



*An Overview & Outlook for*

# CAL FIRE's Reforestation Services Program



STEWART  
MCMORROW  
STAFF CHIEF  
WILDFIRE  
RESILIENCE  
PROGRAMS

Reforestation Strategies for the Southern  
Sierra Nevada in an Era of Climate  
Change Symposium  
June 15, 2022



# But First! .....Some Personal Disclaimers!

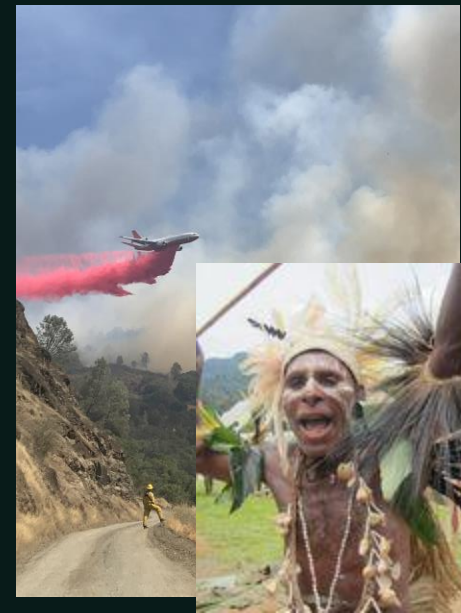
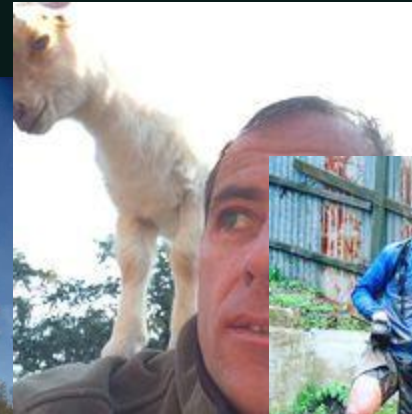


I used to...

- Be a wildlife biologist
- Be a timber faller and arborist
- Be an international forest carbon verifier
- Be a “forester”



- I have never planted a single tree or held a single job for more than 5 years.
- I am usually daydreaming about my next adventure.
- I am not an expert on reforestation



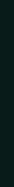
# Agenda

- Operational Overview
- Present Challenges
- Current Endeavors
- Future Projects





# Operational Overview







# Resource Management Programs

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Forest Practice

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Demonstration State Forests

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Urban & Community Forestry

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Forest Improvement

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**Wildfire Resilience → L.A. Moran Reforestation Center**

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Forest Pathology

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Vegetation Management Program

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Prescribed Fire

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Forest Health – Climate and Energy

