	United States	No
Hydraulic Design Reaches	**Water**	Geosyntec http://riverlareports.riverla.org/tools-2/river-reaches/	2016	LA County	No
Impaired Waters	**Water**	California Water Boards https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2012.shtml	2012	California	No
Impervious Surface	**Water**	Multi-Resolution Land Cover Characteristics (MRLC) Consortium https://www.mrlc.gov/data?f%5B0%5D=category%3AUrban%20Imperviousness	2011	LA County	No
LA County Drainage Area Flood Control Map	**Water**	US Army Corps of Engineers Los Angeles District https://www.arcgis.com/home/item.html?id=562aa84a5f5f4a28af44a185308a70d7	2016	LA County	No
Lakes and Reservoirs	**Water**	US Geological Survey https://data.lacounty.gov/	2011	LA County	No
LA River Miles	**Water**	Geosyntec http://riverlareports.riverla.org/tools-2/2d-information/mile-markers/	2016	LA County	No
Soil Database covering Los Angeles County	**Water**	US Department of Agriculture Natural Resrouces Conservation Service https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm	2017	United States	No
Spreading Grounds	**Water**	LA County Public Works https://egis-lacounty.hub.arcgis.com/	2006	LA County	No
Standard Rain Gauges	**Water**	LA County Public Works http://ladpw.org/wrd/Precip/standard.cfm	2006	LA County	No
Storm Drain Network	**Water**	LA County Public Works https://egis-lacounty.hub.arcgis.com/	2013	LA County	No
Subwatershed Boundary	**Water**	LA County Public Works https://egis-lacounty.hub.arcgis.com/	2005	LA County	No
TMDL Numeric Targets	**Water**	Geosyntec	2018	LA County	Yes
Water Purveyor Service Areas	**Water**	LA County Public Works https://www.waterhub.ucla.edu/suppliers.html	2016	LA County	No
Water Quality Prioritization	**Water**	Geosyntec	2013	LA County	No

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Name	Theme	Source	Year	Extent	LARMP Data
Water Reclamation Plants Impacting LA River	**Water**	Geosyntec http://gispublic.waterboards.ca.gov/arcgis/rest/services/Facilities/NPDES_Regulated_Facilities/MapServer	2015	LA County	No
Water Supply Sources	**Water**	UCLA Water Hub https://github.com/erikporse/artes/blob/master/geo/agencies/water_hub_retailers.zip	2017	LA County	No
Watershed Basin	**Water**	US Geological Survey https://data.cnra.ca.gov/dataset/watershed-boundary-dataset-wbd	2016	California	No

Figure 128. A transition area in the Studio City section of the LA River at river mile 37.8. Source: LA County Public Works, 2018.

12.
LITERATURE REVIEW SOURCES

THE LA RIVER MASTER PLAN PROCESS INCLUDED A ROBUST LITERATURE REVIEW OF OVER 140 EXISTING PLANNING DOCUMENTS

The LA River Master Plan process included a literature review of over 140 existing planning documents that are related to the LA River, adjacent communities, adjacent habitat areas, or adjacent infrastructure.

Planning documents included the 1996 LA River Master Plan and 11 other guiding documents, which are outlined in the LA River Master Plan, Chapter 2. Other documents reviewed are listed in this technical backup document on the following pages.

Figure 129. The Master Plan summarizes the 1996 Master Plan and describes the other 11 documents that provided the most guidance for the update to the LA RIver Master Plan, Chapter 2.

LITERATURE REVIEW SOURCES

Document Name	Date	Prepared by	Prepared for
Parks, Playgrounds, and Beaches for the Los Angeles Region (Commonly called the "Olmsted Bartholomew Plan")	1930	Olmsted Brothers and Bartholomew and Associates	Citizens' Committee on Parks, Playgrounds, and Beaches
Santa Monica Mountains Comprehensive Plan	1979	Santa Monica Mountains Comprehensive Planning Commission	Santa Monica Mountains Comprehensive Planning Commission
Plan for Beneficial Reuse of Reclaimed Water	1995	Sanitation Districts of Los Angeles County	Sanitation Districts of Los Angeles County
Los Angeles River Master Plan (1996)	1996	County of LA DPW, USACOE, Sapphos Environmental, JHA Environmental and Engineering, Hall Construction and Engineering, Lawrence R. Moss and Associates,	Los Angeles County Public Works
Long Beach General Plan Land Use Element	1997	Long Beach Department of Planning and Building	Long Beach Department of Planning and Building
Boyle Heights Community Plan	1998	City of Los Angeles	City of Los Angeles
Sherman Oaks-Studio City-Toluca Lake-Cahuenga Pass Community Plan	1998	City of Los Angeles	City of Los Angeles
Encino-Tarzana Community Plan	1998	City of Los Angeles	City of Los Angeles
Northeast Los Angeles Community Plan	1999	City of Los Angeles	City of Los Angeles
Reseda- West Van Nuys Community Plan	1999	City of Los Angeles	City of Los Angeles
Canoga Park-Winnetka-Woodland Hills-West Hills Community Plan	1999	City of Los Angeles	City of Los Angeles
Eden by Design 1930 Olmsted-Bartholomew Plan for the LA Region	2000	William Deverell	N/A
Central City North Community Plan	2000	City of Los Angeles	City of Los Angeles
Common Ground Plan	2001	California Resources Agency, San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy, Santa Monica Mountains Conservancy, EIP Associates, Arthur Golding & Associates, MWH, Oralia Michel Marketing, Garvey Communications, Tree People	San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy, Santa Monica Mountains Conservancy
Long Beach General Plan Open Space and Recreation Element	2002	Long Beach Department of Planning and Building	Long Beach Department of Parks, Recreation and Marine
City of Lynwood General Plan	2003	City of Lynwood	City of Lynwood
Los Angeles River Master Plan Sign Guidelines	2003	Mountain Recreation & Conservation Authority	Los Angeles County Public Works
City of Huntington Park Economic Development Plan	2004	Rosenow Spevacek Group	City of Huntington Park
Silver Lake-Echo Park-Elysian Valley Community Plan	2004	City of Los Angeles	City of Los Angeles
Los Angeles River Master Plan Landscaping Guidelines and Plant Palettes	2004	Los Angeles County Public Works	Los Angeles County Public Works
Compton Creek Watershed Management Plan	2005	Los Angeles and San Gabriel Rivers Watershed Council with assistance of EIP Associates and Heal the Bay	Council for Watershed Health
The Water Replenishment District of Southern California's Groundwater Basins Master Plan	2005	CH2M and RMC	Water Replenishment District of Southern California
LA River Index	2005	River LA, Gehry Partners, OLIN, and Geosyntec	River LA

LITERATURE REVIEW SOURCES

Document Name	Date	Prepared by	Prepared for
City of Downey General Plan: Vision 2025	2005	City of Downey	City of Downey
Compton Creek Regional Garden Master Plan	2006	Mia Lehrer + Associates, Psomas, MK Consulting, The Robert Group	The City of Compton and the Rivers and Mountains Conservancy
Metro Bicycle Transportation Strategic Plan	2006	Alta Planning + Design, Inc	Los Angeles County Metropolitan Transportation Authority
Hydrology Manual	2006	Los Angeles County Public Works Water Resources Division	Los Angeles County Public Works
Long Beach River Link	2007	Long Beach Department of Parks, Recreation and Marine	Long Beach Department of Parks, Recreation and Marine
Los Angeles River Revitalization Master Plan	2007	Tetra Tech	The City of Los Angeles Dept. of Public Works Bureau of Engineering
Compton Creek Earthen Bottom Feasibility Study	2008	Mia Lehrer + Associates Restoration Design Group	Los Angeles and San Gabriel Rivers Watershed Council
City of Commerce 2020 General Plan	2008	City of Commerce	City of Commerce
Los Angeles River Improvement Overlay	2008	City of Los Angeles Planning Department	City of Los Angeles Planning Department
South Gate General Plan	2009	Raimi & Associates	City of South Gate
County Construction Site Best Management Practices Manual	2010	Los Angeles County Public Works Construction Division and Environmental Compliance Unit	Los Angeles County Public Works
City of Bell 2010 General Plan	2010	City of Bell	City of Bell
Compton Creek Trails Community Assessment	2010	Rails to Trails Conservancy	City of Compton
Urban Art Program	2010	City of Glendale	City of Glendale
Sustainable City Master Plan (City of Long Beach)	2010	Long Beach Office of Sustainability	City of Long Beach
LADCP 2010 Bicycle Plan	2011	LADCP	LADCP
Glendale Safe & Healthy Streets Plan	2011	City of Glendale	City of Glendale
Greener Glendale Plan	2011	City of Glendale	City of Glendale
Bicycle Master Plan - Final Plan	2012	Alta Planning + Design	Los Angeles County Public Works
SCAG 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS): Towards a Sustainable Future	2012	SCAG	SCAG
City of Glendale Bicycle Transportation Plan	2012	Ryan Snyder Associates	City of Glendale
City of Long Beach Downtown Plan	2012	AECOM, Cityworks Design, Iteris, Strategic Economics, and ICF Jones and Stokes with Patricia Smith, Contributing	Long Beach Development Services
City of South Gate Bicycle Transportation Plan	2012	Ryan Snyder Associates	City of South Gate
Bicycle Master Plan	2012	Alta	County of Los Angeles
County of Los Angeles 2013-2018 Consolidated Plan	2012	Los Angeles County	Los Angeles County

LITERATURE REVIEW SOURCES

Document Name	Date	Prepared by	Prepared for
SCAG 5th Cycle Regional Housing Needs Assessment Final Allocation Plan	2012	SCAG	State of California
County of Los Angeles Bicycle Master Plan Appendix F Design Guidelines	2012	Alta Planning + Design	Los Angeles County Public Works
The Drought Tolerant Garden	2012	Bki, Green Gardens Group	County of Los Angeles
Warner Center 2035 Specific Plan	2013	Los Angeles Department of City Planning	Los Angeles Department of City Planning
Burbank 2035 General Plan	2013	AECOM	City of Burbank
City of Cudahy Pedestrian Safety Assessment	2013	ITS Berkeley	City of Cudahy
City of Cudahy Housing Element Update	2013	City of Cudahy	City of Cudahy
City of Downey 2014-2021 Housing Element	2013	ESA	City of Downey
City of Los Angeles Housing Element 2013-2021	2013	City of Los Angeles	City of Los Angeles
City of Lynwood Residential Design Guidelines	2013	MIG, Hogle-Ireland	City of Lynwood
Greater Los Angeles County Region (GLACR) Integrated Regional Water Management (IRWM) 2014 Plan Update	2014	Leadership Committee of Greater Los Angeles County Integrated Regional Water Management Region, RMC Water and Environment, Geosyntec Consultants, 2M Associates, Green info Network, Solution Strategies International	Leadership Committee of Greater Los Angeles County Integrated Regional Water Management Region, DWR, Los Angeles County DPW
City of Lynwood – 2014-2021 Housing Element	2014	ESA	City of Lynwood
City of Burbank 2014-2021 Housing Element	2014	AECOM	City of Burbank, Community Development Department
City of Burbank Analysis of Impediments to Fair Housing Choice (FY14/15-18/19)	2014	Karen Warner Associates	City of Burbank, Community Development Department
City of Compton 2030 Comprehensive General Plan Update	2014	Blodgett Baylosis Environmental Planning	City of Compton Planning & Economic Development Division
City of Cudahy Housing Element Update	2014	City of Cudahy	City of Cudahy
City of Glendale 2014-2021 Housing Element	2014	City of Glendale	City of Glendale
City of Huntington Park Bicycle Transportation Master Plan	2014	Evan Brooks Associates	City of Huntington Park
Healthy Communities Policy	2014	Long Beach Development Services, Health and Human Services	Long Beach Development Services, Health and Human Services
Long Beach General Plan 2013-2021 Housing Element	2014	Long Beach Development Services	Long Beach Development Services
Hollywood Community Plan	2014	City of Los Angeles	City of Los Angeles
Housing Element Update	2014	City of Paramount Community Development Department	City of Paramount Community Development Department
South Gate Housing Element	2014	City of South Gate	City of South Gate
Los Angeles County Public Works Low Impact Development Standards Manual	2014	Los Angeles County Public Works	Los Angeles County Public Works
Vision Plan for Griffith Park: An Urban Wilderness Identity	2014	City of Los Angeles Department of Recreation and Parks	City of Los Angeles Department of Recreation and Parks

