

2023 LOS ANGELES RIVER WATERSHED

STATE OF THE

FROM PLANS AND PLATITUDES TO NEW ACTIONS AND ATTITUDES

SEPTEMBER 19 | THE AUTRY MUSEUM OF THE AMERICAN WEST



POSTER SESSION ABSTRACTS





Shared Connections to our Watershed

Gabrieleño Tongva Peoples: Caring for the Paayme Paxaayt

Gabriella Lassos

Sacred Places Institute for Indigenous Peoples

Since time immemorial the Gabrieleño Tongva Peoples have been caring for the Los Angeles River. Traditionally known as the Paayme Paxaayt, the Los Angeles River has been a key means for travel, a rich food source, a gathering place for ceremonial purposes as well as a place to gather basket materials, housing materials, and more. Tongva families understood the importance of respecting the water, meaning that they were able to contribute to a healthy ecosystem to sustain all life in and around the river. They understood the relationship between every part of the ecosystem and how those parts all work together as cleansing systems for the water. The Tongva believed, and still believe, that we are one with nature and that it is our responsibility as human beings to take care of the world around us, just as we take care of our relatives. Before the bustling neighborhoods and highways that exist around the river today, the Tongva had villages that lined the river where they were able to travel to and from via tule boats and Tiats (traditional redwood plank canoes). These villages were trade hubs and some of these sites, like Puvungna, were shared ceremonial spaces where different Tribes/Nations could come together and hold ceremonies. The Tongva and the tribes that shared these spaces still exist in Los Angeles to this day and continue to fight for the Paayme Paxaayt. It's an important part of our efforts in protecting the river to point out the disconnect that still exists between the residents of LA and the Los Angeles River. A big factor in this disconnect is the way that the river has been concretized and is no longer allowed to flow freely. To many the river is just another highway where there happens to be water occasionally flowing. It is important to educate those who live near and visit the river for recreation, so they can begin to realize their relationship and responsibility to this body of water and no longer see it as a resource but as a relative. As we work to protect the river now, we look to the future and the amazing potential that exists if Indigenous voices are taken seriously in the city's continued efforts to revitalize the river. The current LA River Master Plan discounts Indigenous voices and looks to add more concrete to the river rather than naturalizing it. The Tongva along with the many diverse communities that live along the river will continue to fight for naturalization and deconcretization so that Paayme Paxaayt can be healthy and happy once again.

First of its kind: The Los Angeles River Pavilion Project

Carolina Hernandez

Los Angeles County Public Works

The LA River Master Plan's collaborative planning process resulted in a visionary and comprehensive blueprint for the LA River to become 51 miles of connected public open space that addresses equity, flood risk, water quality, water conservation, ecosystem health, access, affordable housing and homelessness, and opportunities for arts and culture. Public Works undertook a 3-year community first approach to address community needs along the Los Angeles River including increased public open space, improved public health, and new infrastructure to address social and environmental inequities. Thousands of County residents joined engagement conversations in person, and nearly 1 million people engaged online to help reimagine the River. Their direct input served as the foundation for this Master Plan that reflects the communities' current needs along the River.

The LA River is a centerpiece of LA County, connecting diverse communities along its 51-mile course from the San Fernando Valley to Long Beach. The Los Angeles River Headwaters Pavilion Project (Project) is the first project of its kind to stem off the newly adopted LA River Master Plan Update. The Project will provide the community of Canoga Park a gateway to the existing LA River Greenway. The Project is located at the headwaters of the Los Angeles River and is a Tier II Pavilion with amenities such as a shade canopy with a main façade, restroom structures, benches, a picnic table, and native landscaping.



The Project's main façade represents and illustrates a historic image of the San Fernando Valley looking towards the mountains using a medium of woven wire tapestry. Strategically located at the headwaters of the LA River, the main façade image strives to highlight a vision of the past and connect the local community to the history of the area and the LA River as a whole. The LA River Master Plan Update envisions a desired cadence of pavilion structures every half mile along the river. This planned cadence would provide river-adjacent communities connectivity along all 51 miles of the LA River.

Upper Los Angeles River and Tributaries (ULART) Revitalization Plan

Sarah Rascon

Mountains and Recreation Conservation Authority

State legislation in 2017 created a Working Group that was established to develop the **Upper Los Angeles River and Tributaries (ULART) Revitalization Plan**, administered by the Santa Monica Mountains Conservancy and their joint powers authority, the Mountains Recreation and Conservation Authority. The appointed working group was comprised of 23 representatives ranging from the State of California, Los Angeles County, and the cities riparian and adjoining the Upper Los Angeles River, along with community leaders. The effort was assisted by seven non-governmental/non-profit organizations helping as partners in outreach and engagement.

The process, as well as the Plan, are the result of extensive coordination and collaboration where stakeholders were brought together based on their past and present connections to the upper Los Angeles River watershed, while sharing their future hopes and expectations for the waterways found in their local communities. In order to foster communities' relationships to their watershed and the region's urban ecology, the Working Group solicited ideas and input from the community, listening to area residents and stakeholders share their vision for the river and tributaries.

Over a period of 20 months, the Working Group in conjunction with NGO/NPO partners convened 33 public meetings to gather feedback and develop a collaborative, inclusive planning process. The plan is the fruit of a collaborative process that collected substantive input from the members of the impacted communities and their lived experiences near and around their local waterways that contribute to the river's watershed resources and its vitality to their communities.

The result is the ULART Plan which identifies more than **300 proposed opportunity areas (OAs)** and projects that were community initiated and/or vetted. The effort also tasked the working group with addressing the unique and diverse needs of the Upper Los Angeles River, Pacoima Wash, Tujunga Wash, Aliso Canyon Wash, Burbank Western Channel, Verdugo Wash, and the Arroyo Seco, and the communities through which they pass, with a priority on disadvantaged communities, identified pursuant to Section 39711 of the Health and Safety Code.

These inclusive, multi-purpose projects propose opportunities that equate to:

- Comprehensive coverage equaling 17.5 square miles (of ULART Opportunity Areas), equivalent to three Griffith Parks! Which provides walkability access that 1.53 million people can easily walk to.
- Capture 8,695 acre-feet of stormwater a year.
- Plant & nurture more than 250,000 trees.
- Provide over 1,000 miles of shaded green streets and trails.
- Preserve and enhance over 6,000 acres of urban wildlife ecology.

The ULART Plan is now in the implementation phase with several opportunity areas underway.



Predicting, Planning for, and Adapting to Our Changing Climate

Planning, Designing, And Building Resilient Multimodal Networks To Achieve The Carbon Reduction, Climate Mitigation, And Adaptation Goals

Kathleen McKernin

Alta Planning + Design

We at Alta apply sustainable thinking to plan, design, and build resilient multimodal networks to achieve the carbon reduction, climate mitigation, and adaptation goals of our client communities. Alta offers a comprehensive set of climate-forward services, from grant-writing through planning, benefits modeling, and policy, through design and rapid implementation.

