Santa Monica Mountains Conservancy
Proposition 1 Urban Creek Funding

PROJECT DETAIL

The Nature Conservancy's
Los Angeles River Stormwater Capture and Habitat Enhancement Project
(Planning and Design Phase)

To facilitate project scoring, this document describes how the Project addresses the 13 grant application components articulated in Section 4.1 of the "Proposition 1 Competitive Grant Program Guidelines" dated September 25, 2017, in addition to the extra components required for urban creek funding proposals. Each of the components is shown below in **bold**.

1) A detailed scope of work, including a list of specific tasks; a detailed budget; and a timeline for project implementation (including a completion date for each task)

SCOPE OF WORK (INCLUDING SPECIFIC TASKS):

- Survey, Utilities Evaluation, Geotechnical Investigations will be conducted by a consultancy team hired by The Nature Conservancy (hereafter TNC). Specific tasks will include:
    - Perform a design survey of the Project site and surrounding vicinity
    - Prepare ortho-rectified photography and a design survey base map
    - Note above-ground structures such as walls, fences, driveways, and sidewalks, as well as boundaries such as property lines, easements, right-of-ways, and streets in the ground survey
    - Take up to ten survey points along the storm drains and other surface water runoff infrastructure to assess inverts of pipes and gutters, crowns of pipes, and ground surface elevations in the Project vicinity
    - Review available relevant utility information provided by the City and or State and utility owners
    - Contact each utility owner listed by Underground Service Alert (USA) to gain a better understanding of the type and location of all utilities passing near and beneath the Project site

- Review information received from utility owners for potential conflicts with the proposed project design and incorporate into the base map
- Conduct geotechnical investigations, including additional focused borings and laboratory testing for shear strength, consolidation, index testing, and/or Proctor testing, to support major Project design elements
- Produce a geotechnical report covering liquefaction analyses and predicted seismically-induced settlement at the Project site and include foundation recommendations for underground structures, recommendations for earthwork and shoring criteria, and estimated groundwater elevation impacts due to proposed and/or incidental infiltration

- Environmental Review will be conducted by TNC's consultancy team as needed. Specific tasks may include:
  - Review available environmental reports and research state databases to acquire additional available information to develop a site constraints report to support Project design
- Preliminary Design and Planning Activities will be conducted by TNC's consultancy team. Specific tasks will include:
  - Create three progressive design iterations for Project concept to be assessed and evaluated based on feedback and factors such as capacity, capture efficiency, cost, constructability, and operations and maintenance
  - Advance Project through iterative evaluation, considering factors such as Project goals, physical design constraints, and hydrologic performance of the various alternatives, and estimated Project cost
  - Produce a preliminary design report to summarize existing site conditions, regulatory compliance background, topographical survey, geotechnical assessment, hydrologic and hydraulic modeling, BMP alternatives and recommendations, possible permitting, operations and maintenance, and line-item cost estimates for each alternative
  - Advance the preliminary design plans to design drawings to allow 30% construction documents for the civil and structural attributes

DETAILED BUDGET (**Non-matching Other Project Costs are being provided to demonstrate full scope/budget of project and will not be tracked or reported as match to SMMC)*

Project Period: 5/2018 - 3/2022

Grant Period: 5/2018 - 12/2019

TASK#	DESCRIPTION	SMMC GRANT REQ'D FUNDS	APPLICANT MATCH FUNDS	OTHER PROJECT COSTS (NON-MATCH)*	TOTAL PROJECT COSTS	COMPLETION DATE
Task 1	Plan & Design the Los Angeles River Project: Engineer-ing Report and Permitting	20 2,741	66,8 81	118,750	38 8,372	DEC-2019
Task 2	Implement the Los Angeles River Project			871,270	87 1,270	MAR-2021
Task 3	Manage & Monitor Los Angeles River Project Site			108,905	10 8,905	MAR-2022
SUBTOTAL DIRECT COSTS		**202,741**	**66,881**	**1,098,925**	**1,368,547**	
INDIRECT COSTS		**47,259**	**15,590**	**255,170**	**318,019**	
TOTAL COSTS		**250,000**	**82,471 (25% of Match + Grant Request)**	**1,354,095**	**1,686,566**	

TIMELINE FOR PROJECT IMPLEMENTATION (WITH COMPLETION DATES):

Task	Project Phases	Specific Tasks
1	Plan and Design the Project [Planning and Design Phase] (December 2019)	• Work with a contracted consultancy team to complete ground survey, utilities evaluation, and geotechnical investigations (May 2018-December 2018) • Consultancy team completes an environmental report review (as needed) (December 2018-March 2019 • Consultancy team complete preliminary design and planning activities (March 2019-December 2019)
2*	Implement the Project [Implementation Phase] (March 2021)	• Secure necessary permits and approvals for project implementation • Remove invasive plants from the Project site • Site preparation • Implement stormwater and runoff capture and reuse feature • Plant native plants at the Project site
3*	Manage and Monitor the Project [Management and Monitoring Phase] (March 2022)	• Adaptively manage the Project site • Monitor the control of invasive plants and the recovery of native plants • Complete annual monitoring reports

2) Any preliminary project plans as required

In 2016, TNC completed a feasibility study to evaluate hydrological options for water capture and habitat restoration at the Los Angeles River. The study, *Water Supply and Habitat Resiliency for a Future Los Angeles River: Site-Specific Natural Enhancement Opportunities Informed by River Flow and Watershed-Wide Action Study* (hereafter referred to as the *Water Supply and Habitat Resiliency Study*), may be accessed and downloaded by following this link:

https://tnc.box.com/s/w0yocpdr8a9qpna1ujmzc19lhhym5jcl

Water Supply and Habitat Resiliency Study found that:

