URBAN ECOLOGY AND RESILIENCE

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DEFINITIONS

Urban: No single definition, but a combination of population density, built infrastructure, and land use.

Novel ecosystem: "differ in composition and/or function from present and past systems" *

Introduced species: species brought by human activity, intentionally (e.g. via horticulture) or unintentionally

- *includes but ≠ invasive species*

* Novel ecosystems: implications for conservation and restoration, Richard J.Hobbs, Eric Higgs,James A.Harris, Trends in Ecology and Evolution, 2009

WHY PROTECT URBAN ECOSYSTEMS?

They play an important role in local, regional, and global biodiversity

They can reduce impacts of climate change by mitigating heat and weather impacts – as well as sequestering carbon

Most people on the planet live in cities

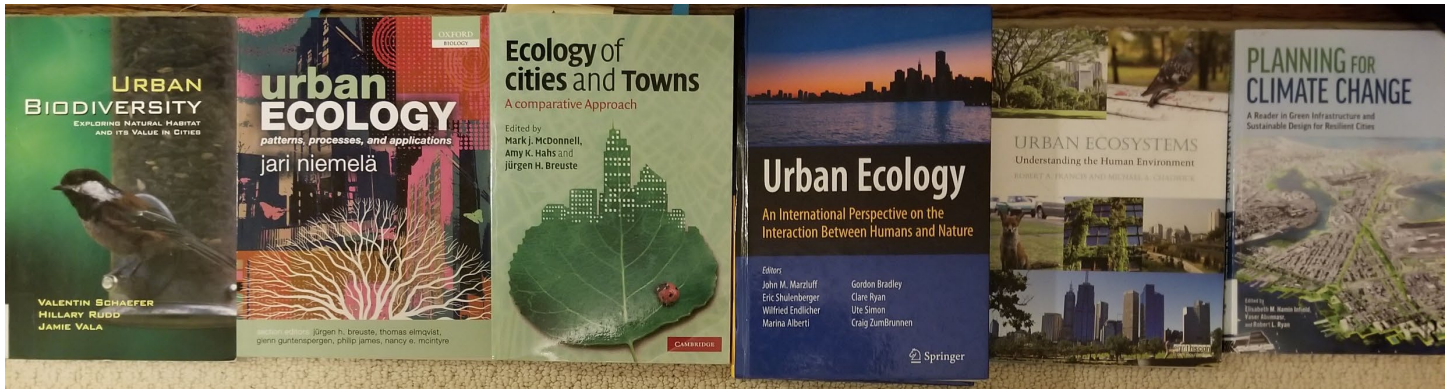
- They hold political influence over conservation
- They deserve benefits of access to nature
- Ecological degradation in urban areas affects human health and well-being globally health

URBAN ECOLOGY

Treats the city as a set of niches that support species and interactions

Relatively new as a field of study

Combines different fields to examine Socio-Ecological-Technological Systems (SETS)



URBAN ECOLOGY AND RESILIENCE

Urban ecology is the scientific study of the relationship between living organisms, including humans, in urban areas.

Changes to physical conditions in urban areas, as well as cultural factors, create novel ecosystems as native species and introduced species interact

Conservation to promote resilience may shift focus to supporting novel, ecosystems that function, rather than native biodiversity

RECOGNIZING URBAN ECOSYSTEMS – HABITAT MAPS

Maps show urban areas as grey, devoid of habitat

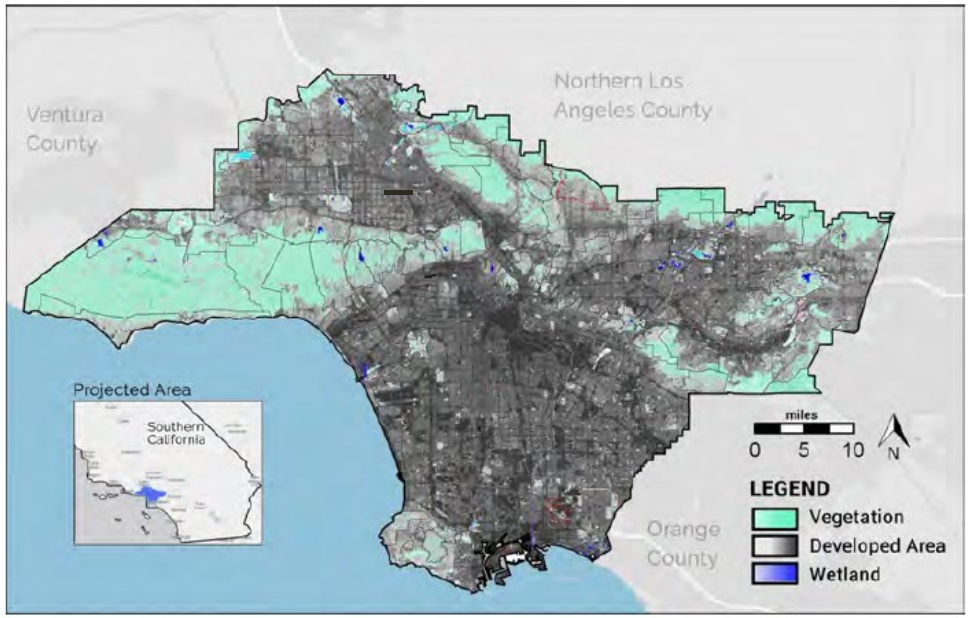


Figure: Study Area Map: Los Angeles County, South

UCLA IOES Practicum2015-16_NPS_Biodiversity_Indicators_Final_Report.pdf

OR, show historic vegetation or ecosystem types

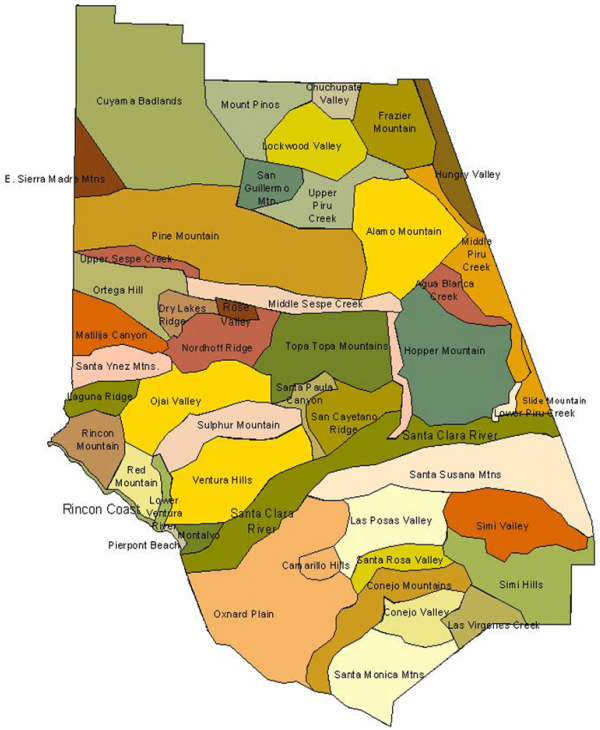


Figure 1. Biogeographic Regions of Ventura County, David Magney Biological Consulting