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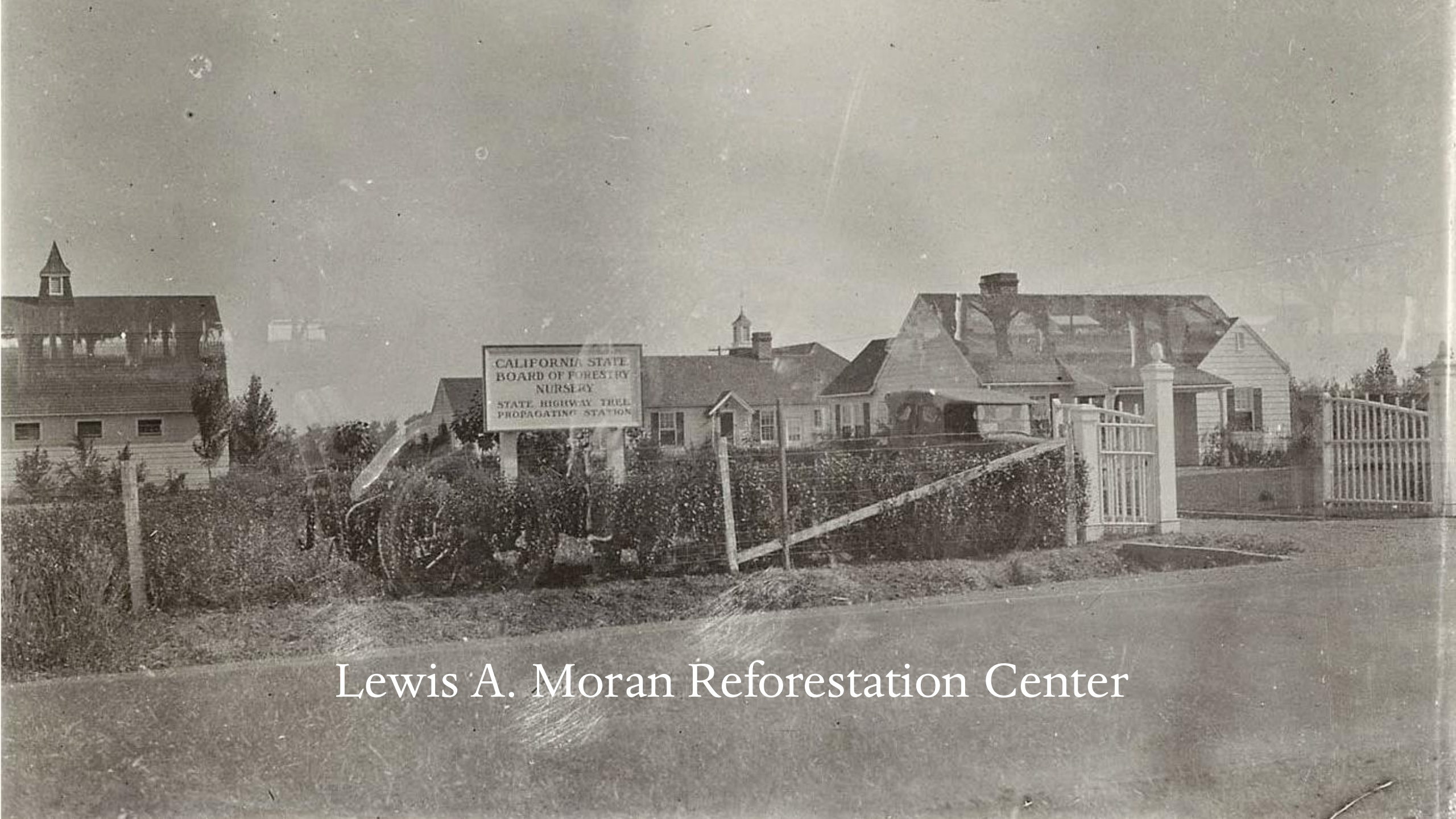
Wood Products & Bioenergy

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Archaeology







CALIFORNIA STATE  
BOARD OF FORESTRY  
NURSERY  
STATE HIGHWAY TREE  
PROPAGATING STATION

Lewis A. Moran Reforestation Center





MAIN OFFICE



# Over A Century of CAL FIRE Reforestation Assistance

Davis Nursery reopens.

2018



2006



Nursery closures as a result of budget cuts. Seedbank at minimum functionality.



2011

The last nursery at Magalia closes.



2022

40,229 pounds of seed

220,839 Seedlings

**LAMRC Staff (~8-13 FTEs)**

1 Forester II – Program Manager

1 Staff Services Analyst

Seed Bank:

2 Forestry Assistant IIs

1 Environmental Scientist

Nursery:

1 Senior Environmental Scientist

1 Environmental Scientist

1 Ret. Ann. For. Asst. II

Up to 5 Forestry Aides (Seasonal)

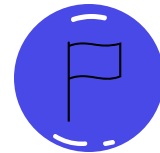
All state nurseries operating at full capacity

1974



Nurseries established in Mendocino, Butte, and Santa Cruz counties.

1947



1939



Division of Forestry sells seedlings reforestation, windbreak, erosion control, and fuelwood purposes.

1917



State Nursery System established

1940



Efforts to start cone collections and seed processing.

1921



Davis Nursery established to provide planting stock to highways and schools.



