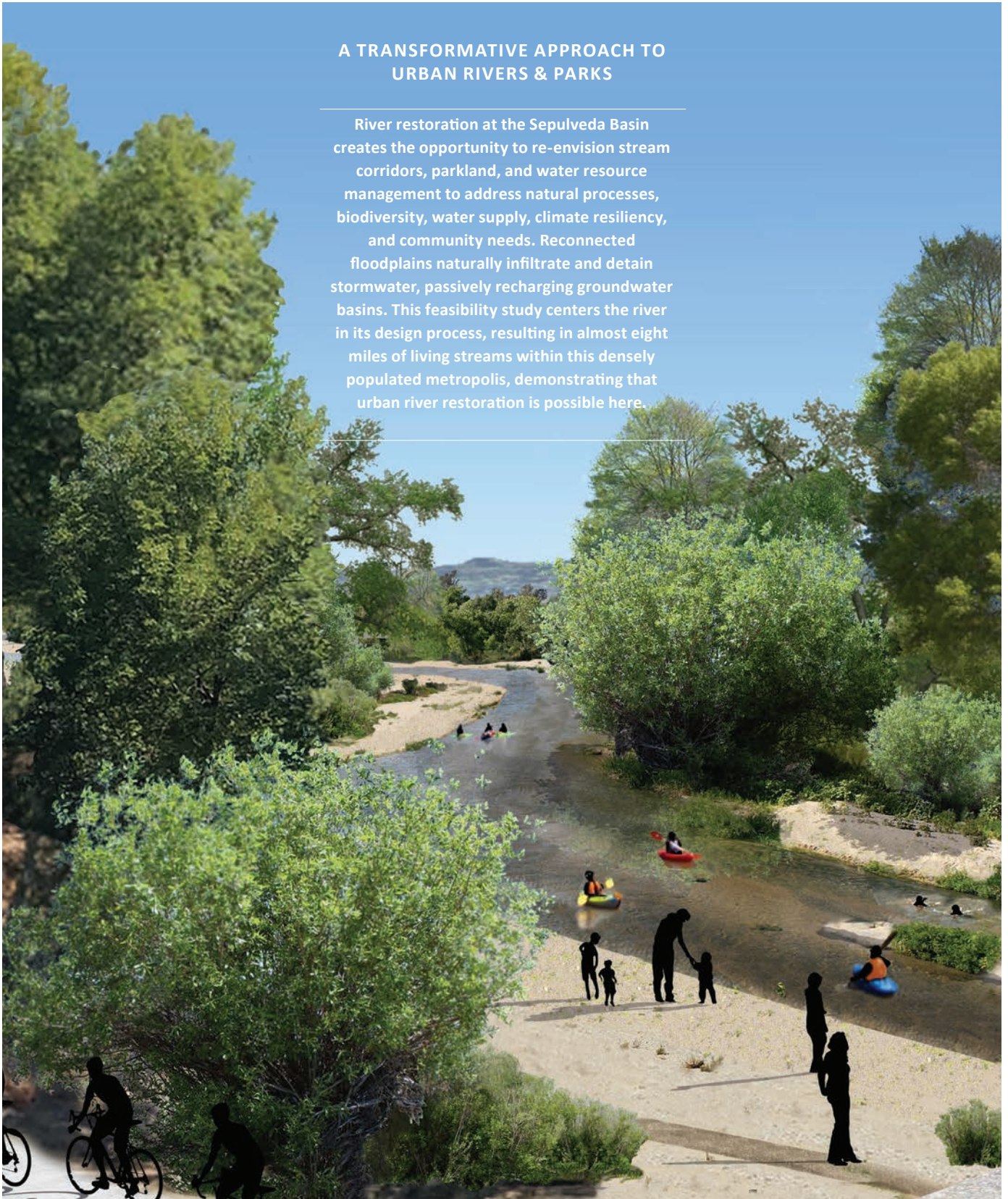


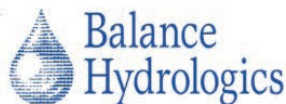
EXECUTIVE SUMMARY

A TRANSFORMATIVE APPROACH TO URBAN RIVERS & PARKS

River restoration at the Sepulveda Basin creates the opportunity to re-envision stream corridors, parkland, and water resource management to address natural processes, biodiversity, water supply, climate resiliency, and community needs. Reconnected floodplains naturally infiltrate and detain stormwater, passively recharging groundwater basins. This feasibility study centers the river in its design process, resulting in almost eight miles of living streams within this densely populated metropolis, demonstrating that urban river restoration is possible here.