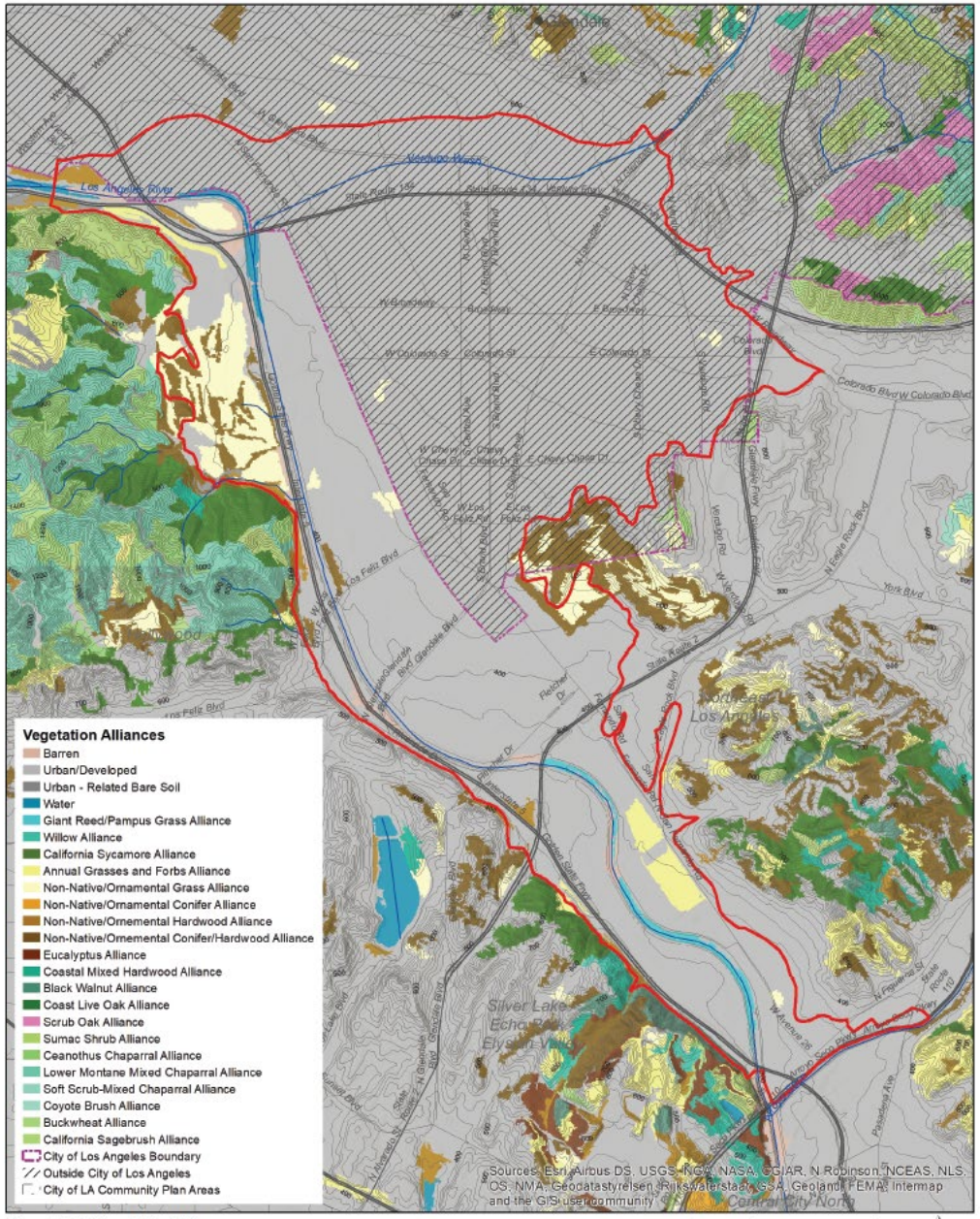


Figure 2-16: Vegetation Alliances
Data source: CALVEG. https://www.fs.usda.gov/detail/r5/landmanagement/resourcemanagement/?cid=stelprdb5347192

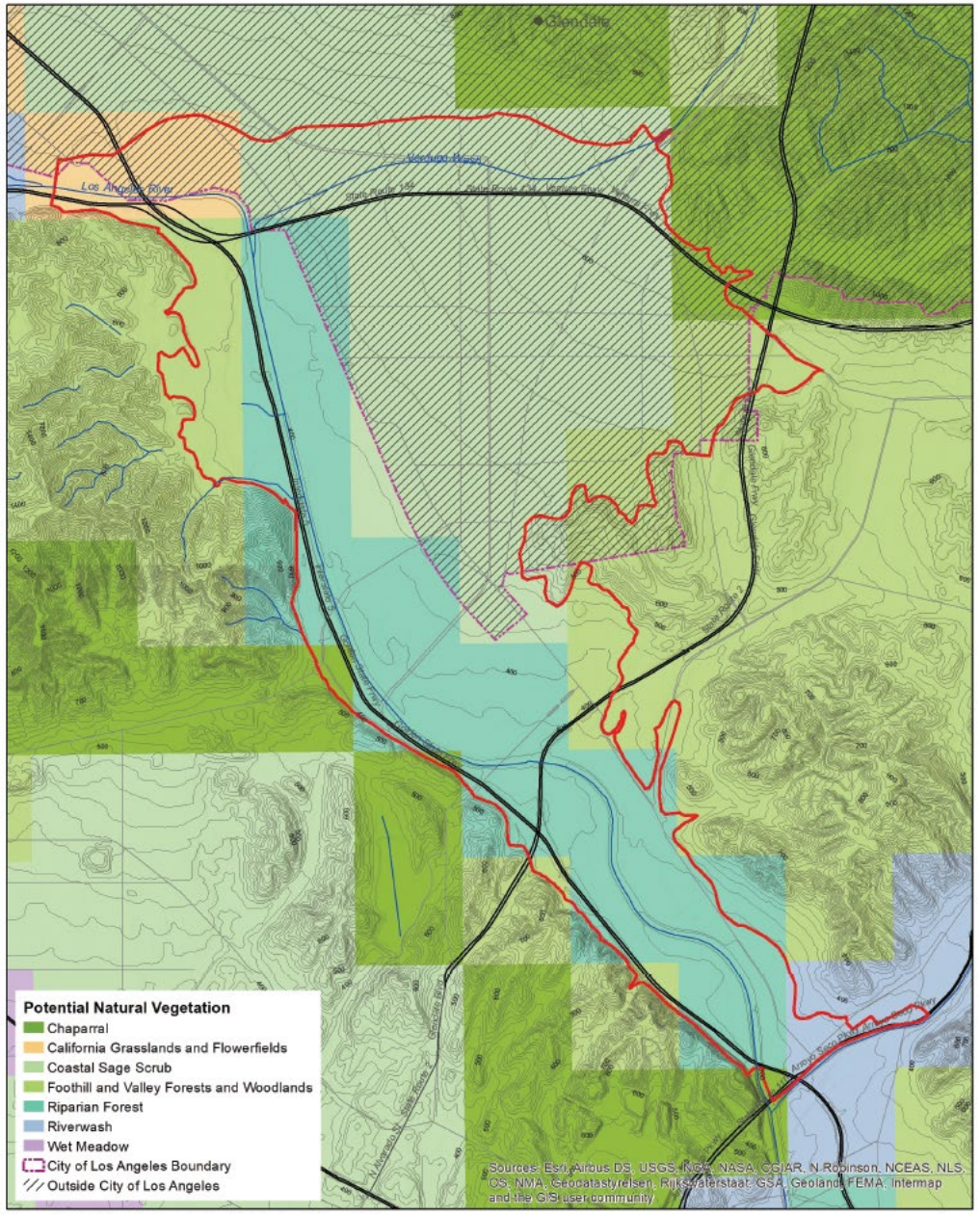


Figure 2-17: Hypothesized Potential Natural Vegetation
Data source: USC Spatial Sciences Institute/UCLA Institute of the Environment: Historical Ecology of the Los Angeles River Watershed Project.