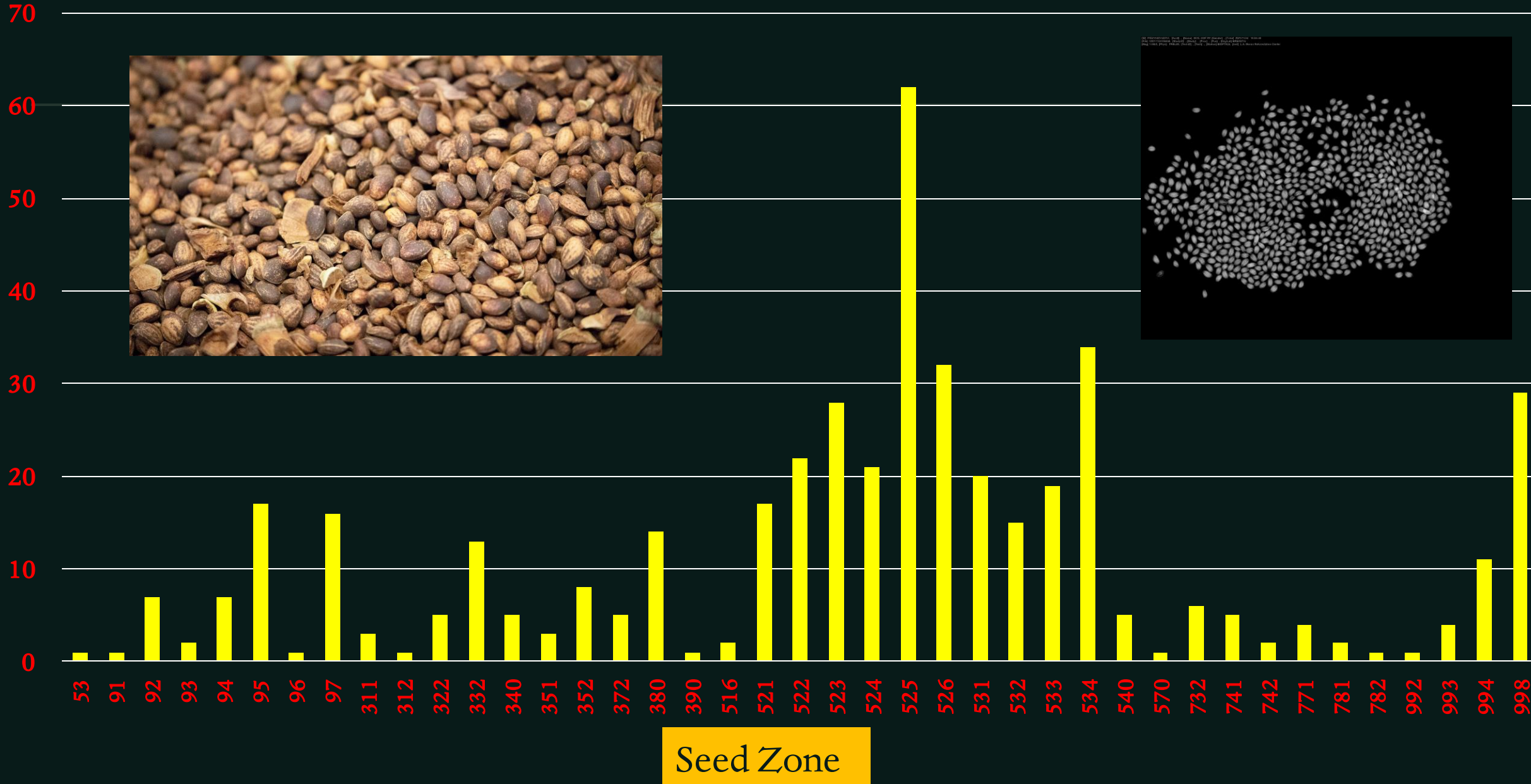
# LAMRC Cone Collection Stats by Species in 2021