Alta led the design team for a network of green alleys in South Los Angeles which completed construction in January 2023. The Central/Jefferson and Quincy Jones Green Alley networks introduced Low Impact Development strategies into existing alleyways in South Los Angeles. This award-winning design included subsurface stormwater capture via infiltration galleries, planters within the alleys to calm traffic and provide landscape areas, new parkway swales at cross-streets to capture additional runoff, and thematic surface treatments related to neighborhood history. These green alleys offer clean, and safe passage for local pedestrians and bicyclists in neighborhood spaces that were previously under used and ignored. Additionally, they connect community members with their regional ecology and the Los Angeles River Watershed health.

Alta worked with El Monte on a linear park on Merced Avenue. The linear park created along a new median will feature walking and biking paths, native plantings, stormwater capture, public art, shade trees, and play areas. This Merced Avenue Linear Park offers green, gray, and blue infrastructure, along with urban greening and heat reduction. Local communities and users benefit not only from the benefits posed to the changing climate, ecological health, and conservation of water sources, but also from the added health benefits supplied by the park. El Monte is in two watersheds: the Los Angeles River Watershed and the San Gabriel River Watershed.

For the Long Beach-Pasadena Urban Cooling Heat Island Reduction project Alta is leading a feasibility study in the cities of Pasadena and Long Beach. This study will develop strategies for climate adaptation and mitigation for three different neighborhoods, each of which are facing the interrelated crises of climate change, and systemic racism. The combined effects of these crises include extreme heat exacerbated by inequitable civic investments and shifting use of and concern over safety in public spaces. This year-long project is funded by a grant from SCAG and will identify sustainable design strategies to cool temperatures; improve walking, biking, and connections to transit and key community destinations; and increase climate resiliency and wellbeing.

The Canoga Park Urban Cooling and First/Last Mile Strategies project focused on shade, cool pavement, native plantings, and traffic safety improvements. This Alta project is based in the San Fernando Valley, Canoga Park, a working-class community with many extreme heat days, incomplete and damaged sidewalks, and a few bikeways. The team analyzed heat-related interventions including Cool Pavement, bioretention plantings, shade structures, and they identified a network project to improve the safety and comfort of bicycling and walking in the area.

Alta's poster(s) will illustrate our design approach using photo simulation graphics and sections to illustrate shared connections to our Watershed and Alta's work in predicting, planning for, and adapting to a changing climate.



Collaborations Between Communities In South L.A. And Michoacan, Mexico

Gina Hakim

University of California Irvine

This poster will highlight the collaborations between communities in South L.A. and Michoacan, Mexico. It focuses on the ways that migrants from Mexico living in Wilmington and West Long Beach have contributed to water infrastructure projects in their home communities, and in doing engage in transnational ecological stewardship. It showcases the way that non-expert stakeholders engage in the cross-border processes of collaborative water knowledge exchange and management, and the potential to mitigate water scarcity and the effects of climate change.

Environmental Justice

Dr. Manya Singh

United States Army Corps of Engineers

The Los Angeles District is proud to be one of the districts leading the way on Environmental Justice issues at the US Army Corps of Engineers. Here, we show our recent partnership and outreach efforts overlaid on an environmental justice map, which utilizes three national indexes (Environmental Justice Index from the CDC, EJScreen from the EPA, Climate and Economic Justice Screening Tool from the CEQ) and CalEnviroScreen. In addition, we show the census tracts that have been identified as “Justice40” communities for USACE, which focuses specifically on communities that qualify as disadvantaged under the Water and/or Climate major criteria from the Climate and Economic Justice Screening Tool. We also provide an overview of our work to advance Environmental Justice.



Monitoring Our Local Watersheds

Tackling Bacteria in the Upper Los Angeles River Watershed Through a Human Health Risk-Based Approach

Brianna Datti

Craftwater Engineering Inc.

Bacteria impairments remain one of the most challenging water quality issues to address in Southern California, resulting in beach closures and unsafe conditions for recreators. The Upper Los Angeles River Watershed is pursuing an innovative method to address the Los Angeles River Bacteria Total Maximum Daily Load (TMDL) requirements. When the Bacteria TMDL was developed in 2010, a pathway towards compliance was established based on outfall monitoring data collected at the time to identify priority outfalls (consistently high *E. coli* loading rates) and outlier outfalls (episodically high *E. coli* loading rates) and a Load Reduction Strategy (LRS) to implement control measures to address. However, following years of implementation challenges and evolving understanding of human health impacts and risks related to bacteria impairments, an adapted, data-driven approach is now being used to reprioritize effort to focus on more feasible and effective strategies. Specifically, efforts are refocused on the highest risk source of illness-causing pathogens (i.e., human waste) and the highest risk areas of the watershed, where it is more likely illness-causing pathogens are present. A renewed emphasis is placed on targeted source control in management strategies.

Recent studies demonstrate that human waste source control is a more cost-effective long-term approach to reducing pathogens associated with bacteria. Human waste typically contains a higher concentration of pathogens, thereby increasing the risk of gastrointestinal illness through recreational exposure. In response, the adapted approach in the Upper Los Angeles River expands on previous efforts with on-the-ground understanding of potential bacteria sources and the relation to public health risk. Human waste source control is a more cost-effective long-term approach to reducing pathogens relative to typical structural BMPs. Further, advancements in human marker tools—such as HF183—can better identify conditions under which pathogens are contributing to downstream impaired receiving waters.

The Upper Los Angeles River Watershed is implementing this innovative risk-based prioritization, using advancements in source investigation tools, robust data collection and processing, and a newly developed human waste source identification and tracking toolbox to conduct human waste source investigations to reduce public health risks and help restore the beneficial uses of the iconic LA River. Robust data collection and processing was conducted across agency departments to shine a new light on potential dry weather flows and pathogen sources in the watershed and prioritization results used to delineate areas of investigation (AOIs), focusing limited management resources in areas posing the greatest risk. Human waste source investigations are being conducted in the top priority AOIs to isolate the contributing sources for targeted abatement strategies. This poster presentation will summarize the methods developed and employed in this watershed, which promise to materially improve bacteria management success in Southern California and beyond.



“Crowd-sourcing” Microbial Surveys using Undergraduate Students and Genomics

Emily Wiley

Claremont McKenna College

“Science in service to society” is central to the mission of the new Kravis Department of Integrated Sciences (KDIS) at Claremont McKenna College, a liberal arts college that is part of the Claremont Colleges consortium. Through the KDIS program, both science and non-science majors will engage with authentic research projects that answer questions of importance to the community, and that have potential for outcomes that will impact decision-making at personal through organizational levels. In the first pilot of a KDIS course that all students at the college will take, regardless of their major, students engaged in a semester-length research project. They performed 16s gene sequencing to identify all of the bacterial species and their relative proportions in the influents and effluent from a local wastewater processing plant - a community partner for the project. The study was funded entirely by the College. Students analyzed the resulting sequence data and presented their results on changes in bacterial populations throughout wastewater processing, to the wastewater plant partner. Not only did the partner receive potentially useful information and data, the students enjoyed an impactful experience as they made new discoveries that were of interest to an external group. This validated their roles as scientists who can make meaningful contributions to important societal questions, such as those relating to health of the environment.

This education partnership model can now be easily transferred to a variety of water monitoring scenarios where a detailed look at all bacterial species and their proportions could be useful to an organization. The course will soon be scaled for ~350 students and we are seeking partners who could benefit from this genomics-based, crowd-sourcing approach to bacterial surveillance in different environments.

