

Developing a Conservation Grove for *Juglans californica*  
(southern California black walnut) in Los Angeles County,  
California



*Juglans californica* at Powder Canyon, Puente Hills Habitat Authority September 4, 2020

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## Introduction

*Juglans californica* S. Watson (southern California black walnut; Juglandaceae) was historically widespread in Los Angeles County, California; however, development in the region has significantly reduced its range, and ongoing development continues to threaten vulnerable walnut woodlands. The California Native Plant Society ranks *Juglans californica* as a 4.2 or “WatchList” on their inventory of rare and threatened plants, indicating that this is a species with a high degree of threat, because historical populations have been so significantly reduced (CNPS 2020).

The purpose of this proposal was to gather genetically diverse propagules from multiple populations of *Juglans californica* throughout Los Angeles County to facilitate the creation of a conservation grove at California Botanic Garden (CalBG), and to distribute seeds and plants at partner institutions. The conservation grove is intended to be a backup source of genetic diversity of these fragmented populations, as they continue to face threats. Since *Juglans californica* cannot be preserved using traditional seed storage methods, the APGA Tree Gene Conservation Partnership allows for the outplanting of trees into a living collection such as the CalBG, the largest botanic garden dedicated to California native plants. This conservation grove will be available to land managers and restoration practitioners to collect walnuts from as a readily available source for a variety of projects. The establishment of the conservation grove will provide a critical resource without the difficulties of permitting and concerns of overharvesting natural populations.

This project was carried out by CalBG, in collaboration with Seed LA. Seed LA is a collaboration of organizations based in Los Angeles with the mission to increase the availability of locally adapted native seeds for the region. The additional contributing partners of Seed LA include: Audubon Center at Debs Park, Grown in LA, Northeast Trees, Palos Verdes Peninsula Land Conservancy, Santa Monica Mountains National Recreation Area, and Theodore Payne Foundation for Wildflowers and Native Plants. The diversity of partners participating in this project allowed for increased success, utilizing multiple institutional and organizational resources, including access to populations and permits for collection.

## Methods

### Permits

A key challenge of seed conservation in Los Angeles County is the diversity of land owners, including public and private preserves of varying sizes, which can affect the ease of

permit acquisition. Initially, Seed LA identified key locations of *Juglans californica* with the potential to support large enough populations to yield a high quality seed collection. The areas initially identified included the Santa Monica Mountains, foothills of San Gabriel Mountains, and hills within the urban core (e.g. Griffith Park, Puente Hills) encompassing an area that stretches north to Ventura County and south to Riverside County. Some populations were identified on private lands (e.g. Debs Park), however, the majority of land access required permission from the City of Los Angeles, Los Angeles County, Mountains and Rivers Conservation Association (MRCA) and the Puente Hills Habitat Authority (PHHA). We were able to secure permits for this project from MRCA and PHHA (Appendix A). Permission was also granted by the Audubon Center at Debs Park, a Seed LA member and owner of parcels at Ernest E. Debs Park. We coordinated with Theodore Payne Foundation, to secure the collection at Griffith Park through their standing permit with the City of Los Angeles (Appendix A).

### Pre-Collection Research

Research was conducted by consulting with project partners and in-house staff regarding seed collection, peak harvest time, processing, and propagation information. Katherine Pakradouni, Nursery Manager at Commonwealth Nursery in Griffith Park, Billy Sale, Restoration Project Manager at CalBG, Bryce Kunzel, Nursery Manager at CalbBG, Tania Romero, Native Nursery Manager at Debs Park, and Tim Becker, Propagation Manager at Theodore Payne Foundation all provided valuable information. Seeds were collected when they were dark in color and dry, not green and moist. Project partners indicated that stratification could enhance seed germination, however others sowed seeds directly into propagation containers. Additional lessons learned were processing tips and pitfalls, including the importance of wearing gloves during walnut processing.

After securing permits, the planning phase moved into scouting trips. Scouting trips were carried out primarily in August to observe the green walnut seed ripening. The scouting team primarily consisted of Naomi Fraga (Director of Conservation, CalBG), Gina Vollono (Coordinator, Seed LA), and Carolyn Mills (Graduate Student Research Assistant, CalBG). Voucher specimens were collected on scouting trips, and a follow up collection trip was estimated based on fruit condition.

### Field Work

The first scouting trip was on August 12, 2020 to Sullivan Canyon managed by MRCA, located in the Santa Monica Mountains, Los Angeles County by Naomi Fraga, Carolyn Mills, and

Gina Vollono. After a very steep trek down into the canyon, we surveyed for nearly six miles in an overstory of oaks with walnuts, and a small trickle of water flowing through in the middle of summer. A very shaded canopy still allowed for a number of walnuts to bear green fruit. The survey team confirmed a sufficient population size of up to 150 individual trees, bearing up to 30 fruits per tree. We estimated a return trip around September or October to collect the walnuts at peak ripeness. Gina Vollono returned to Sullivan Canyon on October 9, 2020 to collect the seeds identified on the scouting trip. It was observed that the fruit ripened later at this location, perhaps because the site is coastal and shadier than any other sites.

