Sepulveda Basin Wildlife Reserve
Wildfire Resilient Habitat Plan

June 2023

The RIVER PROJECT

RESOURCE CONSERVATION DISTRICT OF THE SANTA MONICA MOUNTAINS

Balance Hydrologics

The MISSION of the RESOURCE CONSERVATION DISTRICT OF THE SANTA MONICA MOUNTAINS is to promote land stewardship and resource conservation through ecological research, conservation planning and design, habitat restoration and environmental education, while adhering to the highest standards of transparency and accountability as a public agency. The District is partially funded by a <0.01% portion of residents' regular property tax. Other revenues include grants from public agencies or private foundations, contracts for education, research, and restoration services, and from donations.

Sepulveda Basin Wildlife Reserve
WILDFIRE RESILIENCE HABITAT PLAN

June 2023

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Special Thanks to:
Sepulveda Basin Wildlife Reserve Steering Committee

Los Angeles County Community Wildfire Preparation and Mitigation Program

20 CalFire D-Space 338671

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PROJECT OVERVIEW

With this report we hope to improve wildfire resiliency through the combination of natural systems, restored native habitats, and defined access, to increase the ecological value of the Sepulveda Basin Wildlife Reserve while improving environmental conditions for adjacent disadvantaged communities

INTRODUCTION

A diverse array of plant and animal species, some of which cannot be found anywhere else in Los Angeles, call the Sepulveda Basin Wildlife Reserve their home. Situated in the heart of the San Fernando Valley, the Sepulveda Basin Wildlife Reserve, or SBWR, lies adjacent to the Los Angeles River, between the 405 and 101 freeways. Hundreds of thousands of people visit the SBWR each year to escape the city and enjoy nature. However, frequent and ever intensifying wildfires are threatening this invaluable green refuge. The smoke from these wildfires degrades air quality and put already disadvantaged nearby communities at greater risk.The following study and proposal seek to mitigate wildfire risk through ecologically appropriate strategies. Primarily, strategic planned access and prescribed immersion will restore vital ecosystem services, while providing safer, more equitable access to green space.

SBWR SOUTH RESERVE, FEB 1980, PHOTO COURTESY OF THE CSUN LIBRARY

SBWR WILDFIRE RESILIENT HABITAT PLAN

As a public agency, RCDSMM worked closely with dedicated members of the public, pertinent government agencies, and expert consultants to develop the SBWR Wildfire Resilient Habitat Plan. During 2022 and 2023, continual site visits, historical research, remotely sensed data analysis, and stakeholder feedback guided the evolution of this proposal. We hope that the following research and suggestions aggregated here might inform future visions for the larger Sepulveda Basin and inspire novel ways of predicting and mitigating wildfires while honoring and restoring native ecologies.

History of the Sepulveda Basin Wildlife Reserve

from: https://www.tataviam-nsn.us/community/lariver-encino/

Native people lived near the site of the current Basin before it was colonized; the village of Siutcanga may have been located there or nearby. Springs gurgled in the Basin's vicinity and areas of marsh and wetland formed from baseflow and upwelling groundwater.

Between 1797 and 1867, settlers developed the land for agriculture, eventually incorporating it into Ranchos El Encino and Ex-Mission de San Fernando. Cattle and sheep grazing took place until the drought of 1856, after which it became part of the Lankershim dry wheat farm. At the turn of the 20th century, the land was subdivided into small tract farms before being acquired by the Federal Government in 1936.

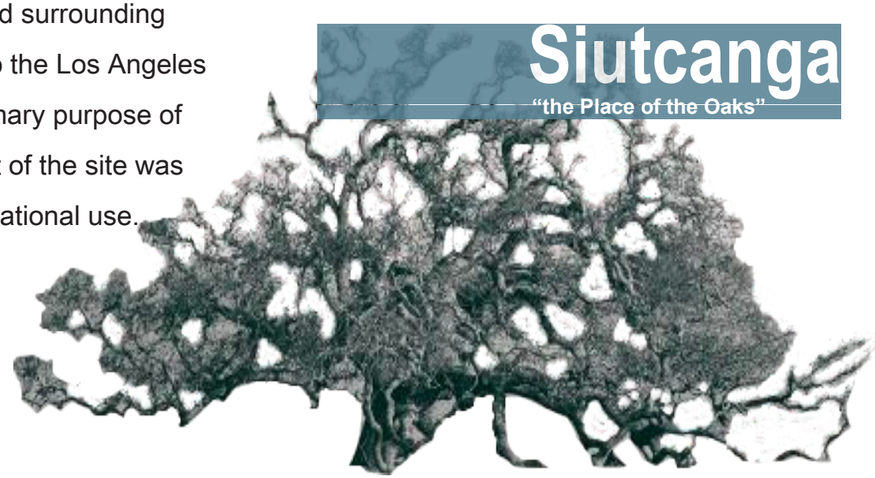
RCDSMM

SBWR WILDFIRE RESILIENT HABITAT PLAN

Credit: https://www.sfvaudubon.org/13914-2/

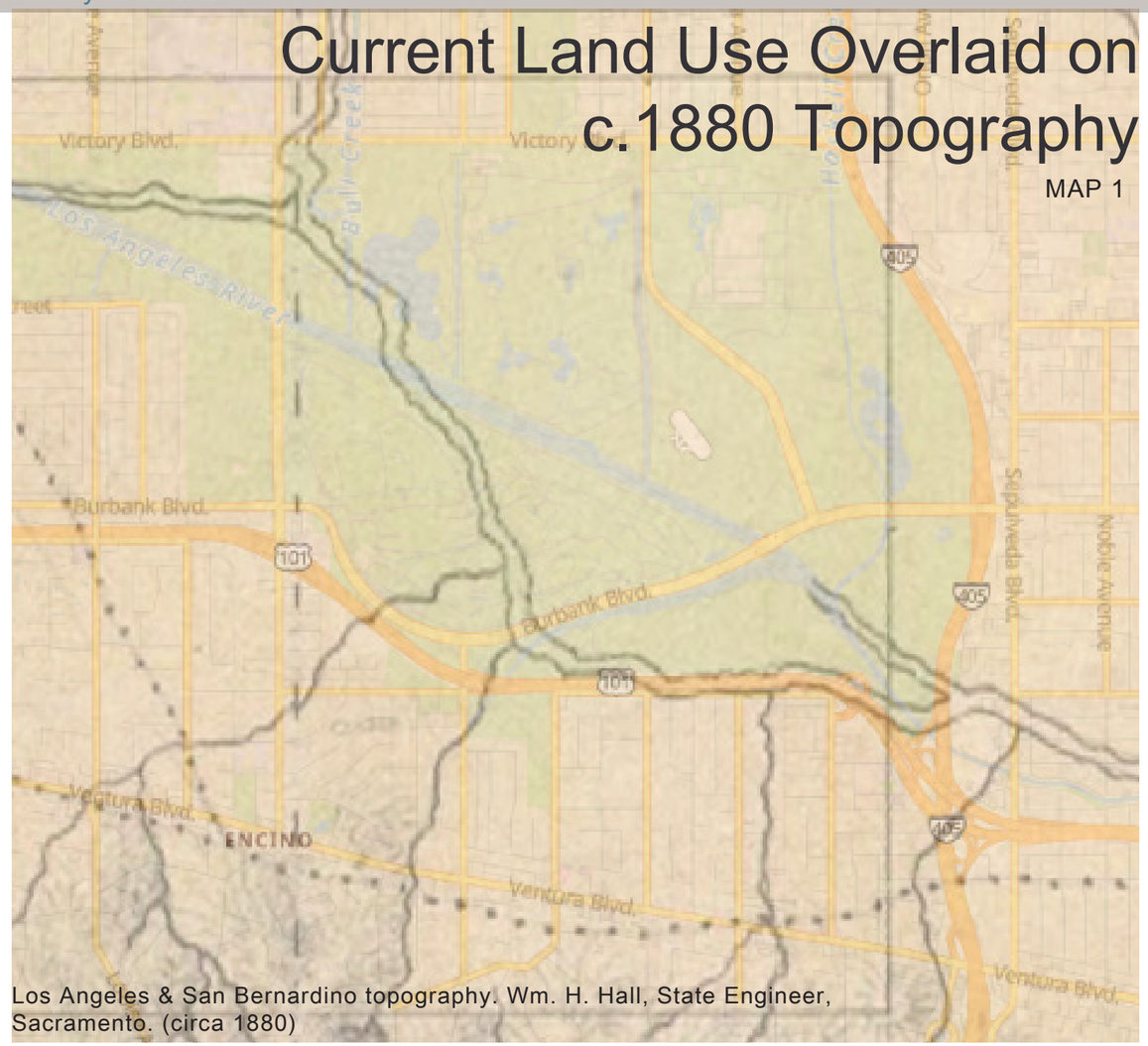
Following the catastrophic Los Angeles Flood of 1938, the U.S. Army Corps of Engineers (USACE) constructed the Sepulveda Dam in the Basin. The USACE completed construction of the dam in December of 1941. Along with the Hansen and Lopez dams, it plays a crucial role in managing flood risk in the San Fernando Valley and surrounding areas that lie adjacent to the Los Angeles River. Apart from its primary purpose of mitigating flood risk, part of the site was also authorized for recreational use.

313 acres of the 2,131.9 acres acquired by the Corps are reserved exclusively for the operation of the Dam; the City of Los Angeles leases the remaining 1,526.8 acres of land for recreational purposes. Of those 1,525.8 acres, the Sepulveda Basin Wildlife Reserve (SBWR) comprises 225.



Current Land Use Overlaid on c.1880 Topography

MAP 1



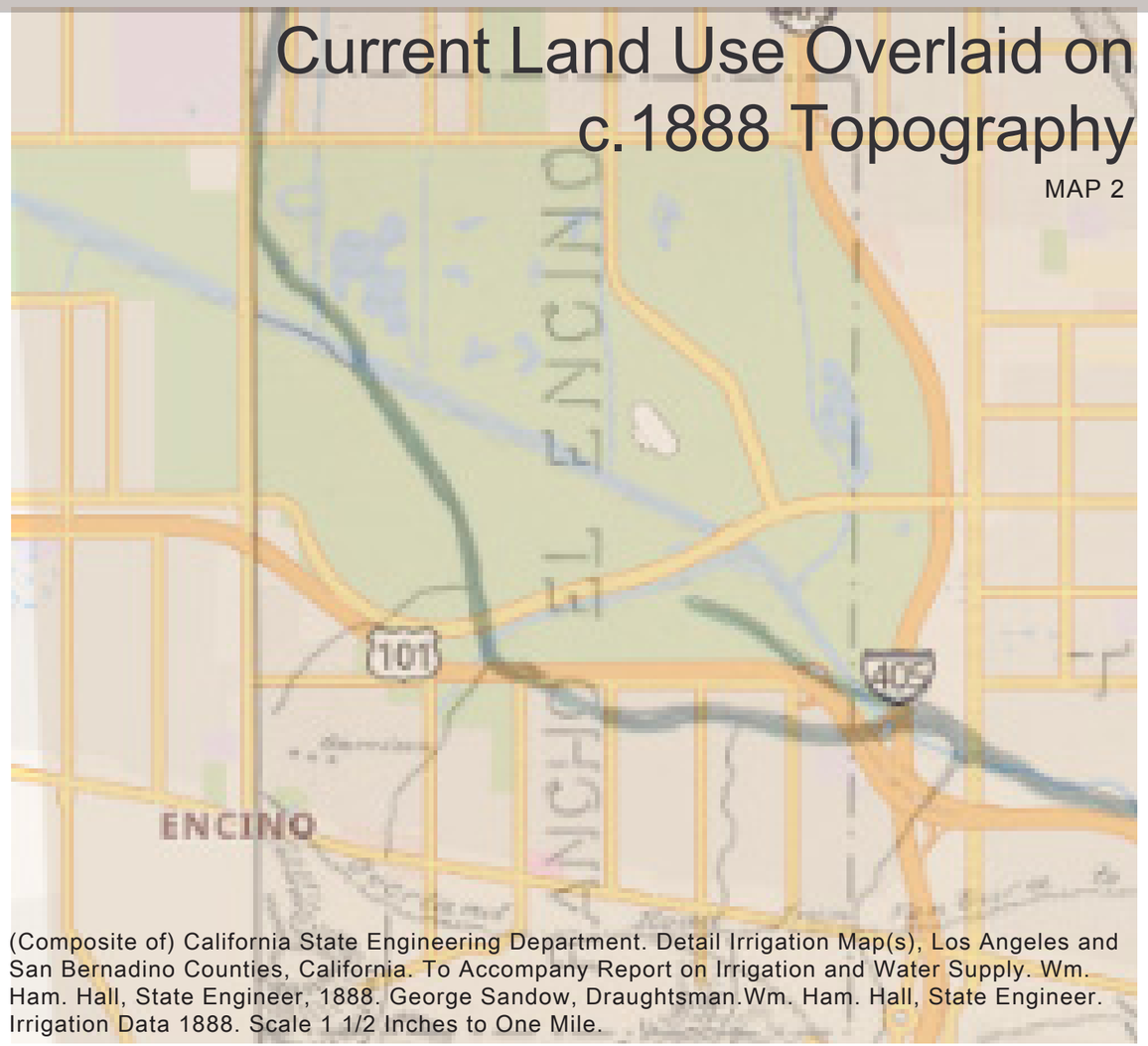
Los Angeles & San Bernardino topography. Wm. H. Hall, State Engineer, Sacramento. (circa 1880)

Before the extensive channelization and flood control efforts undertaken in the 20th century, the Los Angeles River meandered through the Sepulveda Basin, following natural fluvial processes. The original channel created a dynamic riparian ecosystem, supporting diverse plant and animal species and providing crucial habitat for migratory birds. The basin's floor was once home to extensive seasonal wetlands, which experienced natural inundation and drainage patterns, fostering a unique ecological balance.

SBWR WILDFIRE RESILIENT HABITAT PLAN

Current Land Use Overlaid on c.1888 Topography

MAP 2



(Composite of) California State Engineering Department. Detail Irrigation Map(s), Los Angeles and San Bernadino Counties, California. To Accompany Report on Irrigation and Water Supply. Wm. Ham. Hall, State Engineer, 1888. George Sandow, Draughtsman.Wm. Ham. Hall, State Engineer. Irrigation Data 1888. Scale 1 1/2 Inches to One Mile.

However, with the implementation of flood control measures, including concrete lining and channel straightening, the natural hydrological functions of the river were altered, resulting in significant changes to the basin's ecosystems. Understanding the historical Los Angeles River channel in the Sepulveda Basin is essential for restoration efforts aimed at reviving ecological processes and reintroducing native habitats, while still maintaining flood control capabilities.

History of SBWR

SEPULVEDA BASIN, 1953, PHOTO COURTESY OF GUS HARRIS

1953

Post dam construction, primary use as tract farms

History of SBWR

Sepulveda Basin Wildlife Pond, Van Nuys, 1980, Steve Hartman.