Figures from City of Los Angeles. (2020). *2020 Biodiversity Report*. LA Sanitation and Environment.

ISSUES IN URBAN ECOLOGY

Protecting urban habitat and habitat connectivity

Providing equitable access to nature and natural resources

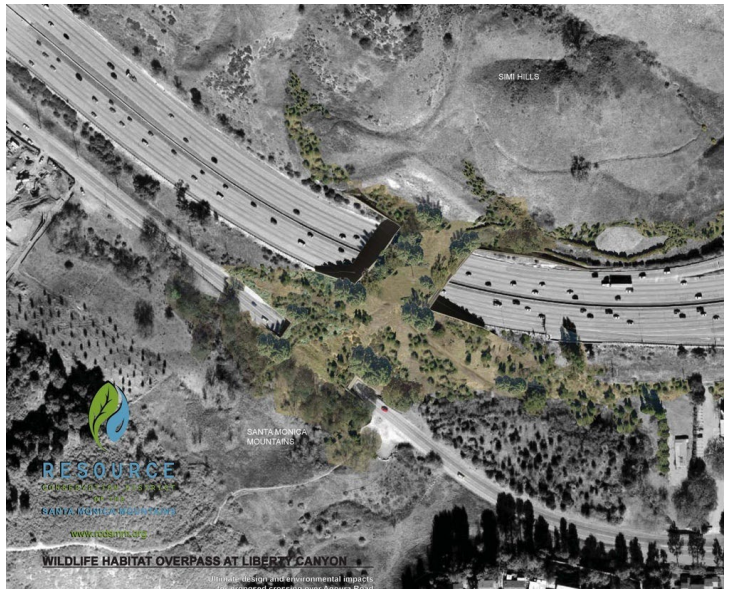
Using nature-based solutions and green infrastructure for ecosystem services

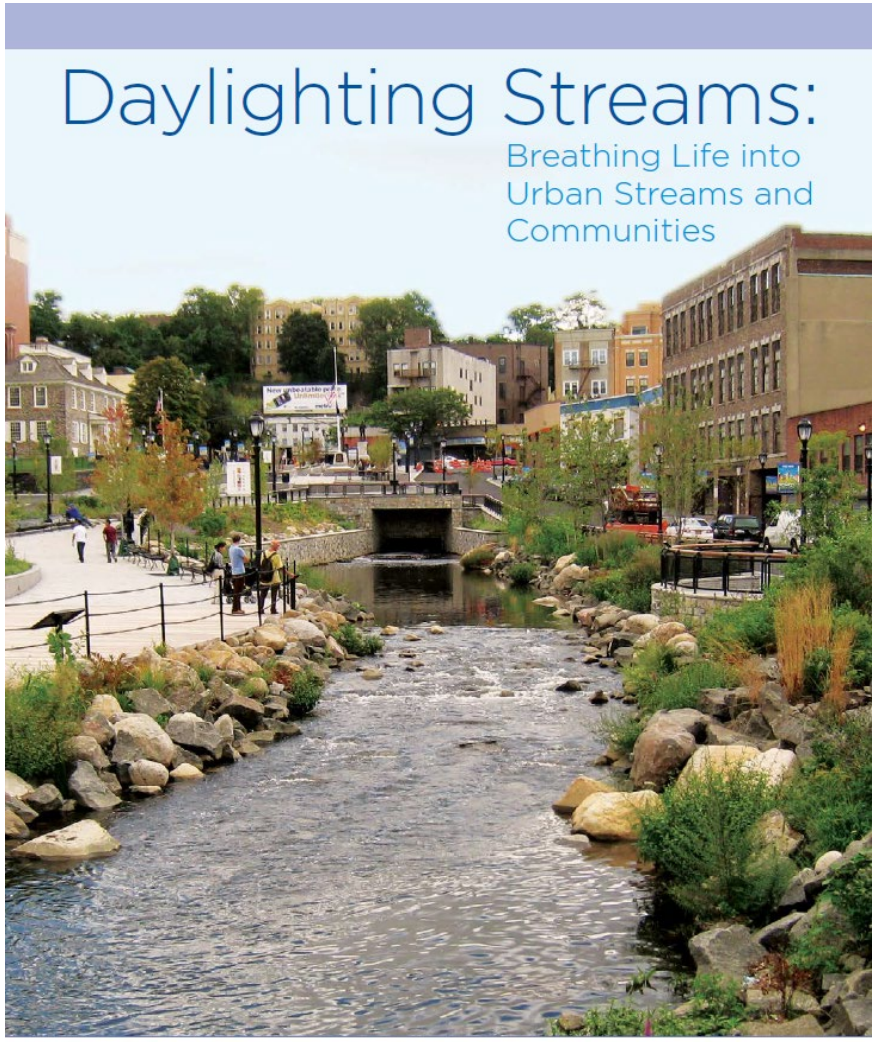
Bringing nature and biodiversity into urban planning

PROTECTING URBAN HABITAT

Protecting/restoring habitat connectivity

- Ability to move between areas





SUPPORTING URBAN HABITAT

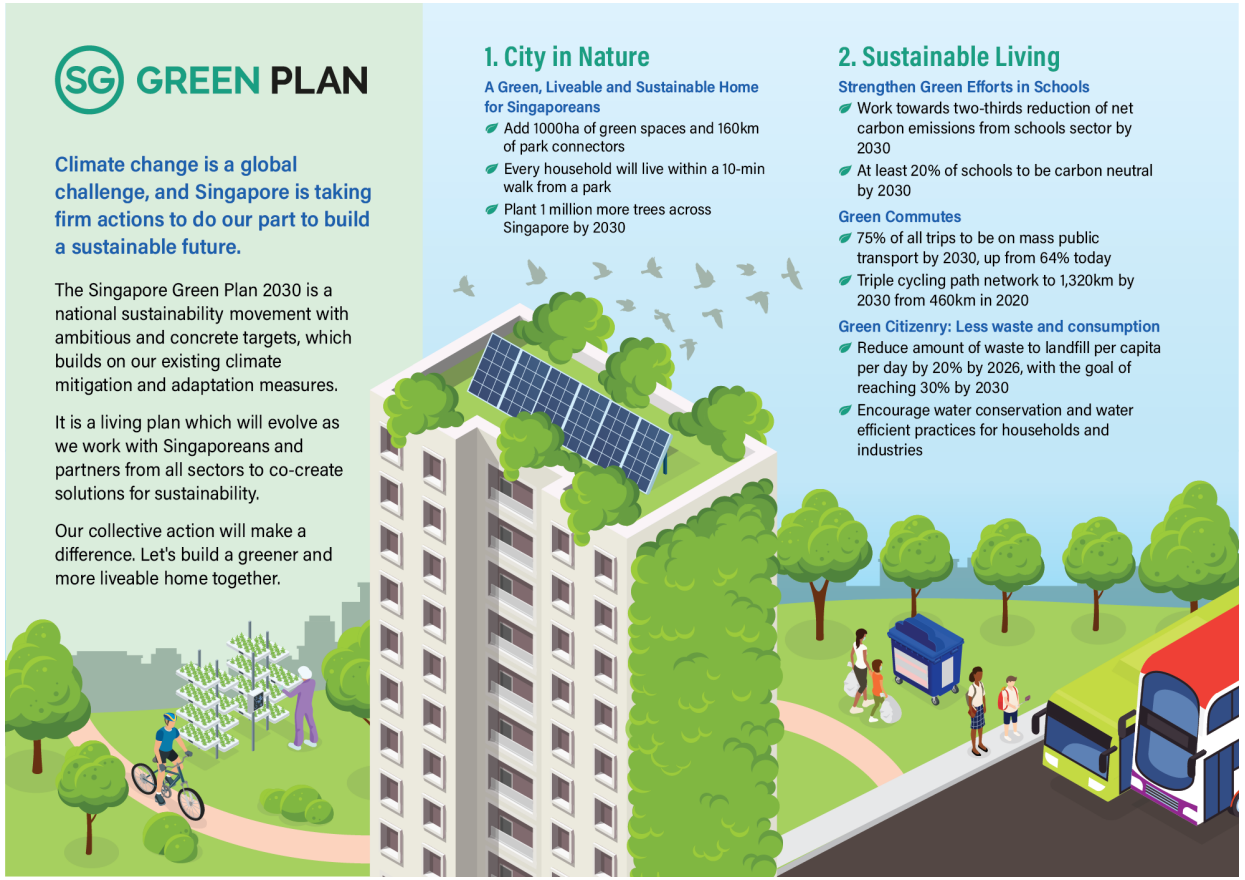
Clean-ups, invasive species management, pollinator support, native landscaping