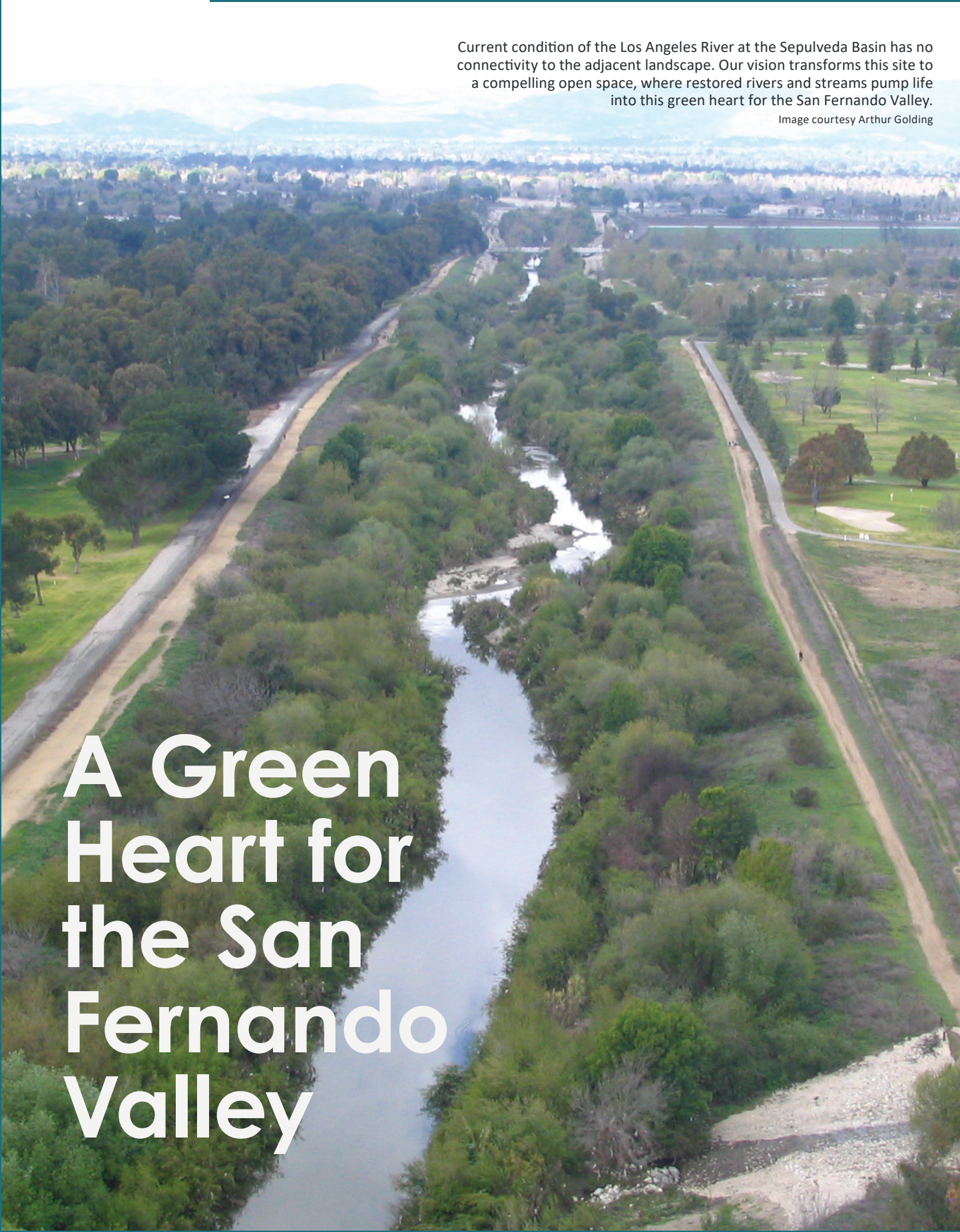


SEPULVEDA BASIN RESTORATION FEASIBILITY REPORT



Current condition of the Los Angeles River at the Sepulveda Basin has no connectivity to the adjacent landscape. Our vision transforms this site to a compelling open space, where restored rivers and streams pump life into this green heart for the San Fernando Valley.

Image courtesy Arthur Golding



A Green Heart for the San Fernando Valley

INTRODUCTION

The Los Angeles River and its tributaries are straitjacketed throughout the Sepulveda Basin, with parks, roads and other open space “turning their backs” to these waterways. Climate change, habitat loss, and the need for open space demand a new approach.



The Los Angeles River and tributaries at today's Basin, 1938.
Photo: UCSB Library, Flight AXJ-1938

The Los Angeles River has lived large in the imagination of the City since its founding. Once a life-sustaining cornerstone for humans and other species, the River was faulted for the consequences of urbanization: increased runoff and constraints on the river floodplain led to catastrophic flooding that sealed the fate of the region's waterways in concrete more than eighty years ago.

The Sepulveda Basin is an Army Corps (USACE) flood management facility built around the Los Angeles River. In larger rainstorms, floodwaters from a 160 square mile area are held back by the Basin's dam, intentionally flooding the recreation area and portions of Burbank and Balboa Blvds. This prevents these floodwaters from joining with high flows from the San Gabriel Mountains, which could otherwise flood downstream communities.