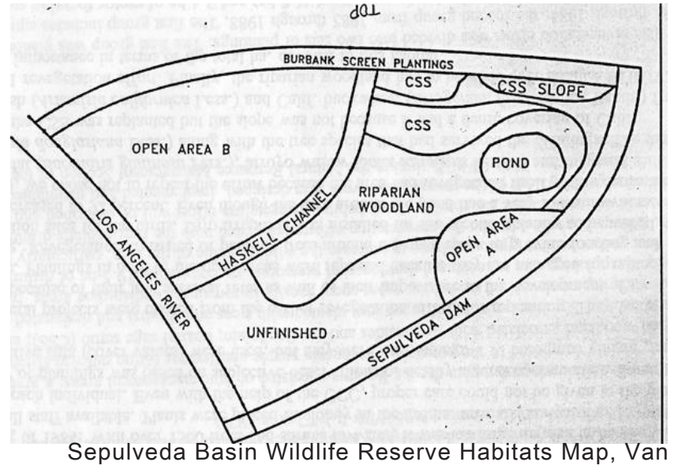
The Wildlife Reserve (SBWR) lies at the southeast corner of the Sepulveda Basin, west of the 405 Freeway, on either side of Burbank Boulevard. In 1979 the Army Corp of Engineers (USACE) extracted clay and earth from the site to build the Van Norman reservoir in Granada Hills. The borrow pits that formed from the extraction filled with rainwater and turned into a seasonal water haven for migratory and resident birds. The influx of birds attracted birdwatchers and environmental organizations to the site.

Wildlife Lake, Feb. 1980, Mima Parra, ACOE.

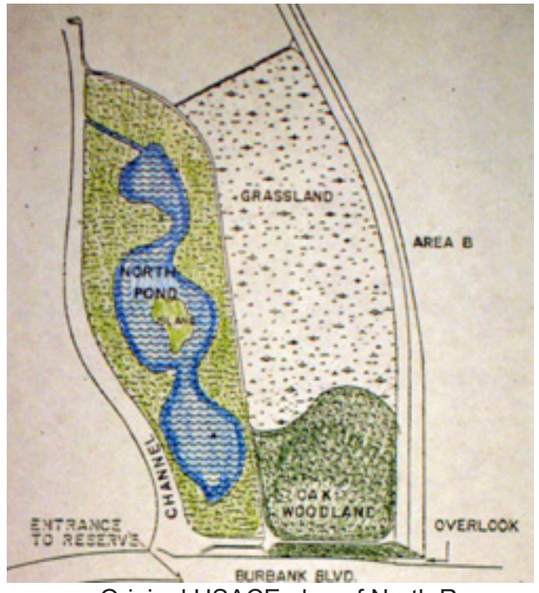
Realizing the potential of the area as a permanent wildlife habitat, these dedicated groups joined forces with the Army Corps of Engineers and other government officials to replant the area with native vegetation. Spearheading the early efforts, Silvia Nefas, Rick Harlacher and Ellen Zunino worked with the Corps to plan and plant what would become the south reserve.

Sepulveda Basin Wildlife Reserve planting, Van Nuys, 1980 Steve Hartman

In 1981 the Sepulveda Basin Master Plan and Final Environmental Impact Report/ Statement officially earmarked 48 acres of land in the southeast corner of the Basin for a “Wildlife Refuge (or Management Area).” The plan included preparing and managing three habitat areas: a sage/grass area, a riparian/willow area, and a freshwater lake.



Sepulveda Basin Wildlife Reserve Habitats Map, Van Nuys, 1988. Steve Hartman



Original USACE plan of North Reserve

In 1988 the north reserve was graded and the wildlife lake dug. The area was hydromulched with several species of annuals, including lupine and poppies. More than 7,000 cuttings of mulefat, three types of willow (*Salix lasiolepis, S. laevigata, and S. goodingii*), and 400 5-gallon containers with species such as elderberry (*Sambucus mexicanus*), white alder (*Alnus rhombifolia*), Arizona ash (*Fraxinus velutina*), and cottonwood (*Populus fremontii*) were planted. Over 5,000 1-gallon cans provided a combination of coyote bush (*Baccharis pilularis*), wild blackberry (*Rubus ursinus*), golden currant (*Ribes aureum*), and California rose (*Rosa californica*).

History of SBWR

Initially, the wildlife lake had to be manually filled with potable water in the fall and drained each year in the spring. But with the development of the Donald C. Tillman water reclamation plant, reclaimed treated wastewater provided water to fill the lake year round. With the lake filled constantly, the inner island provided sanctuary for many bird species. Cormorants, in particular, began nesting in the cottonwood trees on the island.

The treated wastewater was also piped through the south reserve directly into the LAR. The denuded areas from the pipe excavation were revegetated, and the increased water supply provided suitable conditions for vegetation to establish. Between 1980 and 1995, several habitat management and restoration plans were produced to improve conditions for wildlife and human visitors in both the North and South Reserve. [1]

1 see: sepulvedabasinwildlife.org/publicdocs.html

Left: 'White pelicans and nesting cormorants on the island in January, 2007.', Right: Canada geese landing on the Wildlife Lake, Sod farms (bright green fields), early 1990s. https://www.sepulvedabasinwildlife.org/northreserve.html

The implementation of the Wildlife Area expansion plan in 1999 brought about the improvement of a trail along the west side of Haskell Creek, complete with two bridge crossings. Additionally, a non-improved trail was created to lead to the Los Angeles River, offering visitors a view of the spot where Haskell Creek flows into the River. The area just directly west of Woodley became part of the reserve, although it is adjacent to the model airplane field and not open to the public.

SBWR WILDFIRE RESILIENT HABITAT PLAN

Above: "Aerial view of south Reserve with Burbank Blvd. at top (February 2008). Haskell Creek can be seen emptying into the Los Angeles River after flowing through the south Reserve. The dark blue pothole pond is peeking out from the trees at the far right." https://sepulvedabasinwildlife.org/southreserve.html

Above: South Reserve, 1990. https://sepulvedabasinwildlife.org/southreserve.html

History of SBWR

'Hummingbird Hill in all its glory in spring' https://sepulvedabasinwildlife.org.northreserve.html

The SBWR has faced its share of challenges amidst its evolution. As issues with homeless encampments and unauthorized use increased following the 2008 recession, human-caused fires emerged as a major ecological threat to the Basin. In September of 2011, the USACE update to the Sepulveda Basin Master Plan altered the designation of the original 48-acre Wildlife Area located south of Burbank Boulevard to “Project Operations”, to address security issues that had developed from illegal entry and use of the site. The Army Corps of Engineers followed this designation shift in December 2012 by closing off the South Wildlife Reserve (previously the original Wildlife Area) to the public and severely clearing native vegetation that had been established by volunteers over the last 20 years. Public outcry prompted a swift reversal, though, and the South Reserve reopened, and nature has slowly restored the area.

SBWR WILDFIRE RESILIENT HABITAT PLAN

Then in late 2017, the much-awaited “Vegetative Management Plan” for the former South Reserve was released, incorporating input from the Sepulveda Basin Wildlife Area Steering Committee, which formed in 1990. The plan allowed the area to continue functioning as a Wildlife Reserve, although without adding water to a pothole pond that had formed during earlier excavation work.

Two chemical spills in 1999 necessitated the creation of earthen dams along Haskell Creek to prevent further leaching into the reserve. Of the fines levied against the offending companies, about $100,000 went to the SBWR for environmental remediation. This funding was utilized to support the Audubon Society’s youth education program and to undertake a revegetation project named ‘Hummingbird Hill’ and woodland on the north berm of Burbank Blvd. The funds also supported ongoing measures to manage invasive non-native weeds and trees using herbicide.

Still, fires associated with human encampments persisted becoming particularly problematic during the COVID-19 pandemic. During this period, outdoor recreation surged while public investment, enforcement, and management of the area continued to decline. Starting in 2021, a Practicum at the Institute of the Environment and Sustainability at UCLA investigated causes and consequences of wildfire in the Wildlife Reserve raising public awareness of this continual threat.

The extensive efforts aimed at restoring the ecological balance and preserving the natural integrity of the Wildlife Reserve amidst the challenges posed by human activities and environmental incidents continue today. Starting in late 2022, RCDSMM initiated this study and report as part of a larger Los Angeles County community Wildfire Preparation and Mitigation Program. With fire ignitions now happening every day in the SBWR during the summer months, reducing wildfire risk and improving overall habitat resiliency remains essential to this mission of conservation.

SBWR WILDFIRE RESILIENT HABITAT PLAN

Our Guiding Principles

1 Mitigate
risk of fire to protect habitat, neighboring communities, and all (legal) site users

2 Contribute
to a larger, ongoing process of re-envisioning Sepulveda Basin

3 Acknowledge
the decades of hard work by volunteers planting native plants, picking up trash, engaging the public, and fighting to protect the SBWR.

4 Accept
wildlife's need for "privacy" in urban settings - more trails usually means fewer places to rest, nest, roost, etc. Trails are also vectors for weeds and pathogens

5 Enjoyment
of nature given primacy over active recreational uses

6 Protect
nature and natural systems, rather than supporting the perceived needs of every park user, or potential park user

7 Prioritize
native ecosystems over novel ecosystems, where still intact/ restore-able; these areas are getting fewer, and deserve our attention

RCDSMM

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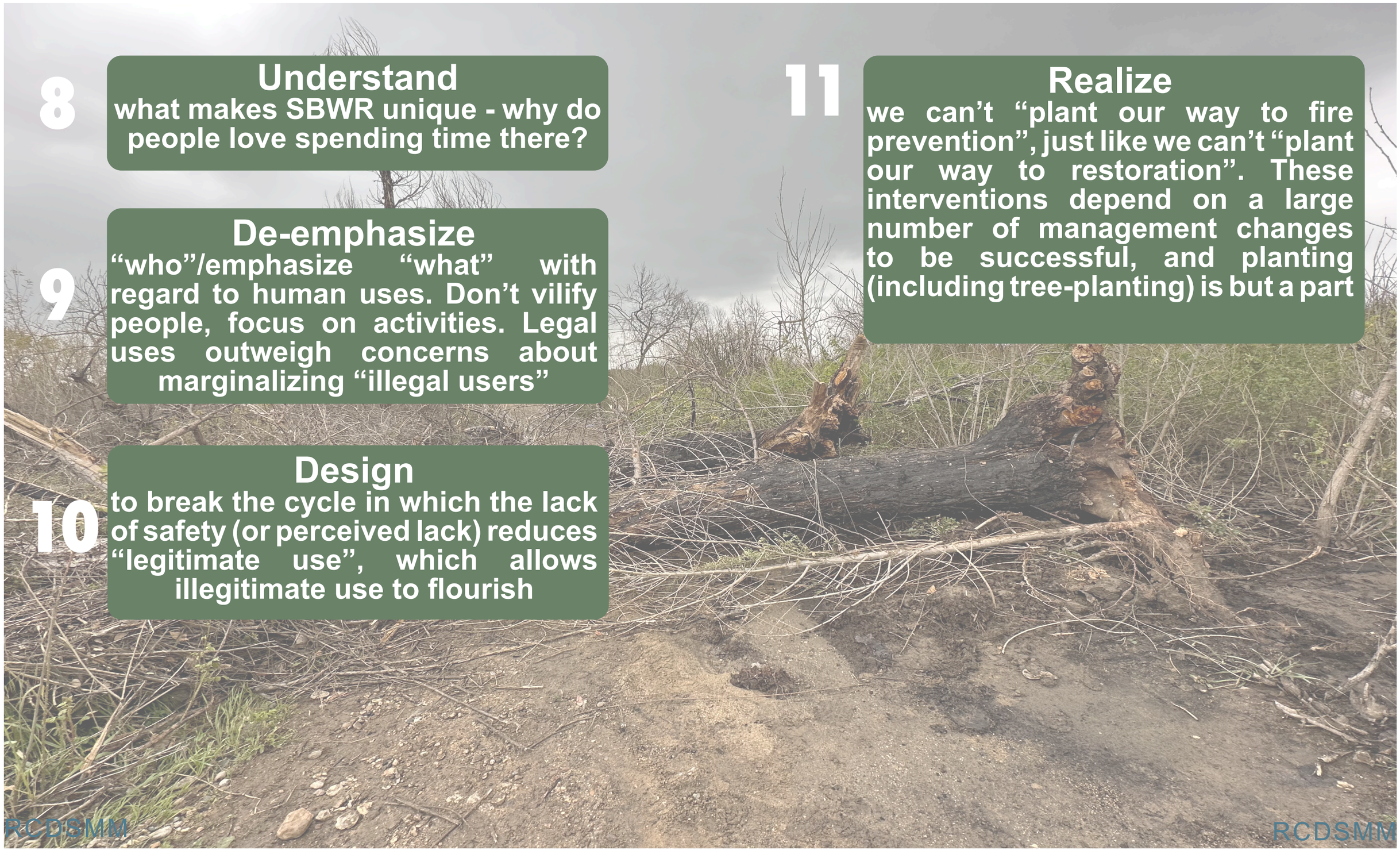
SBWR WILDFIRE RESILIENT HABITAT PLAN



8

Understand

what makes SBWR unique - why do people love spending time there?

9

De-emphasize

“who”/emphasize “what” with regard to human uses. Don’t vilify people, focus on activities. Legal uses outweigh concerns about marginalizing “illegal users”

10

Design

to break the cycle in which the lack of safety (or perceived lack) reduces “legitimate use”, which allows illegitimate use to flourish

11

Realize

we can’t “plant our way to fire prevention”, just like we can’t “plant our way to restoration”. These interventions depend on a large number of management changes to be successful, and planting (including tree-planting) is but a part

RCDSMM

1 Mitigate

risk of fire to protect habitat, neighboring communities, and all (legal) site users

above: Meadows, Mike (Special to the Los Angeles Daily News), https://www.dailynews.com/2020/10/16/firefighters-attack-blaze-on-both-sides-of-burbank-boulevard-in-sepulveda-basin/

Photo by SOCALFIREBUFF91377, https://www.youtube.com/watch?app=desktop&v=MWMfbHnkzRg&feature=youtu.be

"Person Found Dead After Sepulveda Basin Fire."LAFD, https://www.nbclosangeles.com/news/local/person-found-dead-after-sepulveda-basin-fire/2424843/

Mitigating the risk of wildfire stands as the backbone priority of this proposal. Wildfires within the SBWR threaten crucial native habitat, pose severe threats to neighboring communities, and endanger those who currently inhabit the site. While we acknowledge that landscape conditions largely determine wildfire spread, limiting ignitions remains a top priority. Our proposal seeks to address ignition and propagation in tandem.

Photo by SOCALFIREBUFF91377, https://www.youtube.com/watch?app=desktop&v=MWMfbHnkzRg&feature=youtu.be

The 2022 UCLA Practicum Report, *Fire Resilience in the Sepulveda Basin Wildlife Reserve*, identified that human activities caused all known fires in the SBWR to date. Open flames from cooking and drug use, arson, and model airplane crashes rapidly ignite flammable invasive weeds, incinerating native scrub, chaparrel and woodland in its path.

"June 2002 the largest fire burned a large portion of the North Reserve." https://www.sepulvedabasinwildlife.org/northreserve.html

2 Contribute

to a larger, ongoing process of re-envisioning Sepulveda Basin

above: The River Project's Sepulveda Basin Feasibility Report 2022

above: UCLA IoES' Fire Resilience in the Sepulveda Basin Wildlife Reserve 2022

Non-profits, public agencies, and private citizens have collaborated in the planning and development of the Sepulveda Basin Wildlife Reserve. However, a majority of the more recent envisioning and re-envisioning efforts have focused on the entire Basin and not specifically the Wildlife Reserve. We believe this proposal compliments prior efforts while departing from their work and suggesting new alternatives for the site. It is our hope that this work will productively contribute to the ongoing processes of planning and development for the larger Basin. Specifically, The River Project's (TRP) *Sepulveda Basin Restoration Feasibility Report* and the 2022 UCLA Sepulveda Basin Practicum Report, *Fire Resilience in the Sepulveda Basin Wildlife Reserve,* thoroughly informed our research and suggestions.