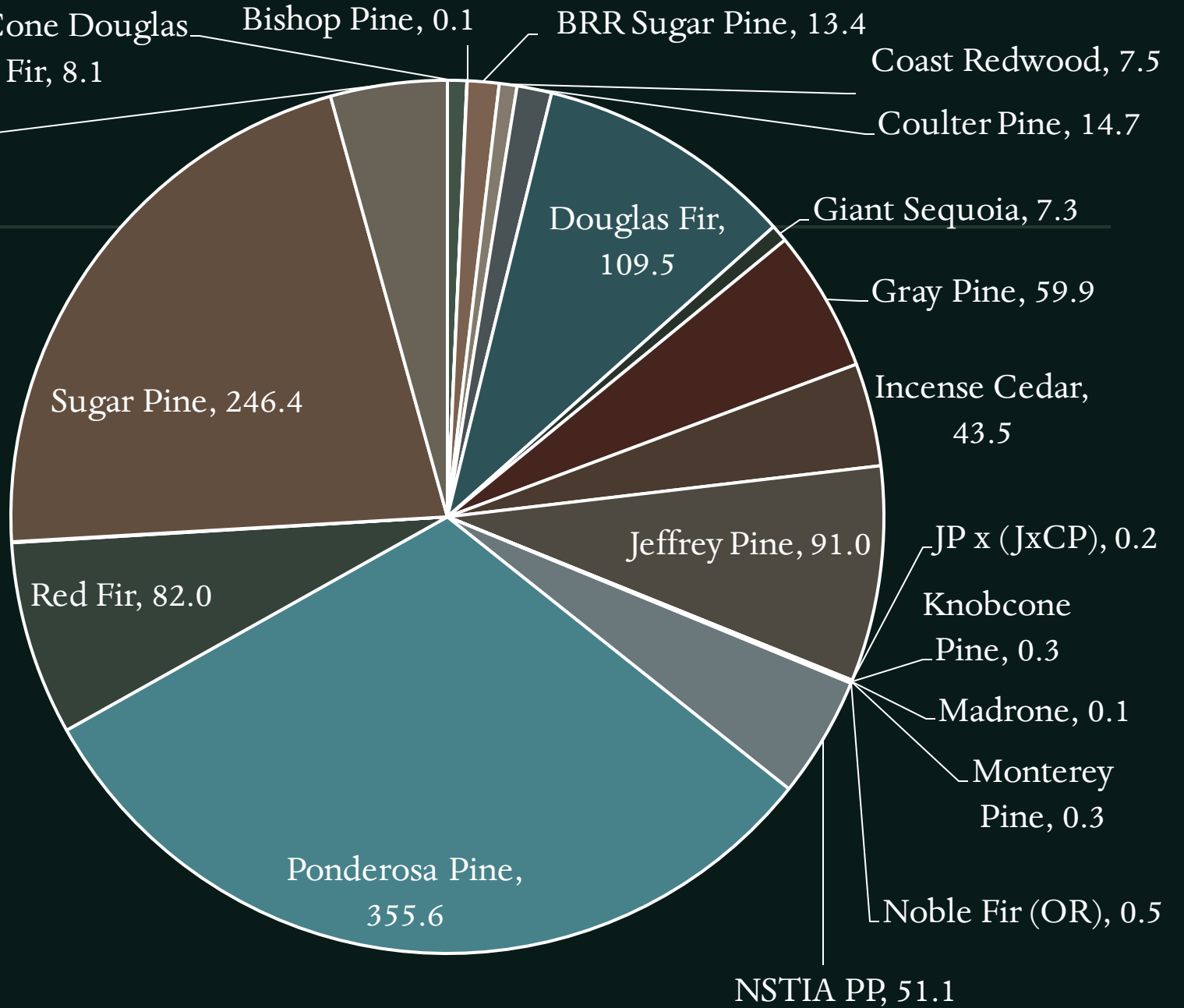
Species	# of Bushels	Lbs
CRW	14.75	48.56
IC	522.3	425.23
JP	62	73.22
PP	1196	1130.36
RF	268	290.89
SP	40	13.51
WF	24	28.31
<b>Grand Total</b>	<b>2127.05</b>	<b>2010.08</b>