This carefully choreographed water ballet allows contemporary Los Angeles to exist. Climate change threatens to disrupt this balance, with anticipated future extreme weather including atmospheric rivers. Increases in drought and heat calls for climate justice: safe, equitable, accessible parks and open space; nature experiences; and the restoration of habitat and biodiversity.

The emergence of parks, bike trails and legalized kayaking on the Los Angeles River has led to a heightened awareness of the potential of the River to serve as a community resource. While public agencies explore how to stabilize the region amidst social, political, economic, and climatic shifts, the existing landscape at the Sepulveda Basin creates an opportunity to demonstrate an ecological approach, one that leverages natural river processes to create self-sustaining habitat; that provides respite, relaxation, and recreation; enhances ground-water recharge; and provides greater flood relief to the region.

Goals + Approach

A restored Los Angeles River contributes to regional ecological sustainability and climate resilience.

Stream corridors respond to the natural processes that shape them through the ever-changing distribution of water and sediment, in a process known as fluvial geomorphology. Water, sediment and vegetation work together to shape and maintain healthy stream corridors through two primary processes: erosion of existing landforms and deposition of new materials to create new landforms. These corridors, from stream to floodplain extent, accommodate the extremes of floods and droughts, expanding and contracting accordingly.

This study uses a process-based approach to stream restoration, focusing on removing impediments to eight miles of the river and its tributaries within the Basin and on creating more naturalized stream environments that can be shaped by geomorphic processes in the years to come. The study recognizes the significant flood manage-

THE OVERARCHING GOAL IS TO RESTORE ECOSYSTEM FUNCTION TO THE BASIN'S STREAMS

ment role of the Basin to the City of Los Angeles and its highly-populated downstream urban areas.

Process-based restoration is a widely supported approach to renaturalizing stream corridors that were constrained in previous decades. Historical data can be used to inform how natural processes functioned in less controlled times, but this study does not focus specifically on reclaiming “historical” stream conditions. The overarching project goal of restoring ecosystem function to the river and its tributaries within the Basin uses a technical understanding of geomorphic processes as the fundamental basis for the envisioned design presented herein. A full realization of the restoration concept, coupled with a reimagining of the Basin’s parkland, could produce a

world-class park with all amenities currently enjoyed today, and so much more.

The park within the Basin serves a large population of both local and regional users—including underserved communities—with a multitude of active and passive recreational interests. User experience of the park can be improved through an expanded network of multimodal pathways and trails, enhanced spatial relationships between programmatic features of the park, and integration of river and tributary corridors as recreational elements that are open, inviting and accessible to the public.

The Project Team envisions park space and uses inspired by the grandeur of New York City’s Central Park and San Francisco’s Golden Gate Park. These parks, while developed in an earlier era with different driving aesthetics and cultural priorities, exemplify principles of successful park design that remain highly relevant to this day.

Specific project goals are:

- Using geomorphic process-based design principles to restore and renaturalize ecosystem functionality to the stream corridors within the Basin
- Removing concrete and other modifications from the river and tributaries within the Basin
- Increasing regenerative wetland and riparian habitat functions and values
- Adding capacity for stormwater detention to reduce flood hazards to downstream and adjacent communities
- Increasing the potential for groundwater recharge during more frequent small to moderate storm events
- Improving the recreational interface with the river and its tributaries, and enhancing the existing Los Angeles River Recreation Zone for fishing and boating, among other public benefits.

Drivers of Planning

Whether it's stream channels and floodplains, parks and waterways, or people and parks, planning to create greater flow and connectivity promotes ecological goals and sense of place.

Questions shaping this study included:

- How are hydrologic processes currently shaping site conditions?
- What geomorphic features are likely to be shaped and maintained by naturalization?
- To what degree can flood detention and groundwater infiltration be quantified with existing data? What data gaps are there?
- What habitats will respond to the conditions created?
- What activities are well-suited for co-location within the riparian corridor?
- How can restored rivers engage with parkland?
- How can stakeholders inform the restoration feasibility process?
- What reference sites and precedent designs demonstrate the feasibility and potential for restoration at the Basin?

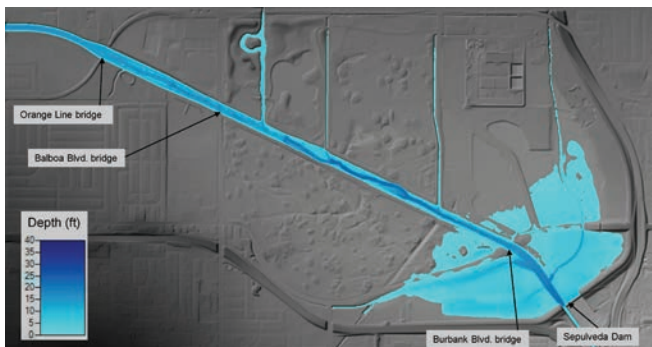
A challenge faced by the Project Team was a lack of existing conditions hydrologic data. Absent stream gage data, the Team created a stepwise hydrograph to model how floodwaters may fill the Basin. Establishing stream alignments and channel dimensions then translated to broad habitat zones, compatible human uses, and spatial relationships that guided the overall park vision layout.