The Influence of Urbanization and Water Reclamation Plants on Fecal Indicator Bacteria and Antibiotic Resistance in the Los Angeles River Watershed: A Comparative Study on Monitoring Methods

Ileana A. Callejas¹, Yuwei Kong², Wei-Cheng Hung², Marisol Cira², Taylor Cason², Ashlyn Sloane², Alexis Shenkiryk², Aaron Masikip², Akshyae Singh², Adriane Jones³, and Jennifer A. Jay²

¹ *Biola University*; ² *University of California Los Angeles*; ³ *Mount Saint Mary's University*

Land use and water reclamation plants (WRPs) have the potential to influence the dynamics of fecal indicator bacteria (FIB) and antibiotic resistance in densely populated coastal watersheds. In this study, sixteen locations were sampled in the Los Angeles River watershed, encompassing undeveloped areas, developed areas, and receiving beaches. Furthermore, water samples were collected both upstream and downstream of three WRPs discharging into the river. Environmental antibiotic resistance is currently measured by culture-, qPCR-, and metagenomics-based approaches, but there is little research comparing data across approaches; this work addresses that gap. Culture-dependent methods were employed to quantify *Enterococcus*, total coliforms, *E. coli* and extended spectrum beta-lactamase (ESBL)-producing *E. coli*. Additionally, qPCR was used to measure four antibiotic resistance genes (ARGs): *sul1*, *ermF*, *tetW*, *blaSHV*, along with *int11* and 16S rRNA genes. The presence of *Bacteroides* HF183 and *crAssphage* markers was quantified via ddPCR. All samples were sent for shotgun sequencing to compare amplification and metagenomic methods to monitor antibiotic resistance. Our findings reveal that developed sites contain ARG levels two to three orders of magnitude greater than undeveloped locations, while undeveloped and beaches have relatively similar ARG levels. Developed areas also had higher ARG abundances and more diverse ARG classes than undeveloped and beach sites as revealed through metagenomic data. WRP effluent generally diluted FIB downstream from the effluent entry points into the river, but exhibited elevated ARG levels and co-location of ARGs, mobile genetic elements, and pathogens. This study underscores the significant impacts of land use and WRPs on ARGs and FIB, while providing a comparative analysis of comparing culture, amplification, and metagenomic methods for monitoring purposes.



Modern Monitoring Solutions Enabling the Los Angeles River's Evolution into a Recreational Haven

Dan Angelescu, David Wanless, Joyce Wong, Michelle Yeh, Shea Thornbury

Fluidion US, Inc.

The Los Angeles River, redesigned in the 1930s essentially as a flood control mechanism, has been widely recognized in recent years for its tremendous ecological and recreational potential. Eliminating public health risks from recreational waters requires, however, active monitoring for pathogens and indicator organisms such as E.coli bacteria. Traditional water quality monitoring methods are slow, lacking timely responses to pollution events and frequent real time data needed for mitigation programs. We present a new generation of in-situ and portable bacterial analyzers that provide near real-time water quality insights, enhancing monitoring accuracy, allowing for better risk assessment, and supporting the vision of reviving water bodies for safe recreational use for events like the 2028 Los Angeles Olympic Games.

Recognition of the L.A. River's potential ecological and recreational value gained momentum in the 1980s, and with the recent passage of the Measure W stormwater funding initiative, numerous new stormwater capture projects are contributing to improving the river's water quality. Despite these efforts, meeting bacterial water quality standards and ensuring safe enjoyment of the river remains a challenge, in part due to limitations of existing sampling and analysis methods.

Traditional bacterial monitoring in public waters relies on time-consuming manual laboratory methods, leading to slow results and often missing rapid pollution events. The personnel required for sampling during storm events poses risks to these operators, and the methods struggle with sample degradation, 6-hour sample holding limits, and refrigeration requirements. Importantly current methods are unable to measure particle-attached bacteria, especially during sediment-heavy flows. This results in inadequate data for informing effective mitigation strategies.

We present a novel approach employing automated in-situ and portable bacterial analyzers, set to transform water quality monitoring. These devices offer same-day water quality insights, enhancing the precision and value of monitoring efforts. Coupled with research on various bacterial types, pathogens, and human markers, these analyzers provide thorough insights into actual health risks associated with water contact. The rapid results, alongside targeted measurement campaigns, help pinpoint pollution sources, refining risk assessment and optimizing water infrastructure, ultimately saving costs and ensuring safer recreational waters.

The significance of this work extends to improving public health and revitalizing swimmable water bodies. The prospect of the 2028 Los Angeles Olympic Games, slated to feature open water swimming at Long Beach, underscores the urgency to reclaim water bodies for recreation. Currently, we're performing ongoing rapid bacterial monitoring in the City of Paris for the 2024 Olympics, which offers a model as they restore the Seine River for Olympic events after a century of swimming bans.

The L.A. River's journey from flood control asset to ecological haven is ongoing. The push to improve water quality through stormwater capture initiatives is substantial, and emerging technologies can bring transformative change. This innovative technology arms operators, engineers, and water quality regulators with data-driven, real-time monitoring to enhance scientific understanding and optimization of stormwater capture projects, paving the way for safe, enjoyable water recreation for the Los Angeles community.



Heal the Bay's River Report Card: Upgraded Grading Methodology of the River Report Card and Monitoring Bacteria Levels in LA County

Alison Xunyi Wu, Tania Pineda-Enríquez, Katherine M. Pease

Heal the Bay

Heal the Bay is a non-profit environmental organization dedicated to protecting Greater Los Angeles' coastal waters and watersheds through a multi-pronged strategy involving science, education, advocacy, and community action. Since 1990, Heal the Bay has issued A-F letter grades based on fecal indicator bacteria (FIB) levels, through our Beach Report Card (BRC), to notify the public about the safety and quality of water at ocean beaches. In 2014 we began monitoring FIB levels in L.A. county's freshwater recreational areas, with the inception of the River Report Card (RRC) in 2017 and since then providing weekly summer grades for over 35 freshwater recreation sites to assess water quality. The grades were displayed as red, yellow, or green and were based on up to two FIBs (*Escherichia coli* and *Enterococcus sp.*), two metrics (single sample and geometric mean), and whether those metrics exceeded health standards. The RRC has limitations such as not being consistent with the A-F letter grading of the BRC, not taking magnitude into account, weighting all metrics equally, and utilizing *Enterococcus sp.*, which is not included in state standards and not monitored by all agencies. We established a Technical Advisory Committee (TAC) of experts to help with the development of a new grading methodology and white paper. In 2023 we implemented a new grading methodology, utilizing only *E. coli* levels to determine water quality, employing the single sample and the geometric mean of *E. coli* concentrations, and taking magnitude into account based on current state water quality standards. The single sample reflects the most recent water quality measurement at a given site and is weighted higher in the grade, while the geometric mean, provides a longer-term view of *E. coli* concentrations in the water. This summer we are providing A+ - F grades for 35 recreation sites in LA County and the water quality grades are shown here. Most sites have grades between A+ to F. The San Gabriel Watershed has the highest number of sites graded A+ followed by sites outside of the official recreation zones in the Upper L.A. River. Within official recreation zones in the Upper L.A. River, most of the sites were graded C. The sites located at the Lower L.A. River are generally graded F. Heal the Bay has also emphasized creating inclusive opportunities for underrepresented students in STEM fields. Over the past summers, we have hired 43 students to conduct field monitoring, perform laboratory work, enter, and analyze data, and participate in education and outreach events. The success of the monitoring program depends on our collaborations with Los Angeles Trade Technical College (LATTC) and California State University Long Beach (CSULB), which includes student recruitment, use of campus laboratories, and in-kind services of staff and faculty. The Summer 2023 monitoring program includes 12 students participating across three monitoring teams, the most in one season to date. Heal the Bay will continue to promote the RRC to protect public health and advocate for water quality improvements.