# Filled Seed Orders, 2017-Present, By Seed Zone



# Filled Seed Orders by Species, 2017 to Present (in lbs)







## 2021 LAMRC Seedling Production

Ponderosa Pine / <i>Pinus ponderosa</i>	87,976
Coast Redwood / <i>Sequoia sempervirens</i>	61,074
Douglas Fir / <i>Pseudotsuga menziesii</i>	29,038
Giant Sequoia / <i>Sequoiadendron giganteum</i>	33,004
Incense Cedar / <i>Calocedrus decurrens</i>	5,380
Jeffrey Pine / <i>Pinus jefferyi</i>	1,220
Sugar Pine / <i>Pinus lambertiana</i>	1,264
Torrey Pine / <i>Pinus torreyana</i>	247
Monterey Pine / <i>Pinus radiata</i>	132
Bishop Pine / <i>Pinus muricata</i>	183
Gray Pine / <i>Pinus sabiniana</i>	70
Coulter Pine / <i>Pinus coulteri</i>	79
Monterey Cypress / <i>Cupressus macrocarpa</i>	91
Interior Live Oak / <i>Quercus wislizeni</i>	451
Blue Oak / <i>Quercus douglasii</i>	630
<b>Net seedling production:</b>	<b>220,839</b>

**2021  
LAMRC  
Seedling  
Production  
By Seed  
Zone**

Seed Zone	Region	Counties Encompassed	Quantity
094	Mendocino Coast	Mendocino	39
095	Sonoma / Mendocino Coast	Mendocino, Sonoma	138
096	Sonoma Coast	Marin, Sonoma	61
097	Central Coast / South Bay	San Mateo and Santa Cruz	61293
120	Central Coast	Monterey	223
140	Southern California Coast	Santa Barbara	45
161	Inland Bay Area	Santa Clara, San Benito	149
332	Inland North Coast Range	Tehama, Trinity	1,006
352	Inland North Coast Range	Sonoma, Mendocino	5,780
371	Inland North Coast Range	Glenn, Tehama	90
380	Napa	Napa and Lake	5,620
524	Northwestern Sierra Nevada	Butte and Plumas	14,558
525	Northern Sierra Nevada	Yuba, Nevada, Sierra, Placer	14,072
526	Central Sierra Nevada	El Dorado, Amador	11,129
533	Southern Sierra Nevada	Fresno	2,165
534	Southern Sierra Nevada	Tulare	103,995
998	Southern CA	San Diego	247