Ideal conditions were considered for boating. Base flows in summer have been sufficient for kayaking and are present in the natural-bottom section of the river upstream of Tillman discharges. Little is known about where this water comes from, but may include groundwater upwelling and urban runoff.

Flood modeling

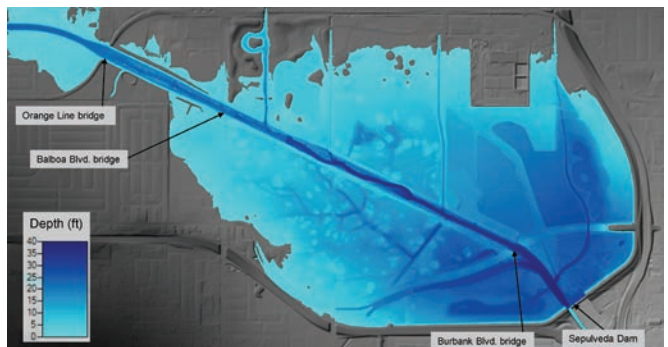
Existing hydrology

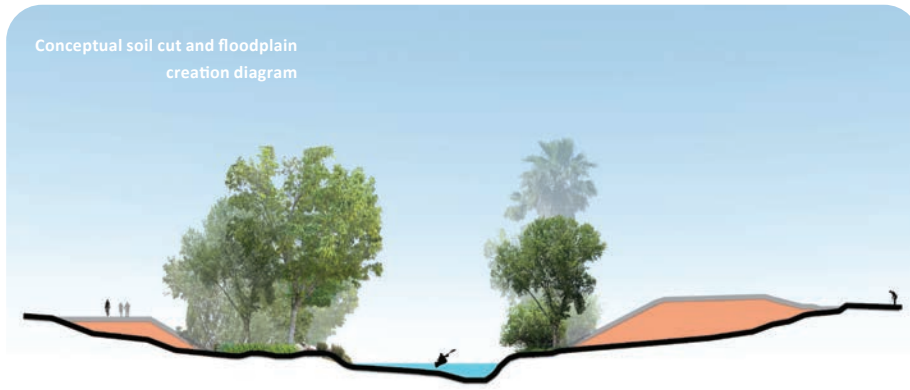
This shows when water begins to backwater at the dam, flooding Burbank Blvd, the Wildlife Lake, and portions of the Balboa Golf Course. Water depth in the Los Angeles River mainstem ranges from about 5 feet to 20 feet.



Given the lack of existing flow data, a stepwise hydrograph was created, showing the effect of a steady increase of flows up a peak flow of 60,000 cfs.

Here the Basin's flood management purpose is fully engaged; detained inflow has filled to the maximum level. Flow breaks out upstream of the G Line Busway bridge and on both sides of Balboa Blvd bridge. Balboa Lake is breached and all golf courses are flooded. Water depth is up to 40 feet at the dam face.





Infiltration

Soils maps indicate a range of infiltration rates up to 4 inches per hour in parts of the Basin. Soils are denser and have lower infiltration rates nearer to the dam face than from White Oak to Lake Balboa. These findings informed where floodplains should be wide enough to take advantage of more porous soils.

Habitat

After reviewing the diversity of wildlife at the Basin, including sensitive species, likely plant alliances were identified for the different zones of the riparian corridor and park uplands. As site hydrology is refined, these can be predicted with greater accuracy.

Capacity

Removing soil increases stormwater storage volume. The Project Team considered potential soil removal volumes alongside potential benefits. Considerations include financial and environmental costs to offhaul. Opportunities to reuse soils onsite should be pursued.

Compatible Boating Uses

A graphic exploration of the appropriate activities along the flood zones of the riparian corridor provided insight into habitat needs as well as organization of recreational elements.

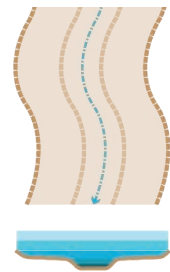
Floodplains

A broader expanse of floodplains in the mainstem and tributaries, that would become activated frequently by low intensity storms, are of strategic importance. Alignments and geometric extents were established; gage data and a hydrograph is needed to confirm benefits and dimensions.

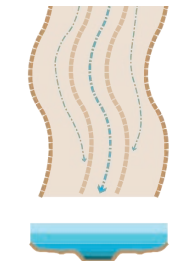
CHANNEL TYPES

Rivers form their channels in response to inputs like water and sediment, as well as overall slope. Each of these channel types create different opportunities for habitat and human exploration and play.