Assessing Trends in Contaminant Transport and Fate Following the 2018 Woolsey Wildfire

CAMPOS, Georgina, YUNES KATZ, Badhia, SALEK, Shaparak, IKEDA, Kyle H., HOOVER, Christian L., KUSHNER, Michael, HAUSWIRTH, Scott, ODIGIE, Kingsley and GANGULI, Priya
California State University, Northridge

In the past decade, the frequency and intensity of wildfires have increased on a global scale, and wildfire-threatened regions have expanded to areas that rarely burned in the past. The increased risk of wildfires has resulted from climate change as well as altering land-use and wildfire control policies. The combination of extreme droughts and higher temperatures causes vegetation to die, which generates fuel for fires. As a result, wildfires in California have become a serious and persistent environmental threat. To better understand the impacts of this hazard on the ecosystem health, we are investigating the release of metals following the 2018 Woolsey Fire in Los Angeles County, California (USA) by assessing their spatial and temporal distribution throughout the catchment. This fire, which burned almost 100,000 acres, including ~60% of the Malibu Creek coastal watershed, is currently the eighth most destructive wildfire in California's history. Wildfires degrade water and sediment quality in numerous ways. The loss of vegetative cover destroys stabilizing root structures, and the intense heat creates hydrophobic soil. These conditions contribute to the exacerbation of surface erosion, which in turn mobilizes contaminants such as metals and other wildfire-derived compounds (e.g., polycyclic aromatic hydrocarbons (PAHs)). Increased storm intensity and stream discharge associated with climate change compounds the hazards of wildfires by enhancing chemical mobilization. While most trace metals are micronutrients and contribute to the health of living organisms, elevated concentrations can be harmful. Although increased contaminant and particulate loads have been documented in burned watersheds, these impacts are not well defined in coastal watersheds where terrestrial and marine ecosystems are linked.

Discharge associated with climate change compounds the hazards of wildfires by enhancing chemical mobilization. While most trace metals are micronutrients and contribute to the health of living organisms, elevated concentrations can be harmful. Although increased contaminant and particulate loads have been documented in burned watersheds, these impacts are not well defined in coastal watersheds where terrestrial and marine ecosystems are linked.



Partnering for Project Success

100 Acre Partnership

Brian Baldauf

Mountains and Recreation Conservation Authority

The City of Los Angeles, California State Parks and the Mountains and Recreation Conservation Authority (MRCA) are formally working together as the “100 Acre Partnership” to collaboratively plan the largest, continuous open space along the Los Angeles River within the Taylor Yard area. The Partnership evolved from community and stakeholder feedback and the need for a coordinated planning and improvement approach across the 100-acre Taylor Yard site.

The 100 Acre Partnership’s first project is the Paseo del Río at Taylor Yard (PdRTY) and will include a one-mile public use greenway, an entry plaza and a water quality improvement wetland that supports natural habitat. Community engagement activities for the project started in 2021 with an emphasis by the Partnership to provide coordinated communication and outreach across all of the efforts at Taylor Yard. The project team has used traditional and non-traditional community engagement and outreach methods to ensure that efforts to reach the community and stakeholders are comprehensive, effective, culturally relevant, and inclusive of disadvantaged and linguistically isolated communities. These efforts have included local hiring of a community organizing team and development of a Community Advisory Committee.

The Paseo del Río at Taylor Yard will include a one-mile public use greenway, an entry plaza and a water quality improvement wetland that supports natural habitat, and runs along the river's edge on both the G1 and G2 parcels. The PdRTY will provide open space for increased habitat along the Los Angeles River. Some amenities that are proposed to be included are: trails, native habitat areas, health and wellness activities, gathering spaces, outdoor classrooms, a kayak launch and landing, and scenic overlooks. The PdRTY will benefit our surrounding communities and region, while increasing access to the Los Angeles River.

The poster will demonstrate engagement efforts completed and key themes that have been heard during this important initial project, and further will illustrate a few key graphics from the proposed final concept design.

The LA River: A Body of Water Which Connects Communities

James Cortes Rivera

Day One

This poster will depict the LA river—from its more natural state to its concrete permutation— as a body of water which connects dozens of communities in the greater LA area. Through this art-focused poster, I will show how community engagement and partnerships among all communities is the best strategy for any projects seeking success. The poster will also feature landscapes and flora native to Los Angeles to demonstrate how the LA river is not an independent entity but one part of a larger ecosystem.



Expanding and improving open space and recreational opportunities for the conservation, restoration and environmental enhancement of the San Gabriel and Lower Los Angeles Rivers Watersheds

Brianna Gorton

Watershed Conservation Authority

The Watershed Conservation Authority's (WCA) mission is to expand and improve open space and recreational opportunities for the conservation, restoration and environmental enhancement of the San Gabriel and Lower Los Angeles Rivers Watersheds.

We connect communities to nature through partnerships with local and regional entities, by planning and implementing projects to improve our watersheds through investment in open space, parks, trails, bikeways, and greenways. The WCA maintains more than 500 acres of open space, ranging from foothill lands to urban river parks that serve some of the densest and most diverse communities in the country.

Our Lower LA River Technical Assistance Program supports local communities and governments to facilitate project realization along the Lower Los Angeles River. This project scope includes working to revive one mile on each side of the 19-mile river from the City of Vernon to its outlet in the City of Long Beach and 14 Southeast Los Angeles County cities and unincorporated County communities, through the development of a watershed-based, equitable, community driven plan, aligned with the Lower LA River Revitalization Master Plan, San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (RMC) Common Ground, and watershed planning principles. Community and stakeholder engagement allows us to identify and support project leads, identify localized interests and provide assistance to local governments, organizations and community leaders.

Our Los Angeles River Ranger Pilot Program partners with the Rivers and Mountains Conservancy, the Santa Monica Mountains Conservancy, Conservation Corps of Long Beach, Nature for All and River in Action, and tributary-adjacent governments. The Conservation Corps of Long Beach River Ambassadors work outdoors to maintain and patrol the local parks, trails, and surrounding areas of the Rio Hondo Confluence to ensure safe, enjoyable and equitable experiences along the LA River and its tributaries by promoting equitable access, recreational and educational opportunities, community engagement, and resource protection along this vital resource.

The Conservation Corps of Long Beach River Ranger Ambassadors also work at Parque Dos Rios, one of the several planned projects from the Lower Los Angeles River Revitalization Plan. The park plan includes a 7+ acre habitat enhancement and rest stop areas located along the Lower LA River at the confluence with the Rio Hondo in the City of South Gate.