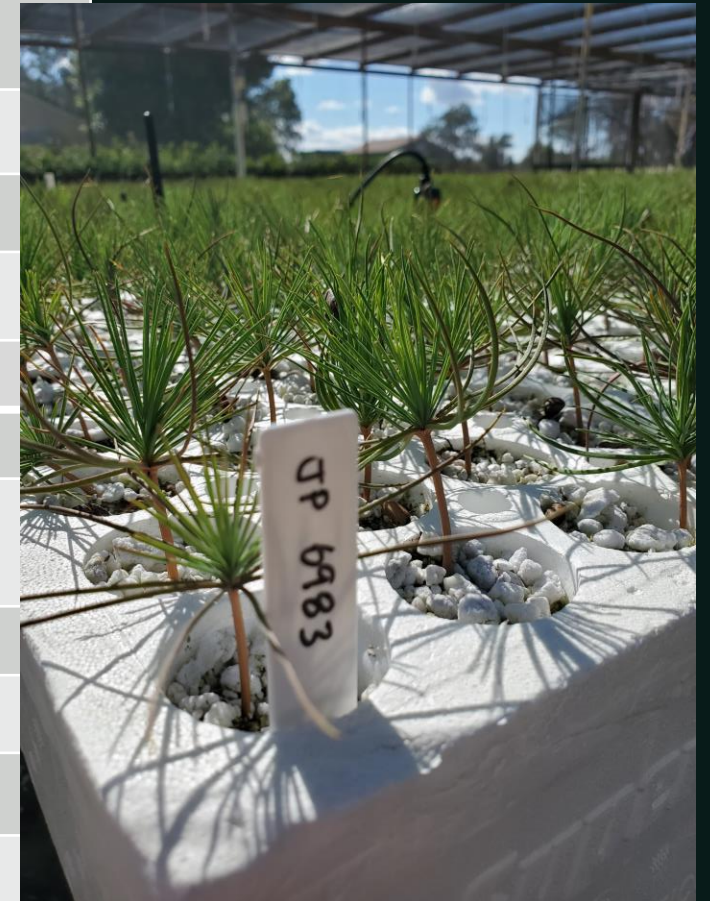




***Moving  
Forward...***

**2022 LAMRC  
Seeds Sown  
for Gross  
Production by  
Species**

Species	Gross Production (total for species)
Coast Redwood	36,075
Coulter Pine	1,184
Douglas Fir	29,063
Giant Sequoia	19,357
Grey Pine	54
Incense Cedar	21,234
Jeffrey Pine	27,787
Madrone	200
Ponderosa Pine	59,705
Red Fir	1,316
Sugar Pine	16,100
White Fir	2,025
<i>Total</i>	<i>214,046</i>