- Bringing the various management priorities of governing agencies and stakeholders into a single integrated vision will foster clarity and certainty for habitat and water quality and supply projects
- Working only to enhance and increase the amount of in-channel perennial riparian habitat will not create as much biological value as identifying complementary enhancement opportunities outside of the river channel in adjacent upper and upland habitats
- Specific to in-channel habitat, increases in biodiversity will only occur when hydrologic conditions (e.g. lower dry weather flows) are created that favor native species
- The landscaping and hydrology of land adjacent to the river and throughout the watershed should be thought of as part of the river's biological and hydrologic system and designed to provide a value-added role to the river's habitat

Guided by these findings, TNC contracted this year with a consultancy team to develop design alternatives within the geographic area assessed in the *Water Supply and Habitat Resiliency Study*. At the time of this writing, TNC and the consultancy team have narrowed the possible locations for a stormwater capture and habitat restoration project from ten to two: the Silverlake Boulevard Street End and the California State Park's Bowtie Parcel. A preliminary report on concept designs for both locations may be accessed and downloaded here:

https://tnc.box.com/shared/static/g9b93cde0gf9xnf7jrg9tsk6pbuia1d5.pdf

Additionally, projects briefs may be accessed and downloaded for each site individually.

Silverlake Boulevard Street End:
https://tnc.box.com/shared/static/tvz1imqimdznxulhidji2j1me4hy9qid.pdf

Bowtie Parcel:
https://tnc.box.com/shared/static/n25qp4j2leqw0r8bx4fwzy3fbcy5vjup.pdf

At the completion of the design alternatives contract, the consultancy team will deliver scope and design options for both projects to TNC. Both projects offer excellent scalability and replicability. Undertaking a project at the Bowtie Parcel would be larger and more complex; Silverlake Boulevard offers the advantages of a modular design, but is smaller. Both projects can be completed in phases. Following the completion of the design alternatives, TNC will hire a consultancy team to complete engineering plans to 30%, which allows the production of construction documents for the civil and structural attributes.

3) A detailed description of the need and urgency for the grant

For more than one hundred years of urban development, Los Angeles has turned to engineered solutions and gray infrastructure to manage water. Rivers were channelized, and drinking water was delivered from lakes and rivers hundreds of miles away. As the cost of maintaining this gray infrastructure skyrockets and the services it provides fall short of meeting environmental standards, Los Angeles is evaluating the use of nature-based solutions that capture and clean rain water and allow it to infiltrate the soil into aquifers beneath the city. Voters have shown support for natural infrastructure projects at the ballot box, especially where parks and open space needs can be addressed as co-benefits. And these nature-based solutions can provide a greater suite of environmental benefits at lower costs (under certain conditions) than traditional alternatives.

As Los Angeles considers how to meet stormwater quality mandates and considers treatment options including single-use treatment facilities, the time is right for natural infrastructure. But significant barriers to widespread adoption remain. Current models of natural infrastructure do not employ components consistent with Los Angeles' ecology that make them sustainable in a future impacted by climate change. TNC intends to plan and build scalable and replicable natural infrastructure projects that overcome these remaining barriers while restoring the multiple benefits that the area's rivers, soils, and habitats once provided to plants, wildlife, and people.

In the last two years and with support from the Santa Monica Mountains Conservancy (SMMC), TNC completed its *Water Supply and Habitat Resiliency Study* to determine the feasibility of natural infrastructure at the Los Angeles River. As part of the study, TNC also produced an ecological baseline of the river's biodiversity. TNC is currently taking the next step and has hired a consultancy team to select a site within a 2.5-mile stretch of the Los Angeles River, corresponding to the *Water Supply and Habitat Resiliency Study,* and to develop design alternatives for a natural infrastructure project, as outline above.

In this proposal, TNC is seeking funding to undertake the next planning steps: the creation of an engineering plan for the project. The complete effort, from planning through implementation and into management and monitoring, is referred to in this proposal as TNC's Los Angeles River Stormwater Capture and Habitat Enhancement Project (the Project); this proposal seeks support for the Project's planning phase and is not intended to support implementation.

Numerous benefits and opportunities will be lost if the Project is not implemented soon. Because California's water supply is under pressure from drought and population growth, there is an interest in Los Angeles River stormwater capture projects that improve water resiliency and water quality. By striking while the iron is hot, the Project will encourage similar efforts throughout Los Angeles waterways and across the state.

Furthermore, critical habitat and biodiversity will be enhanced before it is too rare or costly to protect. Intense demand for housing and commercial development at the Los Angeles River is

mounting and could demolish remaining natural space and create more impermeable surfaces and polluted urban runoff. By implementing this project soon, riparian habitats can be enhanced with native plants, and populations of native animals that currently exist in small refugia along the river will be able to expand their range.

Additionally, the Project will provide a biodiversity and natural infrastructure model for the many restoration and infrastructure development projects that are proposed at the Los Angeles River. Absent this model, other projects will proceed, accomplishing only a fraction of the multiple benefits they might otherwise achieve.

4) A detailed description of how the project will provide multi-benefit ecosystem, water quality, water supply, and watershed protection and public benefits

Upon its completion, the Project will provide multi-benefit ecosystem, water quality, water supply, watershed protection, and public benefits:

MULTI-BENEFIT ECOSYSTEM BENEFITS: The Project will provide animal species currently found within the river channel and adjacent upland areas additional and improved native habitat to support their requirements for shelter, food, nesting sites. Increased habitat could draw additional native wildlife species to the river and nearby open spaces like Griffith Park as native habitat improves and expands. The Project will also remove invasive plants and revegetate with native species to enhance native biodiversity. Currently, the river channel and adjacent upland areas have a high concentration of invasive plants such as arundo (*Arundo donax*), castor bean (*Ricinus communis*), pampas grass (*Cortaderia jubata* and *Cortaderia selloana*), and tree tobacco (*Nicotiana glauca*). The density of invasive plants dramatically reduces habitat for native species, including the federally endangered Least Bell's Vireo (*Vireo bellii pusillus*). While this bird species is known to occur on the Los Angeles River, its opportunities for nesting are few, and the planting of additional native trees, shrubs, and understory plants in the river bottom and adjacent upland areas will assist in its recovery, and support many other resident and migratory species.