LITERATURE REVIEW SOURCES

Document Name	Date	Prepared by	Prepared for
Rail to River Intermediate Active Transportation Corridor Feasibility Study	2014	Alta	Los Angeles County Metropolitan Transportation Authority
Los Angeles River Upper Reach 2 Watershed Management Program	2015	LAR U2 WMG/CWE	Los Angeles Gateway Region Integrated Regional Water Management Authority/LARWQCB
Los Angeles Department of Water and Power's Stormwater Capture Master Plan	2015	Geosyntec	LADWP
Los Angeles River Ecosystem Restoration Integrated Feasibility Report and its Recommended Plan	2015	U.S. Army Corps of Engineers Los Angeles District	The City of Los Angeles
City of Carson Consolidated Plan	2015	City of Carson	City of Carson
City of Compton Bicycle Master Plan	2015	Alta	City of Compton
City of Downey 2015-2020 Consolidated Plan and FY 15-16 Annual Action Plan	2015	The Ramsay Group	City of Downey
City of Huntington Park Consolidated Plan 2015-2020	2015	City of Huntington Park	City of Huntington Park
City of Long Beach Housing Action Plan (2016-2021)	2015	Long Beach Development Services	Long Beach Development Services
City of Long Beach Draft Consolidated Pan (FY2018-FY2022) and FY 2018 Annual Action Plan (Octoer1, 2017=September 30,2018)	2015	Long Beach Development Services	Long Beach Development Services
City of Vernon General Plan	2015	City of Vernon	City of Vernon
Los Angeles County General Plan 2035	2015	County of Los Angeles	County of Los Angeles
Community Climate Action Plan 2020	2015	ICF	County of Los Angeles
Los Angeles River Design Guidelines	2015	City of Los Angeles	City of Los Angeles
Hillside Design Guidelines	2015	County of Los Angeles	County of Los Angeles
Livable West Long Beach: The West Long Beach Livability Implementation Plan	2015	City of Long Beach	City of Long Beach
LA River Habitat Enhancement Study	2016	Land IQ, Natural History Museum Los Angeles County, University of Southern California, WRC, Connective Issue, Inc	The Nature Conservancy
Los Angeles Basin Study	2016	U.S. Department of the Interior Bureau of Reclamation Lower Colorado Region and the Los Angeles County Flood Control District	U.S. Department of the Interior Bureau of Reclamation Lower Colorado Region
Los Angeles River Bike Path Gap Closure Feasibility Study	2016	Metro	Metro
Enhanced Watershed Management Program for the Upper Los Angeles River Watershed	2016	ULAR WMG/CH2M, Black & Veatch, Paradigm, CDM Smith, Larry Walker Associates, Tetra Tech	LARWQCB
Rio Hondo/San Gabriel River Enhanced Watershed Management Program	2016	Rio Hondo/San Gabriel River Water Quality Group/ CWE	LARWQCB
LA River Valley Bikeway and Greenway Design Completion Project, From Owensmouth Avenue to Riverside	2016	City of LA, BOE	City of LA, BOE
Los Angeles Countywide Comprehensive Parks & Recreation Needs Assessment	2016	PLACEWORKS (GreenInfo Network, DakeLuna Consultants, David Taussig & Associates, MIG, Prevention Institute)	Los Angeles County Department of Parks & Recreation
National Park Service Rim of the Valley Special Resource Study	2016	The National Park Service (NPS)	Congress (Consolidated Natural Resources Act of 2008)

LITERATURE REVIEW SOURCES

Document Name	Date	Prepared by	Prepared for
City of Bell Draft Housing Element 2014-2021	2016	City of Bell	City of Bell
City of Bell Bicycle Master Plan	2016	Alta Planning & Design	City of Bell
2015-2020 Five-Year Consolidated Plan and 2015-2016 Annual Action Plan	2016	City of Carson	City of Carson
City of Downey 2016-17 Action Plan	2016	City of Downey Community Development Department	City of Downey Community Development Department
City of Long Beach Assessment of Fair Housing	2016	Long Beach Development Services	Long Beach Development Services
Los Angeles Comprehensive Homeless Strategy	2016	City of Los Angeles	City of Los Angeles
LA River Design Guidebook	2016	Bloomberg Associates	City of Los Angeles
City of El Monte Watershed Management Program	2017	City of El Monte/CASC Engineering and Consulting	LARWQCB
Lower Los Angeles River Watershed Management Program	2017	LLAR WMG/John L. Huter	LARWQCB
One Water 2040 LA Plan - Volume 1 Summary Report	2017	Carollo, Stantec, Geosyntec, CDM Smith, CH2M, KATZ & Associates, M2 Resource Consulting	LASAN
One Water 2040 LA Plan - Volume 2 Wastewater Facility Plan	2017	Stantec, Carollo	LASAN
One Water 2040 LA Plan - Volume 3 Stormwater & Urban Runoff Facilities Plan	2017	Geosyntec, Carollo, Kris Helm Consulting, Paradigm, Larry Walker Associates, Tetra Tech	LASAN
One Water 2040 LA Plan - Volume 4 LA River Flow Study	2017	Carollo, SEITec, CDM Smith, CH2M, Geosyntec, Tetra Tech	LASAN
One Water 2040 LA Plan - Volume 5 Integration Opportunities Analysis Details	2017	Carollo, M2 Resources Consulting	LASAN
One Water 2040 LA Plan - Volume 6 Climate Risk and Resilience Assessment for Wastewater and Stormwater Infrastructure	2017	CH2M, Carollo	LASAN
One Water 2040 LA Plan - Volume 7 Implementation Strategy Details	2017	Carollo, Cordoba Corporation, John Robinson Consulting, Inc., Stantec, CDM Smith, M2 Resources Consulting	LASAN
One Water 2040 LA Plan - Volume 8 Technical Support Materials	2017	Carollo, Stantec, Geosyntec, Paradigm, CDM Smith, CH2M	LASAN
One Water 2040 LA Plan - Volume 9 Stakeholder Engagement Materials	2017	Carollo, Katz & Associates, CDM Smith	LASAN
Los Angeles River Valley Bikeways & Greenways Design Completion Project	2017	City of LA, BOE	City of LA, BOE
2016-2017 Los Angeles County Civil Grand Jury Final Report	2017	Los Angeles County Civil Grand Jury	In support of the County of Los Angeles Board of Supervisors' Strategic Plan: "Foster Vibrant and Resilient Communities"; "Expand Access to Recreational and Cultural Opportunities"
I-710 Corridor Project Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement and Section 4(f) Evaluation	2017	State of California Department of Transportation and the Los Angeles County Metropolitan Transportation Authority	State of California Department of Transportation
LA Sustainable Water Project: Los Angeles River Watershed	2017	UCLA Institute of the Environment and Sustainability, UCLA Sustainable LA Grand Challenge, Colorado School of Mines	UCLA Institute of the Environment and Sustainability, UCLA Sustainable LA Grand Challenge, Colorado School of Mines
Cudahy 2040 Draft	2017	City of Cudahy	City of Cudahy

LITERATURE REVIEW SOURCES

Document Name	Date	Prepared by	Prepared for
City of Downey Consolidated Annual Performance and Evaluation Report (CAPER) FY 2016-2017	2017	City of Downey Community Development Department	City of Downey Community Development Department
City of Downey 2016 General Plan Annual Report	2017	City of Downey Community Development Department	City of Downey Community Development Department
Revenue Tools and Incentives for the Production of Affordable and Workforce Housing	2017	Long Beach Development Services	Long Beach Development Services
Gateway District Draft Specific Plan	2017	AECOM	City of South Gate
2017 Housing Inventory Count (HIC)- Los Angeles Continuum of Care (CoC)	2017	Los Angeles Homeless Services Authority	Los Angeles Homeless Services Authority
2017 Los Angeles Continuum Of Care Homeless Count - Methodology Report	2017	USC	Los Angeles Homeless Services Authority
2017 Assessment of Fair Housing for the Community Development Commission and Housing Authority of the County of Los Angeles	2017	Western Economic Services, LLC	Community Development Commission of the County of Los Angeles; Housing Authority of the County of Los Angeles
Burbank Neighborhood Design Guidelines and Checklist	2017	John Kaliski Architects, Dyett and Bhatia	City of Burbank
The Lower LA River Revitalization Plan (AB 530)	2017	Tetra Tech, Perkins+Will	California State Assembly Bill 530 (AB530), Working Group
County of Los Angeles Water Resilience Plan	2017	Los Angeles County Public Works	Los Angeles County Public Works
LA County Arts Report: Cultural Equity & Inclusion Initiative	2017	County of Los Angeles Department of Arts and Culture	County of Los Angeles Department of Arts and Culture
Emerald Necklace Feasibility Study and Implementation Plan	2017	BlueGreen Consulting and Withers & Sandgreen Landscape Architecture and Planning	Watershed Conservation Authority
Gateway Cities and Rivers Urban Greening Master Plan	2018	Watershed Conservation Authority, North East Trees	Gateway Cities Council of Governments
Los Angeles County Affordable Housing Action Plan	2018	Estolano LeSar Perez; Lesar; Keyser Marston	Los Angeles County Department of Regional Planning
Uptown Open Space Vision Plan	2018	City Fabrick	City of Long Beach
Upper Los Angeles River and Tributaries Working Group	N/A	California State Assembly	N/A
City of Glendale General Plan	N/A	City of Glendale	City of Glendale
City of Los Angeles General Plan	N/A	City of Los Angeles	City of Los Angeles
City of Maywood General Plan	N/A	City of Maywood	City of Maywood
Significant Ecological Areas Program	N/A	County of Los Angeles	County of Los Angeles
TOD Program	N/A	County of Los Angeles	County of Los Angeles
Groundwater Development and Augmentation Plan (GDAP)	N/A	LADWP/Geosyntec	LADWP
Los Angeles County Public Works	Range	Various	Various
Engineering Manuals and Standards	Range	Bureau of Engineering	City of Los Angeles
City of Long Beach General Plan - Mobility Element (Including Appedices: Bike Master Plan, CX3 Pedestrian Plan, Dowtown & TOD Red Master Plan)	Range	Various	Long Beach Department of Planning and Building

Figure 130. Community members attending a presentation at the Compton community meeting, held in April of 2019. Source: LA County Public Works, 2019.

13.
ADVOCACY ORGANIZATIONS

RIVER ADVOCACY IS STRONG WITH MISSIONS AT THE NATIONAL, REGIONAL, AND RIVER SCALE

Among the hundreds of community groups that are present along the river, there are over three dozen organizations and initiatives that focus on the river itself, some of which have been active for over three decades.

Advocacy organizations include national organizations with broad missions, such as the National Resources Defense Council and The Nature Conservancy. They also include regional institutions, such as the Mountains Recreation & Conservation Authority (MRCA).

Organizations that focus specifically on the LA River, such as River LA and Friends of the LA River (FoLAR) have been instrumental in river advocacy efforts and have championed the river as a space for art, culture, and ecology.

In addition, there are organizations that advocate for recreation, grassroots organizations with an interest in environmental and social justice, and those that provide services ranging from community organizing and education to art and the environment. As stated in the Public Stewardship chapter of the LA RIver Master Plan, Chapter 11, these organizations are an essential component to the implementation of the Master Plan's goals for a reimagined LA River.

The name, mission statement, organization activities of all river-related advocacy organizations can be the following pages. Each organization has also been sorted into a "type" category used for clarity in navigating the table. This reference list is intended to help in the formation of partnerships for plan implementation.

Figure 131. The role of public stewardship and advocacy organizations as well as how you can get involved is outlined in the LA River Master Plan, Chapter 11.

ADVOCACY ORGANIZATIONS

Organization/Institution	Mission	Activities	Type
4-H	Empowers youth to reach their full potential working and learning in partnership with caring adults.	Hands-on learning and mentoring programs in areas like health, science, agriculture, and civic engagement.	Community Organization
Amigos de los Rios	Protecting and restoring open space in the urban environment by creating an Emerald Necklace green infrastructure network of parks and trails throughout the Los Angeles Basin.	Training organization for the next generation of environmental stewards, native planting, green infrastructure, community development	Environmental Organization
Anahuak Youth Soccer Association	Latino-led sports organization and social justice organization.	Social network for youth and their families and community leaders, stakeholder capacity-building, river parkway and open space advocacy.	Community + Education Organization
Arroyo Seco Foundation	Preserve and promote the Arroyo Seco, which converges with the LA River east of Eylsian Park.	Planted several thousand native trees, participated in and led major planning efforts, educated the public, and worked to restore/ enhance the natural splendor of the Arroyo, a major tributary to the Los Angeles River	Environmental Organization
Audubon Center at Debs Park	Environmental community hub in the heart of Northeast Los Angeles.	Public programs include guided hikes, community science projects, art classes, musical performances, film screenings, yoga, and tai chi. Seasonal celebrations and special events bring the community together	Environmental Organization
California Landscape Conservation Cooperative	Inform and promote integrated science, natural resource management and conservation to address impacts of climate change and other stressors within and across ecosystems.	Provide educational resources on a variety of programs including climate change and Traditional Ecological Knowledge (TEK) Resources.	Environmental + Education Organizations
Clockshop	Working to expand the dialogue around cultural production, politics and urban space by commissioning new projects by artists and writers and partnering with diverse institutions.	Core activity is the production of year-round commissions, conversations about art, politics, and urban space. Commission work by artists and writers, curate inclusive public programs about pressing social and political issues, and collaborate with institutions.	Art Organization
Community Nature Connection	To increase access to the outdoors for communities impacted by racial, socio-economic, and disability injustices by eliminating existing barriers through advocacy, community centered programming, and workforce development.	Nature-based trainings, programs, and outreach with communities and youth.	Community + Education Organizations
Current: LA	Every two years, Current: LA Public Art Biennial focuses on an issue affecting Los Angeles and other global cities to inspire civic discourse and use contemporary art to deepen connections between people.	Core activity is the production of year-round commissions, conversations about art, politics, and urban space. Commission work by artists and writers, curate inclusive public programs about pressing social and political issues, and collaborate with institutions.	Art Organization
Elysian Valley Arts Collective	"Cultivate a sense of place and support a local, creative community along the rapidly, revitalizing Los Angeles River."	Frogtown Artwalk and other programs and events to cultivate a sense of place, a vibrant local economy and arts education for youth.	Art Organization
Flow Project LA	"A platform for civic arts and education partnerships, programs & projects supporting water resiliency."	Curated events, news and history of civic arts & water resiliency in Los Angeles.	Art Organization
Friends of Atwater Village	"Hands on" group of volunteers working to improve their neighborhood, from river clean-ups to mural projects and more.	Responsible urban gardening, landscaping, and community plantings as well as promotion of local history including that of the Los Angeles River	Environmental Organization
Friends of Griffith Park	"Through advocacy, support, education and service, Friends of Griffith Park works to preserve Griffith Park as L.A.'s signature green and open space, place of free recreation, and linchpin in the survival of Southern California's native ecosystems."	Environmental advocacy, educational events, and clean-ups, developing park use policies with municipal departments, and historical preservation	Environmental Organization
Friends of the LA River (FOLAR)	Protect and restore the natural and historic heritage of the Los Angeles River and its riparian habitat through inclusive planning, education and wise stewardship.	Annual river clean-up known as La Gran Limpieza, advocacy, outreach, education	Environmental Organization
From Lot to Spot	Dedicated to improving blighted, urban neighborhoods in the greater Los Angeles area one vacant space at a time.	Work with communities to build healthy, community-designed spaces	Environmental Organization
Girl Scouts	To build girls of courage, confidence, and character, who make the world a better place.	Sports events; Life skills training; Outdoor activities; Youth and adult programs	Community + Education Organizations