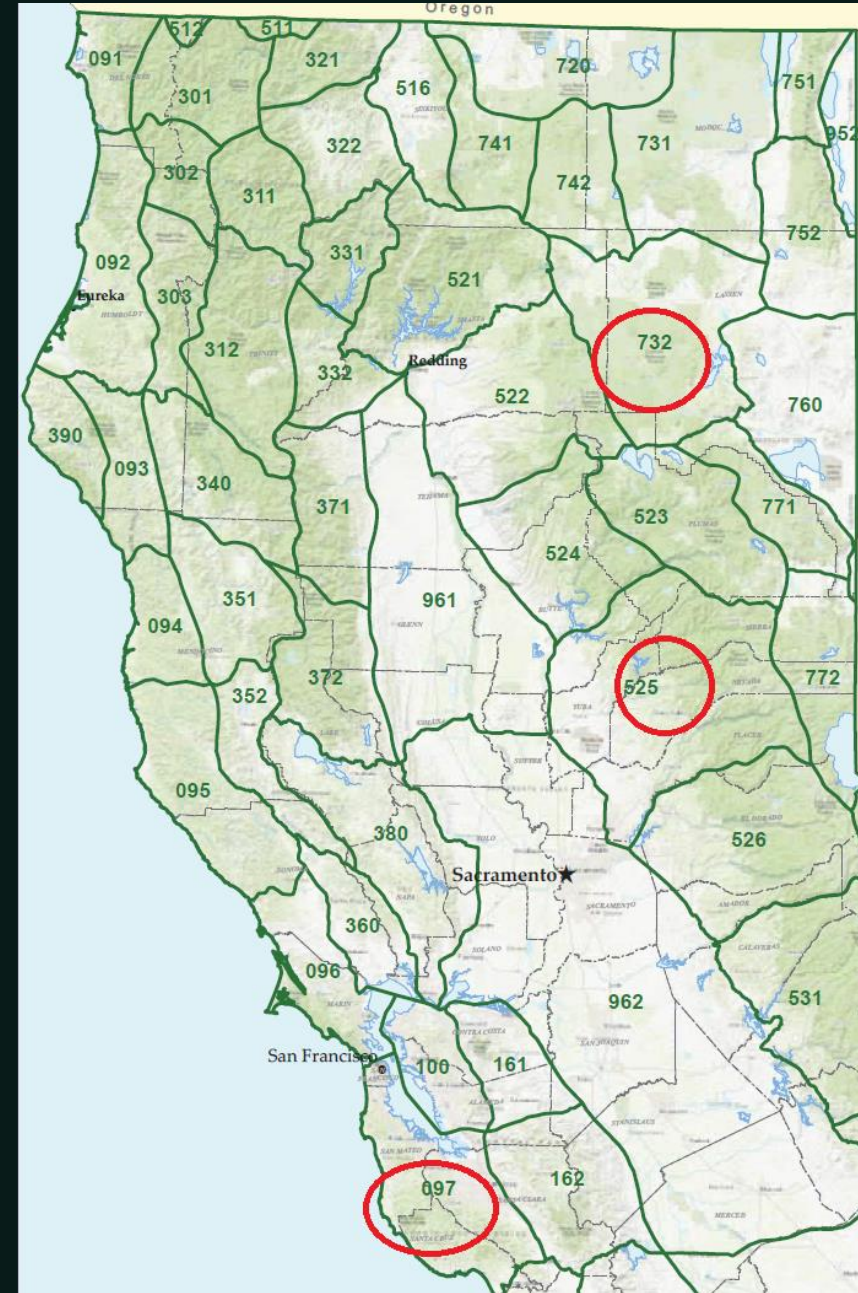




**2022  
LAMRC  
Seeds  
Sown for  
Gross  
Production  
by Seed  
Zone**

Seed Zone	Gross Production
092	4,255
094	8,028
095	1,305
<b>097</b>	<b>28,108</b>
161	52
161/162	54
371	1,208
380	200
522	4,894
523	9,969
524	11,919
<b>525</b>	<b>31,765</b>

Seed Zone	Gross Production
526	12,369
532	24,155
533	12,077
534	17,382
540	4,542
<b>732</b>	<b>27,183</b>
741	1,270
742	959
771	1,170
772	4,403
781	4,581
998	2,255





# Present Challenges







# Deforestation Scale







Cones are a crop that must be harvested when ripe.





System  
Irregularity

- Scarcity
- Periodicity
- Surveys
- Quality

- Accessibility
- Expertise
- Transportability



# LAMRC Infrastructure

Construction



Upkeep



Expansion



Occupancy

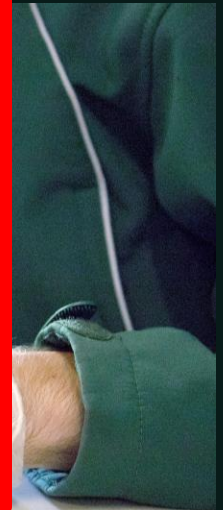


Purchasing





# Personnel





# Current Endeavors



# Educational Offerings

## REFORESTATION CYCLE DIAGRAM

## NATIVE OAKS HANDOUT



UPDATED  
WEBSITE

fire.ca.gov/programs/resource-management/resource-protection-improvement/wildfire-resilience/reforestation-center/

Incidents About Us Careers Programs Grants Resources Stats & Events Search

### Reforestation Services Program

(at Lewis A. Moran Reforestation Center)

California has been devastated in recent years by catastrophic wildfires, changing the landscape of forests and wildlands, our homes and lives. As fires sweep through the state, keeping our forests healthy and wildfire resilient is more important than ever. Growing enough trees to meet the increasing need is our highest priority—and future seedlings will contribute to the strength and restoration of the state's forestlands.

**ATTENTION LANDOWNERS!** Identifying healthy trees for cone collection is an important first step to harvesting seeds for future reforestation needs. CAL FIRE is asking landowners to assist with locating developing cone crops on native California conifers (pine, fir, cedar, redwood). A potential stand of conifer trees consists of approximately 15-20 healthy trees with the top third of the tree containing unopened cones. Please take note of the location (e.g. GPS coordinates) and tree species observed. Please contact the Seed Bank Manager with information about your potential crop.

If you have tree climbing experience, are privately insured, and are interested in cone collections, please contact [Denia.Troxell@fire.ca.gov](mailto:Denia.Troxell@fire.ca.gov) for details.