WATER QUALITY AND SUPPLY BENEFITS: The Project will help Los Angeles meet its needs of creating a more resilient water supply by using natural infrastructure to capture, clean, and reuse stormwater and dry weather runoff. The final design of bioretention elements will be based upon design alternatives currently under study. Bioretention elements will also decrease polluted runoff, which negatively affects the entire Los Angeles River Watershed, including coastal waters.

DRY WEATHER FLOWS: The unique suite of plants and animals found in and around the Los Angeles River is driven by the river's hydrology. Due to increased urbanization as well as treated

wastewater discharge, current dry weather flows are higher than historical levels, which promotes the establishment and growth of invasive species. The urban runoff captured in the bioretention element of the Project will help to lessen the dry weather flows in the river, thereby promoting the survival of native species. It will also serve as a model for other river projects to develop methods of reducing dry weather flows.

PUBLIC ACCESS BENEFITS: The Project will provide public access to urban open space and promote environmental stewardship through community outreach. It will beckon students, communities, conservation groups, and developers to appreciate urban biodiversity, multi-benefit conservation methods, and the river itself as the connective tissue of the City of Los Angeles.

5) A detailed description of how the project achieves one or more of the purposes of Proposition 1 as stated in Water Code Section 79732(a)

The Project achieves the purposes of subsections 2-4 and 8-12 of Water Code Section 79732(a):

2) Implement watershed adaptation projects in order to reduce the impacts of climate change on California's communities and ecosystems.

- Los Angeles County and its riparian habitats are vulnerable to weather extremes brought on by climate change. These extremes include higher temperatures, longer periods of drought, and unpredictable rainfall. In the planning phase of the Project, TNC will research and select a native plant palette that will prove the most resilient to these projected extremes. The stormwater capture and reuse element will further address extended drought periods caused by climate change by capturing water onsite so that it is available to wildlife for a longer period of time between dry spells, thereby locally reducing drought severity. During the planning phase, research will also take place to determine the best way to use reclaimed water, which has a higher salt content than fresh water, on native plants.

3) Restore river parkways throughout the state, including, but not limited to, projects pursuant to the California River Parkways Act of 2004 (Chapter 3.8 (commencing with Section 5750) of Division 5 of the Public Resources Code), in the Urban Streams Restoration Program established pursuant to Section 7048, and urban river greenways.

- The Project is optimally located to further the development of a Los Angeles River parkway, such as the one envisioned by the State Coastal Conservancy in its 51-mile Los Angeles River Greenway. Anchored by the Rio de los Angeles State Park, the Project will

advance the river parkway/Greenway that also includes new parks and trails in the Lincoln Heights neighborhood, the opening reaches of the Los Angeles River to the public in Maywood and Paramount, and the improved Dominguez Gap and DeForest stormwater basins.

4) Protect and restore aquatic, wetland, and migratory bird ecosystems, including fish and wildlife corridors and the acquisition of water rights for instream flow.

- The Project will enhance regional habitat connectivity for migrating species (see *Water Supply and Habitat Resiliency Study*, page ES-5). Although the area where the Project will be located contains established riparian habitat due to its lack of a concrete bottom, some native species have been inhibited by the dense growth of invasive plants such as arundo. Many native insects and birds are unable to nest or inhabit invasive vegetation. Listed riparian species such as Least Bell's Vireo (SE. FE), Least Bittern (CSSC), and Yellow-breasted Chat (CSSC) are known to occur in the flood basins further upstream and could migrate to this region of the Los Angeles River if native habitat were re-established (see *Water Supply and Habitat Resiliency Study*, Chapter 4).

8) Implement fuel treatment projects to reduce wildfire risks, protect watersheds tributary to water storage facilities, and promote watershed health.

- During its implementation phase, the Project calls for the removal of arundo from the Los Angeles River. Its removal will lower the river's vulnerability to wildfires by reducing the fuel base. The removal of arundo will also promote watershed health by limiting upstream source material that could spread new arundo growth downstream.

9) Protect and restore rural and urban watershed health to improve watershed storage capacity, forest health, protection of life and property, stormwater resource management, and greenhouse gas reduction.

- The Project contributes to a growing number of projects located within the Los Angeles River urban watershed that manage stormwater resources and reduce greenhouse gases. By removing invasives, planting native plants, and developing a bioretention element, the Project protects and restores the Los Angeles River urban watershed and enhances its overall health. Scalable and replicable, the Project also reduces greenhouse gases from multiple sources within the urban watershed (see component 7 below).

10) Protect and restore coastal watersheds, including, but not limited to, bays, marine estuaries, and nearshore ecosystems.

- The Project protects the coastal watershed and nearshore ecosystems by reducing and treating contaminated urban runoff. To this end, it supports the State Coastal Conservancy's Green Solution Project, which attempts to develop a countywide network of parks and natural lands in which soil and plants capture and filter stormwater to reduce pollution into nearshore environments, such as the San Pedro Bay and the Los Cerritos Wetlands.

11) Reduce pollution or contamination of rivers, lakes, streams, or coastal waters, prevent and remediate mercury contamination from legacy mines, and protect or restore natural system functions that contribute to water supply, water quality, or flood management.

- In the same way the Project protects the coastal watershed and nearshore ecosystems, it also protects coastal waters by reducing pollution and contamination of the Los Angeles River, which drains into the San Pedro Bay. By adding a stormwater capture element to the river, the Project reduces the flow of dry weather runoff and allows native plants and soils to clean it, improving water quality. This improvement of the natural function of the river contributes to the health of the river and coastal waters. Other projects using the Project as a model will amplify the water quality benefits for greater overall water quality.