We collected walnuts from three sites that are near to each other, but separated by urban development. Naomi Fraga, Carolyn Mills, Katherine Pakradouni, and Gina Vollono surveyed Griffith Park on August 26, 2020. The population was scattered throughout a few square miles, mostly growing on the sides of steep slopes in sandy soil. We collected walnuts on the initial scouting trip because they were ready to harvest at that time. Gina Vollono Coordinated with Tania Romero to survey and collect walnuts at Ernest E. Debs park on September 3, 2020 within five miles of Griffith Park. Tania's experience harvesting walnuts at the site was invaluable, and she was also able to offer propagation support. Less than a mile from Debs Park is Elyria Canyon, an open space managed by MRCA in the urban core surrounded by residential neighborhoods. Elyria Canyon is primarily covered with invasive mustard, with extremely steep hillsides spotted with Oaks (*Quercus* sp.) and *Juglans californica*. Several individuals were located at Elyria Park and a successful collection was made by Gina Vollono on September 10, 2020. These three locations pose unique challenges to seed conservation in an urban and highly disturbed area. First, these populations have been highly impacted and reduced, so we were careful to ensure our collections met the threshold of collecting less than 10% of walnuts produced in 2020. Although these three sites are geographically very close, cross pollination is likely not inhibited by the dense urbanization that occurs between.

Naomi Fraga, Carolyn Mills, and Gina Vollono surveyed two populations for walnuts on land managed by the PHHA (Powder and Turnbull Canyons) on September 4, 2020. CalBG was granted permission to collect walnuts by PHHA based on the terms that they may collect from the CalBG conservation grove in the future. This arrangement is captured in an MOU attached to the report (Appendix A). Many of the walnuts from the season at the time of scouting visit had already been removed by wildlife. This was evident by the amount of nut detritus on the base of the tree. As a result, we were not able to collect walnuts from Turnbull Canyon and we were only able to collect 28 walnuts from Powder Canyon. Although the site did not yield as many nuts as expected, it was imperative to capture the genetic diversity at this site, since these populations expand the

geographic scope of the project. Seeds were collected from Powder Canyon by Gina Vollono on October 23, 2020.

### Seed Processing

All seeds were collected and kept separate by maternal line and placed into brown paper bags. The bags were labeled with the mother number, site location, and any relevant notes. The walnuts were processed by hand using a variety of tools to get the nuts cleaned. First, the outer shell was removed, then, using sharp scissors and files, the layer outside of the nut was shaved off. Brushes were used to wipe off any remaining material. The cleaned and processed walnuts were placed back into their labeled bags, and provided to the CalBG nursery manager, Bryce Kunzel for propagation.

### Results

As a result of this project we collected 374 walnuts from 34 mothers at five locations in Los Angeles County. The total seed collection weight was 1894.29 grams. Plants are currently being propagated with all seeds sown on December 11, 2020, using our standard seed mix, in community flats (tracked separately by maternal line). No cold stratification was used since seed sowing took place in the winter. Seed flats are currently housed in the liner house at the CalBG nursery facilities. Once we have the final number of plants produced we will coordinate distribution to partner institutions. Any additional seedlings that remain after distribution to APGA partners will be distributed to Seed LA internal partners including: Audubon Center at Debs Park, Grown in LA, Northeast Trees, Santa Monica Mountains National Recreation Area, Palos Verdes Peninsula Land Conservancy, and Theodore Payne Foundation. These organizations carry out a variety of ecologically beneficial projects, and all trees distributed will be used for education or restoration and are in line with our permits. The conservation grove at CalBG will hold up to approximately 30 individual trees, with equal representation from all collection sites.

### Contributing Partners

<u>Partnering Organization</u>	<u>Individual Contact</u>	<u>Contribution</u>
California Botanic Garden	Naomi Fraga,	Permit Acquisition Budget Management Scouting Collecting

	Cheryl Birker,	Seed Processing Collection Policy Support
	Gina Vollono,	Permit Acquisition Scouting Collecting Seed Processing Project Coordination
	Carolyn Mills,	Scouting Assistant
	Bryce Kunzel,	Seed Propagation
	Peter Evans,	Conservation Grove Planting Management
<b><u>North East Trees</u></b>	Diego Zapata,	Scouting at NET sites
<b><u>Audubon Center at Debs Park</u></b>	Tania Romero,	Seed Scouting Seed Collection Propagation Support Permit acquisition
<b><u>Commonwealth Nursery</u></b>	Katherine Pakradouni	Seed Scouting Seed Collection
<b><u>Grown in LA</u></b>	Kat Superfisky,	Seed Scouting
<b><u>Theodore Payne Foundation</u></b>	Genny Arnold,	Permit Acquisition Scouting Propagation Support
	Tim Becker,	Propagation Support