ADVOCACY ORGANIZATIONS

Organization/Institution	Mission	Activities	Type
Green LA Coalition	Build a strong movement to win campaigns to transform Los Angeles into a sustainable city.	Investing in LA's Water Future, Living Streets LA- Streets for People, Increasing Urban Parks & Open Spaces, and Greening the Ports of Los Angeles and Long Beach	Environmental Organization
Griffith Park Advisory Board	"Work with park stakeholders and city officials to provide guidance and stewardship for Los Angeles' largest park and urban wilderness."	Advises the Department of Parks and Recreation on how to strengthen their facility's recreation programs and services.	Advisory Board
Heal the Bay	Making greater L.A.'s coastal waters and watersheds safe, healthy and clean.	Research, education, community action and advocacy to pursue their mission	Environmental Organization
Industry's Hopscotch Opera	"A platform for civic arts and education partnerships, programs & projects supporting water resiliency."	Mobile opera company with multiple sites in LA including along the river.	Art Organization
LA Compost	Connect the people of Los Angeles to the soil and each other.	Composting at three regional hubs and 21 community hubs	Environmental Organization
LA Creek Freak	L.A. Creek Freak is a blog featuring links, posts, and educational information towards healthy Southern California streams, creeks, rivers and neighborhoods and much more.	Blogging, outreach	Environmental Organization
LA Neighborhood Land Trust	"Dedicated to the river and to creating tangible benefits to our community. Experienced guides know the river and provide you with innovative instruction."	Has created 27 parks and gardens in the past 15 years	Environmental Organization
LA River Expeditions	Provide navigability of the LA River through expeditions to protect and revitalize our hometown river.	Popular kayaking tours of the LA River	Environmental Organization
LA River Kayak Safari	"Dedicated to the river and to creating tangible benefits to our community. Experienced guides know the river and provide you with innovative instruction."	Urban nature adventures combine bikes, kayaks, and instruction and education about the LA River	Environmental Organization
LA River Public Art Project	Integrate an arts and culture infrastructure into restoration efforts along the Los Angeles River.	Fostering arts and culture infrastructure on the Los Angeles River.	Art Organization
LA Urban Rangers	Art and outreach organization promoting local exploration of Downtown LA, the River and more.	Develop guided hikes, campfire talks, field kits, and other interpretive tools to spark creative explorations of everyday habitats.	Art Organization
Lauren Bon and the Metabolic Studio	Artist actions to achieve interdependence which takes both seeing and doing, both vision and action. A new collective vision is needed, centered and prioritized around the common good and community.	Lauren Bon and her team of artists work in a series of actions including Bending the River Back into the City, Farmlab, IOU, Optics, Sonics, Special Projects in Archiving, and Strawberry Flag	Art Organization
LB Conservation Corps	LB Conservation Corps	Young Adult Corps, Clean & Green, the Sea Lab, Paddle the River, and after school programming	Environmental Organization
Leadership for Urban Renewal Network (LURN)	LURN brings people together to design, build and promote sustainable communities that allow people to live their greatest potential.	Innovation lab, in-house consulting team, access to capital for innovative entrepreneurs	Environmental Organization
Los Angeles Audubon Society	Promote the enjoyment and protection of birds and other wildlife.	Recreation, education, conservation and restoration	Environmental Organization
Los Angeles Conservation Corps	Provide at-risk young adults and school-aged youth with opportunities for success.	Job skills training, education and work experience with an emphasis on conservation and service projects that benefit the community; participate in education and training sessions covering topics such as watershed habitat, native landscaping, river hydrology, ecology, and water quality management efforts for the River.	Community + Education Organization
Los Angeles County Bicycle Coalition	Work to build a better, more bike-able Los Angeles County.	Policy, advocacy, education, and community building.	Community + Education Organization
Los Angeles Waterkeeper	Los Angeles Waterkeeper safeguards LA's inland and coastal waters by enforcing laws and empowering communities. Our activities also include an educational program for high schoolers called Creeks to Coast, which includes LA River hands-on science fieldwork.	"Advocacy and Litigation, community water watch, river assessment fieldwork, and watershed program"	Environmental Organization
Man One Art	Street and graffiti artist dedicated to empowering young artists and engaging with the LA River.	Organizing and leading educational graffiti art workshops and events for art along the LA River and throughout Los Angeles.	Art Organization

ADVOCACY ORGANIZATIONS

Organization/Institution	Mission	Activities	Type
Mountains Recreation and Conservation Authority	Preservation and management of local open space and parkland, watershed lands, trails, and wildlife habitat.	Marsh Park,Compton Creek Trail and Bike Path, Pacoima Wash Natural Park, Tujunga Wash Green way Restoration Project, Pacoima Wash Natural Park	Environmental Organization
Mujeres de la Tierra	Support women and families interested in building healthier and sustainable neighborhoods through public engagement and individual participation.	"Creating a network of trained community leaders to lead, speak and act with a collective and influential voice."	Community + Education Organization
Natural Resources Defense Council	Curbing global warming and creating a clean energy future, reviving the world's oceans, defending endangered wildlife and wild places, preventing pollution, ensuring safe and sufficient water, and fostering sustainable communities.	Outreach, education, policy	Environmental Organization
North East Trees	Community based, grassroots, environmental non-profit organization.	"Parks Design/Build, Watershed Rehabilitation, Urban Forestry, Youth Environmental Stewardship, Community Stewardship"	Environmental Organization
Play the River LA	2015 project intended to explore, reclaim & re-imagine the mighty LA River as a grand civic space that can green & connect our communities.	The Play the LA River card deck is a collectible, playable guide to the entire 51-mile LA River organized in 4 geographical suits— Valley, Glendale Narrows, Downtown & South. Play the LA River facilitates 51 weeks of community-generated river events.	Art Organization
"River LA (formerly Los Angeles River Revitalization Corporation)"	To ensure the 51-mile Los Angeles River integrates design and infrastructure that brings people and nature together. We champion river-oriented policy and sustainable public spaces while creating innovative models for community benefit and participation.	Community stakeholder engagement, LA River Index, Los Angeles River Master Plan (LARMP), Infrastructure investment and improvements	Environmental Organizations
Save LA River Open Space	To preserve the Weddington Golf and Tennis property in Studio City as recreational open space with permanent public access.	Outreach, education, policy	Environmental Organizations
Surfrider's Ocean Friendly Gardens	Volunteer-run landscape education, hands-on training and advocacy program, providing valuable information on how landscapes and hardscapes can be modified to prevent water pollution.	Volunteer programs, training, education, and advocacy.	Community + Education Organizations
The City Project	Influence the investment of public resources to achieve results that are equitable, enhance human health and the environment, and promote economic vitality.	Latino-led team works with diverse allies to ensure equal access to healthy green land use; climate justice; physical education and schools of hope as centers of their communities; health equity and wellness; and economic vitality for all.	Community + Education Organizations
The Council for Watershed Health	"A non-profit organization of community groups, government agencies, business and academia working cooperatively to solve problems in the watershed."	Education, research, and planning	Environmental Organizations
The Nature Conservancy	Conserve the lands and waters on which all life depends.	Outreach, education, policy	Environmental Organizations
The River Project	"Encourage responsible management of our watershed lands and revitalization of our rivers for the social, economic and environmental benefit of our communities."	Outreach, advocacy, scientific research and hands-on educational programs	Environmental Organizations
TreePeople	TreePeople inspires and supports the people of LA to come together to plant and care for trees, harvest the rain, and renew depleted landscapes.	Native planting, green infrastructure, outreach, policy influence	Environmental Organizations
Trust for Public Land	Conserves land for people to enjoy as parks, community gardens, historic sites, rural lands, and other natural places, ensuring livable communities for generations to come.	Los Angeles River & Aliso Creek Confluence Project, Maywood Riverfront Park, Cornfields/ Los Angeles State Historic Park, Green Alleys, Fitness Zones	Environmental Organizations
Turnaround Arts	Turnaround Arts: California, co-founded in 2014 by architect Frank Gehry and arts education advocate Malissa Shriver, uses the arts strategically to fuel school reform efforts in historically disadvantaged communities. Partnering Schools near the LA River.	Three year partnerships with schools providing: art supplies, musical education materials, licensing rights and kits for school musicals, instructional resources, professional learning facilitated by leaders in the field, and high-profile Turnaround Artists who work with students and teachers.	Community + Education Organizations
UC California Naturalist	Foster a diverse community of naturalists and promote stewardship of California's natural resources through education and service.	Environmental certification programs, educational resources, and nature stewardship programs.	Environmental + Education Organizations

Organization/Institution	Mission	Activities	Type
UC Cooperative Extension	Connects the power of UC research in agriculture, natural resources, nutrition and youth development with local communities to improve the lives of all Californians.	Provide educational resources on a variety of programs. Organize thousands of volunteers on natural resource research and education.	Environmental + Education Organizations
UCLA Interpretive Media Laboratory	Interweave artistic creativity with engineering invention, engaging significant issues of culture, community, and communication through research, production and education.	Employs participatory design to build physically interactive, multi-media experiences and location-based mobile applications that together aim to enable collective creativity and exploration of identity located in the LA State Historic Park.	Art Organization
Urban Rivers Institute	Public art, urban gardens and civic resources.	Storytelling through Multi-Media Platform Video Production, Practice-oriented Training for the Next Generation of Urban River Revitalization Specialists.	Art Organization
Urban Semillas	Educate undeserved and monolingual communities about watershed and social justice issues, and to provide them with community-building skills.	Grass-roots capacity building, policy and regulatory advocacy to allow participation in local, citywide, statewide, and nationwide planning and policy development, liaison and outreach to Spanish-speaking communities.	Community + Education Organizations
Village Gardeners (now closed)	All-volunteer, non-profit organization dedicated to the beautification of the Los Angeles River between Coldwater Canyon Avenue and Fulton Avenue, in Studio City & Sherman Oaks, CA. The mission of The Village Gardeners is to lead community in the environmental enhancement of Los Angeles River Green Ways with emphasis on conservation, ecology, and restoration of natural habitat.	Partnerships with schools, community organizations, and governmental agencies. North Valleyheart Riverwalk Green way	Environmental Organizations
Water LA	Is a residence-based rainwater harvesting and urban acupuncture project which offers residents hands-on learning, assistance, and materials to design and complete watershed-friendly home improvements.	Training, outreach, advocacy	Environmental Organizations
William C. Velasquez Institute	Improve the level of political and economic participation in Latino and other underrepresented communities.	Political and economic participation research, public policy advocacy, community organization.	Community + Education Organizations

Figure 132. The LA River Trail overlooks the LA River in the Elsian Valley near river mile 25.2 . Source: LA County Public Works, 2018.

14.
JURISDICTION MAP CATALOG

THE LA RIVER MASTER PLAN REQUIRES PARTICIPATION ACROSS MUNICIPALITIES, NEIGHBORHOODS, AND JURISTICTIONS, WHICH CREATES COMPLEXITY

The LA River Master Plan is a LA County plan which means that the county government is ultimately responsible for implementation. However, this requires coordination with state and local government including, California State Senate, LA County Supervisorial Districts, US Congressional Districts among others. To implement large system-scale strategies along the LA River, coordination across all of these entities will be complex, but crucial.

This chapter is a catalog of the jurisdictional boundaries within LA County. It provides a reference for the relevant governmental entities within specific areas of the river.