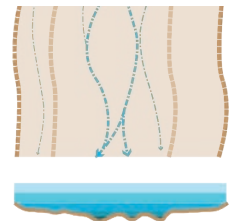
SINGLE THREADED



MULTIPLE THREADED



BRAIDED

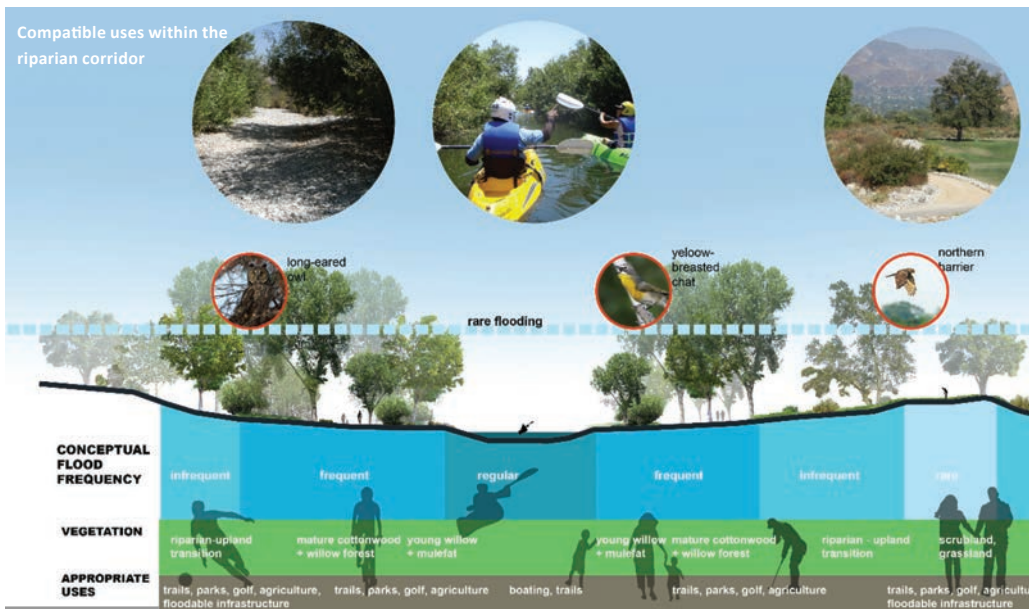


CHANNEL FEATURES

- channel thalweg
- active channel
- floodprone width

FLOOD FREQUENCY CORRELATIONS

- rare
- infrequent
- frequent
- regular
- base flow



Relating the vision to reality

Design References

Old Tujunga Wash at Johnny Carson Park, Burbank, CA



Old Tujunga Wash at Johnny Carson Park

Relevance

- Restored stream integrated into park setting
- Willows maintain green corridor
- Trail system engages the creek

Where it Differs

- Drains a small (3 sq mi) urbanized watershed, seasonal stream

Angeles National Golf Course at Tujunga Wash

Relevance

- Floodable golf course allows low intensity storms to flow around fairways
- Integrates with habitat

Where it Differs

- Dry riparian scrub environment is a function of its location in the watershed, profile slope, and channel type

Angeles National Golf Course, Sunland-Tujunga, CA



Adelaide Municipal Golf Course, Australia

Relevance

- Reduces (3) 18 hole golf courses to (1) 18 hole course, (1) executive 6 hole course, (1) 12 hole course, and (1) minigolf course.
- Multiuse potential (trails, habitat)

Where it Differs

- Not designed for floodability

Proposal for Municipal Golf Course, Adelaide, Australia



Marrano Beach at Rio Hondo, Rosemead, CA

Relevance

- Shallow channel with wide floodplain and terraces
- Demonstrates extent of riparian forest and canopy in an unchannelized waterway
- Regionally local, watershed size is similar to LAR at White Oak Ave.

Where it Differs

- Impoundment of flows at Peck Road Water Conservation Park likely cause of seasonal dry channel.
- Surrounding landscape is ruderal grasses, not native upland habitat

Marrano Beach at Rio Hondo, Rosemead, CA



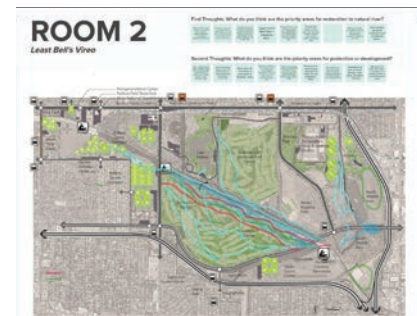
Great Parks

While not performing floodplain functions, New York's Central Park and San Francisco's Golden Gate Park pointed the Project Team to design standards the Sepulveda Basin's parkland could rise to, including:

- Spatially unified
- Extensively networked with trails and paths
- Programmed with cultural as well as sports and leisure uses
- Buffered between uses with habitat, or landscaped with natives to simulate naturalistic landscapes
- Clear identity at urban edge + entries
- Roads through parkland should be calmed for multimodal user safety and enjoyment

Social Drivers

Design Charrette



Stakeholder engagement was focused on the Sepulveda Basin Wildlife Area Steering Committee (SBWASC) along with several agency and elected offices. An online charrette with SBWASC members yielded insights on potential for increased connectivity from trails to road crossings; areas to protect; areas for expanded restoration and flooding; and active recreation needs.