12) Assist in the recovery of endangered, threatened, or migratory species by improving watershed health, instream flows, fish passage, coastal or inland wetland restoration, or other means, such as natural community conservation plan and habitat conservation plan implementation.

- The enhancement of native riparian habitat along the Los Angeles River, which will take place through this project, supports the objectives in the Recovery Plans for both the Least Bell's Vireo *(US Fish and Wildlife Service's Draft Recovery Plan for the Least Bell's Vireo)* and the Southwestern Willow Flycatcher *(US Fish and Wildlife Service Southwestern Willow Flycatcher Recovery Plan).*

6) A detailed description of how the project promotes and implements one or more of the objectives of the California Water Action Plan as stated in Section [2.5 of the guidelines]

The California Water Action Plan articulates the following goals that the Projects helps to achieve:

- Restoration of important species and habitat
    - The Project will enhance habitat at the Los Angeles River and help restore important species to it. The Project would also facilitate movement of wildlife through the urban matrix to core habitat areas, and potentially allow for greater genetic diversity by supporting larger populations of wildlife along the river. TNC has documented 167 total plant species at the river, including 76 native species

such as willow, oak, and sycamore trees. Most vegetation cover, however, is invasive. Arundo, castor bean, pampas grass, and tree tobacco are common (see attached maps, Figures 5-7, and *Water Supply and Habitat Resiliency Study*, Section 4.2). Reported wildlife includes five native reptile species, including western toad and Pacific chorus frog, and two invasive species. The study found 102 taxonomic families of insects, with a higher diversity found on native plants. Seventeen species of mammals are known to occupy the area, including coyote, desert cottontail, and at least five species of bats.

- More resilient and sustainably managed water infrastructure
    - The area in which the Project will be located currently experiences higher flood flow rates and much higher dry weather flow rates than it did historically. The high dry season flow supports and encourages invasive plants to grow, leading to lower levels of biological diversity and water resiliency than would exist under historic flow rates, particularly during dry weather conditions. The bioretention element of the Project will help reduce flow by capturing and cleaning both dry weather flow and stormwater. Doing so would increase the resilience and sustainability of Los Angeles River infrastructure at that location and downstream by taking pressure off river infrastructure to manage high flow rates.

7) A detailed description of how the project helps meet the State's greenhouse gas emissions reductions targets, including a quantification of the metric tons of CO2 or CO2e removed or avoided, and an explanation of the methodology used to quantify this figure

TNC has partnered with Grown in LA, a nonprofit organization, and the Los Angeles Parks Foundation to prepare the former Commonwealth Nursery at Griffith Park in Los Angeles to serve as a nursery for locally sourced native plants. Currently, most plants used for restoration projects in Los Angeles are brought from outside the city or other states, resulting in plant stock that is not resilient for Los Angeles' microclimates. Furthermore, it is necessary to transport the plants by truck, generating fuel costs and greenhouse gas emissions. The Project re-envisions the supply chain by working with Grown in LA to create a local seed and propagule bank so locally sourced native plants can be cultivated near the places they will ultimately revegetate.

In California, the statewide greenhouse gas (GHG) emission level from 1990 has been set as the 2020 emission limit as required by AB 32. This emission level is 431 $MMtCO_2e$ (million metric tons of CO_2 equivalent). In addition, the City of Los Angeles' Climate Action Plan (pLAn) sets goals to reduce L.A.'s GHG emissions by 45% by 2025 against a 1990 baseline of 36.2 MMtCO2e. Emissions

for the city have fallen, and were 29 MMtCO2e in 2013[1]. The pLAn explicitly includes our native plant propagation project in Griffith Park, and our creating a viable source of locally collected and locally-grown native plants for restoration projects as an important part of climate action.

The USDA Natural Resources Conservation Service (NRCS) has developed a GHG and Carbon Sequestration Ranking Tool[2], and has established qualitative rankings for various land use and land management practices that have beneficial impacts on GHG emissions reduction and carbon sequestration. Several of the practices ranked by this tool as being beneficial in increasing biomass and soil carbon will be incorporated into the activities planned for this project, including:

- Tree/Shrub Establishment
- Forest Stand Improvement
- Riparian Forest Buffer establishment
- Riparian Herbaceous Cover establishment
- Land Reclamation of Abandoned Land
- Wetland Restoration

While this NRCS tool is a useful resource to show that our project will help work towards California's greenhouse gas emission reductions by sequestering in plants and soils, it does not provide a specific quantification of the amount of carbon (i.e., in $MtCO_2$) removed or avoided by the project. To make these calculations and provide this quantification, we have used the following methodology:

1. Carbon storage in plants and soils through invasive species removal and native species planting:

- The size of the habitat enhancement project site will be 10 acres
- The main activities involved in this project will be:
    - the establishment of native riparian plants on lands that are currently covered by invasive arundo (*Arundo donax*) that has been in place for over four years (five acres)
    - the establishment of native upland shrubs on lands that are currently abandoned, and have primarily fountain grass (*Pennisetum setaceum*) as vegetative cover (five acres)

[1] http://www.lamayor.org/sites/g/files/wph446/f/landing_pages/files/pLAn%20Climate%20Action-final-highres.pdf
[2] http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/air/?cid=stelprdb1044982