NATURE BASED SOLUTIONS IN CITIES

Incorporating ecosystem services into urban planning

Using NBS to build climate resilience

Using nature to reduce stress (including during pandemic restrictions)



PROVIDING EQUITABLE ACCESS TO NATURE

In a diverse community, inequity can lead to instability

Nature access as a human need and right

Without equity in resource management, we lose a huge resource

Pictures: The Highline, NYC Parks; Thresher shark caught at Huntington Beach Pier, Let's Go Fishing; Chris Cooper, NYC Audubon; Connecting to Nature, National League of Cities

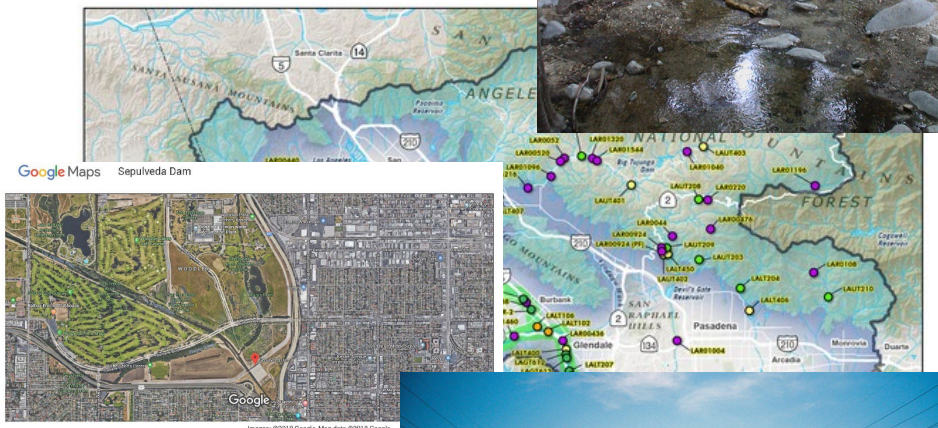
THERE ARE FISH THERE?
RECOVERING AQUATIC HABITAT IN THE LOS ANGELES RIVER

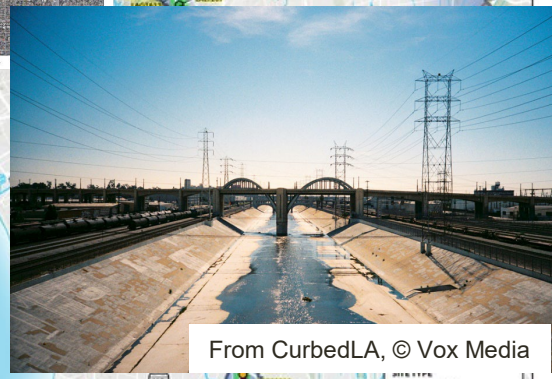
Dr. Sabrina Drill, UC Cooperative Extension
Rosi Dagit, Nina Trusso, Jennifer Mongolo, RCD of the Santa Monica Mountains
Andres Aguillar, CSU-LA
Camm Swift, Natural History Museum of Los Angeles (retd.,)
William Bowling, Friends of the Los Angeles River

LOS ANGELES RIVER

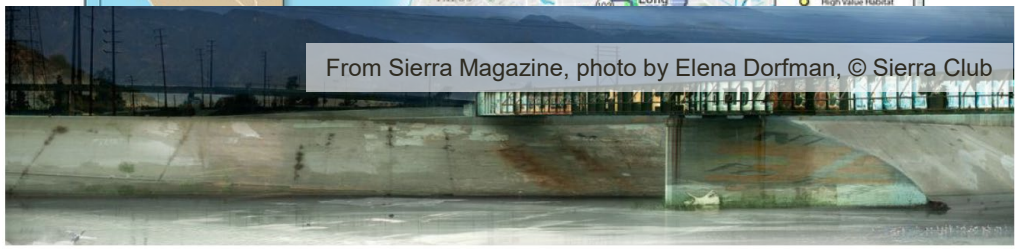
- Upper watershed Angeles NF
- Hydromodification: dams and channels
- Natural bottom in Glendale Narrows and Long Beach

- Slated for ~$2 billion restoration project
  - Restore connectivity and urban parkland
  - Driving a real estate boom/gentrification





From CurbedLA, © Vox Media



From Sierra Magazine, photo by Elena Dorfman, © Sierra Club

Efforts to Restore the Los Angeles River Collide With a Gentrifying City

L.A. paved over a riparian watershed; who benefits from its restoration?

WHAT HABITAT SHOULD BE THERE?

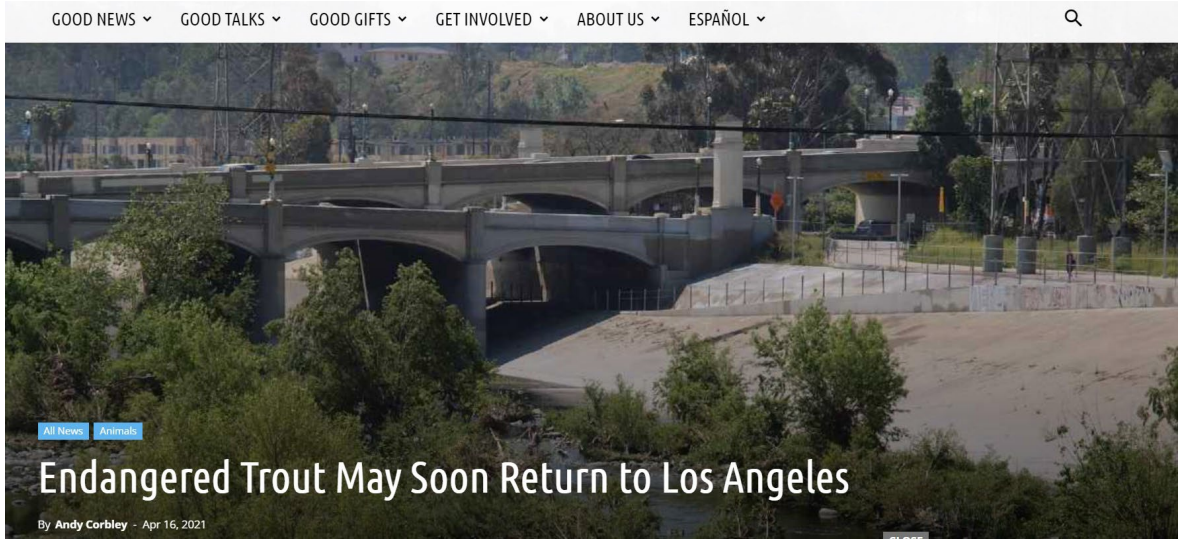
Historic condition

Physical realities

Human needs

- Clean water
- Recreation
- Food fish

FIG. 6.5. Twenty-five-inch steelhead trout caught in the river near Glendale in January 1940. Courtesy, family of Dr. Charles L. Hogue.