The Watershed Conservation Authority seeks out opportunities for improving the environment and residents' quality of life along the Lower LA River. We work to ensure that the voices of the people are heard now and into the future, as the river is reimagined and revitalized into an integral part of a healthy, equitable, and sustainable community.



Partnering for Success: The Ocean Friendly Garden Experience in Long Beach, CA

Kathryn Dressendorfer, Kai Craig

The Surfrider Foundation

The City of Long Beach's waterfront, four miles of coastline along East San Pedro Bay, is bookended by the Los Angeles and San Gabriel Rivers. A breakwater constructed in the 1940s contains much of the runoff transported by these rivers, the receiving waters of an area that encompasses a population of roughly 7 million people!

The Long Beach Chapter of Surfrider Foundation engages with citizens, non-profit partners, private enterprises, and the City of Long Beach to promote its Ocean Friendly Gardens (OFG) Program to mitigate stormwater pollution in our coastal community. Participants can earn the Ocean Friendly Garden certification and a yard sign by meeting our OFG criteria and allowing their garden to be featured on the chapter's website.

The OFG program promotes nature-based solutions that prevent water pollution, build biodiversity, and create climate resilience. The program also strongly encourages the use of native plants to support endemic pollinators, for their ability to thrive in our local environment with minimal irrigation and without the use of harmful fertilizers and pesticides that pollute our watershed. The program collaborated with Puente LBC, SAMO Fund, and LB Sustainability to host two narrowleaf milkweed giveaways to introduce residents to the multi-benefits of native plants.

Surfrider is focused on building a diverse coalition of community partners to change how the city approaches landscaping and empowering residents to take action in their own yards, for their neighbors, or at community sites during volunteer workdays.

Resilient gardens can be adapted to any situation with creative landscapes and hardscapes. Surfrider hosted an OFG garden tour to showcase rainwater retention features like bioswales, rain gardens, and permeable hardscapes and build an understanding of a variety of approaches to preventing runoff in local contexts.

The OFG program lead in Long Beach, Kai Craig, has worked with the Long Beach Water Department on their Direct Install Gardens (DIG) Program to develop watershed-wise designs for low-income residences in North Long Beach to participate in the city's Lawn to Garden Program. The designs were installed by the Conservation Corps of Long Beach, a youth training program designed to promote sustainable career skills.

The OFG program also collaborated with the LB Water Department to establish a stormwater capture feature requirement in the Lawn to Garden Program criteria, creating far-reaching impact to prevent runoff within the LA river watershed.

The OFG program recently donated rain barrels to the VA Hospital's Patient Garden, which serves veterans and healthcare workers. The 300-gallon capacity of the barrels will prevent runoff from entering storm drains and be utilized for watering edible and native plants within the garden. During a volunteer workday, we used rainwater collected in the barrels to water newly planted native plants as well as for our sheet mulching demonstration.

The OFG program continues to seek out collaboration with a variety of community organizations to engage the public and decision-makers in choosing resilient landscapes that protect our watershed for the future.



LA River STEW-MAP: Mapping the Who? Where? How? Of Stewardship Groups and Networks in the Watershed

Michele Romolini¹, Alyssa Thomas²

¹Loyola Marymount University Center for Urban Resilience; ²US Forest Service Pacific Southwest Research Station

In research around social-ecological systems and resilience, place-based stewardship has emerged as a key contributor to meeting environmental, economic, and social goals while creating more sustainable cities and ecosystems. The Stewardship Mapping and Assessment Project (STEW-MAP) is a national research framework developed by the USDA Forest Service that seeks to answer the question “Who are the active environmental stewardship groups in my area and where, why, and how are they caring for the land?” The framework can also show geographic areas where there are gaps in or concentrations of stewardship work. To-date, it has been implemented in 18 locations in the United States and internationally. STEW-MAP defines environmental stewards as “civic groups that conserve, manage, monitor, advocate for, and educate about a wide range of quality-of-life issues in urban areas”.

The LA River STEW-MAP sampling frame used: 1) LA County STEW-MAP data to identify stewardship organizations within the LA River watershed; 2) partner contact lists provided by key stewardship groups within the watershed; and 3) further investigation via internet research to identify additional partners of those organizations listed in (1) and (2). The snowball-sampling approach yielded an inventory of 535 active stewardship groups in the LA River Watershed. From this inventory, 109 groups responded to an online survey and provided details about their organizational characteristics, geographical footprint, and collaborative relationships.

Most responding groups were non-profits, and the government was identified as providing funding to more than two-thirds of them. Most groups had been founded since the 1990s, with nearly a quarter in just the past ten years. Responding groups also tended to be younger and smaller. The groups were also heavily reliant on volunteers; the median number of staff reported was only 9 full-time and 3 part-time positions. Education related responses were prominent throughout, with education a primary focus and one of the most common topics of work; demonstrating that LA River stewardship groups are playing a key role in educating communities about the watershed and broader environmental issues. Furthermore, results showed how stewardship groups support the local environment and communities. For example, “community organizing” was identified by nearly half of the responding groups as a provided service, and “community improvement and capacity building” was among the most chosen focus areas. In terms of geographic distribution, the highest concentrations of groups were found in downtown LA along the river and in the northeastern portion of the watershed, within the Angeles National Forest. Finally, the groups identified over 1200 collaborative, knowledge or funding relationships related to environmental stewardship, demonstrating the many and diverse groups that act as stewards of the LA River Watershed.

LA River STEW-MAP results are available in several formats, including two online interactive tools: a geographic map of the locations and activities of stewardship groups in the watershed, and a network map of the relationships among stewardship groups. This information provides an extensive understanding of the stewardship work occurring in the watershed, and also presents opportunities for groups seeking new collaborative and cooperative partnerships."



Restoring Our Urban River

Fish Passage: Recovery of Southern California Steelhead

AJ Keith

Stillwater Sciences

The Los Angeles (LA) River watershed historically supported a population of Southern California steelhead (*Oncorhynchus mykiss*). These resilient fish navigated the LA River on their journey upstream from the ocean to spawn in the cool streams of the San Gabriel Mountains. Their progeny reared in the mountain streams before migrating downstream through the LA River to the ocean where they grew to adulthood before returning to their natal streams to complete their life cycle. Steelhead are now absent from the LA River due to habitat changes associated with urbanization, and the Southern California population is now listed as endangered. As part of a pilot project to improve habitat and migration conditions for steelhead and other native fish in the LA River, we analyzed conditions in the watershed to identify opportunities for steelhead recovery and their eventual return to the river, as well as limiting factors—or constraints—that need to be overcome. Restoring a steelhead population to the LA River watershed is a conservation goal that is consistent with the City and County of Los Angeles biodiversity goals, the National Marine Fisheries Service's recovery goals, and the goals of many other agency and conservation organizations.

Critical to this recovery effort is understanding the life cycle and ecology of the steelhead population that formerly occupied the LA River watershed and how a restored population of steelhead would use the watershed. Based on extensive research and analysis, we present this information in the form of a Conceptual Ecological Model and Limiting Factors Analysis that describes the primary influences on steelhead freshwater life history in the LA River and the habitat constraints most likely to affect the success of each life stage and limit productivity of the population, with recommended steps to support recovery.