The *Sepulveda Basin Restoration Feasibility Report* explored "the technical feasibility of restoring ecosystem function to the Los Angeles River and five tributaries in the Sepulveda Basin — a 2,000-acre federally owned flood management facility in the heart of urban Los Angeles"("The River Project"). Allowing geomorphic processes to guide design, TRP's suggestions would yield:

~8 miles of restored river and tributaries

~5 times increase in groundwater recharge during frequent storms

~20% increase in flood storage capacity

~22 minutes of additional flood attenuation time in the 100-yr event

- 669 acres aquatic & riparian habitat; 391 acres upland habitat
- Improved water quality via floodplain reclamation
- Expanded accessibility through a network of ADA compliant trails and paths
- Significant increase in recreational facilities
- Opportunities to include cultural facilities
- A park unified around the river corridor as the heart of the Sepulveda Basin

To some evolving extent, the conclusions drawn from this project will inform the currently underway City of Los Angeles' Sepulveda Basin Vision Plan.

3 Acknowledge

the prior presence of Native People on the land we call Sepulveda Basin, including centuries of activities shaping the vegetation we now consider "natural" (e.g., prescribed burning, harvesting seed, etc.).

Hartman, Steve. San Fernando Valley History Digital Library, California State University, Northridge, 1980-1981.

below: "Children's drawings of their time in SBWR." https://www.sfvaudubon.org/sbeep/

below: "Muriel in the Field."https://www.sfvaudubon.org/sbeep/

above: "Cleaning Up SBWR." https://www.dailynews.com/2023/04/28/can-environmental-and-community-leaders-restore-the-sepulveda-basin/

above: "Checking Out the Plankton."https://www.sfvaudubon.org/sbeep/

We also wish to acknowledge the decades of hard work by volunteers planting native plants, picking up trash, engaging the public, and fighting to protect the SBWR.

4 Accept

wildlife's need for "privacy" in urban settings - more trails usually means fewer places to rest, nest, roost, etc. Trails are also vectors for weeds and pathogens.

San Fernando Valley Audubon Society, https://www.sfvaudubon.org/birding-spots/sepulveda-basin-wildlife-area/

Murayama, Grace. "Immature Black-crowned Night-Heron." 11 February, 2017, https://www.sfvaudubon.org.

Murayama, Grace. "Osprey over the pond."11 February, 2017, https://www.sfvaudubon.org.

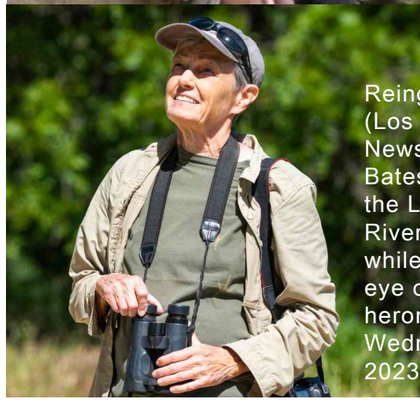
Ad-hoc additions and overall expansion of the trail network since the 1980s has degraded areas of privacy. Maintaining privacy through defined trails and access will maximize places for wildlife to rest, nest, and roost. The additional trail along the eastern edge of the existing wildlife lake has increased (and improved) wildlife-viewing, but at the expense of some wildlife privacy.

5 Enjoyment

of nature given primacy over active recreational uses.

San Fernando Valley Audubon Society, https://www.sfvaudubon.org/birding-spots/sepulveda-basin-wildlife-area/

Degraded Sign, SBWR March 2023



Reingewirtz, Sarah (Los Angeles Daily News/SCNG). "Pat Bates as she visits the Los Angeles River basin in Encino while keeping her eye on a great blue heron rookery on Wednesday, April 19, 2023.

In-tact Sign, SBWR March 2023

Because the Sepulveda Basin boasts a plethora of recreational opportunities (sports fields, fishing, etc.), the Wildlife Reserve must function primarily as a place for people to passively observe and enjoy nature. Birdwatching, nature photography, walking and other non-intrusive activities should be encouraged, and should be considered more important (here) than other activities that might be done elsewhere in the Basin.

6 Protect nature and natural systems, rather than supporting the perceived needs of every park user, or potential park user

Murayama, Grace. “Oriole Nest Made of Plastic Strips 11 February, 2017, https://smbasblog.com/2017/02/13/birdy-morning-at-sepulveda-basin-wildlife-reserve-area-11-feb-2017/

“Kite-fighters abandon their string when a kite is downed or lost — and birds like this pigeon become fatally entangled” https://www.sfvaudubon.org/2016/02/05/drones-and-fighting-kites-in-the-sepulveda-basin-recreation-area/

Each activity within the wildlife area - and anything new proposed - should be compatible with supporting nature and the local ecology. Although nature is constantly in flux, and the area is largely “artificial” (constructed and highly modified), certain activities risk disrupting the native species to such an extent that they can no longer use the site. These impacts may be evaluated on a case-by-case basis (for example, the nesting colony of Double-crested Cormorants is one of the few in the Los Angeles area, and preserving it should be a high priority).

Certain park users visit the wildlife area for activities that inevitably leave trash, or they smoke within the vegetation. These are clearly activities that directly degrade nature, and so our recommendations seek to reduce or even eliminate many of these behaviors, either through design or recommended changes in management.

7 Prioritize native ecosystems over novel ecosystems, where still intact/restore-able; these areas are getting fewer, and deserve our attention

Photos by Isabella Isles, Oak Grove adjacent to Burbank (left), invasive mustard bloom west field (right)

Although the Sepulveda Basin Wildlife Reserve is a largely constructed/“artificial” environment, it was set aside for nature, and to allow local species to populate it and thrive here. At the same time, many non-native plant and wildlife species have also moved in, and now call the Basin home. In cases where decisions need to be made which stay and which go, we will generally favor retaining local native - i.e., species that naturally occur, or would have occurred, along the Los Angeles River through the San Fernando Valley. This means that species brought here by humans (some decades, or even centuries, ago), and their novel ecosystems, would be considered lower-priority for conservation attention.

8 Understand

what makes SBWR unique - why do people love spending time there? “Genius Loci” - Refuge of nature, water, open space in middle of city

From: TRP SB Feasibility Report

Image Credit: Google Earth

Photo by Amanda Thompson, Focal Points Magazine May/June

People flock from near and far to enjoy the unique wildlife and peaceful greenery of the Wildlife Reserve. Although other green spaces exist in the San Fernando Valley, the SBWR remains one of the largest contiguous areas conveniently accessed by both the 405 and 101 freeways. The LA River flows south beyond the dam with its channel extending northwest, bisecting the larger Sepulveda Basin just west of the Reserve. One can sense the proximity to water when in the SBWR - even in the most arid of months, the lushness of the Wildlife Lake and coolness of the shade under the oaks stands out against the heat emanating from the city beyond. In their 2022 Feasibility Report, The River Project described the LA River as the “genius loci” or (protective) spirit of the Sepulveda Basin. Our proposal seeks to reinforce one’s sense of place in the SBWR while reflecting and connecting, through water, the ‘genius loci’ of the greater Basin.

9 De-emphasize

“who” and instead emphasize “what” with regard to human uses. Don’t vilify people, focus on activities. Legal uses outweigh concerns about marginalizing “illegal users”

Photos by Dan Cooper, from top left to right: Burn Pit Under Wildlife Sign, Illegal parking and camping along Burbank, Trash Pile in an East Field Coyote Bush, Burn Pit under Burbank Blvd.

As landscape architects, ecologists, and biologists, our purview does not extend to nor do we have the power to solve (or even address) the houseless/mental health/addiction crisis in Los Angeles. Those who permanently reside in the SBWR should receive the care and housing they deserve, but in the interim, preventing illegal activities that endanger both them and fellow visitors remains the charge of this report. As previously stated, all known wildfires to date originated from illicit human activities. A lack of sufficient funding combined with illegitimate use perpetuates the degradation of the SBWR, which in turn discourages legitimate use.

10 Design

to break the cycle in which the lack of safety (or perceived lack) reduces “legitimate use”, which allows illegitimate use to flourish

Photos by Dan Cooper, Left: dump pile in South Reserve, Right: Burbank Blvd. underpass used frequently for open fires

This tragic cycle also endangers those that do choose to visit the Reserve. Our design recommendations seek to incentivize legitimate and legal uses of the Reserve, while passively preventing or limiting illegitimate use.

11 Realize

we can’t “plant our way to fire prevention”, just like we can’t “plant our way to restoration”. These interventions depend on a large number of management changes to be successful, and planting (including tree-planting) is but a part

Credit: SFV Audubon

Photo by Dan Cooper, remnants of an illegal open fire in the South Reserve

Photo by SBWR volunteers, planting ripped out by unknown individual

11

Even though some habitats naturally limit wildfire propagation, the entire SBWR cannot and will not be converted to “fire safe” habitat. Wildfires begin with an ignition, and spread through virtually any vegetation. Therefore, we must carefully consider what types of vegetation are likely to burn via a common ignition source (e.g., cigarette, spark from vehicle, etc.), and what types of vegetation are likely to carry fire quickly through the habitat.

Our proposal targets ignition sources and offers suggestions for addressing the highly flammable invasive weeds that currently line the roadsides in the vicinity of the Wildlife Area. We offer a broad range of recommendations for new fencing, pathways, and signage (to enable consistent enforcement), as well as “prescribed immersion” - periodically allowing water to fill and drain from currently-dry and highly flammable areas of the Basin.

SBWR WILDFIRE RESILIENT HABITAT PLAN

Wildfire & Soil Moisture Anomalies

Krueger et al. (2022) summarized the findings of over 45 studies on soil moisture and wildfire in a recent review. Pellizzaro et al. (2007) first quantified the soil moisture–fuel moisture relationship for various shrub species in Italy, finding that soil moisture was a better predictor of live fuel (i.e., vegetation) moisture than were weather variables or weather-derived drought indices. Qi et al. (2012) corroborated those findings and calculated that soil moisture explained 66% of the variability in live fuel moisture for oak and sagebrush vegetation in northern Utah, and that soil moisture was more strongly correlated with live fuel moisture than were other remotely-sensed vegetation indices.

"Soil moisture was more strongly correlated with live fuel moisture than were other remotely-sensed indices"

Other studies from a broad range of ecosystems and locales highlight this relationship between vegetation amount ("fuel load"), vegetation aridity ("fuel moisture content"), wildfire probability, and soil moisture. Crucially, increased soil moisture stress, defined as drier-than-average soil moisture conditions, is associated with increased litter fall (i.e., leaf drop) and an increase in non-photosynthetic vegetation (dead wood), which comprise the increased fuel load associated with wildfire.

SBWR WILDFIRE RESILIENT HABITAT PLAN

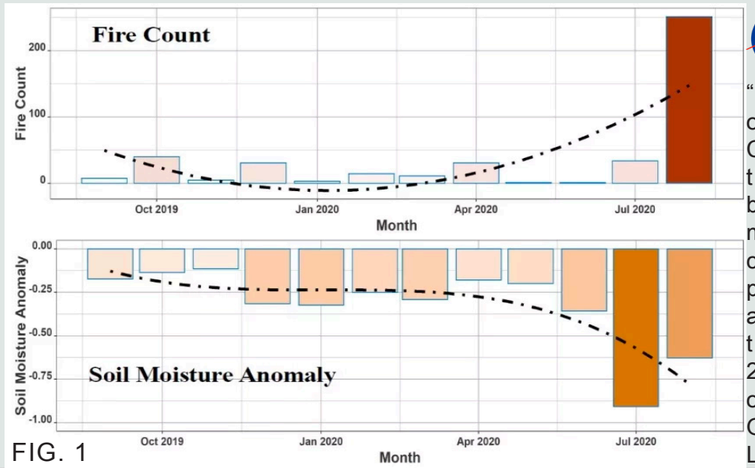


FIG. 1

EARTH SCIENCE APPLIED SCIENCES

"The top chart shows the number of fires detected in Northern California from September 2019 through August 2020, while bottom chart shows how the soil moisture deviates from average conditions over the same time period (also known as soil moisture anomalies). These data show that dry soil conditions in July 2020 may have led to more fires occurring in August." Credit: NASA GSFC Hydrological Sciences Lab, John Bolten, Nazmus Sazib.

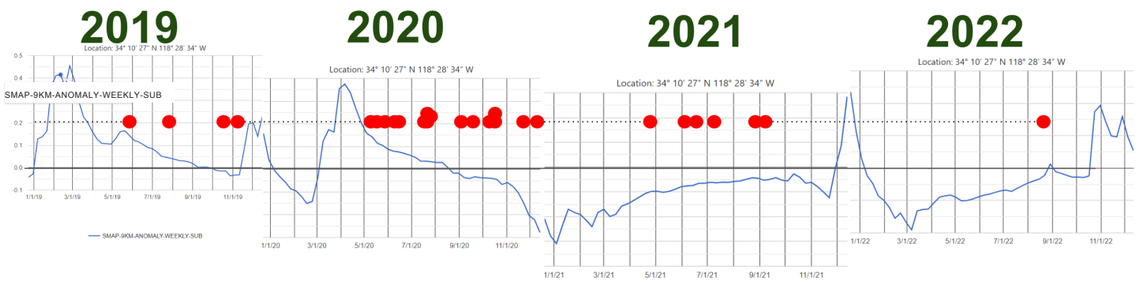
Wildfire size also appears to be associated with these soil moisture anomalies. O et al. concluded that in arid environments, positive soil moisture anomalies (i.e., wetter conditions than average) occur 5 to 6 months before large wildfires, with soil returning to normal and/or negative moisture levels (i.e., drier conditions than average) 1-2 months preceding large burns, illustrating a direct relationship between soil moisture, biomass, and fire extent (Krueger et al. 2023).

"Soil moisture anomalies are the amount that current soil moisture conditions, at the depth of plant roots, deviate from the historical average"

RCDSMM aggregated soil moisture anomalies for the Sepulveda Basin using data from NASA's Soil Moisture Active Passive mission (SMAP), and found a similar periodicity of soil moisture anomalies and wildfire events conforming to the global trend for arid regions reported by O et al. (2020). Data for the vicinity of the Sepulveda Basin from SMAP mission revealed that on average, positive soil moisture anomalies indeed tend to exist in the Sepulveda Basin during the 5 to 6 months preceding wildfires and then decrease (either returning to normal or becoming negative) in the 1 to 2 months before recorded wildfires (see Figures 2 & 4).

Wildfire & Soil Moisture Anomalies

Sepulveda Basin Soil Moisture Anomalies & Wildfire Occurrence



Soil moisture anomaly
Fire events
Time between fire seasons

FIG. 2

Soil moisture data sourced from an application funded by NASA and USDA-NASS, designed and developed by USDA-NASS and the Center for Spatial Information Science and Systems at George Mason University. Fire data sourced from Landsat Burned Area Products and LAPD reports.

In a study specifically focused on California and Australia, Sazib et al. (2022) confirmed this same soil moisture anomaly-wildfire relationship, concluding that soil moisture from SMAP was positively correlated with wildfires in drier regions given 1-2 month lead times, and attributed this to an increased biomass accumulation in arid regions (similar to climatic conditions in the San Fernando Valley).