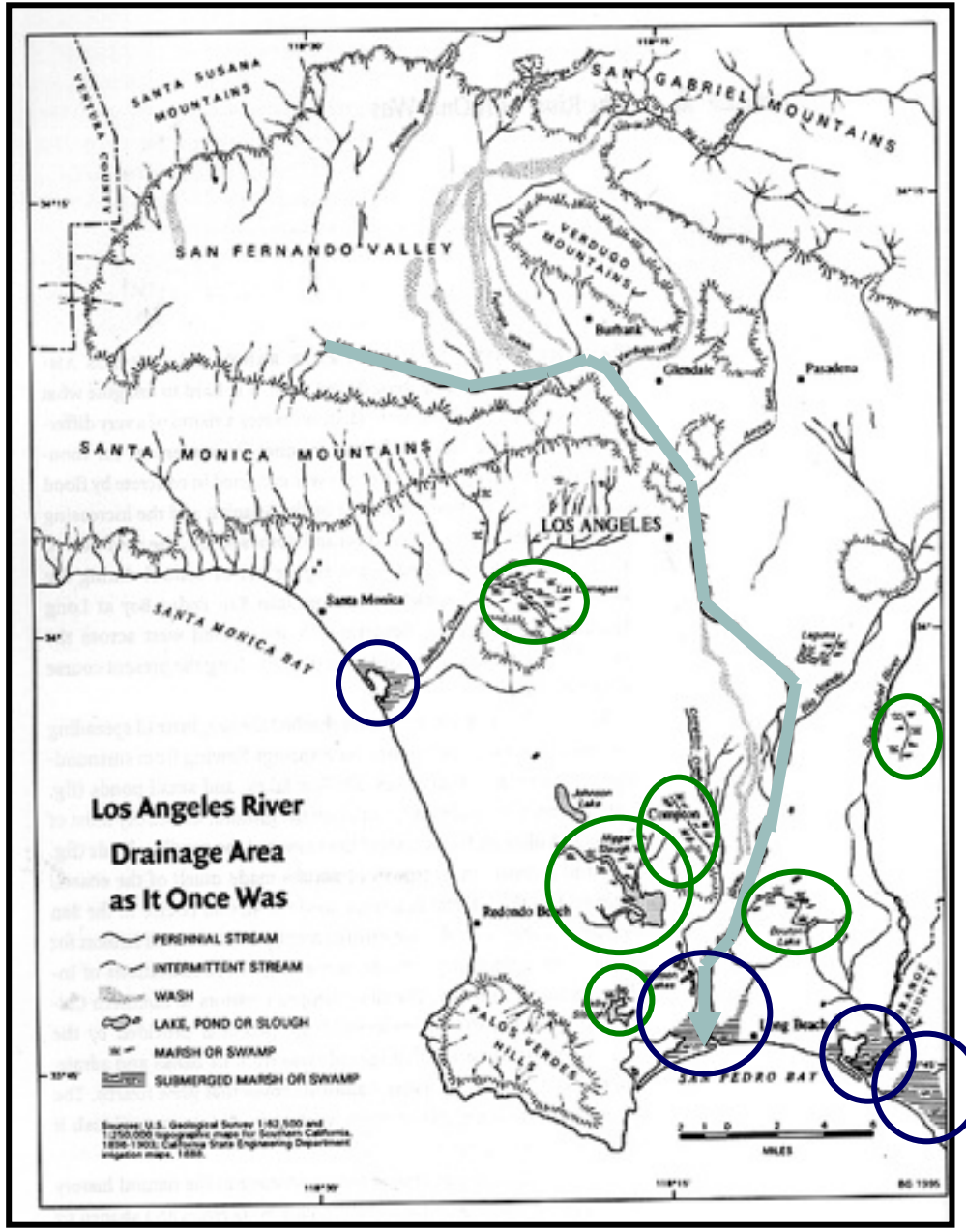


Image adapted from Gumprecht, 2001

CAN RIVER RE-DEVELOPMENT SUPPORT BIODIVERSITY, NATURAL RESOURCES, AND AVOID GENTRIFICATION?

Theoretical framework: “just green enough” (Wolch et. al 2014) - programs that explicitly protect social AND environmental values.

Can urban river restoration be “just blue enough” to enhance biodiversity balanced with ecosystem and cultural services in a way that does not drive gentrification?

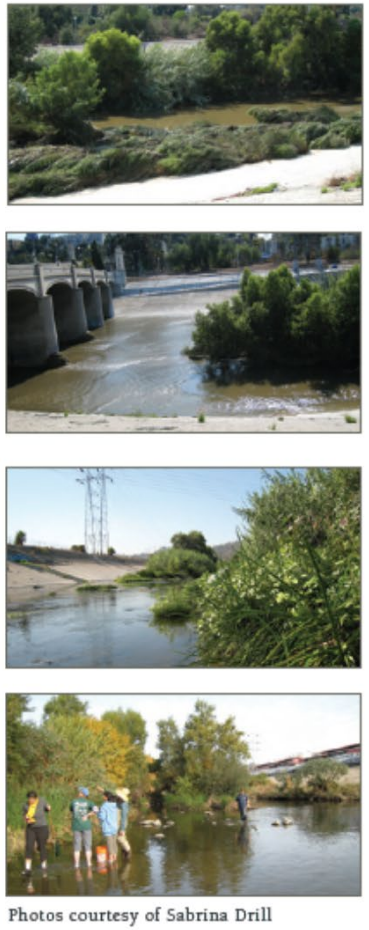
- Habitat
- Flood mitigation
- Groundwater recharge
- Food fishery
- Passive recreation: hiking, birdwatching and biking,
- Active recreation: soccer fields, kayaking, fishing

WHAT FISHES ARE FOUND IN THE LA RIVER?