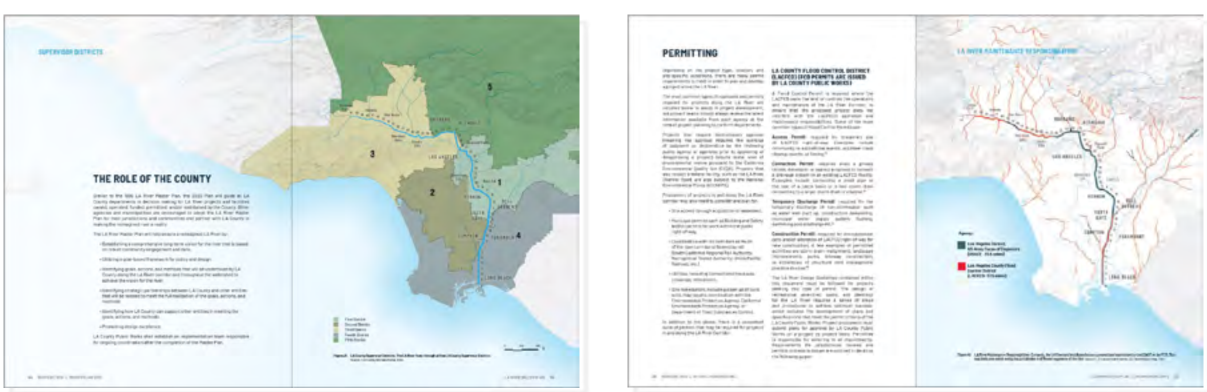

Figure 133. Learn more about jurisdiction, ownership, and rights in the LA River Master Plan, Chapter 2, as well as how jurisdiction impacts permitting along the LA River in Appendix I: Design Guidelines, Chapter 1.

MUNICIPALITIES AND NEIGHBORHOODS WITHIN LA COUNTY

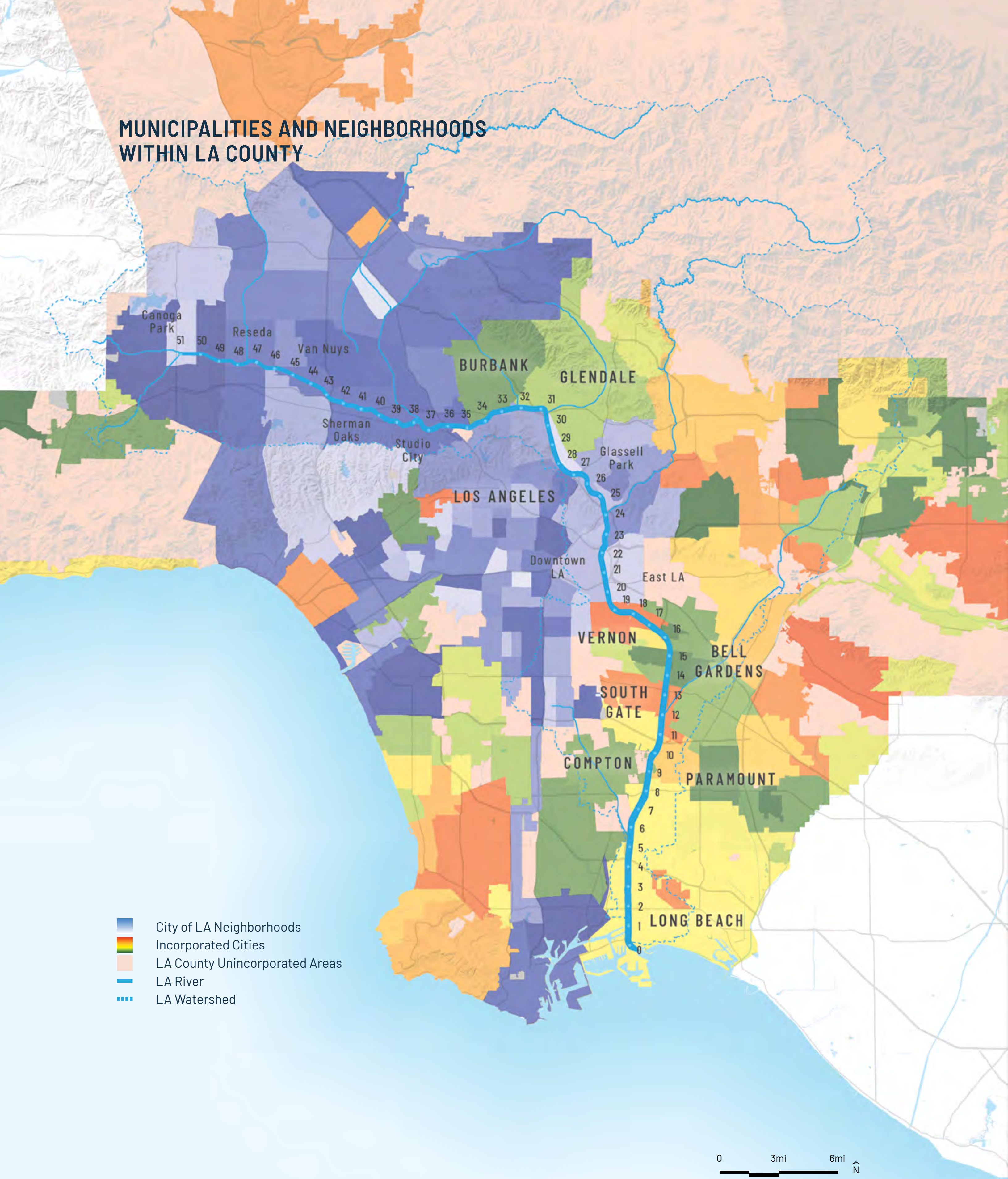

Figure 134. Communities within LA County. There are 17 municipalities located within one mile of the LA River and 44 municipalities within the LA River Watershed. Source: LA County GIS Data Portal, City Boundaries and Annexations, 2016 & LA City Communities and Planning Areas, 2014.

FLOOD INFRASTRUCTURE MAINTENANCE JURISDICTION WITHIN LA COUNTY

Figure 135. Maintenance Jurisdictions Within LA County. The Los Angeles US Army Corps of Engineers and Los Angeles County Flood Control District have jurisdiction over different portions of the LA River. Source: Los Angeles County Public Works, GIS Maintenance Map, 2016.

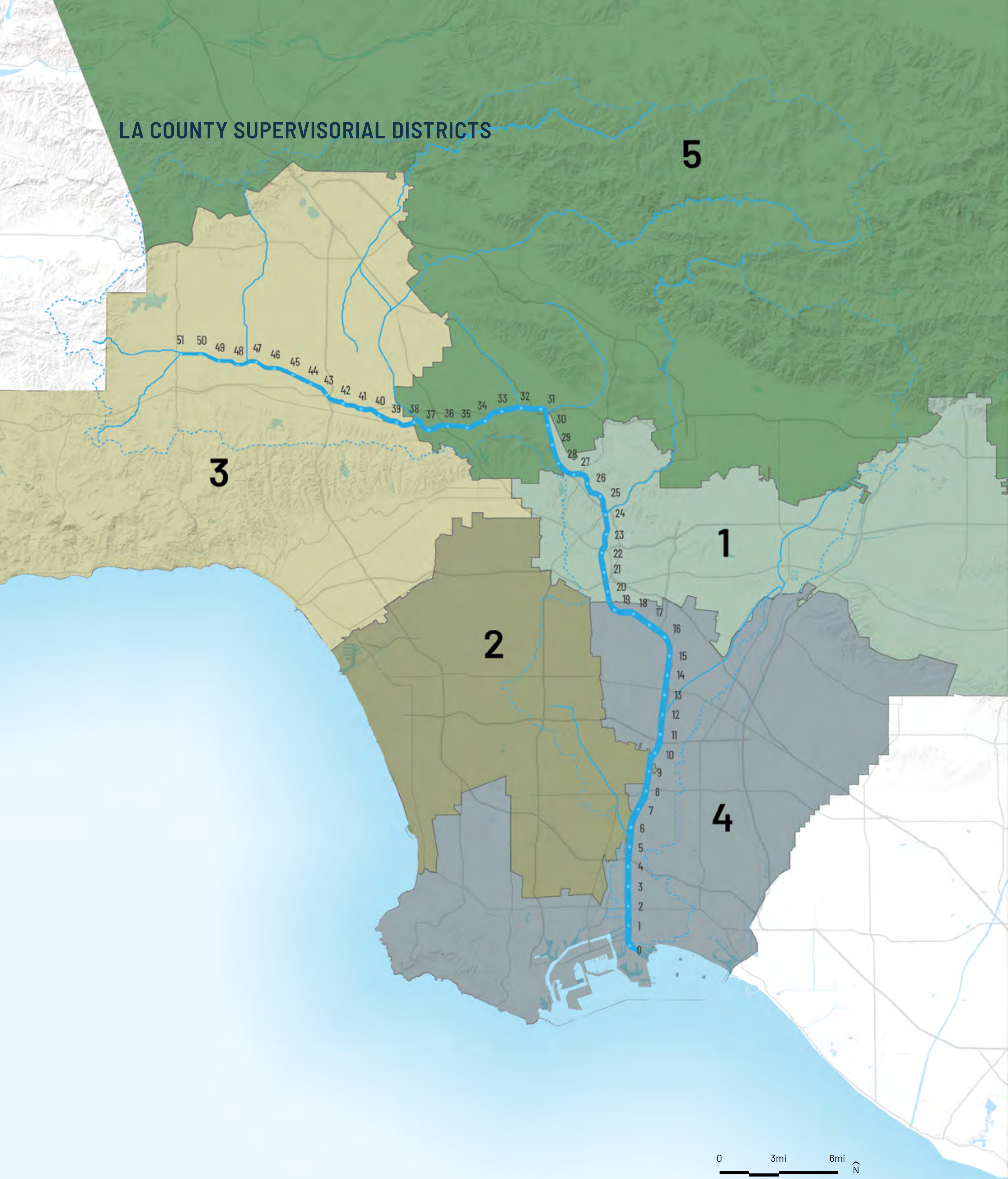

Figure 136. LA County Supervisorial Districts. The LA River flows through all five LA County supervisorial districts. Source: We Draw the Lines CA, Supervisorial District Boundaries, 2021.

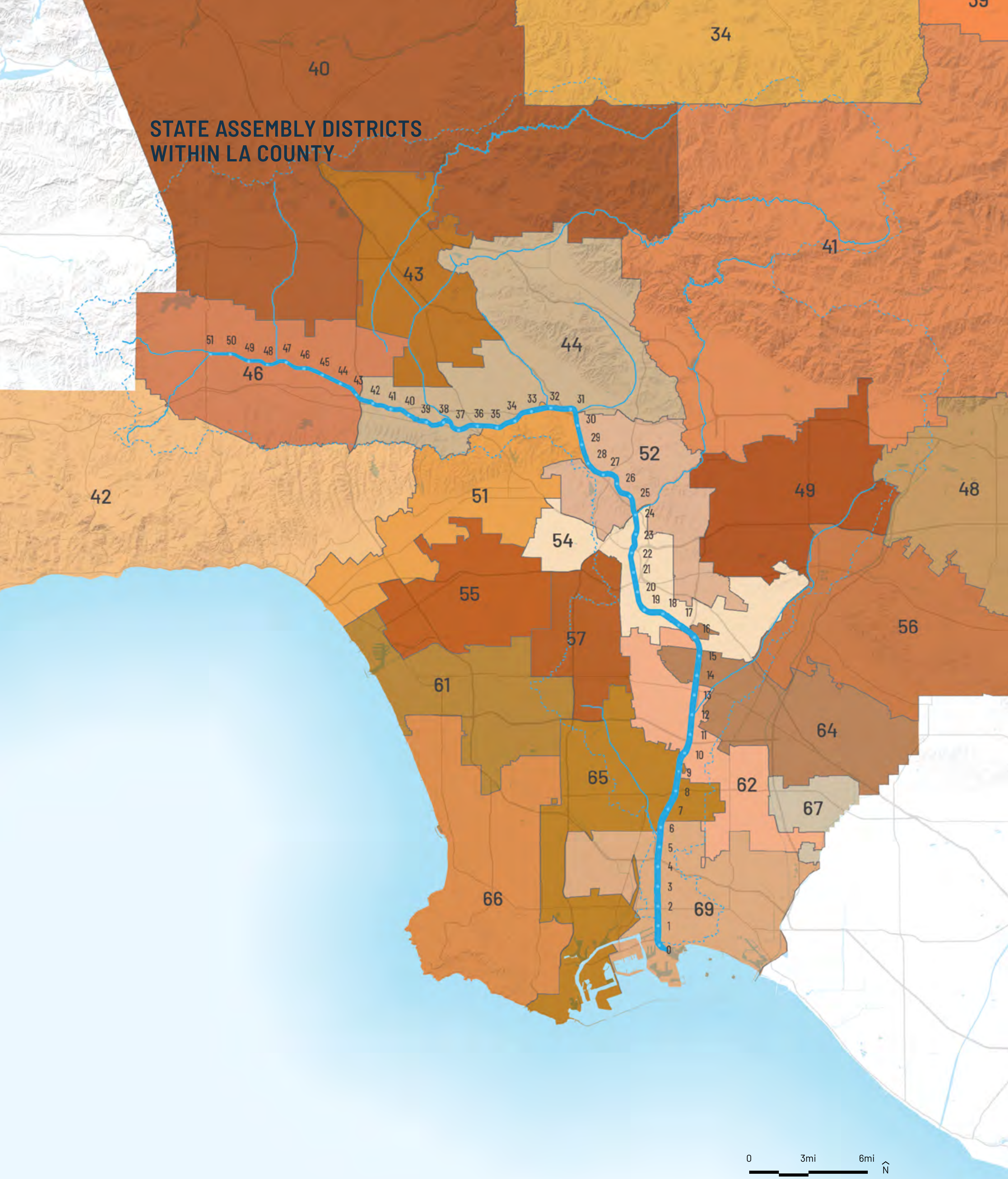

Figure 137. State Assembly Districts Within LA County. The LA River flows through eight of the state assembly districts within LA County in 2021.
Source: We Draw the Lines CA, California State Assembly Districts, 2021.