Indeed, wildfires in the Sepulveda Basin tend to occur when soil moisture is at average or below-average levels (i.e., normal or negative soil moisture anomaly conditions), which begin typically in May and end in November (see Figures 2 & 4). During this summer and fall period, the Wildlife Reserve tends to accumulate a high biomass of dead vegetation, including dried grass and invasive forbs such as mustards (Family: Brassicaceae).

Sepulveda Basin Fire Regime

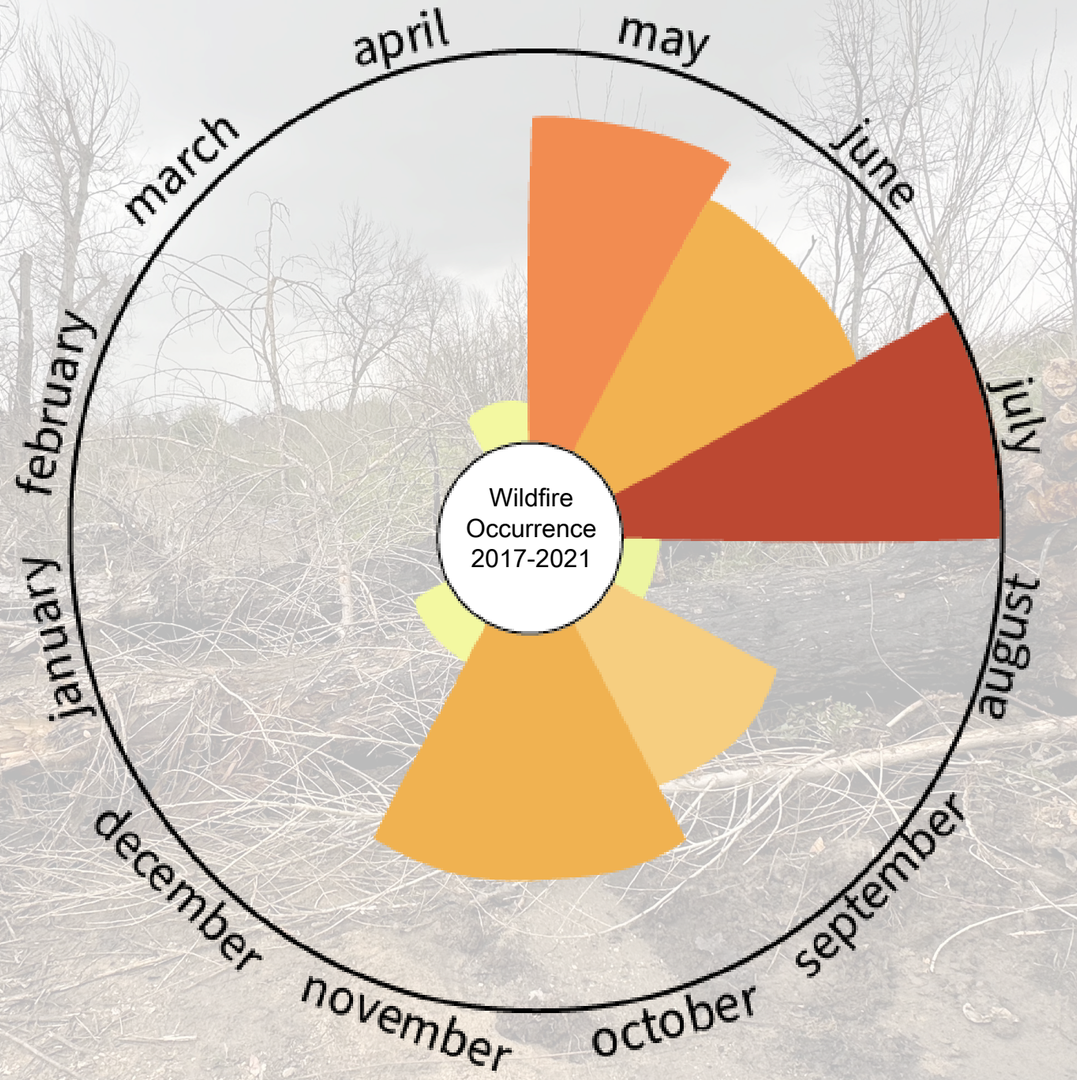


FIG. 3

Wildfire & Soil Moisture Anomalies

Fire Occurrence & Average Soil Moisture Anomalies in the Sepulveda Basin (2018-2022)

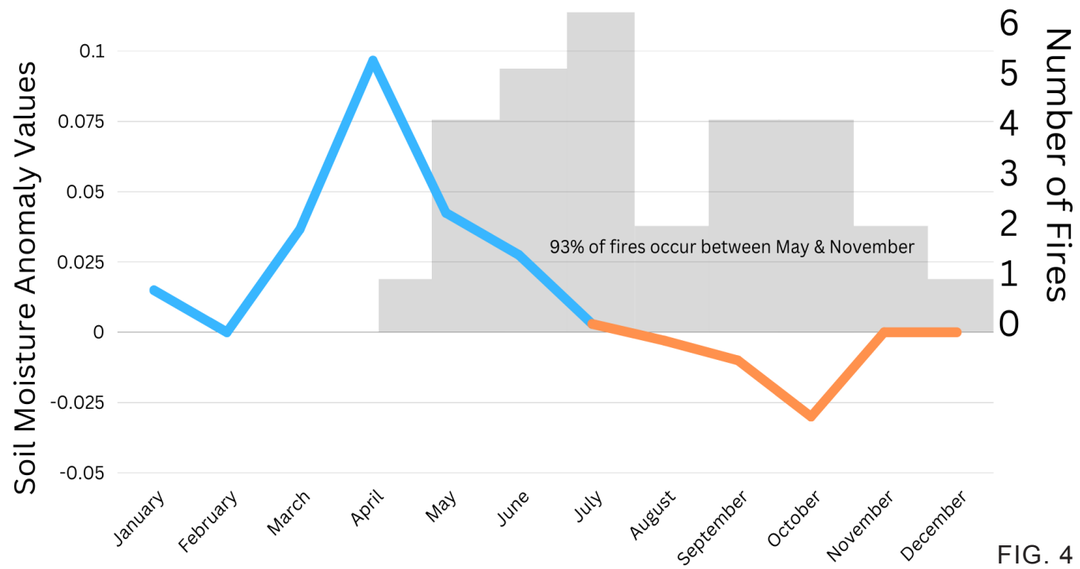


FIG. 4

Soil Moisture Data: NASA and USDA-NASS, application developed by USDA-NASSand the Center for Spatial Information Science and Systems at George Mason University.
Fire data: Landsat Burned Area, LAPD Records, UCLA IOES Fire Resilience in the Sepulveda Basin Wildlife Reserve

O et al. (2020) qualified their conclusions on the SMA-wildfire relationship, stating that these soil moisture signals are most pronounced in sparsely populated areas with low human influence, and for larger fires." While this may seem like a different scenario from the broader Los Angeles region, the Sepulveda Basin is an anomaly itself in urban Los Angeles, being a largely undeveloped area with considerable open space and many acres of natural, "un-manicured" vegetation. Therefore, it may resemble a wildland area in the way it responds to soil moisture anomalies (as explained by O et al.), and the prevalence of vegetation (as opposed to structure) fires here. And, as observed by Famiglietti et al. (2008), soil moisture can vary greatly across short distances, such that fire conditions at, say, the Wildlife Area, may be radically different from those at adjacent Lake Balboa.

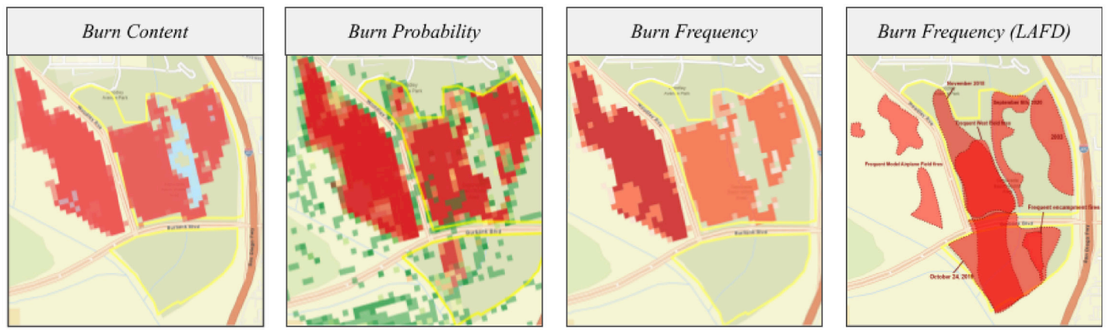
In-situ soil moisture monitoring stations could confirm the accuracy of soil moisture anomalies currently observed with the coarser, remotely sensed SMAP data (Krueger et al. 2023). The UCLA Practicum team in *Fire Resilience in the Sepulveda Basin Wildlife Reserve* identified the most ignition prone areas (see Map 3) RCDSMM suggests adding between 1 and 5 stations located in these areas.

The practicum team concluded that "normal soil moisture levels, and low fuel [= vegetation] moisture levels on days of fire" indicated that "factors other than soil moisture, such as air temperatures and humidity, may influence the rapid drying rates of the vegetation" (page 20). While it may have been that "normal" soil moisture levels existed on days that fires occurred, we favor using seasonal soil moisture anomaly trends (which would, in turn, drive vegetation/"fuel" moisture, to reveal the long term drivers of wildfire at the Basin.

As seen in Figure 2, 21 out of the 29 recorded fires within the Basin occurred following 1-3 months of soil moisture anomaly conditions. In other words, it's the period of anomalies that appear to drive fires, rather than a particular threshold value (Kreuger et al.). However, using this pattern to inform management has been challenging. Most fire risk rating systems still do not incorporate soil moisture anomaly conditions in their predictions.

MAP 3

UCLA 2022 Practicum Team Burn Data



Comparing visualization methods of burn data recorded on select dates (used for burn content and burn probability), burn frequency from all dates in 2017 to 2022, and drawings from interviews with LAFD

Wildfire & Soil Moisture Anomalies

The traditionally incorporated predictive variables used in wildfire rating systems such as temperature, wind speed and direction, and relative humidity lie beyond the immediate control of any public agency, department, or volunteer group. Thus, knowledge of existing conditions may provide short-term information, but cannot be used for long-term planning.

For more than a century, due to the lack of control over said variables, fire prevention has relied on massively physically altering vegetation, either through fuel breaks, disking/grubbing, thinning/ masticating, grazing, controlled burns, and other vegetation management techniques. However, these activities all take planning and a relatively high level of staff funding to implement, and can have devastating local effects on biodiversity, particularly on rare plants, invertebrates and ground-dwelling wildlife. Our recommendation explores titrating soil moisture conditions just enough to limit rapid curing, while also providing a more natural “ember moat” (essentially a moist-soil fuel break) in the event that vegetation does ignite.

Many questions remain unanswered on the soil moisture anomaly wildfire relationship (Kreuger et al.). We acknowledge that the scientific basis of this proposal rests on relatively new research that did not establish causality between wildfire and soil moisture anomalies alone. We believe the unique circumstances of the SBWR (available Tillman water, existing purple pipe infrastructure, rare species, and the general understanding that wetlands are more fire resilient (Corday 28)) create an opportunity to further our understanding of the soil moisture anomaly wildfire relationship.

To summarize, in densely-vegetated areas with high, unregulated/unpredictable human activity such as the Basin, we recommend monitoring soil moisture anomalies (i.e., at a monthly and seasonal scale) to provide the lead time necessary to implement ignition-reduction methods.

Matching predictive variables to the appropriate timescale needed to implement management regimes is critical to reducing wildfire risk in high-frequency fire regimes such as the Basin.

SBWR WILDFIRE RESILIENT HABITAT PLAN

Prescribed Immersion

Given the strong relationship between soil moisture anomalies and wildfire, we propose that “artificially” modulating soil moisture conditions - using controlled, periodic, shallow-depth flooding - could mitigate wildfires themselves. Rather than relying on prescribed burns to rid the soil surface of dried vegetation, we suggest that this “prescribed immersion” would extend what is a naturally positive soil moisture environment in late winter and spring to later into the critical time frame of summer/fall.

A combination of perforated pipes using diverted water from the Donald C. Tillman Reclamation plant, swale channels, and headgates could accomplish such a disruption to the wildfire-soil moisture relationship during targeted points in the year (i.e., from late spring until the first substantial rain in the winter).

No examples of artificially titrating soil moisture conditions to reduce wildfire risk exist. But wildfire science has established that some habitat types do not as easily facilitate wildfire spread (Schaefer and Magi 55). Implementing “prescribed immersion” in the SBWR therefore becomes a test case for examining soil moisture as a wildfire mitigation agent.

Under this premise, prescribed immersion would serve two purposes.

SBWR WILDFIRE RESILIENT HABITAT PLAN

Post rain in the North Reserve, east of Haskell Creek, March 2023
photo by Isabella Isles

Firstly, it would limit wildfire spread by reducing the capacity for ignitions to generate into full-fledged wildfire by creating ‘ember moats’ and increasing the water content within vegetation, slowing the curing, and thereby decreasing their flammability (Krueger et al). Secondly, some of the inundated areas would develop into seasonal wetlands, recreating historical seasonal wetland habitat once found across the floor of the San Fernando Valley (Ethington and Haynes 2020). Preliminary observations from spring 2023 (coinciding with massive amounts of rainfall throughout the region) suggest that this seasonal wetland habitat would be well-used by migratory birds, such as American Wigeon (see image on page 66).

Based on our site visits, review of topography, and hydraulic modeling results, we anticipate that flow from these seasonal wetlands would direct into the Los Angeles River, thus mimicking what would have been natural inundation and drainage patterns that the entire area would have experienced before channelization of the Los Angeles River and its tributaries (see Map 5).

San Joaquin Marsh, Irvine

A flourishing, managed wetland

Balance Hydrologics completed hydraulic modeling efforts to progress the concept of prescribed immersion and seasonal wetlands within the SBWR. The results demonstrated the feasibility of achieving the proposed immersion and laid the framework for a phase 2 study.