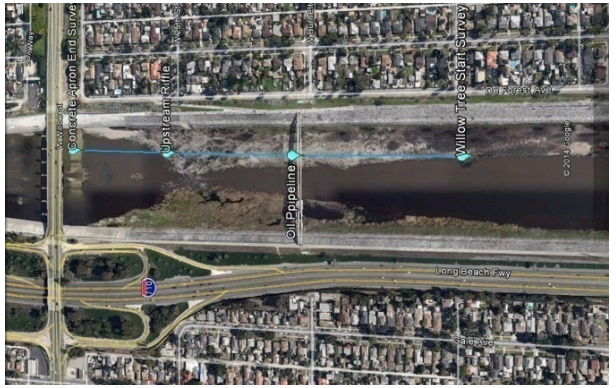
Glendale Narrows
2008

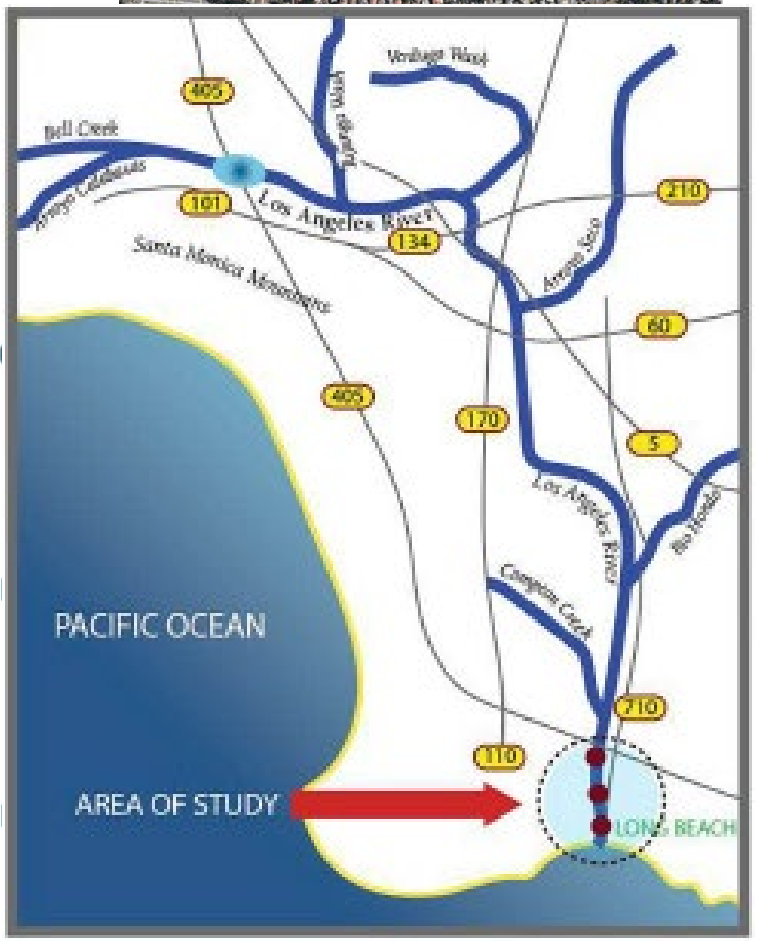
2014-2018

- Lower LA/Estuary
- CSU-Los Angeles Class Surveys Glendale Narrows/Bowtie
- Sepulveda Dam (upper middle)

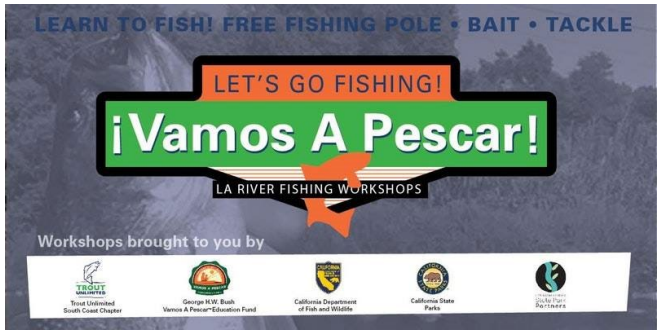


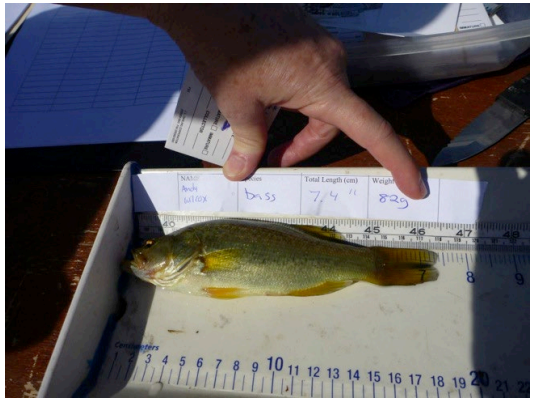
Photos courtesy of Sabrina Drill





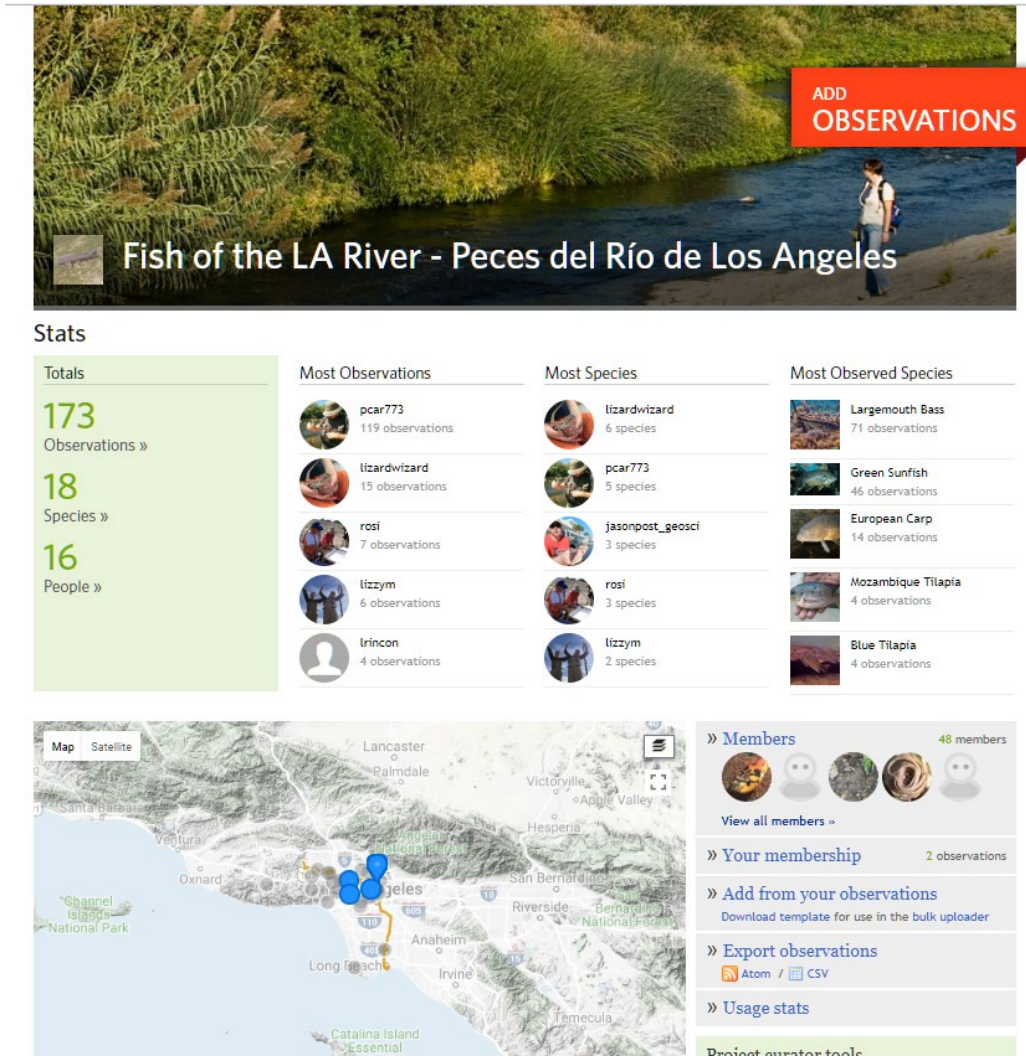
ENGAGING COMMUNITIES: VOLUNTEERS AND FISHING DERBIES





Images, R-L: Off tha'Hook derby logo, Friends of the Los Angeles River; Vamos a Pescar, CA State Parks; OTH Fishing Derby, S. Drill; Long Beach Casting Club Members at a volunteer fish survey day, S. Drill; Fishing in the LA River, Jim Burns/lariverflyfishing.com; Largemouth bass caught at fishing derby, S. Drill