STATE SENATE DISTRICTS WITHIN LA COUNTY

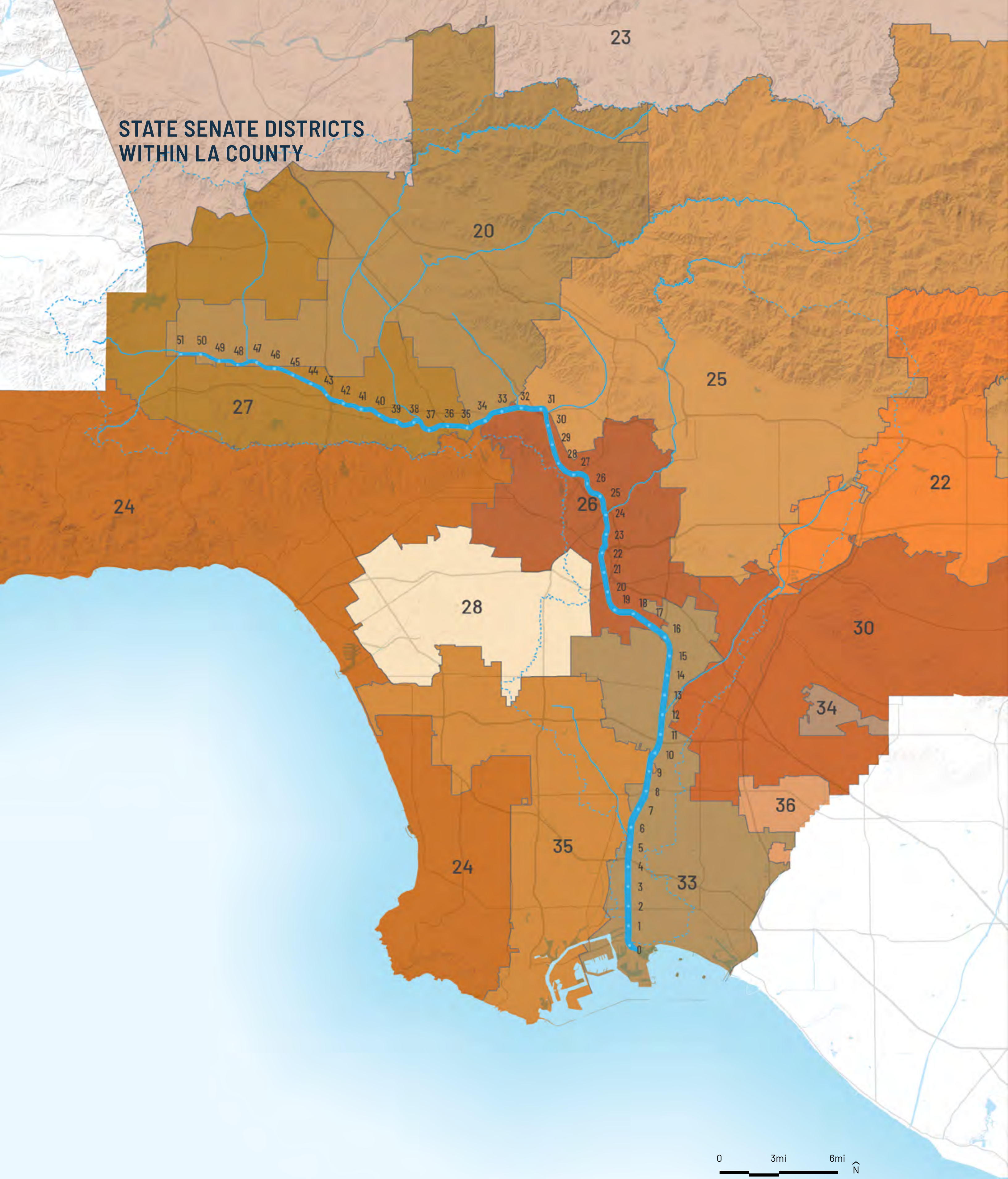

Figure 138. State Senate Districts Within LA County. The LA River flows through six state senate districts in 2021. Source: We Draw the Lines CA, California State Senate Districts, 2021

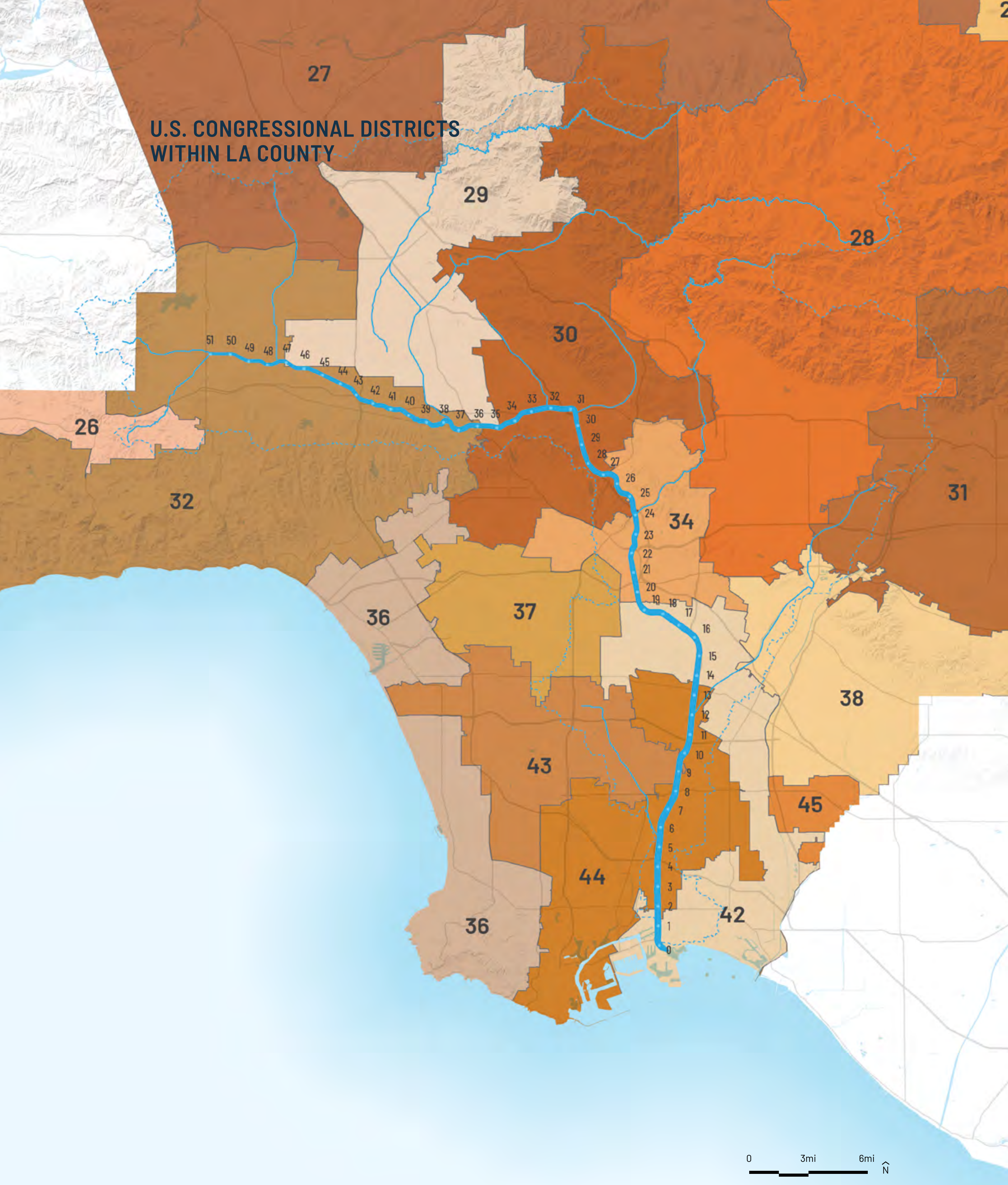

Figure 139. U.S. Congressional Districts Within LA County. The LA River flows through six US congressional districts in 2021. Source: We Draw the Lines CA, California Congressional Districts, 2021.

HEALTH DISTRICTS WITHIN LA COUNTY

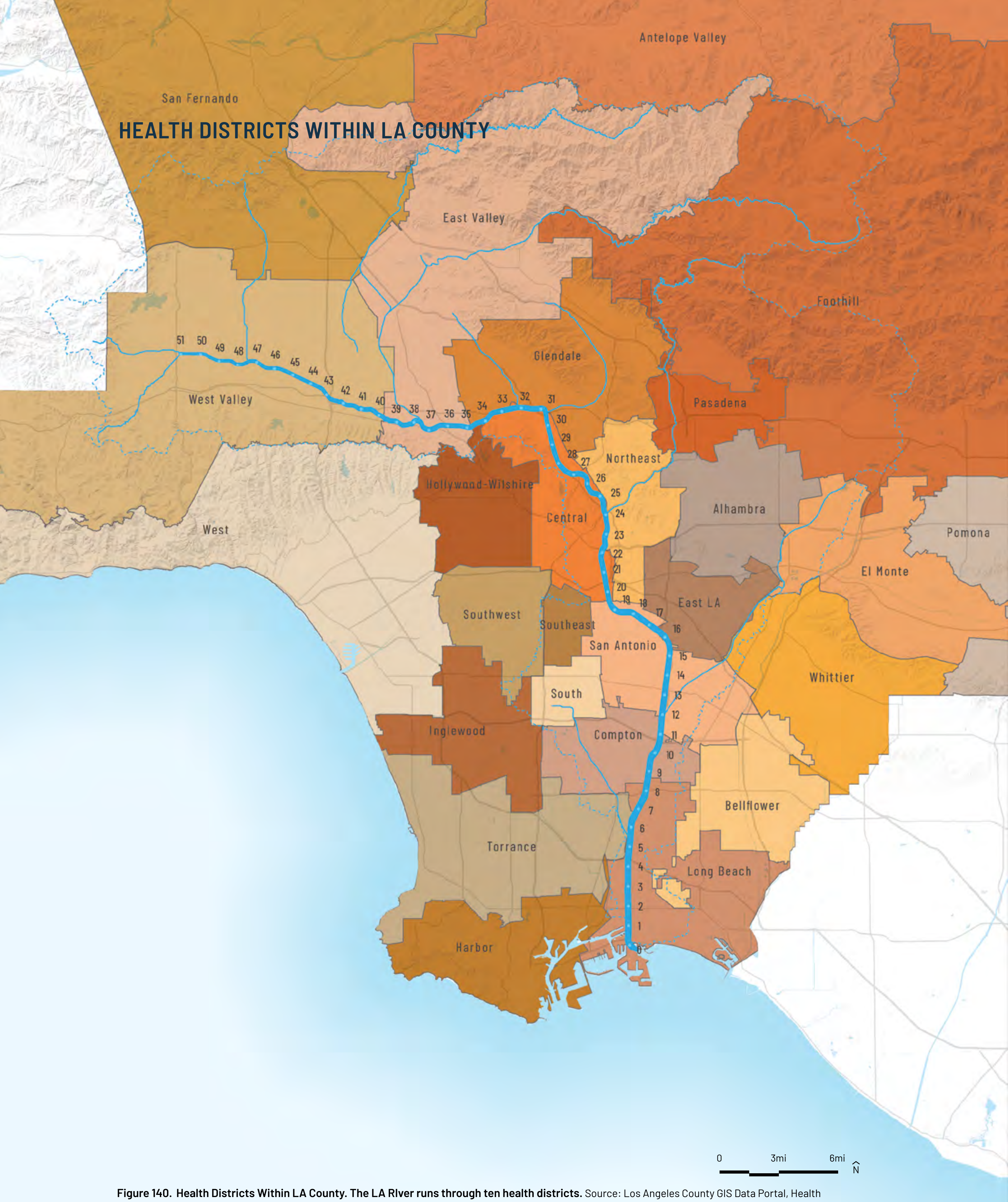

Figure 140. Health Districts Within LA County. The LA RIver runs through ten health districts. Source: Los Angeles County GIS Data Portal, Health Districts, 2012.