Although the mainstem LA River has no spawning or rearing habitat for steelhead, it serves as the only migration pathway to and from the spawning and rearing habitat in the upper tributaries. The presence of migration barriers and altered flow patterns are perhaps the most critical limiting factors for steelhead recovery. A critical step for recovery of LA River steelhead is providing upstream passage for adults to reach spawning habitat in the upper tributaries and downstream passage for juveniles to reach the ocean. Elevated water temperature, poor water quality, and non-native species are also among the factors that may limit steelhead success in the mainstem LA River.

Returning steelhead to the LA River is possible if upstream and downstream passage can be provided and other key limiting factors are addressed. Design and planning for fish passage improvements in the LA River to facilitate upstream and downstream migration between the ocean and tributary habitats are now underway. The next steps for steelhead recovery in the LA River watershed will benefit from and build upon the information and recommendations in this Conceptual Ecological Model and Limiting Factors Analysis through pilot projects, planning, and implementation of long-term sustainable actions for steelhead recovery.



Evaluating the 2022 Los Angeles River Master Plan Through Participant Observation of Community-Based Events

Nakiessa Abbassi

University of Oregon

Urban river restoration efforts have grown over the past century due to declining riparian ecological health. This includes restoration and revitalization efforts concentrated on the Los Angeles River. This main source of fresh water for Los Angeles residents was channelized in the early 1900s due to flooding concerns. Now a flood control channel that collects urban runoff and rainwater throughout the city, the river continues to be an important resource for over 1 million Angelenos who live in the one mile stretch of neighborhoods surrounding the river, known as the L.A. River Corridor. A significant portion of Corridor residents live in disproportionately underrepresented environmental justice river communities. The 2022 Los Angeles River Master Plan (LARMP) addresses not only the river's current ecological state, but also considers social and economic issues within the Corridor. Along with ecosystem rehabilitation and continued flood control, the 25-year plan aims to cultivate a river conducive to community-wide recreation opportunities, sustainability, economic opportunities, and environmental awareness using an equity framework. In the past, L.A. River plans have been criticized for inadequately collaborating with Corridor communities, causing greater inequality. The purpose of this study is to evaluate how well this iteration of the LARMP addresses Corridor concerns, ensures community inclusion in the planning and implementation process, and how decision-makers interacted with the Corridor. I will do this through participant observation of community-based events to build solidarity, followed by focus group sessions and interviews to better understand community participation and concerns, and their inclusion in the LARMP.

Screening and identification of plant growth promoting bacteria for use in enhancing native plant revegetation

Felix Xianyang Chao, Michelle Lum

Loyola Marymount University

Camissoniopsis cheiranthifolia (beach evening primrose) is native to the western coast of North America, where it grows on coastal dunes. Along the Los Angeles and Santa Monica coast, including within the ecologically critical El Segundo Sand Dunes, it is being used in revegetation efforts to promote dune formation and restore native species. Seed broadcasting is the easiest and most cost-effective method of revegetation, however seed germination and plant establishment is particularly sensitive to abiotic stressors, including drought and high salinity. Plant-associated bacteria are known to improve the ability of plants to tolerate abiotic stress, and pretreatment of seeds with such plant growth promoting bacteria has the potential to improve both germination and growth, allowing for greater success in revegetation efforts. Here, we outline the development and application of high-throughput assays for the evaluation of bacterial strains that had been isolated from the rhizosphere of California native plant species of interest for dune restoration, including *C. cheiranthifolia*. The optimal conditions to simulate salinity stress or drought on *C. cheiranthifolia* were determined so bacterial strains could be tested for plant growth promoting activity under these conditions. We identified bacterial strains of *Pseudomonas* and *Priestia* that demonstrate the promotion of germination and growth of *C. cheiranthifolia*, as well as resistance to abiotic stresses such as drought and salinity. In turn, these strains can be incorporated into seed pretreatments, leading to greater success in revegetation efforts. These techniques can be extended to other species of plants, leading to greater success in revegetation and in turn more resilient, biodiverse coastlines.



Local River Design Lab

Alexander Robinson
USC School of Architecture

A multidisciplinary team of University of Southern California faculty and project partners are developing innovative practices and technologies to combine engineering, landscape architecture, and public engagement synergistically. In collaboration with the City of Los Angeles Bureau of Engineering, the U.S. Army Corps of Engineers Engineering Research and Development Center (ERDC) Coastal Hydraulics Laboratory (CHL) and Engineering With Nature® (EWN), a local arts and outreach organization and other partners, the team is developing a large-scale hydraulic physical model combined with augmented reality and other engagement and multi-functional design enhancements. The model is housed in a laboratory adjacent to the river and the major site and community in question. Additionally, an adjacent multi-instrument in-river “observatory” is underway.

Seed LA: Los Angeles Regional Native Seed Network

Marco Castaneda¹, Genevieve Arnold², Amanda Bashir⁸, Cheryl Birker¹, Scott Cher⁵, Naomi Fraga¹, Rachel O’Leary⁷, Antonio Sanchez⁹, Cris Sarabia³, Jack Smith⁶, Kat Superfisky⁴

¹California Botanic Garden; ²Theodore Payne Foundation for Native Plants; ³Palos Verdes Peninsula Land Conservancy; ⁴Grown in LA; ⁵North East Trees; ⁶TreePeople; ⁷City Plants; ⁸Los Angeles Conservation Corps; ⁹Santa Monica Mountains Fund- an official NPS partner

SeedLA is the collaborative effort of several environmental nonprofits based in Los Angeles. It is dedicated to bolstering the availability and use of regionally suitable and adaptive native seeds to conserve and enhance the ecological diversity of the greater Los Angeles area. Los Angeles County, with its large population and the second-largest metropolitan area in the United States, faces significant challenges due to urban expansion and habitat fragmentation. Urban greening projects are underway to preserve the region's threatened biodiversity, making the need for locally-sourced seeds urgent. By utilizing locally sourced seeds, restoration and greening projects can establish resilient plant populations that thrive in the local climate and soil conditions, providing numerous ecosystem services for people and wildlife. SeedLA identifies healthy populations within our region, collects seeds with permission, processes and stores those seeds, and makes them available for use in local restoration and urban greening projects. Through an ongoing partnership with the Nature Conservancy, SeedLA is currently engaged in the Bowtie Wetlands Demonstration Project. The Bowtie Parcel, an 18-acre brownfield site along the L.A. River, is closer to becoming a public green space. SeedLA will play a pivotal role in habitat enhancement with the provision of native plants, helping to improve water quality and supporting fauna. In this poster, SeedLA will share its history, challenges, accomplishments, and goals for the future, highlighting how strong collaborations between environmental organizations lead to more successful and impactful restoration projects.



Sennett Creek Greenway Planning and Design Project

Lynne Dwyer

North East Trees

Santa Monica Mountains Conservancy and North East Trees are planning a greenway project to be located at the confluence of Sennett Creek and the Los Angeles River, in the City of Los Angeles. A feasibility study has been initiated and stakeholder input is being solicited.

The Sennett Creek Greenway project site is located along the south bank of the Los Angeles River near Griffith Park and is adjacent to the LA City's Headworks Project. The project is 33 river miles from its mouth in Long Beach.