- Arundo stands accumulate 0.6 Mg C ha^{-1} $year^{-1}$ (0.24 Mt C ac^{-1} yr^{-1}) of soil organic carbon (SOC). In the absence of disturbance, the aboveground biomass C of Arundo stops accumulating after four years.[3]
- While measurements of above- and below-ground C accumulation are not available for fountain grass, closely-related kikuyu grass (*Pennisetum clandestinum*) has been shown to accumulate 2.6 Mg C ha^{-1} $year^{-1}$ (1.05 Mt C ac^{-1} yr^{-1}) of soil organic carbon (SOC)[4]. In the absence of disturbance, the aboveground biomass C of perennial bunchgrasses stops accumulating after they reach full size, so the size of the soil C pool under fountain grass is likely remaining unchanged from year to year.
- In comparison, native California riparian vegetation accumulates 3.67 Mt C ha^{-1} $year^{-1}$ in aboveground biomass and soil organic carbon (SOC)[5].
- Native California upland shrub vegetation accumulates 22 g C m^{-2} $year^{-1}$ (0.089 Mt C ac^{-1} yr^{-1}) of soil organic carbon (SOC)[6]. Mean net aboveground primary productivity in pure stands of the chaparral shrub *Ceanothus megacarpus* is 850 g m^{-2} yr^{-1}. Assuming that this is typical for native California upland shrubs, and that 50% of the biomass is carbon (a commonly used value[7]), aboveground growth accumulates at a rate of 3.44 Mt C ac^{-1} yr^{-1} of biomass C. This means the whole system (soil + aboveground biomass) accumulates C at a rate of 3.53 Mt C ac^{-1} yr^{-1}.
- Therefore, the carbon sequestration potential of this habitat enhancement over the 10-year project term may be expressed as follows:
    - Five acres of native riparian plants (replacing arundo):
      3.67 Mt C ha^{-1} $year^{-1}$ - 0.6 Mt C ha^{-1} $year^{-1}$ = 3.07 Mt C ha^{-1} $year^{-1}$
    - Five acres of upland shrub plants (replacing fountain grass):
      3.53 Mt C ac^{-1} yr^{-1} - 1.05 Mt C ac^{-1} yr^{-1} = 2.48 Mt C ha^{-1} $year^{-1}$
    - Total: 5.55 Mt CO_2.

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[3] Monti, A., and W. Zegada-Lizarazu. 2016. Sixteen-Year Biomass Yield and Soil Carbon Storage of Giant Reed (Arundo donax L.) Grown Under Variable Nitrogen Fertilization Rates. BioEnergy Research 9:248–256. Available from http://dx.doi.org/10.1007/s12155-015-9685-z.

[4] Neal, J. S., S. M. Eldridge, W. J. Fulkerson, R. Lawrie, and I. M. Barchia. 2013. Differences in soil carbon sequestration and soil nitrogen among forages used by the dairy industry. Soil Biology and Biochemistry 57:542–548. Available from http://www.sciencedirect.com/science/article/pii/S0038071712003677.

[5] Matzek, V., Puleston, C. and J. Gunn. 2015. Can carbon credits fund riparian forest restoration? Restor Ecol, 23: 7–14. doi:10.1111/rec.12153. Text available from: http://www.virginiamatzek.com/uploads/1/8/4/5/18453417/rec-14-151_final.pdf

[6] Post, W. M., and K. C. Kwon. 2000. Soil carbon sequestration and land-use change: processes and potential. Global Change Biology 6:317–327. Blackwell Science Ltd. Available from http://dx.doi.org/10.1046/j.1365-2486.2000.00308.x.

[7] Fonseca, F., de Figueiredo, T. & Bompastor Ramos, M.A. Agroforest Syst (2012) 86: 463. doi:10.1007/s10457-012-9509-5

2. Emissions avoided through use of plants grown in nearby Griffith Park nursery, as opposed to other native plant nurseries that could produce adequate stock for this project:

- The Griffith Park nursery has the capacity grow approximately 10,000 plants for this restoration effort.
- Assuming that each plant will be in a one-gallon pot (7 in. diameter), a flatbed trailer truck with a bed measuring 48 feet by 8.5 feet would be able to haul 1,148 plants at a time, necessitating a minimum of nine round-trips from the nursery to the project site to deliver all of the stock.
- The distance traveled by road between the Griffith Park nursery and the project site is approximately 3.2 miles one way.
- In comparison, the one-way distance from the project site to other wholesale nurseries that may have the capacity to propagate native plants for this project is as follows:
    - Las Pilitas Nursery – 217 miles
    - RECON Native Plants, Inc. – 135 miles
    - Tree of Life Nursery – 70 miles
    - El Nativo Growers – 27 miles
- The total vehicle miles traveled to transport all of the plants from each of the nurseries is as follows:
    - Las Pilitas Nursery – 3,906 miles
    - RECON Native Plants, Inc. – 2,430 miles
    - Tree of Life Nursery – 1,260 miles
    - El Nativo Growers – 486 miles
    - Griffith Park Nursery – 57.6 miles
- The average fuel efficiency for a flatbed trailer truck with a bed measuring 48 feet by 8.5 feet is 6.5 miles per gallon of gasoline[8]
- Burning one gallon of gasoline produces 8.887×10^{-3} Mt CO_2[9]
- Therefore, the C emissions produced by hauling plants from the various nurseries would be as follows:
    - Las Pilitas Nursery – $5{,}340.403 \times 10^{-3}$ Mt CO_2 (5.340 Mt CO_2)
    - RECON Native Plants, Inc. – $3{,}322.371 \times 10^{-3}$ Mt CO_2 (3.322 Mt CO_2)
    - Tree of Life Nursery – $1{,}722.710 \times 10^{-3}$ Mt CO_2 (1.72 Mt CO_2)
    - El Nativo Growers – 664.474×10^{-3} Mt CO_2 (0.664 Mt CO_2)
    - Griffith Park Nursery – 78.752×10^{-3} Mt CO_2 (0.079 Mt CO_2)

[8] http://cta.ornl.gov/vtmarketreport/pdf/chapter3_heavy_trucks.pdf

[9] https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references

- Therefore, the emissions avoided by using plants grown locally at Griffith Park could range from 0.585 to 5.26 Mt CO_2.

8) A detailed description of how the project promote and implements other relevant regional and state plans and policies

The Project will promote and implement multiple relevant regional and state plans.