INATURALIST



RESULTS

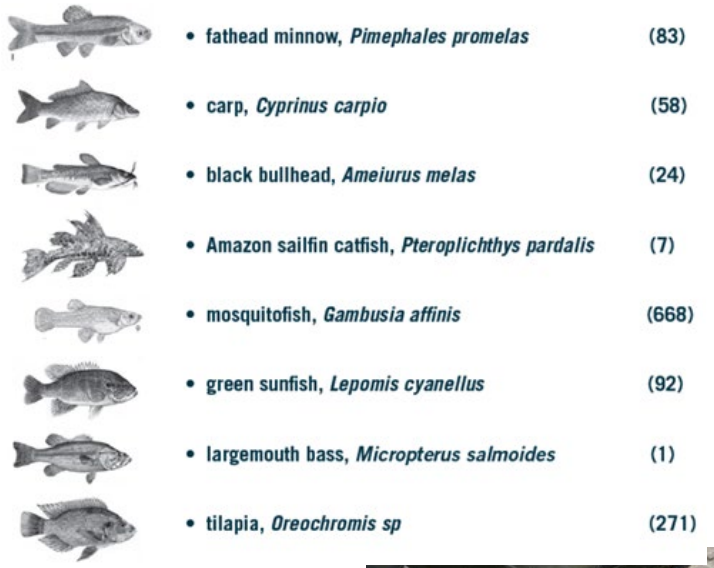
18 taxa, 14 non-native

- 3 estuarine native, 1 FW native (n >5600)

Healthy, large population

Few native species:

Predominantly warm perennial water fish community



TEMPERATURE PROFILE

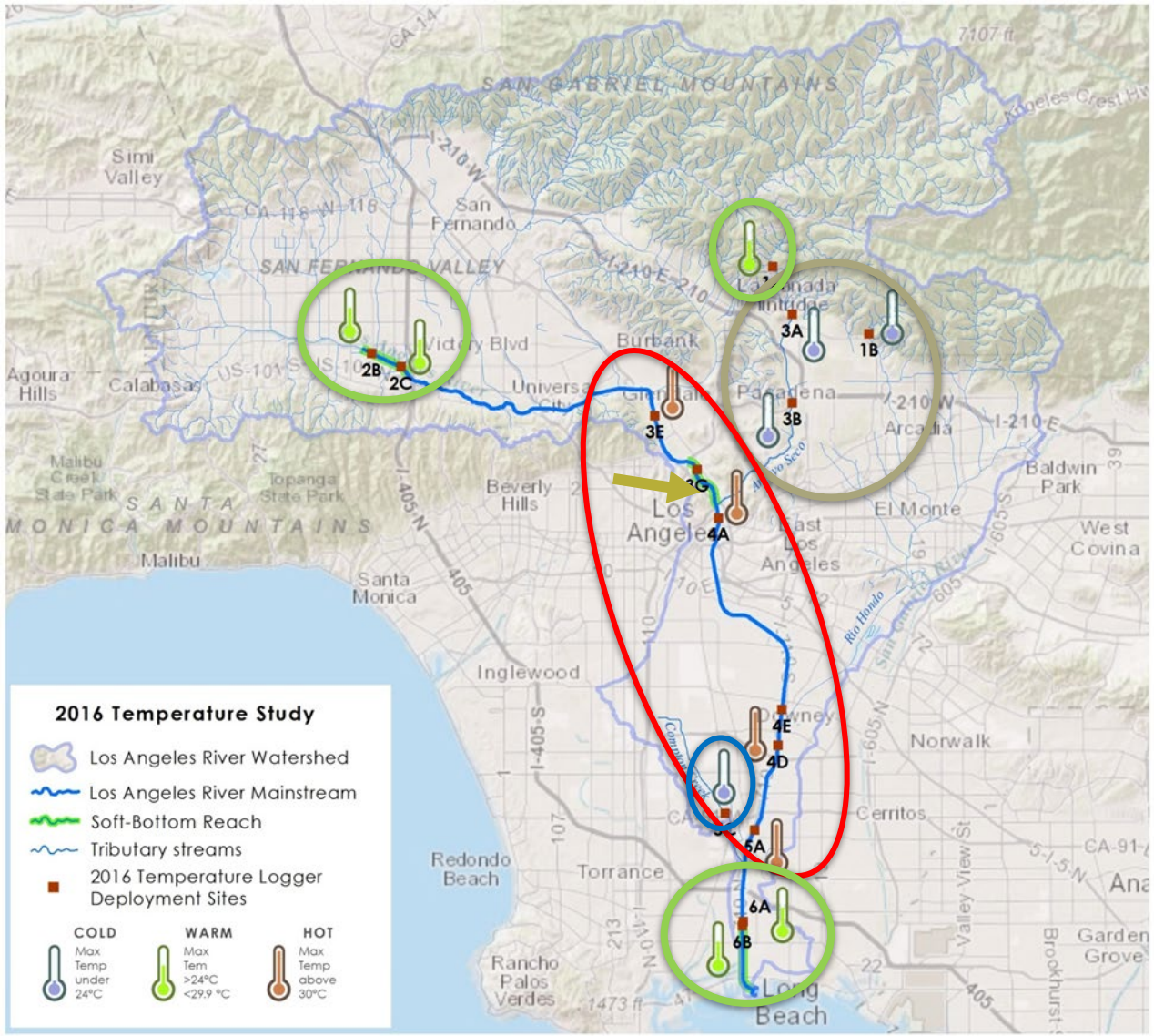


Figure from Mongolo, J., Trusso, N., Dagit, R., Aguilar, A., & Drill, S. L. (2017). A Longitudinal Temperature Profile of the Los Angeles River from June through October 2016. *Bulletin, Southern California Academy of Sciences*, *116*(3), 174–192. https://doi.org/10.3160/soca-116-03-174-192.1

WHO IS RESTORATION/REVITALIZATION FOR?

Images: The La Kretz Bridge in Atwater; the proposed 2750 Casitas development in Glassel Park; new lofts in Frogtown. All from CurbedLA, https://la.curbed.com/