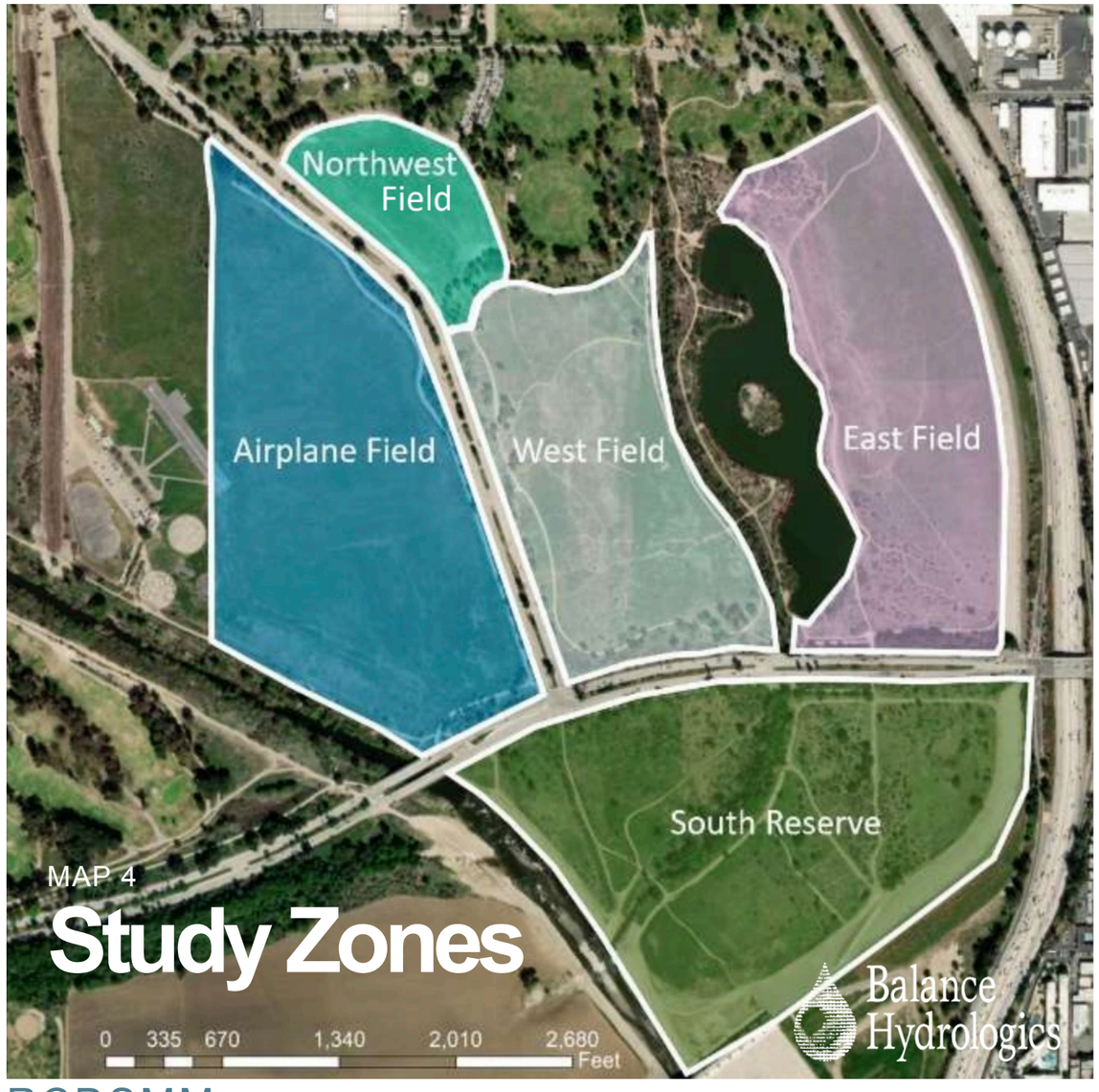


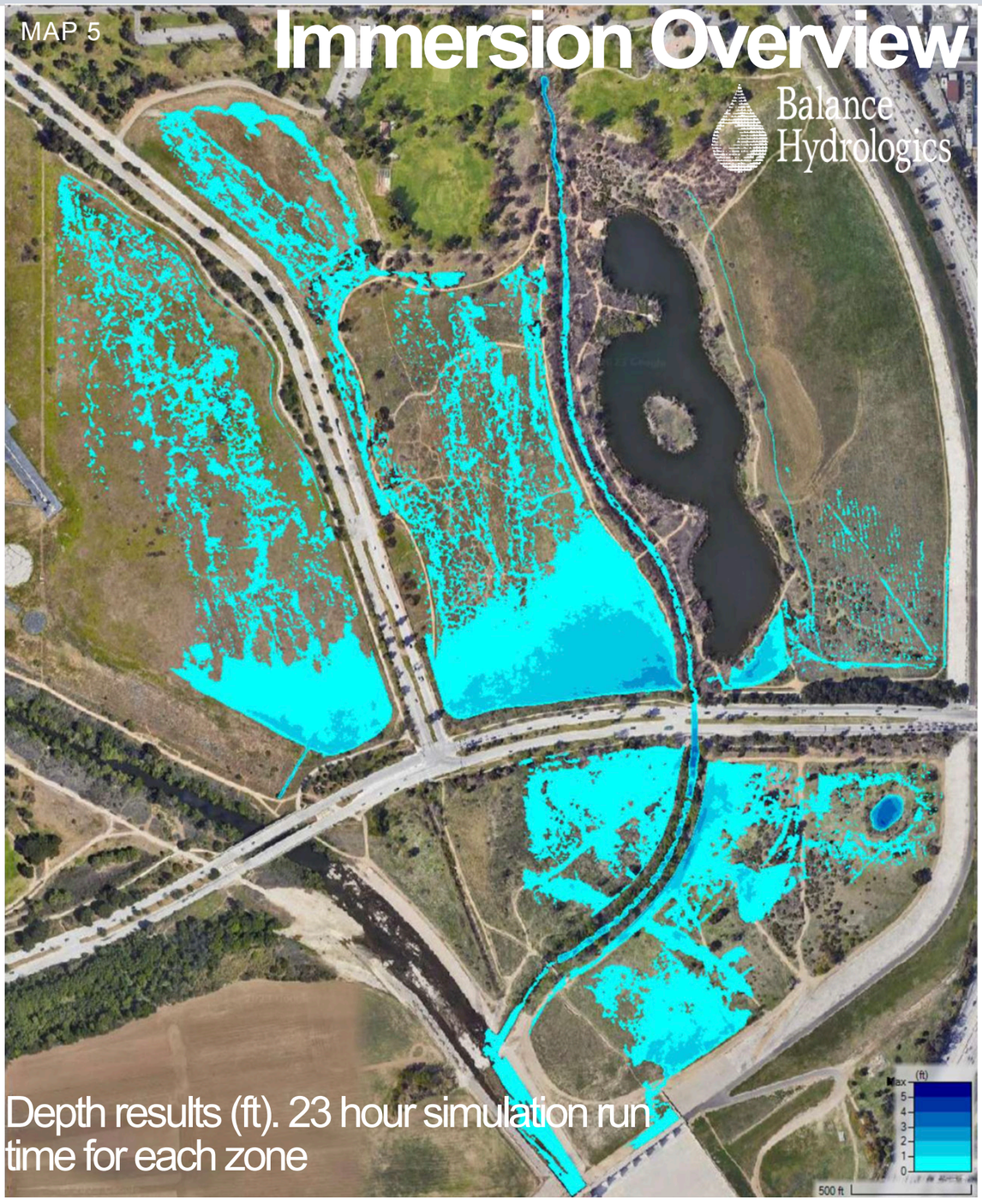
Table 1. Required volumes to achieve wetting and ponding per project goals.

Area	Point Sources	Total Flow (cfs)	Volume (cu ft)	Volume (ac-ft)
Northwest	one @ 2 cfs	2	165,600	3.8
Westfield	two @ 2 cfs	4	331,200	7.6
Airplane Field	one @ 2 cfs	2	165,600	3.8
Eastfield	one @ 1.5 cfs; six @ 0.25 cfs	3	248,400	5.7
South Reserve	23 @ 0.25cfs	5.75	476,100	10.9

The study area was subdivided into five distinct zones: Westfield, Eastfield, Northwest Field, Airplane Field, and South Reserve (see Map 4). Working closely as a team to iteratively adjust model runs to achieve project goals, three potential methods of water delivery were considered:

- Water delivery that bubbles out onto the land upstream of the seasonal wetland areas (“fill-and-spill”),
- Water delivery that is blocked along the lower reaches of the designated seasonal wetland areas (“plug-and-flood”), and
- A combination of the two above methods.

The overall goal of the modeling effort was to optimize locations of the point-source inflows to provide sufficient wetting of the target areas within the simulation timeframe. The inflow rates were first modeled using a distributed approach, meaning the assumed available flows from the Tillman Water Reclamation Plant “purple pipes” were divided between the point-source locations within the model. Tillman purple pipe outflows can be found in Figure 3 of Appendix A. For the later iterations, it was assumed that additional flows could potentially be temporarily diverted to achieve the project goals.



After 14 different setups, the model indicated that, over a 23-hour simulation window, ponding that achieves the goals of the feasibility study is possible (see Map 5) with dribble points positioned strategically along the terrain and terrestrial modifications such as plugs, swales, and berms (see Map 6).

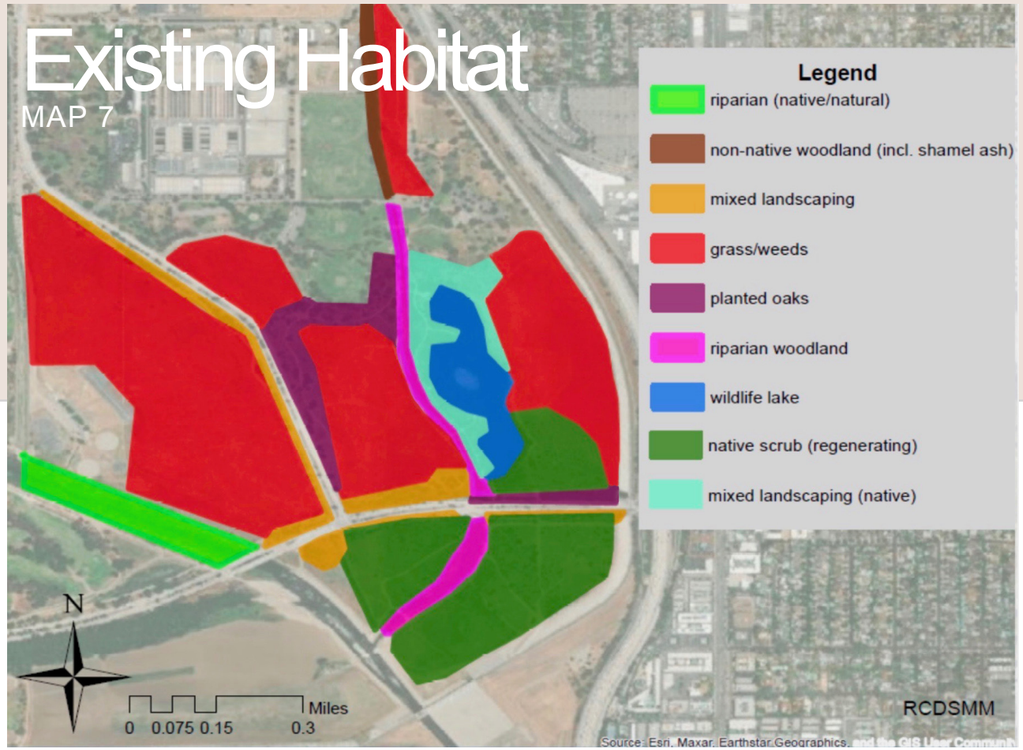
Habitat Changes

Prescribed immersion may also help improve the ecological value of a large portion of the SBWR by type-converting it from invasive and highly flammable weeds to largely native seasonal wetland plant species (invasive weeds currently cover around 50% of the reserve) (see Map 7).

Some of the areas indicated in the immersion plan (Map 5) won't receive enough water to develop into seasonal wetlands but will receive enough to boost growth and theoretically limit curing and flammability. For the areas that already host regenerating native scrub, such as in the south of the east field by the planted oaks, the added water should contribute to its establishment. Low profile alluvial scrub should be prioritized in this area as opposed to larger shrubs to limit encampment opportunity and flammability.

The northernmost reaches of the east field should continue as managed grassland with adequate weeding regimes. The mid-zone of the east field then becomes a transition zone to the low profile alluvial scrub and riparian edge of the lake.

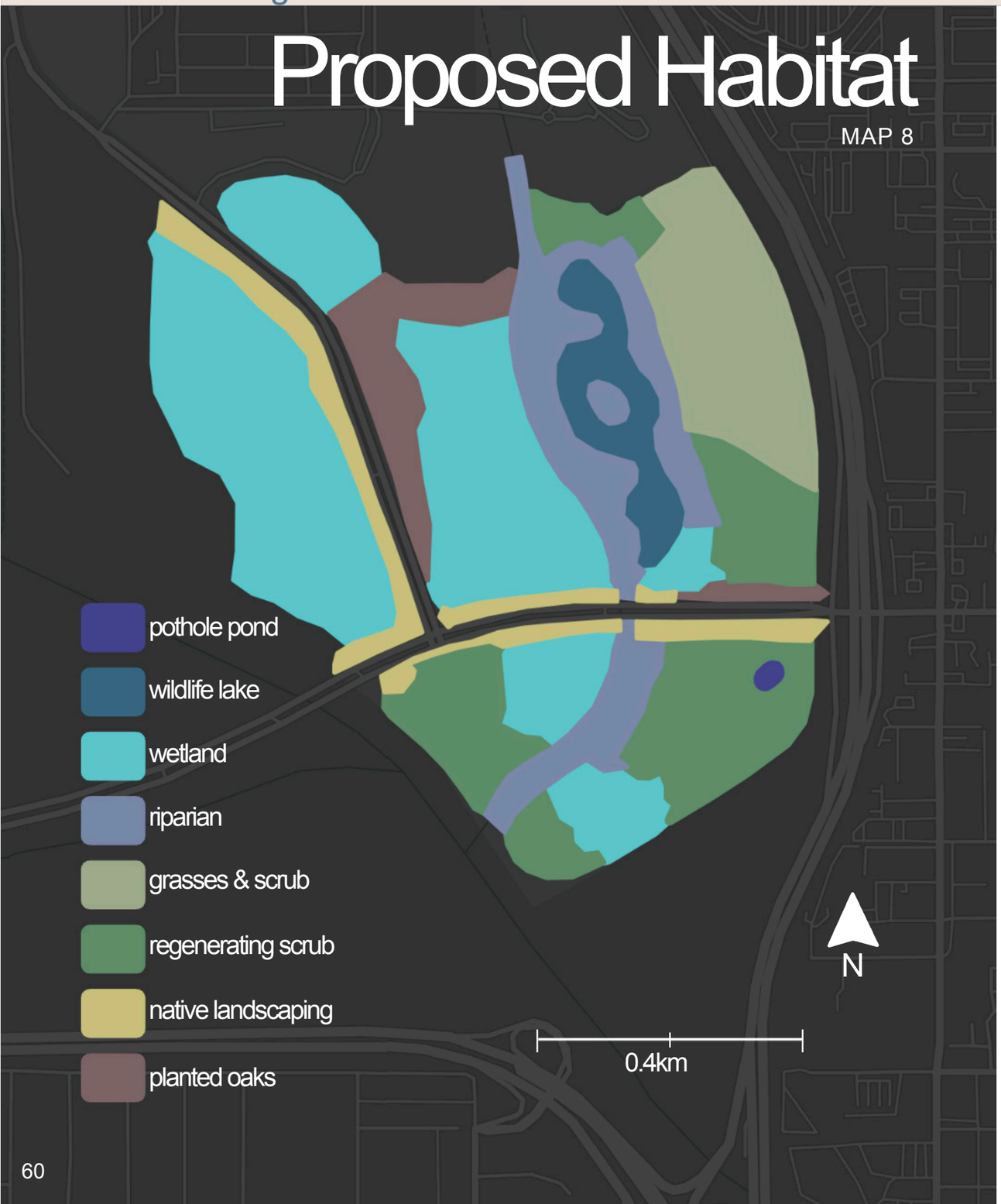
The swale channel carrying water to the lower east field expands and protects the east edge of the Wildlife Lake and extends the riparian zone, converting it from flammable weeds. Some "spillage"/ "leakage" occurred along the swale channel during model runs. A berm resolved this "spilling" but in future project phases, purposeful "spilling" may be explored to create more protected habitat cells.



The model airplane field currently boasts little ecological value and easily ignites when model airplanes crash (which they frequently do). Prescribed immersion may convert the entire area to shallow wetland habitat that prevents ignitions from developing into full fledged wildfires.