REGIONAL PLANS:

City of Los Angeles Low Impact Development (LID) Ordinance: The purpose of LID is to mitigate the impacts of runoff and stormwater pollution as close to its source as possible. LID comprises of a set of site design approaches and best management practices such as the implementation of bioretention, pollution retention, or vegetated swales. The Project will serve as an example of a LID solution and will incorporate a bioretention element to capture and clean stormwater and dry weather runoff.

City of Los Angeles Sustainable City pLAn: The Project supports several of pLAn's goals. pLAn proposes to capture and clean stormwater to reduce Los Angeles' dependency on imported water by 50% by 2025 and to grow its local water supply by 50% by 2035. pLAn also sets goals to reduce Los Angeles' GHG emissions by 45% by 2025 against a 1990 baseline of 36.2 MMtCO2e. pLAn explicitly includes TNC's native plant propagation in Griffith Park, and the creation of a viable source of locally collected and locally-grown native plants for restoration projects as an important part of climate action.

pLAn also proposes solutions, like distributed water projects, that prepare the city for increasing climate disruptions, including longer and hotter heatwaves. It further aims to improve neighborhood conditions in underserved, low-income communities and improve access to outdoor space.

City of Los Angeles Department of Water and Power Stormwater Capture Master Plan: LADWP's plan states, "To ensure a safe and reliable water supply for future generations of Angelenos, one of the City's key strategies is to increase the local water supply and decrease the need to purchase imported water. However, in large part due to urbanization, most precipitation that falls onto the City flows into storm drains and out to the ocean. Considering these conditions, stormwater is an increasingly viable supply. Capturing and using stormwater on-site can offset potable water demand.... Projects to capture and conserve stormwater runoff comprise an important component of the City's water supply portfolio." The Project will address these issues by capturing stormwater runoff at the project site before it drains to the ocean.

City of Los Angeles River Revitalization Master Plan: The Plan envisions projects that achieve goals of improving the environment, enhancing the water quality, and improving water resources and the ecological functioning of the Los Angeles River. Projects must also provide public access to the Los Angeles River, significant recreation space and open space, new trails, and improve natural habitats to support wildlife. Preservation and enhancement of the river's flood control features is also encouraged, as is fostering a growth in community awareness of the Los Angeles River and pride in the Los Angeles River. The Project is consistent with each of these goals.

County of Los Angeles River Master Plan: The County's River Master Plan adopted goals to improve flood control, public safety, appearance, and community pride in the river. It promoted the river as an economic asset to surrounding communities and called for the restoration of its environmental resources and stormwater alternative. Public involvement was encouraged, as was public access and a variety of recreational opportunities. The Project is consistent with the Master Plan's goals by reducing flow and flood risk, providing a stormwater alternative, making the river more natural and appealing in its appearance, creating a place for people to engage with the river and take pride in it. It will also remove invasive plants and enhance habitat for native plants and wildlife.

US Army Corps of Engineers and the City of Los Angeles Los Angeles River Ecosystem Restoration Plan: The US Army Corps of Engineers is planning to implement a large-scale restoration project along 11 miles of the Los Angeles River; this stretch includes the Project area. Plan projects should provide opportunities for connectivity to ecological zone, reintroduction of ecological and physical processes such as a more natural hydrologic and hydraulic regime that reconnects the river to historic floodplains and tributaries, reduced flow velocities, increased infiltration, improved natural sediment processes, and improved water quality.

The Project aims to model early term stormwater capture and habitat enhancement success to the Corps as it develops its ecological approach, an effort with long-term ramifications for the Los Angeles River and other rivers in the more arid western United States. It further supports the plan's call for the creation and reestablishment of historic riparian strand and freshwater marsh habitat to support increased populations of wildlife and enhance habitat connectivity.

Integrated Regional Water Management Plans: The Project will apply towards the following goals of regional watershed plans:

- Taking a collaborative approach to achieve social, environmental, and economic objectives.
- Delivering a higher value for investments by considering all interests, providing multiple benefits, and working across jurisdictional boundaries at the appropriate geographic

scale. This includes water quality, better flood management, restored and enhanced ecosystems, and more reliable water supplies.

STATE PLANS:

State Coastal Conservancy Strategic Plan (2013-2018): The Project helps effectuate six goals of the Strategic Plan as outlined below.

- Goal 2: Expand the system of coastal public accessways, open-space areas, parks and inland trails that connect to the coast.
    - Objective 2E: Design new regional trails and river parkways that connect inland populations to the coast.
    - Objective 2F: Construct new regional trails and river parkways that connect inland populations to the coast.

  The Project will design and construct a site of enhanced habitat and naturalized public access along the Los Angeles River, catalyzing future sites that will create an urban greenway connecting the inland Los Angeles region to the coast.

- Goal 3: Revitalize coastal and inland waterfronts that provide significant public benefit and promote sustainable economic development.
    - Objective 3A: Develop waterfront revitalization plans that increase accessibility, create more inclusive access opportunities, support commercial and recreational fishing, encourage economic revitalization, promote excellence and innovation in urban design, enhance cultural and historic resources, and that are resilient to a changing climate.
    - Objective 3B: Implement waterfront revitalization projects that increase accessibility, create more inclusive access opportunities, support commercial and recreational fishing, encourage economic revitalization, promote excellence and innovation in urban design, enhance cultural and historic resources and that are resilient in a changing climate.

  The Project will develop and implement the revitalization of inland riverfront habitat that will provide natural public space for the community to interact with and learn about natural conservation within a highly urbanized space. The habitat enhancement and stormwater capture features of the project will create more inclusive access opportunities, support recreation, encourage economic revitalization, promote excellence and innovation in urban design, and enhance cultural and historic resources in a way that is resilient to a changing climate.

- Goal 4: Protect significant coastal resource properties, including cropland, rangeland and forests.
    - Objective 4A: Protect significant coastal and watershed resource properties.
    - Objective 4C: Implement projects that preserve and restore fish and wildlife corridors between core habitat areas along the coast and from coastal to inland habitat areas.