River Restoration + Vision Plan



WHITE OAK ENTRY +
BOAT HOUSE

BALBOA
GRAND
ENTRY

URBAN
AGRICULTURE
THROUGHOUT



RIVER
KAYAKING



LOS ANGELES
RIVER ACCESS +
RECREATION

GOLF INTEGRATED WITH HABITAT

The San Fernando Valley's Green Heart acts as a new Central Park, expanding the experience of recreation to include a broader suite of venues including music, performing arts, a botanical garden and First Nations cultural space. The park unfolds a sequence of spaces and activities along a network of trails.

EXPANDED NETWORK
OF MULTIMODAL +
PEDESTRIAN
TRAILS





A reimagined park is unified around a restored river system, experienced via an extensive trail network, and connected to the urban interface.

The outcome of the study shows that many beloved existing park elements can be unified with a new spatial configuration that creates a river core, with trails that integrate activities and park entries with all stream corridors.

Rivers pump life into the San Fernando Valley's Green Heart

A TYPICAL DAY AT THE NEW PARK

A typical park visit for a family may begin by alighting from the G Line stop at Woodley Ave. They rent bicycles from the nearby stand and, cycling down the promenade past the Missile Bandshell, notice a musical event that will be featured that evening. Arriving at the Central Green, they unpack a picnic from their backpacks. After lunch, they cycle over the Los Angeles River to a new sports field complex, where one child joins a softball game while another runs off to a nearby playground. The parents ride along the river, enjoying the cooling effect of the trees, listening to the birds, pausing to watch fishermen and kayakers. Retrieving their children, they happen upon a puppet show at the Placita where they also enjoy refreshments, before heading back to Woodley Avenue to return their bikes and head home.

Special features

WHITE OAK ENTRY + BOAT HOUSE

The intersection of White Oak Ave and Victory Blvd anchors the west end of the Basin with a new entry that celebrates the river while inviting visitors from the surrounding neighborhoods to find familiar beloved features: dog parks, skate parks, Intergenerational Center. A new Boat House fronts on a trail leading to a seasonal kayak launch on the LAR, which now is a 2 ½ mile long adventure.

BALBOA BLVD GRAND ENTRY

A significant urban intersection with local bus and G Line stops, the Balboa Grand Entry creates a heightened sense of arrival and gateway to the Basin. An entry plaza greets visitors and provides bike rentals and wayfinding. A trail leads visitors through the willows and cottonwoods of the restored Bull Creek corridor, to Lake Balboa, the LAR, or numerous other destinations. Visitors may also amble the urban promenade of Balboa Blvd, a hospitable streetscape that signals to drivers that this cut-through is a visual break from the urban landscape that encourages traffic calming.

WOODLEY AVE GRAND ENTRY

A gracious entry plaza greets visitors from Victory Blvd and the G Line transit station. Woodley Creek is daylighted next to the plaza, and leads visitors along paths to the Missile Bandshell, Central Green, and Heart of the River Cultural Space. A road at the Woodley Entry Roundabout leads motorists and bicyclists to the remodeled nine hole Woodley Golf Course and Lake Balboa.

CENTRAL GREEN

Tree-lined paseos lead to the Central Green for concerts, casual games, picnics, rest and relaxation. A variety of activities including a paved placita for Farmer’s Market and food trucks, sports fields, dog parks, and community gardens ring the Green. Trails radiate from the Green’s central core to the other areas of the park.