The west field of the North reserve also receives enough water in this scheme to develop into shallow wetland in its upper and middle reaches. Its southern most region may experience ponding of up to a couple feet and develop into deeper wetland habitat (see Appendix A). The same follows for the area at the south east of the Wildlife Lake (see Map 5).

In the South Reserve, the added water also may create an extended riparian zone along Haskell Creek. Wetlands should form on either side of Haskell where adequate water allows (see Map 8).



Of course, the proposed inundation to create seasonal wetlands must not interfere with the Basin's primary directive: flood retention. Since wetlands augment organic matter in the soil through increasing the number of micropores and macropores, the soil moisture capacity of the soil should increase over time. According to USDA soil scientists, every 1% increase in organic matter results in as much as 25,000 gallons of available soil water per acre (Rust).

Stakeholders raised concern about the seasonal wetlands providing conditions for mosquito infestation. Because there is already water within SBWR (Wildlife Lake, Haskell Creek, LA River) and this proposal suggests only intermittent immersion with adequate natural drainage that follows the existing topography, the conditions would not suit mosquito populations.

Rather than stagnating water, it is our intent to restore the dynamic ecological function that once existed at the site. Diverse species and appropriate native vegetation would maintain an equilibrium that prevents an overpopulation of insects such as mosquitoes.

The water added would drain naturally into the LAR. Additionally, there is sufficient distance between the proposed wetlands and human habitation.

The establishment of seasonal wetlands would recreate historical habitat that once abounded in the San Fernando Valley. The wetlands would provide essential breeding, foraging, and resting areas for a wide range of wildlife species, including migratory birds, amphibians, reptiles, and aquatic organisms (the SBWR hosts over 200 species of birds in any given year). The seasonal wetlands would also promote nutrient cycling, water filtration, and soil retention, enhancing the overall ecological functioning of the reserve.

Native species suited to each proposed habitat type should be promoted and managed accordingly (Cooper et al. 2022). The water intended to discharge in response to anomalous soil moisture conditions may be utilized to establish new plantings.

Table 2. Native Species Lists

Wetland Species

Family	Latin Name	Common Name
Alismataceae	Alisma triviale	Northern water plantain
Alismataceae	Sagittaria sanfordii	Sandford's arrowleaf
Araceae	Lemna sp.	Duckweed sp.
Asteraceae	Centromadia parryi ssp. australis	southern tarplant
Asteraceae	Euthamia occidentalis	western goldenrod
Boraginaceae	Heliotropium curassavicum	alkali heliotrope
Convolvulaceae	Cressa truxillensis	alkali weed
Cyperaceae	Bolboschoenus maritimus	sea clubrush
Potamogetonaceae	Stuckenia pectinata	Sago pondweed

Riparian Species

Family	Latin Name	Common Name
Asteraceae	Helenium puberulum	sneezeweed
Brassicaceae	Rorippa palustris	Bog Yellowcress
Phrymaceae	Erythranthe cardinalis	scarlet monkeyflower
Phrymaceae	Erythranthe guttata	seep monkeyflower
Platanaceae	Platanus racemosa	western sycamore
Poaceae	Paspalum distichum	Knotgrass
Poaceae	Setaria parviflora	knotroot bristlegrass
Rosaceae	Rubus ursinus	trailing blackberry
Salicaceae	Populus fremontii	Fremont cottonwood
Salicaceae	Salix exigua	narrowleaf willow
Salicaceae	Salix gooddingii	Goodding's willow
Salicaceae	Salix laevigata	red willow
Salicaceae	Salix lasiandra	Pacific willow
Salicaceae	Salix lasiolepis	Arroyo Willow
Typhaceae	Typha domingensis	southern cattail
Typhaceae	Typha latifolia	broad-leaf catttail

Wetland & Riparian Species

Family	Latin Name	Common Name
Asteraceae	Pluchea odorata	marsh fleabane
Cyperaceae	Cyperus difformis	variable flatsedge
Cyperaceae	Cyperus eragrostis	tall flatsedge
Cyperaceae	Cyperus erythrorhizos	red root flatsedge
Cyperaceae	Cyperus odoratus	fragrant flatsedge
Cyperaceae	Eleocharis sp	spikerush
Cyperaceae	Schoenoplectus acutus	hardstem bulrush
Cyperaceae	Schoenoplectus americanus	American three-square bulrush
Cyperaceae	Schoenoplectus californicus	California bulrush
Juncaceae	Juncus balticus ssp. ater	Baltic rush
Lythraceae	Ammannia coccinea	Scarlet Toothcup
Poaceae	Leptochloa fusca ssp. uninerva	Mexican sprangletop
Polygonaceae	Persicaria punctata	dotted smartweed
Polygonaceae	Persicaria sp. (cf. lapathifolia)	swamp smartweed

Riparian & Scrub Species

Family	Latin Name	Common Name
Asteraceae	Artemisia douglasiana	California mugwort
Cucurbitaceae	Marah macrocarpa	Chilicothe
Onagraceae	Epilobium brachycarpum	panicled willowherb
Onagraceae	Epilobium ciliatum	fringed willowherb
Rannunculaceae	Clematis ligusticifolia	western virgin's bower
Urticaceae	Urtica dioica	stinging nettle
Viburnaceae	Sambucus cerulea	blue elder
Vitaceae	Vitis girdiana	desert wild grape

Scrub Species

Family	Latin Name	Common Name
Amaranthaceae	Amaranthus cf. blitoides	Procumbent pigweed
Amaranthaceae	Atriplex lentiformis	big saltbush
Anacardiaceae	Rhus integrifolia	Lemonade berry
Apocynaceae	Asclepias fascicularis	Narrowleaf milkweed
Asteraceae	Pseudognaphalium biolettii	two-color rabbit tobacco
Asteraceae	Pseudognaphalium californicum	California cudweed
Asteraceae	Pseudognaphalium microcephalum	Feltleaf Everlasting
Asteraceae	Pseudognaphalium stramineum	cottonbatting plant
Boraginaceae	Eucrypta chrysanthemifolia	common eucrypta
Boraginaceae	Phacelia cicutaria	caterpillar scorpionweed
Boraginaceae	Phacelia distans	distant phacelia
Boraginaceae	Phacelia minor	wild canterbury bells
Boraginaceae	Phacelia ramossisima	branching phacelia
Cactaceae	Opuntia littoralis	Coastal Pricklypear
Convolvulaceae	Calystegia macrostegia	coast morning glory
Convolvulaceae	Cuscuta subinclusa	canyon dodder
Euphorbiaceae	Croton californicus	California spurge
Fabaceae	Acmispon americanus	Spanish clover
Fabaceae	Acmispon maritimus	coastal bird's-foot trefoil
Fabaceae	Lupinus bicolor	miniature lupine
Fabaceae	Lupinus hirsutissimus	Stinging Lupine
Fabaceae	Lupinus sparsiflorus	Coulter's lupine
Grossulariaceae	Ribes aureum	golden currant
Juglandaceae	Juglans californica	Southern California Walnut
Malvaceae	Malvella leprosa	alkali mallow
Montiaceae	Claytonia perfoliata	miner's lettuce
Onagraceae	Clarkia unguiculata	Elegant Clarkia
Onagraceae	Eulobus californicus	California primrose
Onagraceae	Oenothera elata (hookeri)	tall evening primrose
Poaceae	Nassella lepida	foothill needlegrass
Polygonaceae	Eriogonum fasciculatum	California buckwheat
Polygonaceae	Eriogonum gracile	slender wooly buckwheat
Scrophulariaceae	Penstemon spectabilis	showy penstemon
Solanaceae	Datura wrightii	sacred datura
Verbenaceae	Verbena lasiostachys	western vervain
Solanaceae	Solanum douglasii	chaparral nightshade

Table 3. Species of Concern

Type	Scientific Name	Common Name
Animals - Birds	*Accipiter cooperii*	Cooper's hawk
Animals - Birds	*Ardea herodias*	Great Blue Heron (nesting colony)
Animals - Birds	*Falco columbarius*	Merlin (wintering)
Animals - Birds	*Falco peregrinus anatum*	American Peregrine Falcon
Animals - Birds	*Icteria virens*	Yellow-Breasted Chat
Animals - Birds	*Lanius ludovicianus*	Loggerhead Shrike
Animals - Birds	*Nannopterum auritum*	Double-Crested Cormorant (nesting colony)
Animals - Birds	*Pyrocephalus rubinus*	Vermilion Flycatcher
Animals - Birds	*Rallus limicola*	Virginia Rail
Animals - Birds	*Setophaga petechia*	Yellow Warbler
Animals - Birds	*Sialia currucoides*	Mountain Bluebird
Animals - Birds	*Spinus lawrencei*	Lawrence's Goldfinch
Animals - Birds	*Sturnella neglecta*	Western Meadowlark
Animals - Birds	*Vireo bellii pusillus*	Least Bell's Vireo
Animals - Insects	*Bombus crotchii*	Crotch Bumble Bee
Animals - Insects	*Danaus plexippus plexippus pop. 1*	Monarch - California Overwintering Population
Animals - Mollusks	*Helminthoglypta traskii traskii*	Trask Shoulderband
Animals - Reptiles	*Diadophis punctatus modestus*	San Bernardino Ringneck Snake
Plants - Vascular	*Centromadia parryi ssp. australis*	Southern Tarplant
Plants - Vascular	*Juglans californica*	Southern California Black Walnut
Plants - Vascular	*Phacelia hubbyi*	Hubby's Phacelia

The Yellow-Breasted Chat, for example, is a localized breeder, present April - August (with occasional transients possible later in fall) in the SBWR. Ideal breeding habitat includes several components, including extensive, dense riparian scrub/low woodland, fresh water (either running or ponded), and mesic, weedy habitat for foraging. It would not be expected far from permanent drainages, but also occurs in areas where anthropogenic water has produced dense riparian and even weedy habitat. Its favored habitat types expand under the proposed habitat scheme created by prescribed immersion (see Map 8).

American Wigeon in Model Airplane Field After Rain, 2023

photo by Dan Cooper

It breeds annually with an estimated 3-4 territories each year, in largest expanses of riparian vegetation, including SBWR (along Haskell Cr.). Prescribed immersion expands its favored habitats (see Map 8).

Another sensitive species, the Western Meadowlark, utilizes extensive grassland, athletic fields, and other large lawn areas in winter. In the SBWR, it makes heavy use of the open fields, including the "West Field" and Model Airplane Field (USGS, unpubl. data; ebird/iNat). Under the proposed habitat scheme, dry and open grassy areas on the west of the airplane field and in the north of the east field provide suitable ground.

A growing body of evidence suggests that freshwater wetlands may also mitigate climate change by creating anaerobic conditions which protect existing soil carbon, while vegetation continues to sequester atmospheric carbon dioxide. Wetlands may therefore be considered a "negative emission technology"(Valach et al. 2021). In a critical era of decision making for the Los Angeles River and its watershed, choosing 'nature based solutions' instead of 'hard engineering strategies' progresses climate mitigation rather than pushing for purely adaptive solutions (such as removing habitat with mowing, disking, grubbing).

Prescribed immersion in the SBWR requires some technology (pipes, pumps, headgates) to create shallow wetland habitat. In this sense, prescribed immersion mimics low-tech process-based restoration (LTPBR). The current SBWR water features (Wildlife Lake & Haskell Creek) rely on the technology and infrastructure exiting the Donald C. Tillman Water Reclamation Plant. Creating shallow wetlands by extending this existing infrastructure therefore seems a site appropriate strategy that yields many of the ecological benefits of LTPBR.

Ideally, low-tech process-based restoration of the Los Angeles River, as put *Basin Feasibility Report,* manifests in the final version of the City of LA's *SB Basin Vision Plan*, and complements and enhances the unique requirements of the Sepulveda Basin Wildlife Reserve.

The following renders imagine an enhanced SBWR, post prescribed immersion, with establishing wetlands and an expanded riparian zone. The existing DG paths are shown as improved in some areas - raised slightly above the wetlands to allow continual use on defined trails.

Wildlife Lake Trail West

FIG. 5

The existing trail west of the Wildlife Lake, imagined post-restoration, with fire resilient wetlands formed, and Haskell Creeks populated with sycamores and willows.

Wildlife Lake Trail East

FIG. 6

The existing trail east of the Wildlife Lake, imagined post-restoration, with fire resilient wetlands formed and protective fencing at the most ignition prone zone, closest to neighboring communities.

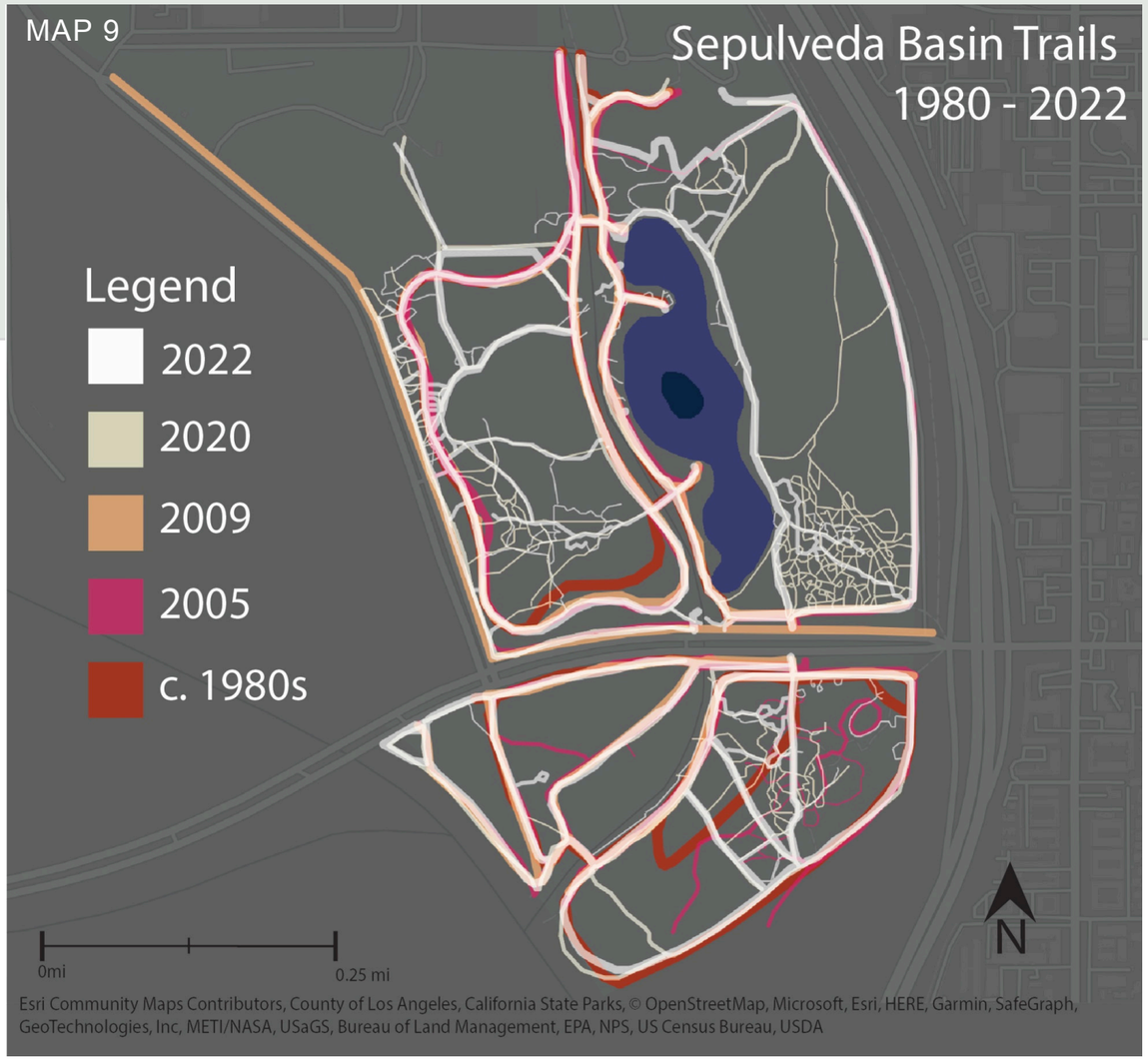
Defined Access & Human Use

Informal footpaths continue to proliferate throughout the Wildlife Reserve and serve as a vector for litter and other illicit activities (MAP 9).