  The Project will protect significant watershed resources and create valuable migratory habitat for fish and wildlife for neighboring inland regions as well as for coastal bird populations by replacing invasive plants with native vegetation that provides nesting and habitat opportunities for a greater abundance of native wildlife.

- Goal 5: Enhance biological diversity, improve water quality, habitat, and other natural resources within coastal watersheds.
    - Objective 5E: Implement projects to improve fish habitat including projects to remove barriers to fish passage, ensure sufficient instream flow, and provide in stream habitat and favorable water temperatures.
    - Objective 5F: Complete plans to improve water quality to benefit coastal and ocean resources.
    - Objective 5G: Implement projects to improve water quality to benefit coastal and ocean resources.

  This Project will ensure healthy stream flow by removing invasive plants such as arundo, which can obstruct flows, not only in its live form within the channel, but when it breaks loose and flows downstream. The stormwater and runoff capture element in this project will reduce dry weather flows, allowing this area of the river to more resemble its historical flow pattern. Habitat enhancement and the runoff capture element will also reduce polluted runoff to enter the watershed, including the runoff to the coastal zone.

- Goal 7: Enhance the resiliency of coastal communities and ecosystems to the impacts of climate change.
    - Objective 7A: In cooperation with public agencies, universities and non-governmental organizations, identify significant climate-related threats, management challenges and priority technical assistance needed to maintain resilient coastal communities and natural resources.

- Objective 7C: Conduct site-specific, regional and landscape-level vulnerability assessments of uplands and waterways, and develop adaptation plans to address predicted climate change impacts to natural resources, biodiversity, and critical habitat.
- Objective 7E: Implement adaptation pilot projects that address climate change impacts to uplands natural resources, biodiversity and critical habitat.
- Objective 7F: Implement projects that reduce greenhouse gases by increasing carbon sequestration, or by supporting land uses that reduce energy consumption including vehicle miles traveled.
- Objective 7G: Implement tree and vegetation planting projects that reduce urban heat islands and provide other benefits such as reduced energy use, improved air quality, enhanced stormwater management, and improved quality of life.

The Project will work with public and private sectors to identify and promote practices that create natural spaces and communities that are resilient to climate change. A vulnerability assessment and adaptation plan will be carried out that future projects can model. The native plant propagation done at Griffith Park will serve as a local source for the community to learn about adaptive practices and resilient native plant restoration. Having this centrally located source will eliminate truck miles traveled to transport native plants from distant nurseries. The Project's bioretention element will increase the City's water resiliency by creating and promoting effective stormwater management. The creation of resilient habitat in this highly urbanized area will improve the quality of life for the public and wildlife.

- Goal 9: Expand environmental education efforts to improve public understanding, use and stewardship of coastal resources.
  - Objective 9A: Support programs and events that improve public understanding of coastal resources.
  - Objective 9B: Support the design and installation of interpretive or educational displays and exhibits related to coastal, watershed, and ocean-resource education, maritime history, and climate change.
  - Objective 9C: Construct or improve regional environmental education centers that educate the public about environmental issues affecting the coast and inland watersheds.

The Project will create educational and outreach opportunities to increase the public's understanding of environmental stewardship, urban conservation, and the issues that are affecting the inland watersheds and resources. An educational display or other interpretive element will be installed at the Project site to inform and inspire the public about the benefits of natural infrastructure, local ecology and conservation, and climate change resiliency.

California Water Boards' Strategy to Optimize Resource Management of Storm Water (STORMS): The Project will help achieve STORM's goals:

- Change the perspective that stormwater is a waste or hazard, and treat it as a valuable water resource.
- Manage stormwater to preserve watershed processes and achieve desired water quality and environmental outcomes.
- Collaborate in order to solve water quality and pollutant problems with an array of regulatory and nonregulatory approaches.

California Water Boards' Watershed Management Initiative (WMI): Similarly, the Project also addresses WMI's goals:

- Use water quality to identify and prioritize water resource problems within individual watersheds.
- Involve stakeholders to develop solutions.
- Establish working relationships between staff from different programs.
- Better coordinate local, state and federal activities and programs, especially those relating to regulations and funding, to assist local watershed groups.

California @ 50 Million: The Environmental Goals and Policy Report

The Project will promote the goals of the California @ 50 Million Strategy by helping to create healthy, equitable, and sustainable communities, build a resilient water system, protect natural landscapes, incorporate climate change adaptation into planning and investment, and lead by example to make the state a model for long-term sustainability.

California Climate Adaptation Strategy/Safeguarding California: Reducing Climate Risk Plan

The Project will help to implement the California Climate Adaptation Strategy's goals of reducing emissions, and will create readiness and promote the best available science and research. The local propagation of native plants will greatly reduce emissions from trucks transporting plants to restoration sites. TNC's approach to stormwater capture, habitat enhancement, and outreach will inform the public and private sectors about climate change resiliency and readiness. The

research done in the planning, implementation, and monitoring of this project will help to inform future efforts throughout the region.

California Wildlife Action Plan

The Project will promote the California Wildlife Action Plan by conserving wildlife and vital habitat within the Los Angeles Watershed, before it becomes too rare and costly to protect. Project research, planning, and implementation will promote the need for wildlife conservation within a heavily urbanized space and guide responsible development that takes environmental systems into account. The Project will inform future efforts of invasive species control and native habitat enhancement.

California Aquatic Invasive Species Management Plan

The Project will work towards the Plan's goals of reducing the harmful effects of aquatic invasive species by removing invasive vegetation such as arundo, which forms dense stands, demands high amounts of water, and prevents native vegetation and biodiversity from thriving. While arundo grows very tall, it provides little shade to in-stream habitat, resulting water temperatures that can harm native aquatic wildlife, including frogs, turtles and fish. Increasing the amount of native vegetation will better support native riparian animals. .