HEART OF THE RIVER CULTURAL SPACE

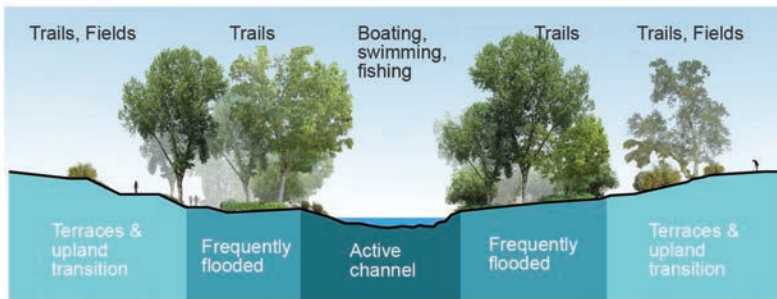
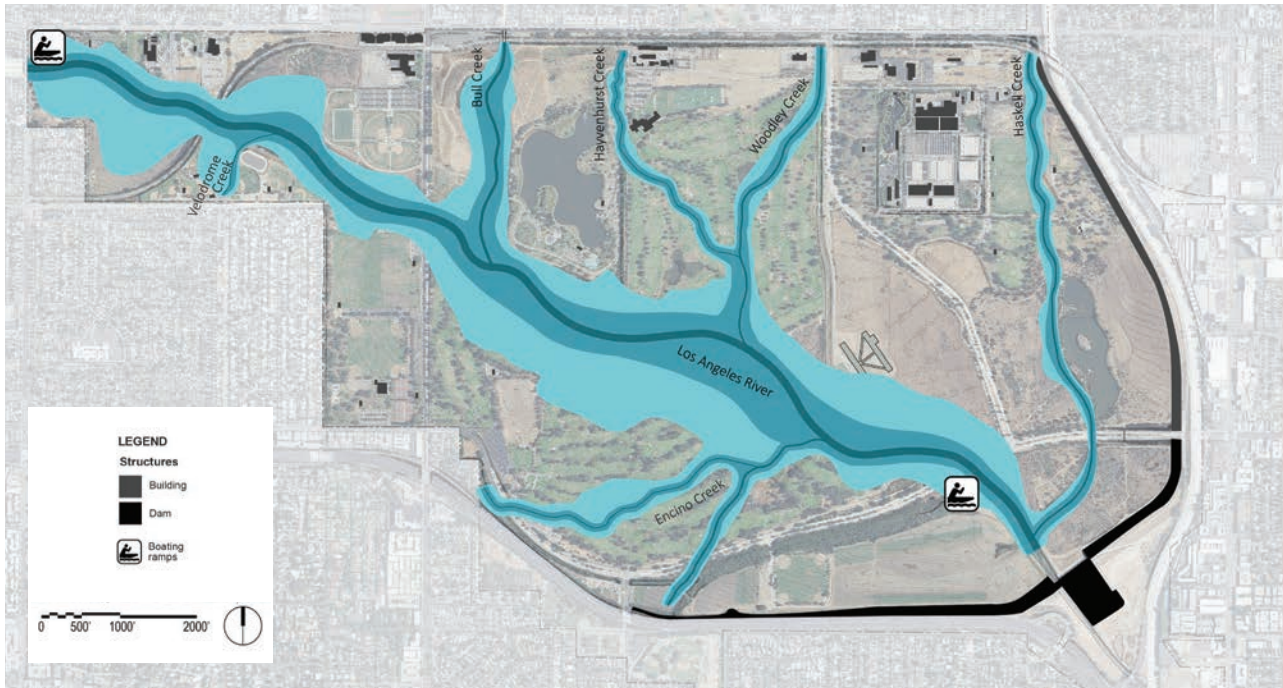
Located near the heart of the Basin, nestled between the Los Angeles River, Hayvenhurst Creek and its confluence with Woodley Creek, the Heart of the River Cultural Space combines spaces celebrating traditional uses and relationships with nature and natural processes. A dedicated space alongside and within the River’s forested canopy creates an anchor for cultural activities of Los Angeles First Nations peoples, whose activities may in fact include larger areas of the Basin. A botanical garden explores the ethnobotany and traditional knowledge that immigrants bring to the greater Los Angeles area. Trails from the Heart of the River connect to other cultural and recreational activities at Lake Balboa and Woodley Golf Course.

THROUGHOUT THE BASIN

Trails, athletic fields, passive recreation space, picnic and barbecue areas, community gardens, playgrounds, court sports, golf courses, habitat and other park amenities are interspersed throughout the park.



River Restoration Concept Benefits



Benefits:

- Concrete removal
- Reintroduction of natural river processes
- Restoration of ecological and riparian corridor functionality
- Increased groundwater recharge potential
- Increased stormwater storage
- Increased flood attenuation time

Alternative Concept

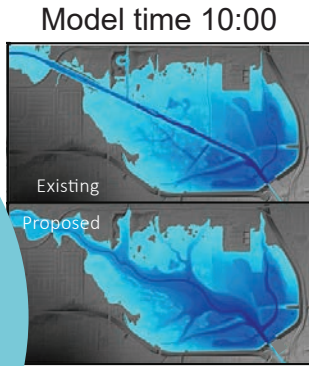


A more modest restoration alignment was developed to understand the potential of minimal impact to existing infrastructure and park features.

This alignment was not pursued for study due to deficiencies compared to the Restoration Concept, including fewer geomorphic and ecological benefits, and less stormwater detention, flood management and groundwater recharge potential.

Flood managers gain as much as an additional
20 mins
in Basin stormwater retention time,
 reducing downstream risks. This could help to prevent catastrophic flooding as rainfall intensifies under climate change.

Hydraulic modeling also demonstrates less frequent flooding of Burbank and Balboa Blvds, and higher elevation golf course areas. Floodwaters spread over floodplains, and generally increasing the stormwater detention capability of the Basin at lower flood flows.