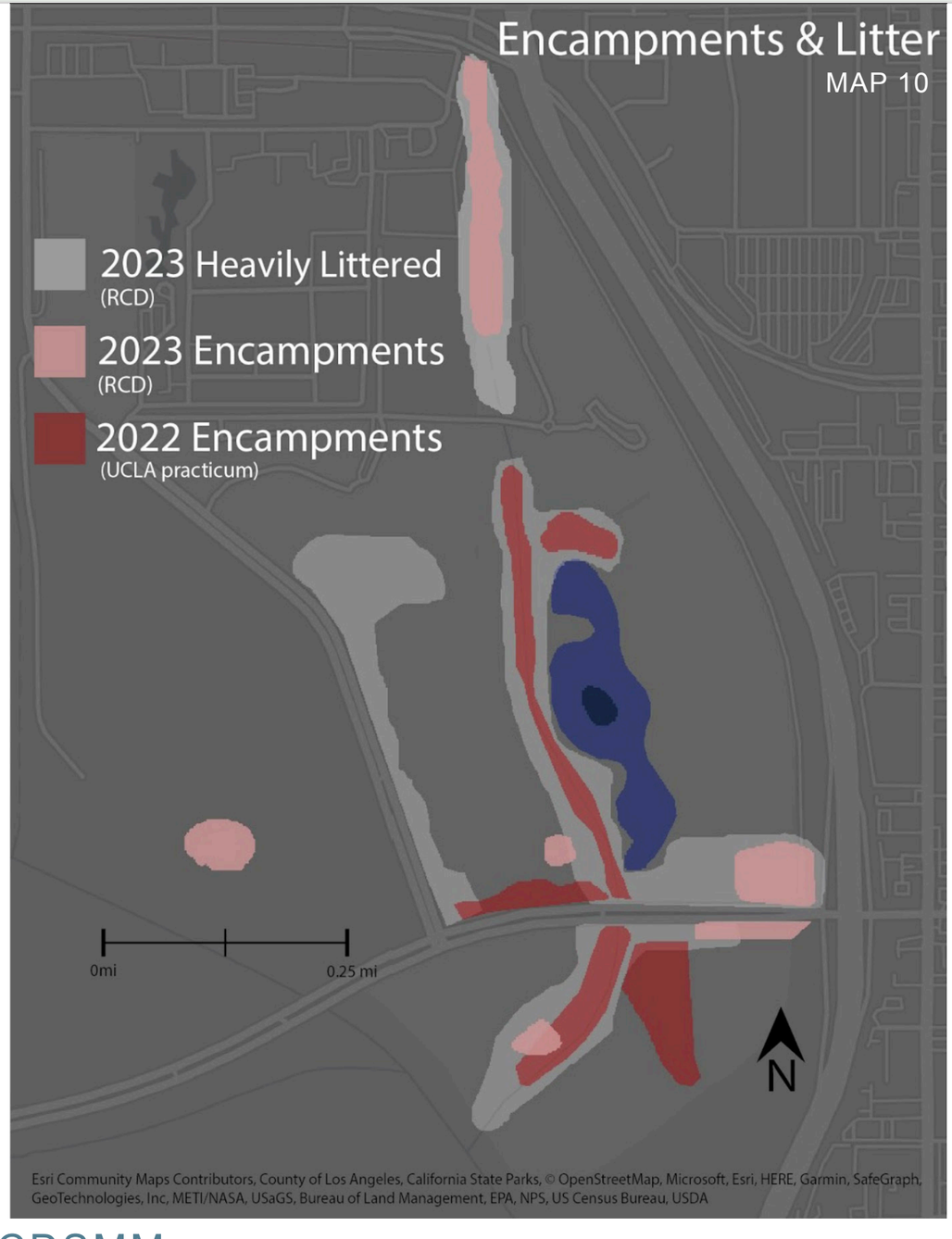
Long-time users of the site in agreement that litter is currently as bad as it's ever been in the history of the place. Litter appears to have three main sources: 1) dumped refuse - often construction material and household garbage along major roads; 2) plastic and other floating material conveyed by waterways, especially Haskell Creek; and 3) "horde piles" around encampments, typically within dense shrubland habitat (including those both along and far from waterways) (see Map 10). In each area, piles of litter attract non-native vermin such as rats and cockroaches, encourages fires (arsonists lighting "bonfires"), and smothers vegetation, thus degrading ecological function and diminishing the beauty of the place. As Steve Hartman (California Native Plant Society) put it, "we don't want a 'world-class urban wildlife refuge' to become synonymous with out of control litter and encampments" (Hartman 2018).

Based on our experience in protected areas around the world, it is our strong assertion that better-defined access (through fencing, signage and clear entrance points) will limit both the volume of litter and the number of areas of litter accumulation, while not overtly preventing current unhoused residents from remaining in place, if this becomes city policy (which it appears to be heading toward).

SBWR WILDFIRE RESILIENT HABITAT PLAN



Defined Access & Human Use



SBWR WILDFIRE RESILIENT HABITAT PLAN

The Sepulveda Basin Wildlife Reserve was established in the 1980s, when the county's population was 25% lower than today, and prior to the "street drug" addiction epidemics that have shaped street life in urban Los Angeles since the 1990s. This has resulted in a shift in the usage of the wildlife area from passive recreation (birding, jogging) to an area to "safely" buy, sell, and take illegal drugs without fear of arrest or harassment. Some users are permanent residents of the Wildlife Area, and reside in encampments (including tents, under tarps, and more recently, makeshift huts and "houses" built with discarded construction material dumped in the area). These encampments are concentrated along the Los Angeles River channel, the Haskell Creek channel, and in the vegetation southeast of the wildlife lake (semi-permanent recreational vehicle encampments are also present in these areas, and along major roads and in parking lots).

Other drug-oriented visitors - based on our own observations and brief conversations during visits - stop at the wildlife area throughout the day to obtain drugs, and "use" in the vegetation nearest areas of drug activity (i.e., closest to Burbank Blvd. and Woodley Ave.). Frequently, sex is exchanged for drugs, and evidence of this activity is typically left on the ground and not disposed of in garbage cans (which are not available in the wildlife area).

This usage accompanies several ancillary activities that degrade the land and habitat, and threaten ecological processes and native species, not to mention the public's enjoyment of the site (including trampling and trash accumulation). Importantly, it also appears to be a primary driver of wildfire ignitions, as various types of drugs require that the users smoke, which leads to people passing-out while ingesting. Cigarette-smoking also frequently accompanies these illicit activities (based on evidence left by participants).

Defined Access & Human Use

Dumping Site in the South Reserve, January 2023

Fire Under Sign, March 2023

Faded Sign, March 2023

SBWR WILDFIRE RESILIENT HABITAT PLAN

Burn Pit, March 2023

For encampment residents, fires are frequently used as retaliatory “punishment” by users, with accompanying violence; as a result, encampment residents and drug participants frequently carry weapons for self-defense, and there appears to be no current law enforcement option for “low level” crimes such as street-level drug sales and use, weapon-carrying (in a non-threatening manner), prostitution, and illegal parking (Officer Terazzas, LAPD, pers. Comm., 5/23/23). This, understandably, results in a frightening tableaux for “legitimate visitors” of the Wildlife Area, and ensures that wildfire ignitions will continue to be an issue without a clear remedy.

Although increased access to human services on-site or nearby is frequently suggested as a remedy to the current situation, our charge as biologists, ecologists, landscape architects, and environmental scientists is first to protect vulnerable and valuable species, ecosystems, and green space.

Mustard & Illegible Sign East of Widlife Lake, May 2023

Importantly, we are not passing judgment on, or devising regional solutions to, drug use and encampment establishment in the San Fernando Valley; nor are we personally demonizing users, and recommend they be arrested. Rather, we assert that permanently inhabiting the basin and engaging in criminal acts such as arson, open drug use, violence, prostitution,

Defined Access & Human Use

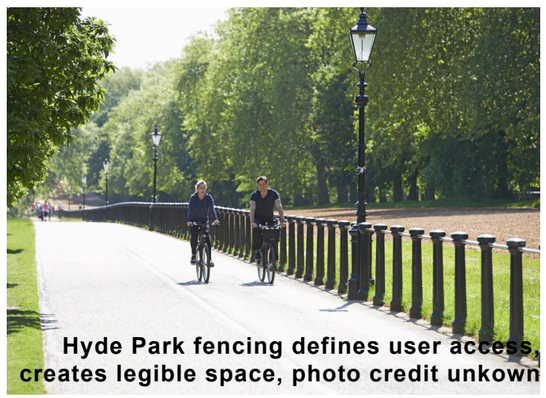
and starting fires (without permits) may be categorically regarded as an extreme threat to both the natural ecosystem present, and to everyone who uses the Wildlife Area. And, unless these threats are widely understood (and not just swept under the rug or labeled as “urban ills” too complicated to fix), fires will remain a grave threat.

Because of this, combined with the lack of active law enforcement, we suggest a passive enforcement strategy, one that relies on durable fencing and “defined access points”, similar to that of an urban park. This new fencing and defined access would decrease the permeability of the Wildlife Area’s edges, protecting the wildlife and sensitive species therein, and limiting unmonitored entry and exit.


Poorly located bi-rail fencing currently allows cars to informally pull off into the SBWR from Burbank Blvd.

‘We suggest a passive enforcement strategy, one that relies on durable fencing and “defined access points”, similar to that of an urban park.’


Central Park Fencing, photo courtesy of di_the_huntress on Flickr


Hyde Park fencing defines user access, creates legible space, photo credit unkown

SBWR WILDFIRE RESILIENT HABITAT PLAN

Proposed Fencing Description

The SBWR lies at the nexus of the 405 and 101 freeways. Burbank Blvd. and Woodley Ave. comprise the south and west edge of the “North Reserve” of the SBWR, respectively. Burbank Blvd. borders the north edge of the South Reserve, with the Sepulveda Dam and the Los Angeles River forming its south and west edge. The off ramp of the southbound 405 Fwy. (at Burbank Blvd) arrives at a small parking lot that “informally” opens directly into the southeast corner of the North Reserve (see images on right).

Importantly, no formal path down to the Wildlife Area exists from this lot and no signage indicates it to be a legitimate access point, although many people use this for entry to the SBWR. One can barely make out the existing signage through graffiti scrawled across and scraped off over the years. A new sign declares “NO USE AFTER SUNSET OR BEFORE SUNRISE’’, but there is no gate on this lot, and no enforcement then,

or during the day, of illicit activities. A paved, and little-used (by vehicles) access road runs from the lot, along the levee top following the eastern edge of the North Reserve (i.e., between the SBWR and the 405 Fwy.). The public now uses this access road as a walking path.


Existing ‘gate’ at 405 Fwy. & Burbank Blvd


Inadequate & broken fencing at southeast corner of North Reserve

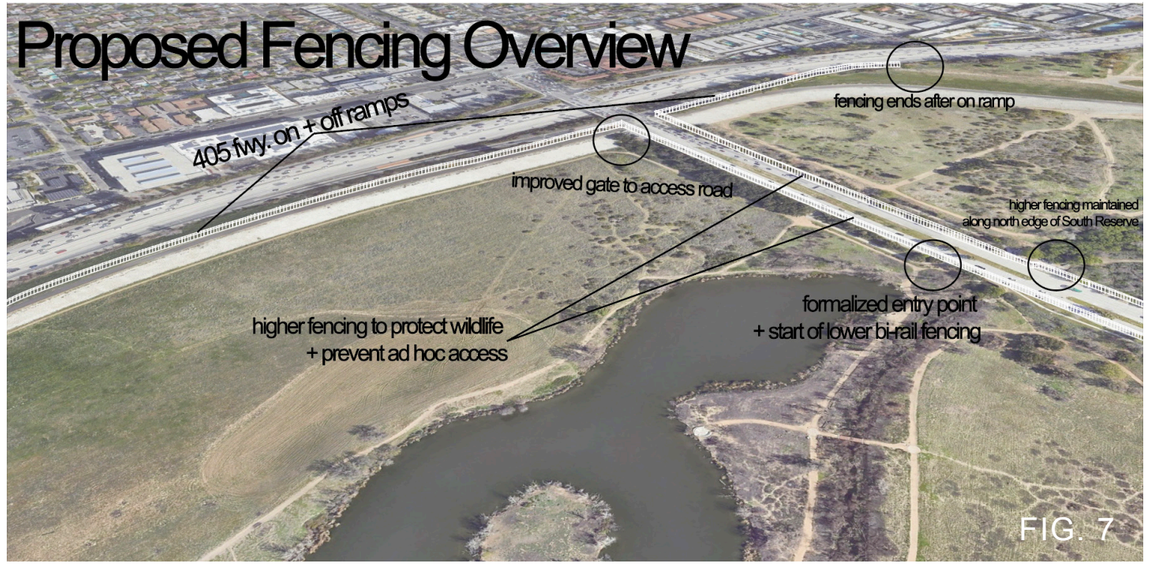
Defined Access & Human Use

Because the area immediately beneath the parking lot is a hotspot of encampment and illicit use (including drug-dealing and using), fencing this area would better define the terms of use of the site, even in the absence of good signage, or signage lost to graffiti. Perhaps most importantly, the newly forming seasonal wetlands would have a fair chance at establishing. With proper access defined, a naturally more sustainable, fire-resistant community could develop.

Along Burbank Blvd., recommended fencing would continue until the corner of Woodley Ave., where a cement monument and existing signs denote a main entrance into the North Reserve (now rarely-visited, because no nearby parking is available here). The existing bike lane would not be affected.

Recommended fencing would then run north along the eastern edge of the North Reserve, protecting the newly-forming seasonal wetlands and its species. In the South Reserve, it would also run from the 405 Fwy. (southbound) on ramp, and west along the south side of Burbank Blvd. Since there is no clear entrance into the South Reserve on the south side of Burbank Blvd. currently, we do not recommend adding it - a small number of cars park at the edge of the South Reserve, having simply pulled off along Burbank Blvd. (under clear “No Parking” signs). Evidence of fires are frequent along this particular edge, and it has emerged as one of the most popular trash-dumping (and burn pit) sites in the SBWR.

Faded Sign with Graffiti



We do not recommend new fencing along Woodley Ave., as this area is heavily-used by “legitimate” park users, typically for walking, birding, and jogging. We do, however, recommend not adding new shrub and tree vegetation here, as it is currently the main “cruising area” of SBWR, with open prostitution occurring in the dense mulefat and coyote bush scrub vegetation and under planted oaks here (east side of Woodley Ave., just north of Burbank Blvd.).