Sennett Creek is a tributary to the Los Angeles River and has a watershed approximately 704 acres in size which includes the north slope of Griffith Park, Forest Lawn and Mount Sinai Memorial Parks. The study area is approximately 16 acres. The main project area lies between Forest Lawn Drive and the Los Angeles River and is dominated by electrical towers and overhead power lines. Habitat on the project site is severely degraded.

This project will improve the habitat value along the River and create wildlife corridors that can provide resources and access to the River and its tributaries. Environmental benefits include improving, protecting, restoring, preserving, interpreting, and developing the land and water resources of the Upper Los Angeles River watershed.

The Sennett Creek Greenway and was identified as an opportunity area in the Revitalization Plan developed by the Upper Los Angeles River and Tributaries (ULART) Working Group. The project is located within The Rim of the Valley Trail Corridor, which is a network of parks and trails surrounding the San Fernando Valley.

Greenway projects can improve climate resiliency and protect the Los Angeles River Watershed. The Sennett Creek Greenway project has the potential to restore native habitat, improve water quality and provide recreational trail connections.

For twenty-five years North East Trees and the Santa Monica Mountains Conservancy have worked together to develop greenways along the Los Angeles River with recreational trails, benches, artistic interpretive displays and California native plants.



Monitoring the Los Angeles River for Chemical and Biological Toxicants: Impacts on the Local Ecosystem and Public Health

Mahesh Pujari, Mas Dojiri, Farhana Mohamed, Jennifer Smolenski, and Danielle Ayala

LA Sanitation and Environment

The Los Angeles River (LA River) is 51 miles long and flows from the western San Fernando Valley to Long Beach. Due to flood events at the beginning of the century, most of the LA River has been channelized and lined with concrete. The LA River is the main conduit for transporting storm flow, urban runoff, and treated effluent to the LA River estuary and Pacific Ocean. It is sustained by water from rain, natural springs, urban runoff, and discharge from three water reclamation plants. Over 98 million gallons of water are carried by the LA River to the sea each day. Portions of the river have earthen bottoms and natural springs resulting in more natural conditions, which support habitat and recreational use. These sections of the LA River are used for fishing, hiking, bird watching, and kayaking by some of the City's four million residents. The LA River Revitalization Project provides a framework for restoring the ecological health of the river and includes recommendations that aim to expand the usable sections of the LA River and improve the overall quality of the river.

These posters highlight the results of the LA River Watershed Monitoring Program (LARWMP), which was developed by the Cities of Los Angeles and Burbank, along with the Council for Watershed Health and County of Los Angeles Department of Public Works, in cooperation with the Los Angeles Regional Water Quality Control Board, USEPA staff, as well as other local stakeholders. LARWMP conducts annual assessments to better understand the health of a dynamic and predominantly urban watershed. The goals of the program are to provide managers and the public with a more complete picture of conditions and trends in the LA River Watershed along with improving the coordination and integration of monitoring efforts for both regulatory compliance and ambient water condition. A total of thirteen agencies have partnered to coordinate their efforts, beginning in 2008, to evaluate the water quality, toxicity, and biological/habitat condition in the LA River Watershed in order to help address five important questions: What is the condition of streams in the watershed? Are conditions at areas of unique interest getting better or worse? Are receiving waters near discharges meeting water quality objectives? Is it safe to swim? Are locally caught fish safe to eat? The consortium has allocated resources to collect freshwater, estuary seawater, estuary sediment, and fish tissue samples for the determination of levels of bacteria, organic pollutants, metals, invertebrates, and general chemical constituents. The City of Los Angeles is committed to maintaining a rigorous environmental monitoring program for the LA River and to participating in programs that ensure the future improvement of the health of our watershed. The City's participation in LARWMP continues to be of great value to all Angelinos and will be part of our mission for years to come.



Three Water Quality Notification Beacons at Recreation Zones of the LA River

Mas Dojiri, Mahesh Pujari, Robert Savinelli, and Farhana Mohamed

LA Sanitation and Environment

LA Sanitation and Environment (LASAN) has developed and implemented a water quality beacon notification system that enables the direct communication of accurate, up-to-date, and easily-accessible water quality/public health information to recreational users of the Los Angeles River (LA River). The solar-powered water quality notification beacons were installed in August 2020. The system was designed and built in-house because notification beacons were not commercially available.

The LA River is accessible for limited recreational use each year during the summer season. Recreation zones are operated by the Mountains Recreation and Conservation Authority (MRCA) and are sponsored in part by the City of Los Angeles. LASAN has developed a website and a beacon notification protocol and encourages all visitors to the recreation zone to visit www.lacitysan.org/waterquality to review water quality conditions, consult on-site signage and beacon display, and exercise care when accessing the LA River at one's own risk.

The water quality in the recreation zones varies from “suitable for water recreation” to “unsuitable for water recreation” depending on the levels of *E. coli* bacteria detected in river water samples. Following heavy rains, and at some other times, *E. coli* counts in the LA River can reach levels that exceed state water quality standards. LASAN tests river samples from the Sepulveda Basin and Elysian Valley River recreation zones twice per week for *E. coli* at the Environmental Monitoring Division laboratories. LASAN transmits microbiological results to the water quality notification beacons which display:

- green (< 235 MPN *E. coli*, SUITABLE FOR WATER RECREATION)
- yellow (235-576 MPN *E. coli*, SUITABLE FOR WATER RECREATION WITH CAUTION)
- red (>576 MPN *E. coli*, NOT SUITABLE FOR WATER RECREATION)
- and flashing red (CLOSED PER MRCA PROTOCOL)

*MPN is most probable number per 100 ml

The color of the indicator light color is controlled remotely in the laboratory. The records listed on www.lacitysan.org/waterquality are predominantly green and yellow dating back to May 2018. The only extended red closures occurred in May 2019 and September 2022. The water quality beacon project continues to inform Angelinos of when it is safe to recreate in the LA River and when to stay away from recreational zone water using the same easy to understand color system found in traffic lights.



River restoration is integrated water management and climate resilience: the Sepulveda Basin as a case study

Melanie Winter, Jessica Hall, Anne Senter, PhD, Scott Brown, P.G., Anna Nazarov, P.E.

The River Project

The River Project, Balance Hydrologics, The Wildling Design Studio, and GHD partnered to complete a restoration feasibility study for the 8 miles of Los Angeles River and tributaries that run within the Sepulveda Basin. The Basin is a 2,000 acre flood management facility owned and operated by the USACE, with space leased to the City of Los Angeles. It is an important wildlife and recreational destination for communities in the San Fernando Valley, and may be used for sporting activities during the Los Angeles 2028 Olympics.

The study focused on evaluating the geomorphic, hydrologic, hydraulic, and ecological feasibility of restoring ecosystem function to the 8 miles of waterways while improving access and recreational opportunities. Restoration objectives included increased storage capacity, downstream flood attenuation, improved groundwater recharge potential, enhanced channel dynamics, and expanded habitat and biodiversity. Design elements were supported by 2D HEC-RAS hydraulic modeling of existing and proposed conditions. Community engagement included stakeholder charette exercises to understand existing opportunities and constraints as conceptual project elements were developed, presentations to various community groups, and collaboration with tribes and relevant agencies. Modeling results and desktop analyses for the proposed conceptual design indicate that restoration of dynamic river and tributary processes are feasible within the Basin, and would address numerous key challenges.