Homelessness and the LA River

Source: LA River Master Plan 2020

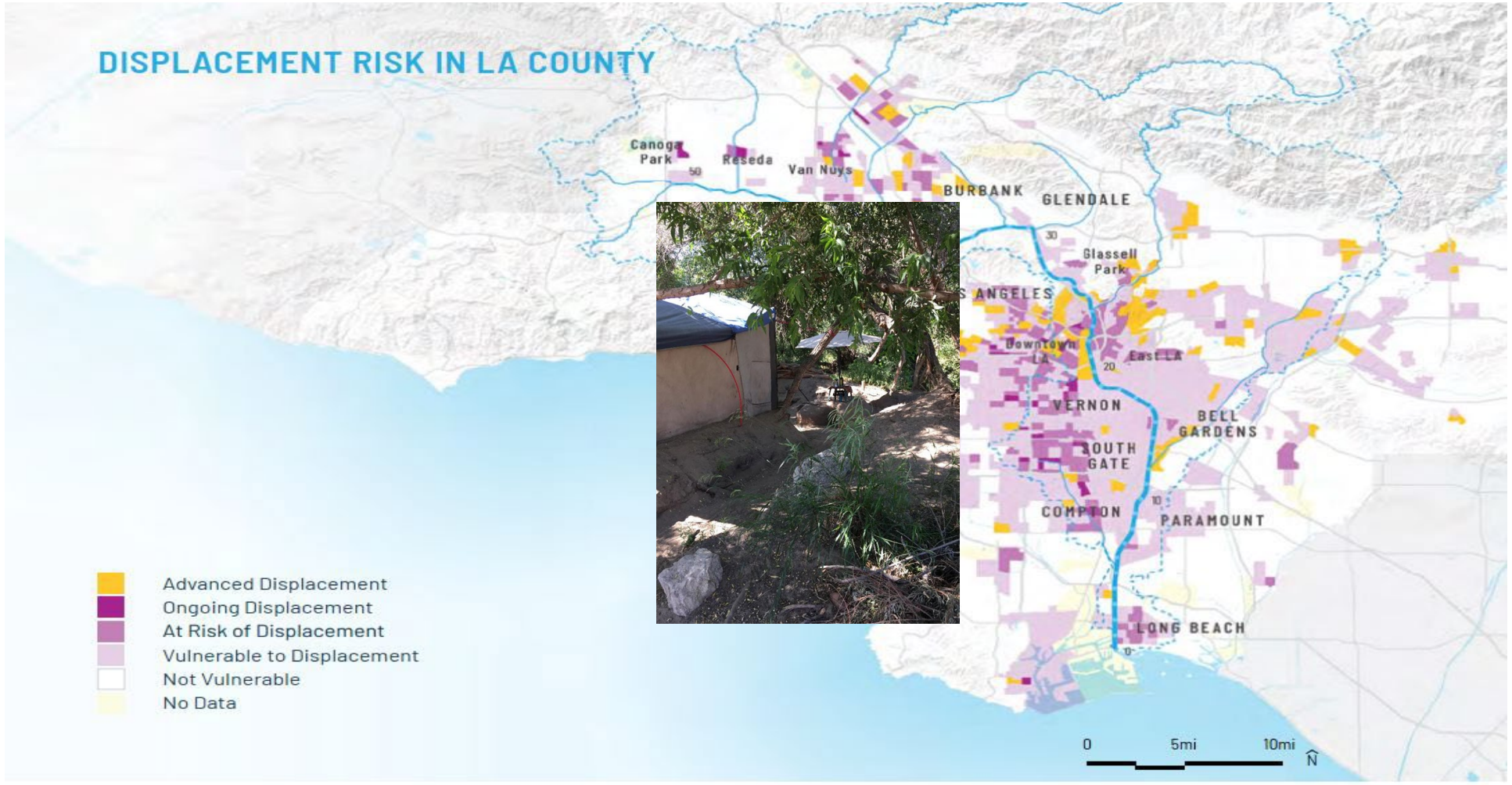
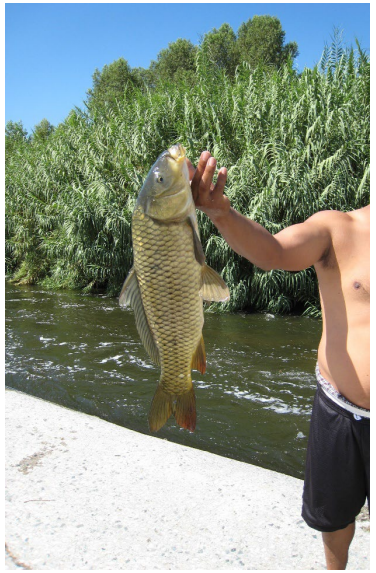
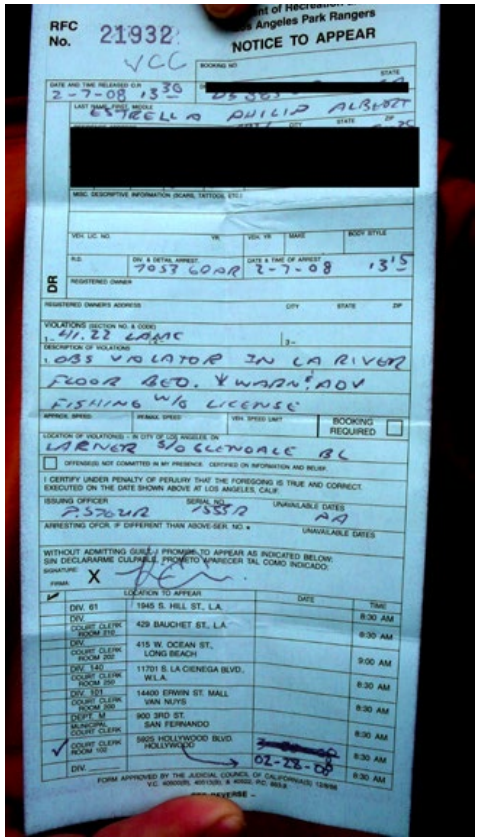


Figure 85. Displacement Risk in LA County. Displacement risk is most pervasive between Downtown LA and Long Beach. This map was developed based on research by the Urban Displacement Project. Source: Chapple, K., Loukaitou-Sideris, A., Waddell, P., Chatman, D., & Ong, P. (2017). Developing a New Methodology for Analyzing Potential Displacement.

Fishing on the LA River





Violation	Statute	Class*	Total Bail and Maximum Penalty**	Level
Trespass (waterways closed to public access - Ex. flood control channels)	CA Penal Code § 555 et seq.	Misdemeanor, Infraction	$1000 fine and 6 months imprisonment***	State
Unlawful taking or possessing of fish or wildlife	CA Fish and Game Code § 2000 (a)	Misdemeanor	$890 and 1 year imprisonment	State
Importing/taking/possessing any rare or endangered animal	CA Fish and Game Code § 2080	Misdemeanor	$1300 and 1 year imprisonment	State
Fish of indeterminate size	CA Fish and Game Code § 5508	Misdemeanor	$1095 and 1 year imprisonment	State
Each additional fish of indeterminate size	CA Fish and Game Code § 5508	Misdemenaor	$82 and 1 year imprisonment	State
Taking or possession of fully protected fish	CA Fish and Game Code § 5515 (a)	Misdemeanor	$2120 and 1 year imprisonment	State
Fishing without a license	CA Fish and Game Code § 7145	Infraction	$485	State
Unlawful taking of animal	CA Fish and Game Code § 12003.1 (a)	Misdemeanor	$1095 and 1 year imprisonment	State
Fishing methods with 2 poles	14 CCR § 2	Misdemeanor, Infraction	$890 and 1 year imprisonment	State
Fishing methods with net	14 CCR § 2	Misdemeanor, Infraction	$1300 and 1 year imprisonment	State
Take of Southern California Steelhead (*O. mykiss*)	16 USC 35 § 1531 et seq.	Misdemeanor	$50,000 and 1 year imprisonment	Federal

*Violations charged as infractions do not carry jail sentences
**Total Bail Includes Base Fine, Penalties, Court Fees
*** Only base fine mentioned

Sources: LACoDPW Signage, California Fish and Game Code §12000, US Endangered Species Act §11 (a-b), California Uniform Bail Schedule (Judicial Council of California, 2019)

NATURALIST PARTICIPATION IDEAS

Interpret urban ecosystems for communities

- Lead an urban hike or kayak

Engage with environmental and climate planning

- Attend or help organize community meetings etc.

Participate in or help coordinate

- clean-ups/maintenance
- tree planting and invasive species removal
- energy or climate risk community audit
- bike/walk friendly community mapping

Educate about green infrastructure

- Install a rain garden or other stormwater BMP

Foster participation in science:

- participate in, generate, train others https://calnat.ucanr.edu/California_PPSR
- Train community members to access water quality or climate data

Promote environmental equity and justice

- Connect with members of underheard communities
- Share information about input opportunities