The proposed fencing and creation of seasonal wetlands at SBWR serves a twin purpose. First, it would directly block ignition sources, such as tossed cigarettes and bonfires set to trash piles. It would also reduce the available areas for litter-dumping (along major roads) and the ease of setting up (and moving to and from) encampments, which is now unimpeded by fencing or other barriers. Shallow, seasonal flooding would further encourage currently unhoused residents to migrate their shelters to drier ground in the area (which there is plenty of and closeby), while posing no danger to their wellbeing.

Woodley Ave. & Burbank Blvd.

FIG. 8

The corner of Woodley Ave. & Burbank Blvd. , imagined post-restoration, with wetlands formed, appropriately placed fencing, legible signage, and impoved paths for pedestrians and bicyclists.

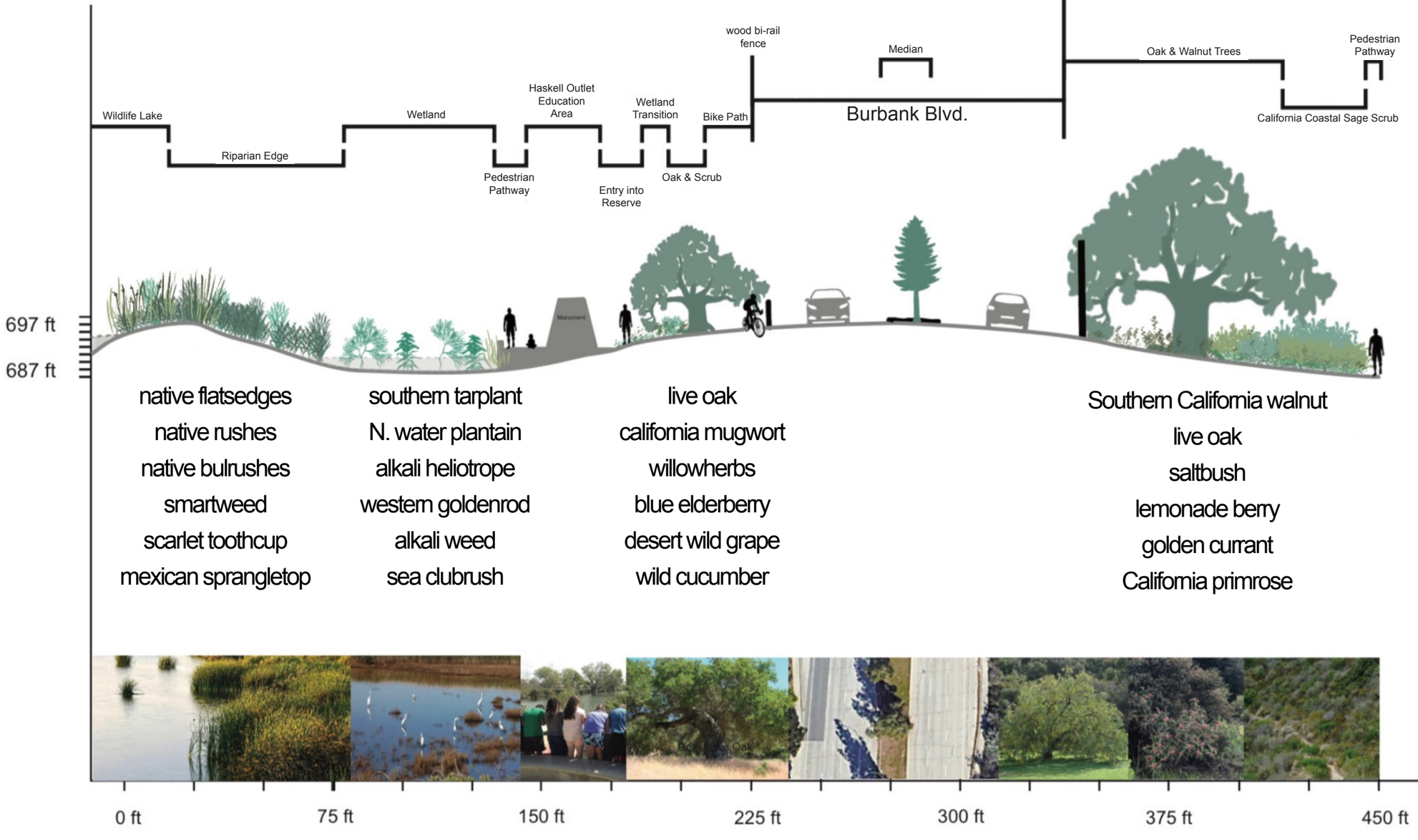
Burbank Blvd. & 405 Fwy. On & Off Ramps

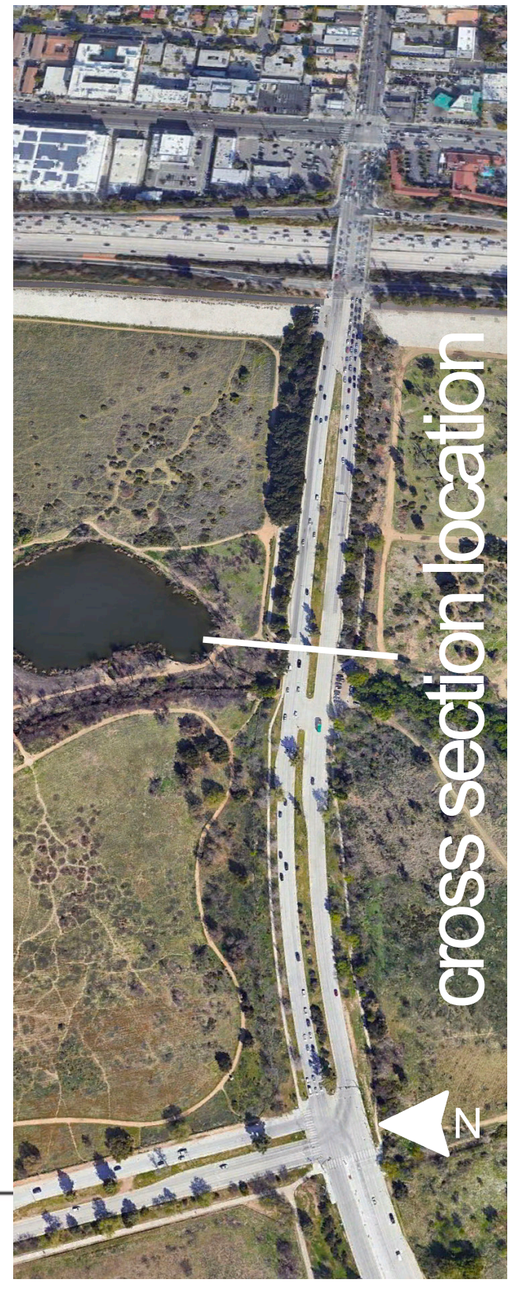
FIG. 9

The intersection of Burbank Blvd. & the 405 on and off ramps imagined post-restoration, with appropriate fencing, gates, legible signage, and fire resilient habitat established.

Cross Section of North & South Reserve at Burbank Blvd.

FIG. 10





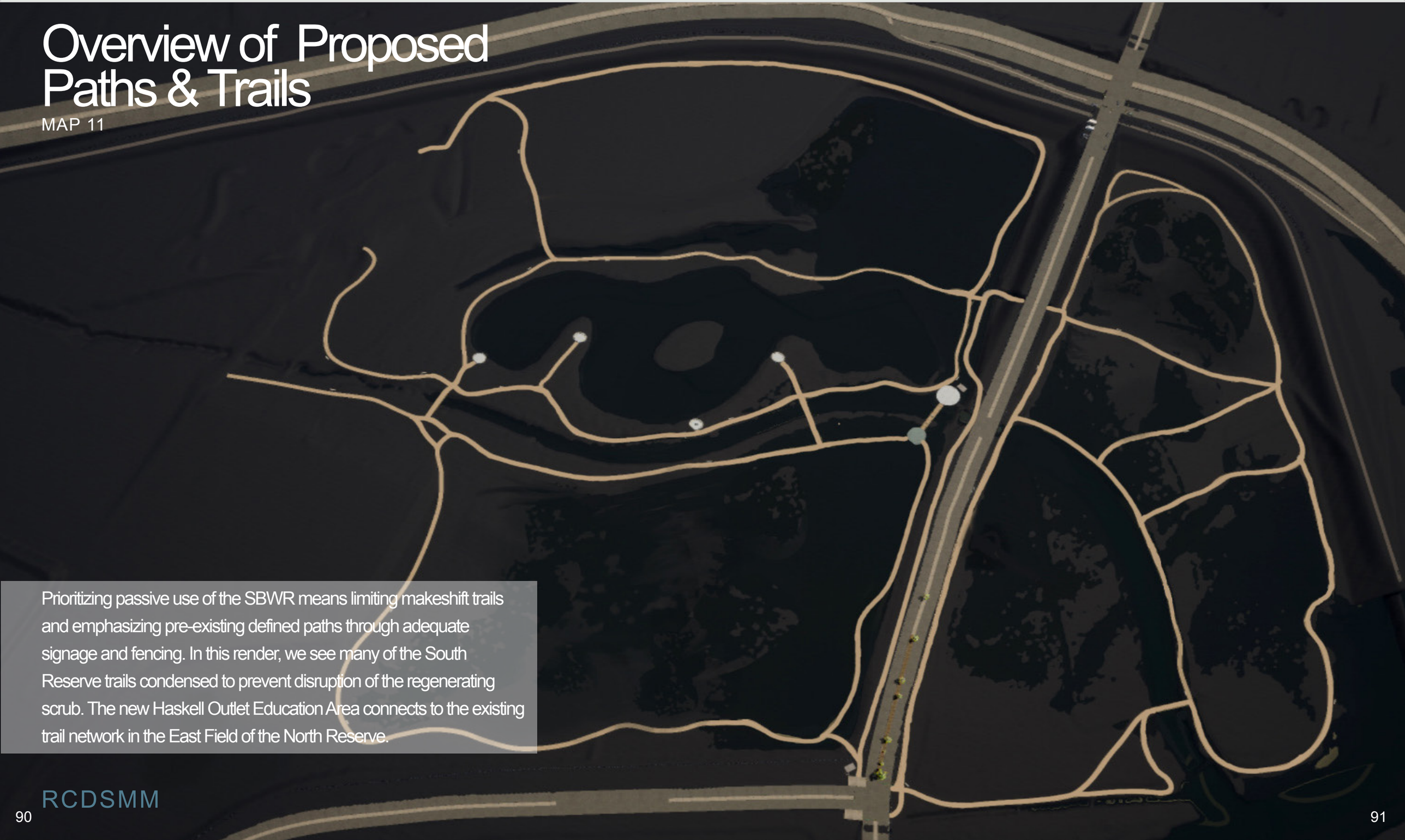
Haskell Outlet Education Area

FIG. 11

A new education area imagined near the Wildlife Lake's Outlet into Haskell Creek, welcoming visitors as they enter the North Reserve on Burbank Blvd. Fencing protects the establishing wetlands and raised pedestrian pathways clearly direct movement.

Overview of Proposed Paths & Trails

MAP 11



Prioritizing passive use of the SBWR means limiting makeshift trails and emphasizing pre-existing defined paths through adequate signage and fencing. In this render, we see many of the South Reserve trails condensed to prevent disruption of the regenerating scrub. The new Haskell Outlet Education Area connects to the existing trail network in the East Field of the North Reserve.

Next Steps

Necessary further study includes:

A Phase 2 with Balance Hydrologics and The River Project to investigate infiltration and evapotranspiration rates in the prescribed immersion zones.

Continued dialogue with the Donald C. Tillman Reclamation Plant and LADWP, detailed plumbing proposals, and water budget breakdowns.

With the Sepulveda Basin Vision Plan already incorporating key elements of this plan, advocating for its execution in the projects first phases also appears a clear next step.

In the immediate future, however, it is our reccomendation that soil moisture anomaly levels are monitored closely, as the predictive pattern for wildfire occurance seems to have already taken shape. And in this interim before prescribed immersion may reduce wildfire risk, weed management protocols must be implemented in high fire risk zones as soon as possible.

CONCLUSION

Engaging Balance Hydrologics and The River Project for refinement and schematic design, RCDSMM garnered feedback from stakeholders and collaborated with the City of Los Angeles' Sepulveda Basin Vision Plan to integrate their work into parallel planning initiatives.

Building upon the UCLA IOES Practicum Report's fuel management recommendations and The River Project's invaluable work in their Feasibility Report, RCDSMM utilized data from NASA's SMAP mission to investigate the relationship between soil moisture anomalies and fire occurrence within the Reserve.

The prescribed immersion plan, using reclaimed water, aims to create temporary seasonal wetlands, strategically targeting ignition sources and discouraging encampment in highly flammable areas. Concurrently, the plan works towards type-converting such areas into more permanently fire-resilient habitats, offering safer shelter for those seeking refuge. Defined access through fencing and proper signage will draw people to enjoy the reserve safely.

By fusing efforts and aligning with existing funding opportunities, the path to physical implementation of the plan has been paved.

A video showcasing the 3D concept design model may be found at RCDSMM.org

References

Cooper, D.S., R.A. Hamilton, C.J. McCammon and B. Demirci. 2022. Biological resources and report for “Baseline dry season in-channel vegetation mapping” Los Angeles River (and selected reference sites). Prepared for Watershed Conservation Authority, Azusa, CA. Feb 28, 2022.

Corday, Jackie. 2022.“Restoring Western Headwater Streams with Low-Tech Process-Based Methods: A Review of the Science and Case Study Results, Challenges, and Opportunities.” American Rivers, November 2022.

Ethington, Philip J., et al. 2020. “Historical Ecology of the Los Angeles River Watershed and Environs: Infrastructure for a Comprehensive Analysis.” Report to the John Randolph Haynes and Dora Haynes Foundation, June 15, 2020, Spatial Sciences Institute, University of Southern California, Los Angeles. Accessed 7 June 2023, https://cawaterlibrary.net/wp-content/uploads/2020/06/ethingtonhaynesfinalreportcompressed-1.pdf.

Hartman, Steve. 2018 .“Sepulveda Basin Wildlife Reserve: A World-Class Urban Refuge.” Fremontia, Journal of the California Native Plant Society, vol. 46, no. 1, May 2018.

Krueger, Erik S., et al. 2023.“Using Soil Moisture Information to Better Understand and Predict Wildfire Danger: A Review of Recent Developments and Outstanding Questions.” International Journal of Wildland Fire, vol. 32, pp. 111-132.

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Rust, Brad. 2015.“Healthy Soils: The Promise For the Future.” USDA Forest Service, U.S. Department of Agriculture, March 2015. Accessed 10 May 2023, https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3834308.pdf.

Sazib, Nazmus, et al. 2021. “Leveraging NASA Soil Moisture Active Passive (SMAP) for Assessing Fire Susceptibility and Potential Impacts over Australia and California.” IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, vol. PP, pp. 1-1. doi:10.1109/JSTARS.2021.3136756.

Schaefer, A. J., and Magi, B. I. 2019. “Land-Cover Dependent Relationships between Fire and Soil Moisture.” Fire, vol. 2, no. 4, p. 55. https://doi.org/10.3390/fire2040055.

Valach, Anna C., et al. 2021. “Productive Wetlands Restored for Carbon Sequestration Quickly Become Net CO2 Sinks with Site-Level Factors Driving Uptake Variability.” PLOS ONE, vol. 16, no. 3, article e0248398. doi:10.1371/journal.pone.0248398.