WATER PURVEYORS WITHIN LA COUNTY

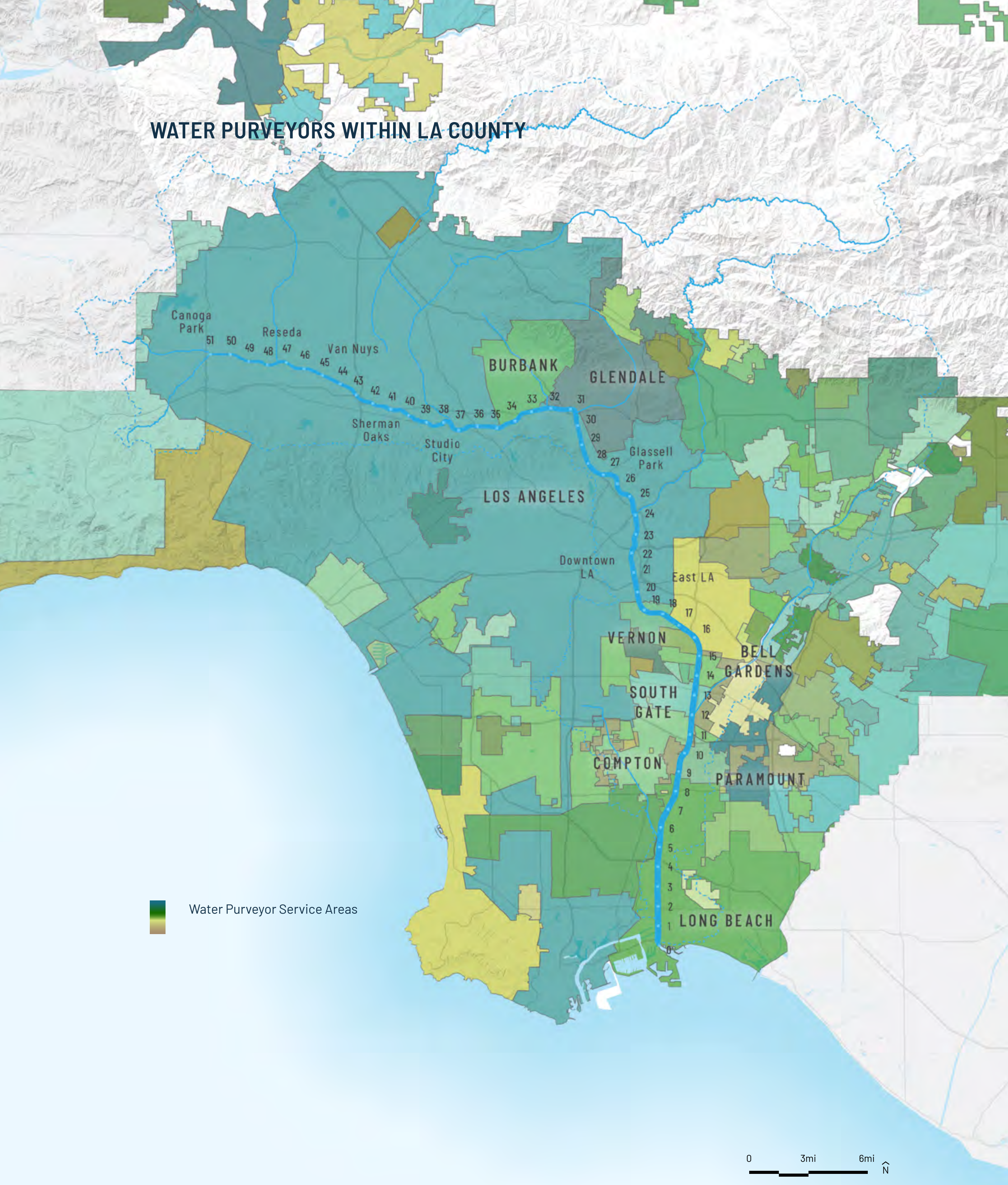

Figure 141. Water purveyors withing LA County. The City of Los Angeles is the largest water purveyor in LA County. Source: LA County GIS Data Portal, Water Purveyor Service Areas, 2009.

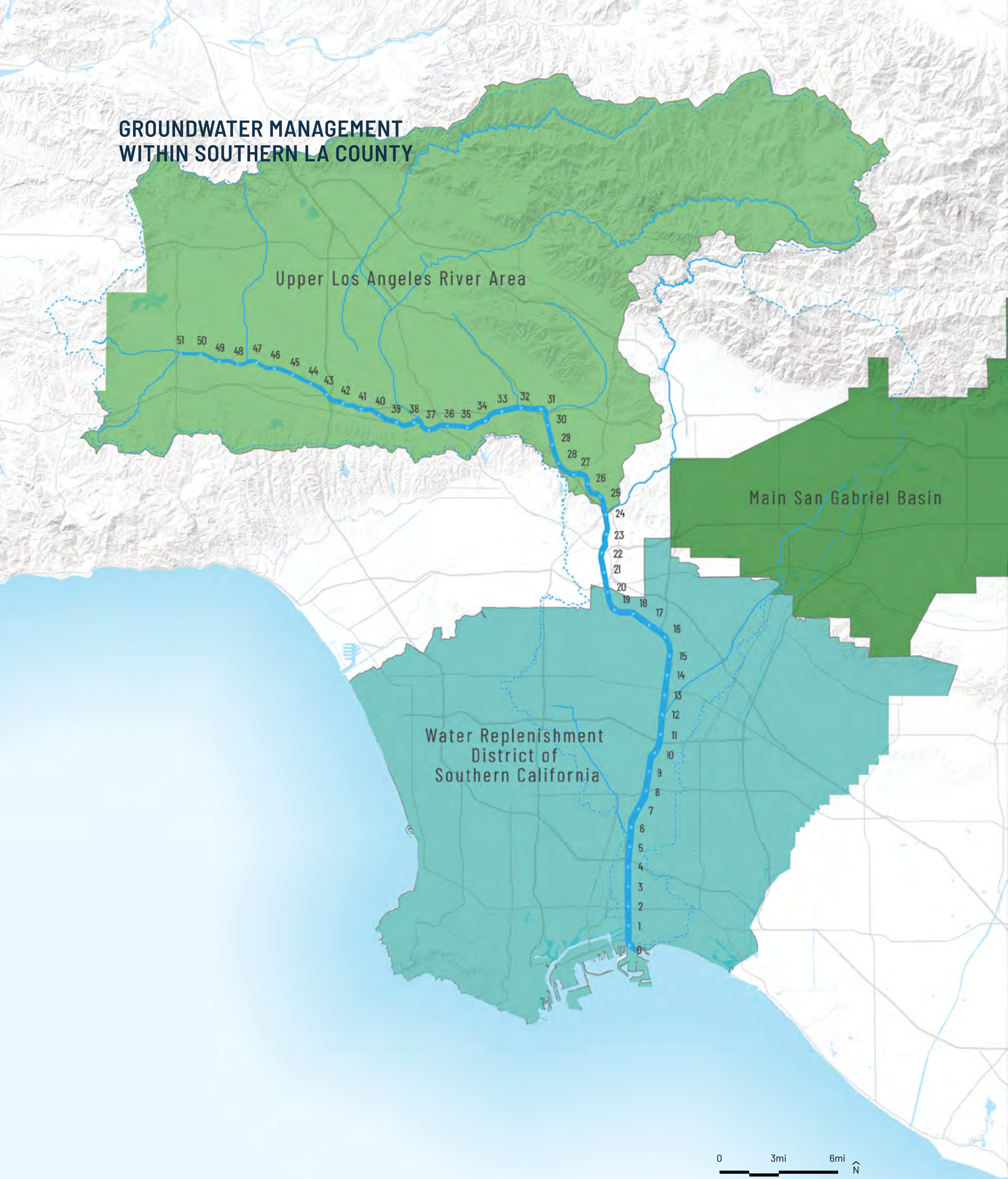

Figure 142. Groundwater Masters within LA County. The LA River flows though the Upper Los Angeles River Area and the Water Replenishment District of Southern California. Source: Department of Water Resources, Groundwater Adjudicated Areas in Groundwater Basin, https://gis.water.ca.gov/arcgis/rest/services/Boundaries/i03_Adjudicated_Areas/MapServer

Figure 143. Regional Water Quality Control Boards Within LA County. The LA River is one of the "Waters of the United States" according to the Code of Federal Regulations, and is, therefore, a protected waterbody under the jurisdiction of the State Water Resources Control Board and the LA Regional Water Quality Control Board (Region 4) for compliance with the Clean Water Act. Source: California Water Resources Control Board, Administrative/Regional_Board_Boundaries, http://gispublic.waterboards.ca.gov/arcgis/rest/services/Administrative/Regional_Board_Boundaries/MapServer

Figure 144. California State Conservancies within LA County. The Coastal Conservancy, Santa Monica Mountains Conservancy, and Rivers and Mountains Conservancy all have areas of jurisdiction in LA County, Source: Sierra Nevada Conservancy, State Conservancies - CNRA [ds1754], 2015; Mountains and Recreation Conservation Authority, SMMC Boundary, 2021.

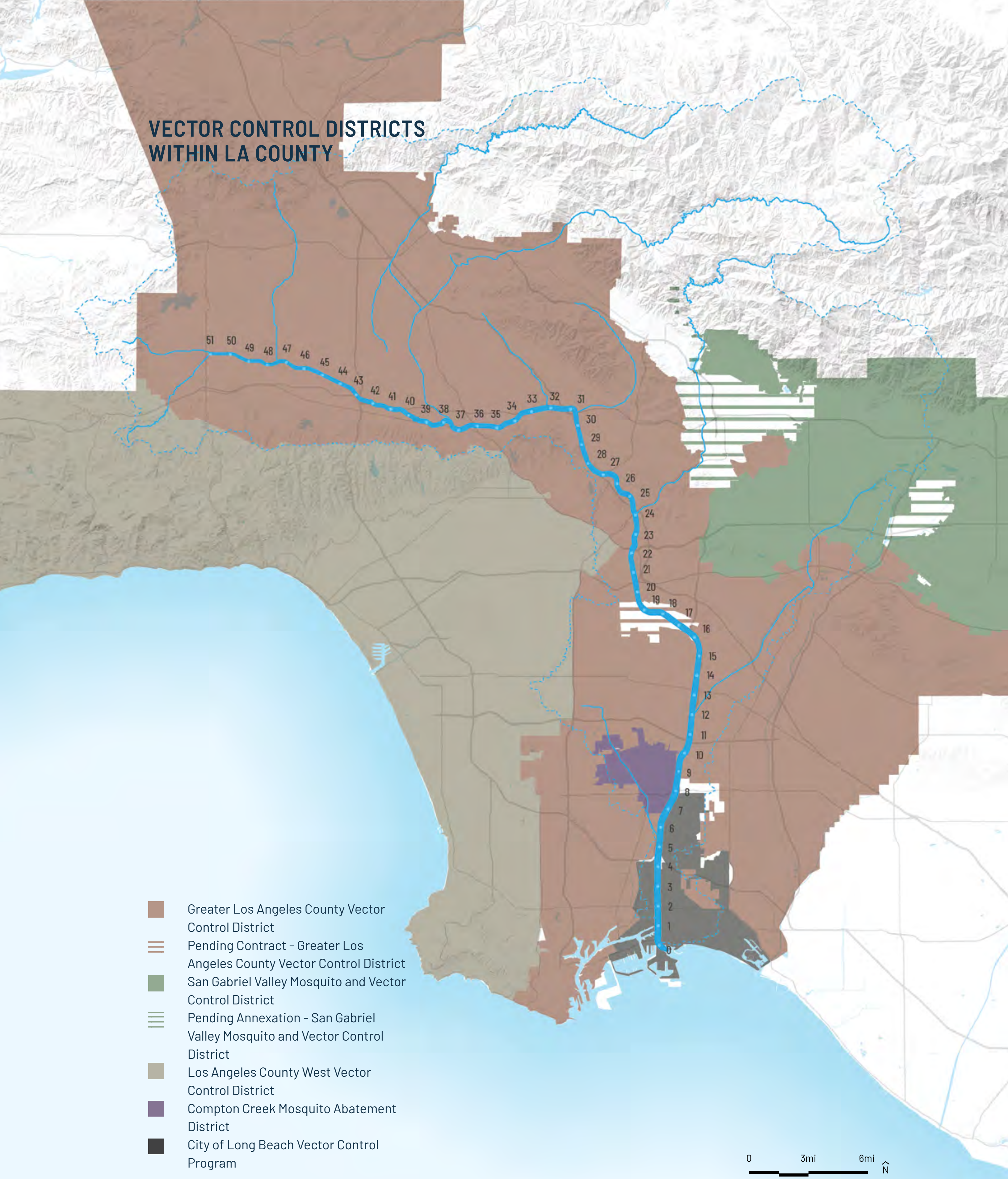

Figure 145. Vector Control Districts Within LA County. The LA RIver flows though three vector control districts. Source: Mosquito and Vector Control Association of California, Agency Map, http://www.arcgis.com/home/webmap/viewer.html?webmap=604a0fe9f2b74e98a53b53d192b2ac67&extent=-131.4442,32.5803,-108.7025,41.6862, 2016.

Figure 146. Mark Hanna (Geosyntec) and Jessica Henson (OLIN) present at the 7th Steering Committee Meeting in September 2019.
Source: LA County Public Works, 2019.

RESOURCES

GLOSSARY

1% Flood (100-Year Flood): A flood of a magnitude that has a 1 percent chance of being equaled or exceeded in any given year (i.e. has a recurrence interval of 100 years, on average).

1% Floodplain (100-Year Floodplain): Areas with a 1 percent annual chance of flooding.

0.2% Flood (500-Year Flood): A flood of a magnitude that has a 0.2 percent chance of being equaled or exceeded in any given year (i.e. has a recurrence interval of 500 years, on average).

0.2% Floodplain (500-Year Floodplain): Areas with a 0.2 percent annual chance of flooding.

Active Transport: Modes of transportation that are non-motorized relying on physical activity, such as walking and cycling, in addition to public transportation, which will be understood to require walking or cycling as a part of the whole journey. (Source: Healthy Spaces & Places, Australia)

Aquifer: A natural underground layer of porous, water bearing materials (sand, gravel) usually capable of yielding a large amount or supply of water.

Aquifer Recharge: Aquifer recharge (AR) and aquifer storage and recovery (ASR) are processes that convey water underground. These processes replenish groundwater stored in aquifers for beneficial purposes. Although the terms are often used interchangeably, they are separate processes with distinct objectives. AR is used solely to replenish water in aquifers. ASR is used to store water which is later recovered for reuse. (Source: US EPA)

Area Median Income: The median family income calculated by the US Department of Housing and Urban Development (HUD) for each jurisdiction, in order to determine Fair Market Rents (FMRs) and income limits for HUD programs. Also known as HUD Area Median Family Income.