Aquatic and riparian habitat is increased to
509 acres
 including cottonwood and willow forests, and mulefat thickets.

Oak woodlands, native grasslands, and scrublands populate upland areas and define new ornamental landscapes, resulting in
669 acres
of upland habitat and native landscaping.

Floodplain restoration would increase the potential for groundwater recharge while providing larger riparian and ecosystem benefits. Flows from low intensity storms are conservatively estimated to **increase groundwater recharge potential by**
5x
 compared to what existing conditions allow today.

Additional storage capacity of
3,800
(acre-feet) would add approximately 20% more flood detention space to the Basin. Lower volumes of soil removal translate to decreased storage capacity.

Soccer fields and trail miles
double
 Ballfields increase by 125% and basketball courts by 400%. Dog parks increase by 2 acres. Golf courses become multiuse facilities with an 18-hole course, a 9-hole course, and a 6-hole course.

amenities compared

RECREATIONAL ACTIVITY	EXISTING	PARK VISION
ARCHERY	2 AC	2 AC
BALLFIELDS, REGULATIONS	11	12
BASEBALL OR SOFTBALL	17	23
BASKETBALL	2	8
BATTING CAGES	9	CAN BE ACCOMMODATED
CRICKET	4	4
DOG PARK (TOTAL AREA, AC)	5.3 AC	7.5
GOLF	(3)-18 HOLE	(1)-18 HOLE; (1)-6 HOLE; (1)-9 HOLE
GYM	✓	✓
HANDBALL	3	4
INTERGENERATIONAL CENTER	✓	✓
LAKE BALBOA, INCLUDING MINIBOATS, HARBOR, BOATHOUSE	✓	✓
MODEL AIRPLANE FIELD	95 AC	83 AC
MULTIMODAL AND PEDESTRIAN PATHS	+/- 33 MI	+63 MI
PICNIC TABLES	91	MEETS OR EXCEEDS
PIT COURTS	4	4
PLAYGROUNDS	4	6
SKATE PARK	✓	✓
SOCCER	8	19
TENNIS	16	16
VELODROME	✓	✓
WILDLIFE AREA	182 AC	182 AC
OTHER ACTIVITY	EXISTING	PARK VISION
AGRICULTURE	113 AC	113 AC

Advancing the Agenda

Technical studies should move in tandem with stakeholder engagement, fundraising, and permitting to align design with an accelerated implementation timeframe for completion prior to the 2028 Olympics.

Restoration implementation of the stream corridors and park renovation could be completed in time to be broadcast worldwide during the 2028 Olympics. This would necessitate an accelerated design and implementation schedule, which would include stakeholder outreach and market analyses; legal and organizational agreements for the lead agency and ongoing management of the envisioned park; a suite of technical studies, designs, and environmental permitting documents; and phased implementation.

The Project Team recommends an approach led by the State of California, most likely the Department of Water Resources (DWR). DWR's agency initiative for "Cutting Green Tape" and affiliation with the USACE program Engineering With Nature (EWN) provide a basis for leadership on the project. USACE is an important and sought-after Federal partner and funding source. Strong funding and lead agency support is vital to accomplishing the restoration work in time for the 2028 Olympics; funding through the International Olympics Committee as a means to support environmental justice elements for the local community should be pursued as well.

Future phases should incorporate a Technical Advisory

Committee composed of external experts representing the different disciplines required by the work. Their role would be to act as a sounding board, third party reviewer of the work conducted, and to ensure transparency in the design process.

Creation of a Community Advisory Board would provide additional oversight and build consensus around the intensive stakeholder engagements necessary to ensure that the diverse needs of the population were being met.

Next steps for the design team include studies for greater technical detail to solidify expectations, design refinement, and environmental permitting.

Social

Next steps include extensive stakeholder engagement including disadvantaged communities, First Nations, neighbors and community members, regional park users, sports leagues, model airplane aficionados, urban farmers, neighboring businesses, and lessees. A community needs assessment will also be performed.

Legal

Creation of management structures for both project implementation and ongoing facility operations are paramount to forward movement. With the City of Los Angeles as the primary lessee of the Basin, this project will need the support of their leadership. The legal and permit team will need to also secure USACE approval for the project.

Technical

Complex technical studies including hydrology, hydraulics + geomorphology; habitat + wildlife; landscape architecture; geotechnical; utilities; traffic; greenhouse gases; tree surveys; topographic survey; cultural resource surveys; and other civil and structural engineering are needed to support design plan refinement and environmental permitting.



An Accelerated Schedule

To complete the River Restoration and Park Vision in time for the 2028 Olympics, stakeholder engagement, and technical studies including design and permitting must launch immediately. Construction documents and implementation is likely to unfold over several years, with restoration first to promote landscape establishment, then phasing in park elements.