Process-based restoration elements would involve concrete removal, increased meandering, floodplain reconnection, and evolution of new habitat via dynamic channel processes across broad riparian zones. Storage capacity and downstream flood attenuation would increase meaningfully. Groundwater recharge potential would also increase, with flows spreading across new floodplains, especially during smaller more frequent stormwater runoff events. Ecological components would include increased habitat acreage with an expanded and biodiverse plant and tree palette. Park functionality has been reimaged to create more inviting areas that relate to and connect with the waterways, while also improving access, safety, mobility, and recreational opportunities in conjunction with the City's planning for Olympic activities.

Future project phases will include further technical studies such as a ground-truthed topographic analysis, thorough geotechnical soils and infiltration analyses, utilities analyses, a detailed tree survey, and hydraulic modeling refinements to support the basis of design, intensive stakeholder engagement, refinement of grading plans and planning palette from conceptual through various iterative exercises to a biddable plan set.

The study demonstrates the feasibility and myriad benefits of restoring floodplain and ecosystem function to the Los Angeles River and tributaries in the middle of the urbanized San Fernando Valley.



Habitat Restoration at Hidden Valley Wildlife Area following long-term Arundo Management

Ray Nunez

HANA Resources

Riverside County Regional Park & Open-Space District and HANA Resources will restore and enhance native habitat in Hidden Valley Wildlife Area (HVWA) in Riverside, California. Riverside County Regional Park & Open-Space District (Parks District) obtained funding in 2020 from the California Wildlife Conservation Board (WCB) to develop a conceptual restoration plan for ecosystem restoration, with a focus on removing giant reed (*Arundo donax*) and other high-priority invasive plants (castor bean, saltcedar, tree tobacco, poison hemlock, and perennial pepperweed) and restoring approximately 980.88 acres of native riparian and upland habitat. The project builds on the success of a 30-year effort by Parks to remove giant reed within HVWA. Parks District has been managing giant reed at HVWA since 1991, when it covered approximately 90 percent of the riparian habitat along the Santa Ana River (SAR) in Prado Basin. At HVWA and throughout the watershed, efforts continue to remove giant reed stands and continue to treat resprouts and new infestations following wildfire and flooding. Large giant reed “scars”, areas where giant reed was removed, are not recovering and remain devoid of vegetation. Disturbance in these scarred areas will continue to facilitate re-invasion of giant reed and other invasive plants. In these denuded and degraded areas where large giant reed infestations were removed, active restoration is needed to reestablish the native riparian and upland vegetation. Passive restoration is appropriate in areas where smaller, less dense stands of giant reed were removed. The project will reduce wildfire risk through fuel reduction through the removal of giant reed biomass and the creation of fuel breaks by planting cactus in upland habitats bordering the surrounding residential neighborhoods. The project will improve and increase breeding habitat for least Bell's vireo and provide co-benefits such as improved habitat and habitat connectivity for other special-status species that inhabit or could potentially inhabit HVWA.

The project will be executed in five phases. Phase 1 will be completed in 2023. Phase 1 tasks include Outreach & Planning Meetings, Habitat Restoration Plan (HRP) & Designs, GIS/Aerial Imagery, and finalization of the Environmental Review and Management Plan Outline (WCB 2021). The California Environmental Quality Act (CEQA) compliance tasks associated with this phase include securing CDFW's approval of the Statutory Exemption for Restoration Projects (SERP) and conclusion of technical studies (biological and cultural resources). Data from the technical studies (soils, hydrology, vegetation, wildlife, and special-status species) was used to describe the existing site conditions to inform the restoration design. Project implementation will occur in Phases 2–5. Each implementation phase will be five years in duration and the entire project will be completed within 20 years. Phase 2 will consist of giant reed biomass removal followed by planting Mulefat Scrub. Phase 3 consists of Willow Riparian and Southern Cottonwood/Willow Forest planting. Phase 4 will consist of Riparian Scrub and Riversidean Alluvial Fan Sage Scrub planting. Phase 5 includes Coastal Sage Scrub/Cactus planting. Management of giant reed resprouts and seedlings will be performed throughout all phases.



River, Revitalized - How to Restore the Los Angeles River

Dani Behr, Lauren DeMott, Caitlin Keller, Danielle Lewis, Annie Woon Yun, Jin Zhang, and Barry Lehrman (principal investigator)

Cal Poly Pomona Landscape Architecture

Cal Poly Pomona Master of Landscape Architecture students in partnership with LA Waterkeeper evaluated strategies and tactics required to safely naturalize the Los Angeles River. The team concluded that removing the concrete bottom and restoring native riparian habitat along the entire Los Angeles River is feasible, once sufficient storm water retention capacity is developed.

Naturalization will reduce channel capacity by an average of 30%. 34,000 acre-feet of retention is required to mitigate increased flood risks from naturalizing 95% of the river during a 0.2% (500-year) storm event. Within 2.5 miles of the river, there are 9,300 acres of land suitable for retention with a capacity of 1,900 to 39,000 acre-feet.

Measurements of 24 transects across the river in the Glendale Narrows/Elysian Valley determined the average channel obstruction by vegetation and sediment in a naturalized river will be 30% of the cross-section.

Modified river channel capacity for 0.2% (500-year), 0.5% (200-year), and 1.0% (100-year) storm events were modeled along the entire river. To avoid flooding during a 0.2% storm where peak flow exceeding 70% design capacity of the channel over 12 hours, various reaches of the river will require between 4,000 acre-feet to 37,000 acre-feet of retention during peak flow. 14,000 acre-feet retention will allow 1.4 miles of the river to be restored, 28,000 acre-feet retention = 24.6 miles (50%) naturalized, and 34,000 acre-feet = 48.5 miles (95%).

Conceptual site designs (n=6, 205-acre average site) tested strategies to integrate retention, habitat restoration, and recreation into a variety of adjacent land-uses. Our designs provided an average of 0.18 acre-feet of storage per acre, utilizing an average of 17% of the site to a depth of 12 feet.

Within 2.5 miles of the river (216.5 square miles), the study inventoried public land, golf courses, sports facilities, school yards, power transmission and railroad right of ways, parking lots, industrial, and vacant land that are suitable for retention, that collectively have the potential retention capacity of 1,900 acre-feet to 39,000 acre-feet.

LA County's Safe Clean Water Program (SCWP) has created 2,281 acre-feet of storage in the Upper Los Angeles River watershed at a cost of \$155,000 per acre-foot. Using the SCWP's average cost per acre-foot, constructing 37,000 acre-feet of retention will cost \$5.7 billion, and will take 30 to 45 years.



Engineering with Nature

Dr. Manya Singh

United States Army Corps of Engineers

The Engineering With Nature (EWN) Initiative is the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental, and social benefits through collaboration. The South Pacific Division, which includes the Los Angeles District, is an EWN Proving Ground, which are places where innovative ideas are tested on the ground throughout US Army Corps of Engineers missions. Here, we introduce the EWN principles and invite others to collaborate with us on innovative solutions that serve the needs of the community.