Aspect: The compass direction of exposure of a site to environmental factors (in particular, sunlight).

Beneficial Use: 1. The uses of water necessary for the survival or well being of man, plants and wildlife. These uses of water serve to promote the tangible and intangible economic, social and environmental goals of mankind. Examples include drinking, swimming, industrial and agricultural water supply, and the support of fresh and saline aquatic habitats. 2. Defines the resources, services, and qualities of aquatic systems that are the ultimate goals of protecting and achieving. For example, Beneficial Use of Estuarine Habitat are uses of water that support estuarine ecosystems, including, but not limited to preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds), and the propagation, sustenance, and migration of estuarine organisms. (Source: Regional Water Board, Heal the Bay)

Best Management Practice (BMP): In the context of water quality, BMPs are structural, non-structural devices and/or managerial techniques that improve or prevent the pollution contained within dry and wet weather runoff from reaching downstream water ways.

Box Channel: A rectangular-shaped section of a channel, typically made of concrete.

Climate Resourcefulness: An approach to climate resilience and justice that frames resilience in community action and/or activism as well as community self-determination and agency. This framework proposed a re-centering and re-grounding of resilience in communities and progressive, justice movements. (Source: Mackinnon and Derickson, 2013. "From Resilience to Resourcefulness: A Critique of Resilience Policy and Activism." Progress in Human Geography, 37.)

Community Based Process: Varies among communities and project scope but generally includes the following steps: initial community consultation; gathering data, observations, and analysis of primary issues; sharing those issues back to the community for further input; and finally, implementation. (Source: Project for Public Spaces)

Confined Aquifer: An aquifer in which an impermeable layer of soil or rock lays on top and prevents water from seeping into the ground.

Distributed Infiltration: Naturally or artificially allowing rainwater and runoff to percolate into the soil on a widespread basis.

Ecosystem Function: The biological, geochemical and physical processes that take place or occur within an ecosystem.These processes often benefit human needs directly or indirectly. For example: providing shade, carbon sequestration, or filtering pollutants.

Ecosystem Services: The direct or indirect contributions of ecosystems to human well-being that support our survival and quality of life.

Embankment (Levee): An often manmade primarily earthen barrier along a watercourse with the principle function of containing, managing, or diverting the flow of water in to reduce risk from temporary flooding.

Extant Vegetation: The mix of plants and trees present above ground in a vegetated area that still exists from pre-urbanization conditions.

Fenceline: A boundary line created by a fence or other linear element.

Flood Control Basin: Large, empty basins which hold significant amounts of water during flood conditions to reduce flooding downstream. Examples of flood control basins in LA County include Sepulveda and Hansen.

Flood Channel: Concrete or earthen channels that convey water during large rain events. Flood channels are sometimes built on the courses of waterways as a way to reduce flooding. The LA River and many of its tributaries operate as flood channels.

Flood Control District: The Los Angeles County Flood Control Act (ACT) was adopted by the State Legislature in 1915, after a disastrous regional flood took a heavy toll on lives and property. The Act established the Los Angeles County Flood Control District and empowered it to provide flood protection, water conservation, recreation and aesthetic enhancement within its boundaries. The Flood Control District is governed, as a separate entity, by the County of Los Angeles Board of Supervisors.

Functioning Ecosystem: A dynamic complex of plant, animal, and microorganism communities and their non-living environment that exhibits biological and chemical activities characteristic for its type, regardless of whether the system visually looks like a natural system.

Groundwater Basin: Groundwater stored in an area with permeable materials below the ground, typically capable of storing a significant supply of water.

Habitat Linkage: A connection between large areas of habitat that is typically vegetated. Linkages are critical to provide sufficient habitat for wide-ranging animal species with large home territories as well as for other wildlife species.

Historic Floodplain: Areas subject to inundation by the LA River and its tributaries and distributaries prior significant channelization in the 19th and 20th centuries.

Hydraulic Reach: A reach is a length of stream or river used as a unit of study. It contains a specified feature that is either fairly uniform throughout, such as hydraulic characteristics or flood damages, or that requires special attention in the study, such as a bridge. (Source: USDA)

Hydraulics: Science that focuses on the movement of water through channels, pipes, and rivers.

Hydrology: The study of water, specifically its properties, movement and interaction with land, and how it affects the earth and atmosphere.

Infiltration: The gradual flow or movement of water into and through (to percolate or pass through) the pores of the soil.

Injection: An injection well is a device that places fluid deep underground into porous rock formations, such as sandstone or limestone, or into or below the shallow soil layer.

Invasive Species: An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. (Source: USDA)

LA River ROW: The LA River right-of-way is the "fenceline to fenceline" area of the river channel and typically includes the river, river banks or levees, and LA River Trail. The ROW is owned and maintained by a variety of entities.

Landside (Levee): The area from the edge of the crown to the toe of the levee opposite of the riverside.

Levee: An embankment whose primary purpose is to furnish flood protection from seasonal high water and which is therefore subject to water loading for periods of only a few days or weeks a year.

Local Park: Local parks are under 100 acres and contain active amenities such as athletic courts and fields, playgrounds, and swimming pools. (Source: LA County Parks and Recreation)

Low Flow Channel: In a concrete flood control channel, the low flow channel is a narrow, lowered section within the middle of the channel, designed to concentrate steady, non-wet weather runoff (water treatment flows, irrigation, etc.) by increasing channel velocity and depth.

Low Impact Development (LID): term used to describe a land planning and engineering design approach to manage stormwater runoff as part of green infrastructure. LID emphasizes conservation and use of on-site natural features to protect water quality.

Multiuse Trail: Trails which allow for many user types, such as pedestrians, cyclists, and equestrians.

Native Species: A species that is a part of the balance of nature that has developed over hundreds or thousands of years in a particular region or ecosystem. (Source: USDA)

Nature-based: Nature-based strategies aim to protect, manage, and enhance natural or modified ecosystems through sustainable techniques that produce benefits for society and biodiversity. (Source: International Union for Conservation of Nature)

Perched Aquifer: Localized zone of saturation above the main water table created by a laterally limited layer of underlying impermeable material.

Planning Frame: A series of nine geographical areas used in the LA River Master Plan to assist in the delineation of reach-specific concepts related to jurisdictional, hydraulic, and ecological zones. The planning frames also offer a more detailed local scale to assess project cadence, character, and community connectivity along the varying conditions of the LA River.

Platform Park: A park situated on a structural deck spanning over a space typically unsuitable for parkland, such as a roadway or waterbody.

Potable Water: Water quality that is suitable for drinking.

Receiving Waters: All distinct bodies of water that receive runoff or wastewater discharges, such as streams, rivers, ponds, lakes, and estuaries.

Recharge: Process of addition of water to the saturated zone such as an aquifer. (Source: USGS)

Recharge Area: An area in which water reached the zone of saturation by surface infiltration. (Source: USGS)

Reclaimed Wastewater: Wastewater-treatment plant effluent that has been diverted for beneficial uses such as irrigation, industry, or thermoelectric cooling instead of being released to a natural waterway or aquifer. (Source: USGS)

Regional Detention (Basin): A detention basin which collects stormwater runoff from a relatively large area, and has been designed to use storage as a means of reducing downstream flood peaks, reducing possible flood damage, or reducing downstream channel construction costs. Regional facilities are usually multi-purpose, and normally are the responsibility of a public entity.(Source: Pima County Regional Flood Control District)

Regional Park: Park over 100 acres and contains active amenities such as athletic courts and fields, playgrounds, and swimming pools.(Source: LA County Parks and Recreation)

Resiliency: The capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow, no matter what kinds of chronic stresses and acute shocks they experience. (Source: 100 Resilient Cities)

Right-of-way: An easement granted or reserved over the land for transportation or other public service infrastructure such as electrical transmission lines or flood control channels. The LA River right-of-way includes the entirety of the river channel as well as the landside areas immediately adjacent to the channel banks that facilitate continuous operations and maintenance access by the LA County Public Works (on behalf of the Flood Control District) and the United States Army Corps of Engineers (USACE)

Riparian: Pertaining to the banks of a stream,most often used to describe the hydrophilic (water-loving) vegetation along a stream.

River Mile: A measure of distance along the river centerline from its mouth. The LA River river mile system was developed in 2016 to reduce confusion between different jurisdictional reach designations. This numbering system is used consistently throughout the LA River Master Plan, with mile zero at the river mouth in Long Beach and mile 51 in Canoga Park.

River Ruler: The river ruler is an analysis tool developed for the LA River Master Plan that represents and takes measure of the entire 51 miles of the LA River in a simple vertical straight-line diagram. This approach simplifies and reinforces the river's linearity, allowing the eye to quickly perceive how conditions along the river change from one river mile to the next. This compact abstraction of the river allows for comparing across multiple river ruler categories at multiple locations along the river in a single drawing and is essential for recognizing where planning and design proposals can achieve multiple benefits at a particular location.

Spreading Basin: Basin used to impound water to allow for slow percolation of water into the ground in order to recharge the underlying groundwater aquifer.

Spreading Grounds: A spreading ground is a water conservation facility that retains surface water long enough for it to percolate into the soil where it can be stored and pumped for later use. Spreading grounds must be located within soft bottom channels or adjacent to rivers and flood channels and situated where underlying soils are permeable and in hydraulic connection to a target aquifer.

Stormwater: Stormwater runoff is generated from rain and snowmelt events that flow over land or impervious surfaces, such as paved streets, parking lots, and building rooftops, and does not soak into the ground. The runoff picks up pollutants like trash, chemicals, oils, and dirt/sediment that can harm our rivers, streams, lakes, and coastal waters. (Source: US EPA)

Trapezoidal Section: A section of a channel with a trapezoidal cross-section. This shape is used to efficiently convey flows on a concrete surface.

Tributary: A stream that flows to a larger stream or other body of water.

Unconfined Aquifer: A water table—or unconfined—aquifer is an aquifer whose upper water surface (water table) is at atmospheric pressure, and thus is able to rise and fall. Water table aquifers are usually closer to the Earth's surface than confined aquifers are, and as such are impacted by drought conditions sooner than confined aquifers. (Source: USGS)

Upland: Referring to locations elevated above lower-lying locations, often used when discussing two locations within a watershed.

US Army Corps of Engineers: The Army Corps of Engineers provides public engineering services in peace and war to strengthen national security, energize the economy, and reduce risks from disasters.

Water Quality: Surface water conditions suitable for aquatic life and human health.

Water Security: The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socioeconomic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability. (Source: United Nations Water)

Water Supply: Available water provided to fulfill a particular need. If the need is domestic, industrial, or agricultural, the water must fulfill both quality and quantity requirements. Water supplies can be obtained by numerous types of engineering projects, such as wells, dams, or reservoirs. (Source: Encyclopaedia Britannica)

Water Year: The 12-month period from October 1 through September 30 for any given year. Water years are written as the ending year (i.e., water year 1986-87 is written as 1987).

Watershed: The land area that drains into a river or stream. An area of land that contributes runoff to one specific delivery point. Large watersheds may be composed of several smaller "sub watersheds," each of which contributes runoff to different locations that ultimately combine at a common delivery point. Watersheds are usually bordered and separated from other watersheds by mountain ridges or other naturally elevated areas.

Wetland: Any number of tidal and non-tidal areas characterized by saturated or nearly saturated (wet) soils most of the year that form an interface between terrestrial (land-based) and aquatic environments. These include freshwater marshes around ponds and channels (rivers and streams) and brackish and salt marshes. Other common names include swamps and bogs.

ENDNOTES

1 For a description of the Los Angeles Prairie see: Schiffman, Paula M. "The Los Angeles Prairie." From Deverell, William and Greg Hise, Land of Sunshine: An Environmental History of Metropolitan Los Angeles, 2005, pp. 38–51. For historic vegetation mapping see: Kuchkler, A. W. Natural Vegetation of California, 1977. For studies on nearby waterways see: Stein, ED, S Dark, T Longcore, N Hall, M Beland, R Grossinger, J Casanova, M Sutula, "Historical ecology and landscape change of the San Gabriel River and floodplain." 2007.

2 USGS Western Ecological Research Center, Bioregions of the Pacific U.S. https://www.usgs.gov/centers/werc/science/bioregions-pacific-us?qt-science_center_objects=0#qt-science_center_objects.

3 U.S. Census Bureau, American Community Survey 2006–2010 5-Year Estimates, Table B03002, 2010; U.S. Census Bureau, American Community Survey 2015–2019 5-Year Estimates, Table B03002, 2021.

4 Chris McCormick, "Armenian Exceptionalism," The Atlantic, 4 April 2016, https://www.theatlantic.com/business/archive/2016/04/glendale-armenians/475926/.

5 Calculated from U.S. Census Bureau, American Community Survey 2012–2016 5-Year Estimates, Table B00001, 2016; U.S. Census Bureau, 2016 TIGER/Line Geodatabase (machine-readable data files), 2016.

6 The 85th percentile storm refers to the depth of rain that 85 percent of all storms are less than and is used to design water quality improvements. This size storm occurs frequently (i.e., in most years), whereas the 1% storm occurs infrequently (i.e., once in 100 years, on average).