California Essential Habitat Connectivity Strategy for Conserving a Connected California

The research, planning, and implementation of this Project will promote the Essential Habitat Connectivity Strategy's goals of identifying large remaining blocks of intact habitat and natural landscapes and model linkages between them that need to be maintained, particularly as corridors for wildlife.

9) Indicate whether the project will have matching funds from private, local, or federal sources, and if so, to what extent

TNC has private funds in-hand to provide the match outlined in the Project Budget. If awarded, the SMMC grant could also help TNC meet required match on a challenge grant from a private funder for $750,000. As part of the challenge grant, TNC must raise an equal amount by December 31, 2017, but the funder has expressed willingness to carry the fundraising period into 2018 if TNC is awarded public funding. To meet the challenge and fund preliminary Project scoping efforts, TNC also solicited and received funding from Walt Disney Company Foundation, Boeing, Metabolic Studio, Snapple, and SMMC (specifically for the *Water Supply and Habitat Resiliency Study*), as well as individual donors. TNC will also pursue additional funding from additional private individuals and public funding from the California Natural Resources Agency's Urban Rivers Grant Program. Please refer to the attached budget for additional details.

10) Indicate whether the project will benefit a disadvantaged community

The specific location of the Project will be determined during the engineering phase following the completion of design alternatives. Per the DAC Mapping Tool developed by the Department of Water Resources, approximately half of the geographic area in which design alternatives are being developed is in a DAC census tract considered a "Severely Disadvantaged Community." The other half of this area is considered a "Disadvantaged Community." According to CalEnviroScreen Version 2.0, one half of the Study Area has a CalEnviroScreen Score of 86-90%, while the other half has a score of 71-80%.

11) Indicate whether the project will use the services of local or state conservation corps

Because we are requesting funding for engineering and permitting, we have not yet consulted with local or state conservation corps about their ability to implement the Project. In connection with other proposals for state grant funding, we have communicated with the Los Angeles Conservation Corps, with which TNC worked on invasive plant eradication at the Santa Clara River and on Santa Cruz Island, about their future interest in the Project. We believe there are elements of the Project that are suited to LACC's services.

12) A detailed description of any new or innovative technology or practices that will be applied to the project

Estimates put the cost of stormwater quality compliance in Los Angeles County at $20 billion, yet public revenues (including those that could be raised through a proposed parcel tax in 2018) fall well short of that amount and leaves a funding gap. Consequently, the time is right to explore innovative market-based strategies that optimize private financing and partnerships. TNC is laying the groundwork so the Project can be the first stormwater capture and habitat enhancement project to use market-based strategies to bring private financing to stormwater capture in Los Angeles. It will serve as a template to catalyze private investment opportunities in the form of impact investing. TNC has initiated similar work in Washington, D.C. through its stormwater credit trading program and developed a series of best practices and lessons learned in other major cities. TNC will use that information in the Project while building the case locally for market-based strategies.

13) A detailed method for monitoring and reporting on the progress and effectiveness of the project during and after project implementation

TNC will develop a plan for monitoring, evaluating, and reporting the effectiveness of the Project. The management and monitoring phase of the Project will begin in the first year of implementation. Project maintenance, monitoring, and reporting will take place using the best adaptive management practices. (Further information on the projected methods for invasives

removal, revegetation, and maintenance and reporting can be found in Chapter 6 of the *Water Supply and Habitat Resiliency Study.)*

TNC has extensive experience with adaptive management, which allows a nimble response to changes detected through regular monitoring. This will include documenting the control of arundo and other invasive species, and the recovery of native species through natural recruitment of active planting. Qualitative and quantitative monitoring of various factors will be recorded each year and the results will be used to evaluate progress towards the Project's goals and guide further action at the site. TNC will involve the community and educational programs to assist in the monitoring process to increase community engagement and encourage environmental stewardship of the river.

For the first five years, management and monitoring will be carried out by TNC with the involvement of community outreach and partner organizations. After the first five years, TNC will reach an arrangement with the landowners and partnering organizations and agencies to ensure that proper maintenance, monitoring, and outreach is continued in accordance with TNC's standards for at least 20 years.

Additional requirements for Section 79735(a) funding:

• A description of how scope of work will protect or enhance and urban creek as defined in Section 7048(e)

An urban creek is defined in part as "... a river that crosses built-up residential, commercial, or industrial property." In the case of the Los Angeles River, the full 51-miles runs through lands that have been converted for human use. Residential, commercial, and industrial parcels are immediately adjacent to the river along its course and are present in the area where the Project will be located. Consequently, the Project as described above is anticipated to protect and enhance the Los Angeles River in its capacity as an "urban creek" by capturing and cleaning dry weather runoff and stormwater flows and enhancing habitat.

• A description of how project is consistent with the Common Ground Plan

The Common Ground Plan aims to expand the conversation about restoring balance between human and natural systems in Los Angeles County from beyond the rivers to the entire watershed. Guiding principles and objectives are accomplished through a variety of opportunities, including those involving river parkways, habitats and corridors, flood protection, surface water, and groundwater.

The Project is consistent with the Plan's river parkways opportunities because it helps to create a continuous ribbon of open space, trails, active and passive recreation areas, and wildlife habitat

along the Los Angeles River. Furthermore, the Project will be designed and engineered with respect to the existing of its location, the needs and desires of the local community, and the connection and linkages that can be created or strengthened.

In terms of habitats and corridors, the Project will help restore and protect riparian habitat in the Los Angeles River both in-channel and in the upland areas. Enhancements will improve the quality of habitat for native species already present and for those in migration.

The Plan calls for improvements to flood protection, the capture and cleaning of stormwater, and the ability to infiltrate stormwater where possible. The Project is consistent with these strategies and is expected to incorporate stormwater and dry weather runoff technologies to capture, clean, and infiltrate water to the extent the location will allow.