## Distribution Sites

<b>Garden</b>	<b>Location</b>	<b>Contact Name</b>	<b>Contact Title</b>	<b>Outreach?</b>	<b>Status</b>
<b>Fullerton Arboretum</b>	Fullerton	Greg Pongetti	Living Collections Curator	Yes	Yes
<b>UC Riverside Botanical Gardens</b>	Riverside	Janine Almanzor	Curator	Yes	Yes
<b>Los Angeles Arboretum</b>	Arcadia	Jim Henrich	Curator of Living Collections	Yes	Yes
<b>Ventura Botanical Gardens</b>	Ventura	Bennett Collings	Horticulture & Collections	Yes	Pending
<b>Santa Barbara Botanical Gardens</b>	Santa Barbara		Director of Horticulture	Yes	Pending
<b>San Diego Botanical Garden</b>	San Diego	Tony Gurnoe	Director of Horticulture	Yes	Yes



### Collection Information from Each Site

CalBG Accession #	Voucher	Seed Collection Location	Collection Date	Mother #	Quantity in bag	Grams
	Roa 48	Debs Park	9/3/20			
				1	10	48.05
				2	9	30.59
				3	10	32.46
				4	9	48.85
				5	10	31.77
				6	8	31
				7	10	41.28
				8	10	41.38
				9	9	34.15
				10	6	25.02
				11	11	30.6
				12	6	32.85
					<b>108</b>	<b>428</b>
	Roa 48	Griffith Park	8/26/20	Mother #	quantity in bag	grams
				1	10	22.45
				2	7	43.55
				3	10	68.11
				4	8	35.81
				5	10	36.81
				6	7	33.19
				7	7	42.48
				8	8	45.9
				9	11	39.77
				10	11	66.95
					<b>89</b>	<b>435.02</b>
	Fraga 6373	Mandeville Canyon	10/9/20	Mother #	quantity in bag	grams

				1	10	69.82
				2	2	12.29
				3	4	17.48
				4	8	70.08
				5	2	11.78
				6	18	102.18
				7	11	52.42
					<b>55</b>	<b>336.05</b>
	<b>Roa 48</b>	<b>Elyria Canyon</b>	<b>9/10/20</b>	<b>Mother #</b>	<b>quantity in bag</b>	<b>grams</b>
				1	11	37.48
				2	10	49.82
				3	9	55.75
				4	11	60.35
				5	9	55.63
				6	11	56.01
				7	10	78.2
				8	11	49.69
				9	12	102.07
					<b>94</b>	<b>545</b>
	<b>Fraga 6375</b>	<b>Powder Canyon</b>	<b>10/23/20</b>	<b>Mother #</b>	<b>quantity in bag</b>	<b>grams</b>
				1	4	26.24
				2	5	17.46
				3	3	16.26
				4	5	26.09
				5	11	64.17
					<b>28</b>	<b>150.22</b>
	<b>TOTALS</b>	<b>Grams:</b>	<b>1894.29</b>			
		<b>Pounds:</b>	<b>4.17</b>			
		<b>Quantity:</b>	<b>374</b>			

Photos

Map



Map of *Juglans californica* locations in greater Los Angeles. Red and blue dots are locations documented by herbarium specimens. Our collections locations are denoted by orange stars.

1) Sullivan Canyon. 2) Griffith Park. 2) Elyria Canyon, and Debs Park. 4) Powder Canyon.

Griffith Park:

Photo1: (left): Ripe walnuts on the tree at Griffith Park

Photo 2: (right) Naomi Fraga, Katherine Pakradouni, and Carolyn Mills scout and collect walnuts along an east facing slope.



**Puente Hills:**



Photo 3: Large *Juglans* specimen at Puente hills Habitat Authority, an oasis of native habitat within densely urban Los Angeles.



Photo 4: Small Juglans grove within Puente hills Habitat Authority offers shade, forage and protection for the bird and mammal populations at the site.

**Elyria Canyon:**



Photo 5: On the trail at Elyria Canyon, *Juglans* individuals can be found every few feet and grow along the steep hillsides. Gina Vollono collected seeds in smoky conditions while the Bobcat Fire, just twenty miles east, was at its height.



Photo 6: Processing the walnuts first required cracking its outer shell.





Photo 7: After the shells were cracked and the outer layer was scraped off, the walnuts are cleaned and ready to propagate.



Photo 8: Cleaned and processed walnuts separated in their maternal lines are packaged and ready to be sent to the nursery for propagation.