7 Hydraulic Engineering Center – Hydrology Modeling System (HEC-HMS) is developed by the US Army Corps of Engineers.

8 USACE, 2015. Los Angeles River Ecosystem Restoration Feasibility Study, Appendix E Hydrology and Hydraulics, Table 17, September 2015.

9 ULAR EWMP (2016), https://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/watershed_management/los_angeles/upper_losangeles/20160127/UpperLARiver_mainbody_revEWMP_Jan2016.pdf.

10 based on Los Angeles Homeless Services Authority, "2020 Homeless County Data By Census Tract" (2020) & City of Glendale, "2020 Homelessness Count Report" (2020) & City of Long Beach, "2020 Long Beach Point-In-Time Count Statistic Summary" (2020) & City of Pasadena, "2020 Homeless Count" (2020).

11 Traced from: Blake Gumprecht, "The Los Angeles River: Its Life, Death, and Possible Rebirth", 2001.

12 Ibid.

13 Traced from A. W. Kuchler Natural Vegetation of California Map, 1977.

14 Modified from City of Los Angeles GIS Data., 2018.

15 Based on data extracted from NRCS soil database US Department of Agriculture Natural Resources.

16 Adapted from Water Quality TMDL, LA County MS4 Permit Attachment O.

TABLE OF FIGURES

ACKNOWLEDGMENTS

This update to the LA River Master Plan, completed in 2022, was initiated by the LA County Board of Supervisors and led by LA County Public Works. The creation of the plan was informed by numerous departments within LA County as well as municipalities, organizations, and individuals that served on the Steering Committee and Subcommittees.

In addition to the named individuals on these pages, many people committed to the future of the LA River contributed significantly to the plan by sharing ideas, priorities, and goals for the river.

This Master Plan was made possible only through their rich contributions.

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Figure 147. Cyclists and pedestrians utilize the LA River Trail during the annual SELA arts festival at river mile 12.3.
Source: LA County Public Works, 2018.

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Aydin Pasebani
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Julia Orozco

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Iris Anna Regn
Pauline Kamiyama
Leticia Rhi Buckley
Mayen Alcantara

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Kayla Kelly-Slatten

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Yareli Sanchez

EAST YARD COMMUNITIES FOR ENVIRONMENTAL JUSTICE
mark! Lopez
Alessandro Negrete
Jessica Prieto

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Manuel Gonez
Stephen Mejía-Carranza

FROM LOT TO SPOT
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Edel Vizcarra

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Julia Salinas
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Maressa Sah
Sarah Schurtz

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Evelyn Cortez-Davis
Rafeal Villegas
Manuel Aguilar
Scott Hungerford

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Beth Kent
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Bruce Reznick
Melissa von Mayrhauser

MUJERES DE LA TIERRA
Irma R. Muños
Paola Machan

PACOIMA BEAUTIFUL
Veronica Padilla-Campos
Andres Ramirez

PUBLIC COUNSEL
Antonio Hicks

PUBLIC WORKS
Keith Lilley
Carolina Hernandez

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Deborah Smith

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Mark Stanley
Joseph Gonzalez
Marybeth Vergara

SANTA MONICA MOUNTAINS CONSERVANCY
Joseph T. Edmiston
Sarah Rascon (MRCA)
Brian Baldauf (MRCA)
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Gabrielle Weeks

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Dan Sulzer

US DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Pauline K. Louie

WATER REPLENISHMENT DISTRICT
Sergio Calderon
Robb Whitaker
Kimberly Badescu

LA RIVER ADVOCATE
Mia Lehrer

Figure 148. Members of LA River team and community members at the Elysian Valley community engagement meeting in November of 2018.
Source: LA County Public Works, 2019.

CONSULTANT TEAM

Mark Hanna, Project Manager

Jessica Henson, Project Manager

PRIME, LEAD ENGINEER, AND WATER RESOURCES:
GEOSYNTEC CONSULTANTS
Mark Hanna
Ken Susilo
Najwa Pitois
Al Preston
Joe Goldstein
Paul Senker
Daniel Lee
Nami Tanaka
Curtis Fang
Stephanie Tong
Yoshi Andersen
Mustafa Ghuneim
Randy Brandt
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KEARNS & WEST
Joan Isaacson
Jack Hughes
Jenna Tourje
Taylor York

WEB DESIGN:
MOSAIC

LANDSCAPE ARCHITECTURE, URBAN DESIGN, AND PLANNING:
OLIN
Laurie Olin
Richard Roark
Jessica Henson
Andrew Dobshinsky
Nate Wooten
Joanna Karaman
Rebecca Klein
AJ Sus
Claire Casstevens
Diana Jih
Kate Lawler
Michael Miller
Danielle Toronyi
Alexa Vaughn-Brainard
Sarah Swanseen
Evangeline Sheridan
Gabriela Arevalo
Jonathan Franklin
Derek Lazo
Ruochen Wang
Andrea Binz
David Armbruster
Megan Hedges

BRANDING:
72&SUNNY

AFFORDABLE HOUSING:
STREET LEVEL ADVISORS
Rick Jacobus

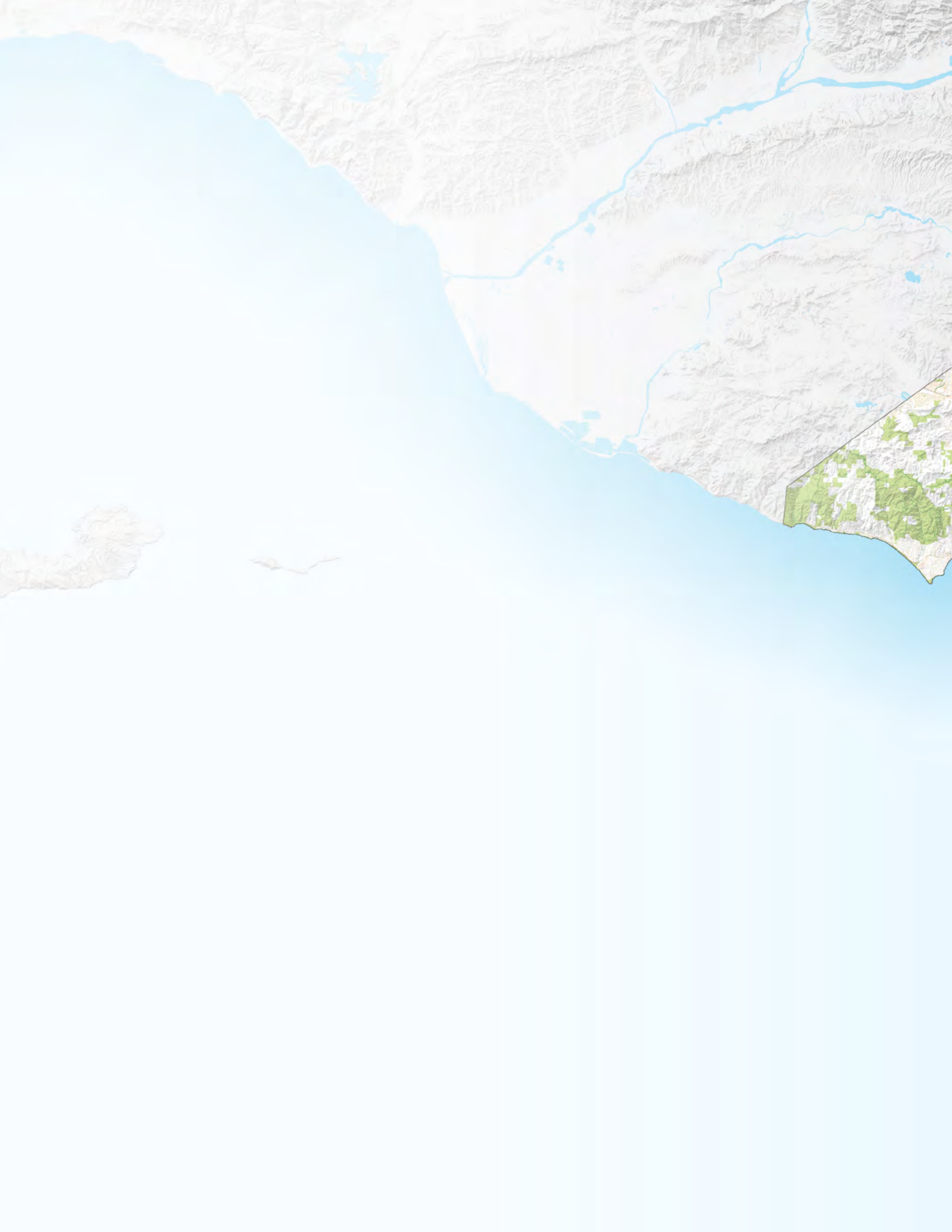
ARCHITECTURE AND PLANNING:
GEHRY PARTNERS
Frank Gehry
Tensho Takemori
Meaghan Lloyd
Anand Devarajan
Shuo Zhai
Dana McKinney

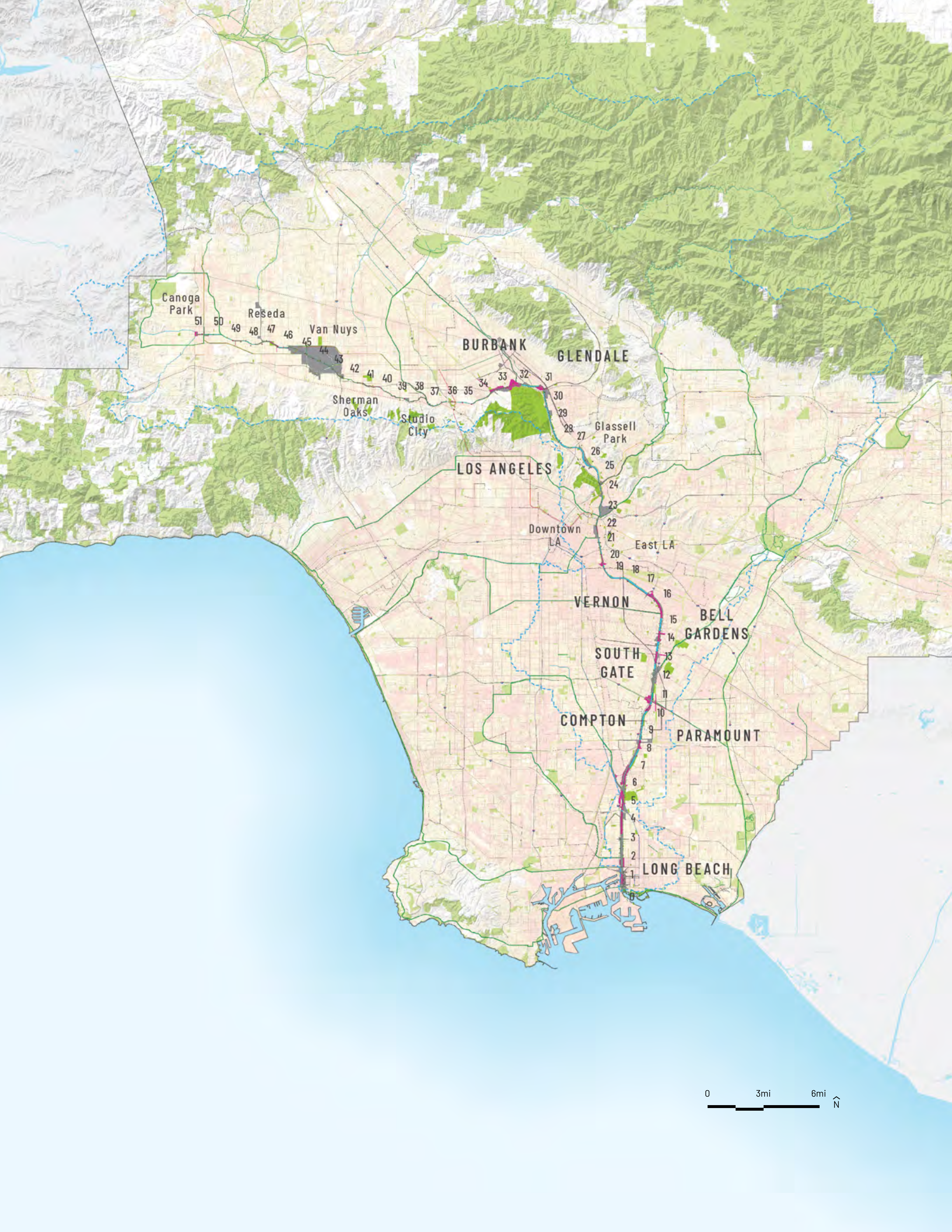
ENGAGEMENT:
RIVER LA, DAKELUNA
Kate Moulene
Ed Reyes
Angela Barranco
Lou Pieh
Jon Switalski
Natalie Gonzalez
Jason Foster
Miguel Luna
Bridgette Calderon

WATER RESOURCES:
KRIS HELM

MEDIA RELATIONS:
ACTUM
Glenn Gritzner
Abby McRae

Figure 149. Community members visiting the SELA Arts Event and participating in painting lessons. Source: OLIN, 2019.





Canoga Park
Reseda
Van Nuys
Sherman Oaks
Studio City
BURBANK
GLENDALE
Glassell Park
LOS ANGELES
Downtown LA
East LA
VERNON
BELL GARDENS
SOUTH GATE
COMPTON
PARAMOUNT
LONG BEACH
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RIVER
MASTER
PLAN

Geosyntec OLIN Gehry Partners, LLP