**NEW: 2022 Cone Collections & Contracting Training - Reforestation Cycle Flyer**

Type here to search



**LEWIS A. MORAN  
REFORESTATION CENTER**

COLLECTING AND SOWING ACORNS  
FOR  
CALIFORNIA'S NATIVE OAKS



# 2022 Cone Collections & Contracting Training



May 17<sup>th</sup>

- Southern California  
Coldwater Canyon Park  
12601 Mulholland Drive  
Beverly Hills, CA 90210

June 1<sup>st</sup>

- Central California  
Mid Valley Regional Fire Training Center  
9594 E. American Ave  
Del Rey, CA 93616

June 8<sup>th</sup>

- Northern California  
2741 Cramer Lane  
Chico, CA 95928

Contents:

- Cone collection standards.
- Overview of seed needs.
- ArcGIS tools.
- Cone collection & survey safety.
- Cone storage.
- Partnerships & how to contract with the agencies.



8:30am – 4:00pm

\*There will be a 1-hour break for lunch, but lunch is not provided.

## Further information:

The USFS, CAL FIRE, and American Forests are partnering to provide a free in-person cone collection & contracting training. Through this unified approach, we aim to increase our reforestation efforts. There will be three locations for this training to capture different areas within California. The trainings are open to foresters, USFS staff, CAL FIRE staff, and any interested contractors *but space is limited*.

To register fill out the form in the registration link: <https://forms.office.com/g/86xJPw0qhi>

\*please note that submission of form does not guarantee a spot. A follow-up email will be sent reserving your spot based on space availability.

For agency related questions contact: Olivia Roe from USFS at [olivia.roe@usda.gov](mailto:olivia.roe@usda.gov) or Denia Troxell from CAL FIRE at [denia.troxell@fire.ca.gov](mailto:denia.troxell@fire.ca.gov)







## L.A. Moran Reforestation Center Request Form

Thanks for your interest in plant materials from the LA Moran Reforestation Center! We produce containerized stock of conifer tree species for reforestation on private and state-owned lands in California. In addition, we maintain a seed bank of source-identified native conifer species from seed zones and elevations throughout California. If you are interested in obtaining seed and/or seedlings from us, please fill out the information below and a staff member will follow up with you to discuss the order details. Filling out this form does not guarantee that the seeds or seedlings you request will be available.

PLEASE NOTE: For seedling requests, we are currently only accepting 2023 contract orders for reforestation projects requiring 1,000 or more seedlings. We do not currently have any seedlings available: if you are small landowner looking for fewer than 1,000 seeds, please check back with us in the fall about 2022 seedlings.

\* Required

### Basic Information

1. First Name \*



### STATE SEED BANK SEED PRICES

Effective April 2010

SPECIES	0.1 LB	0.5 LB	1.0 LB	AVG SEED/LB
Coast Redwood	\$ 97.00	\$ 291.00	\$ 485.00	88,975
Sierra Redwood	\$ 77.00	\$ 231.00	\$ 385.00	78,500
Douglas-fir	\$ 58.00	\$ 174.00	\$ 290.00	Coastal 33,450 Sierra 27,400
Big Cone Douglas-fir	\$ 35.00	\$ 105.00	\$ 175.00	4,300
White Fir	\$ 26.00	\$ 78.00	\$ 130.00	10,200
Red Fir	\$ 25.00	\$ 75.00	\$ 120.00	4,700
Grand Fir	\$ 26.00	\$ 78.00	\$ 130.00	25,000
Incense Cedar	\$ 49.00	\$ 147.00	\$ 245.00	13,600
Pines				
Bishop	\$ 30.00	\$ 90.00	\$ 150.00	47,343
Coulter	\$ 30.00	\$ 90.00	\$ 150.00	1,325
Gray, Foothill	\$ 30.00	\$ 90.00	\$ 150.00	590
Jeffrey	\$ 27.00	\$ 81.00	\$ 135.00	3,700
Knobcone X Monterey (F1 Plantation)	\$ 44.00	\$ 132.00	\$ 220.00	16,300
Knobcone	\$ 44.00	\$ 132.00	\$ 220.00	17,400
Monterey (NZ source)	\$ 30.00	\$ 90.00	\$ 150.00	16,026

# Programmatic Efficiencies

- Policy, Guidance, BMPs
- Pricing & Terms of Sale
- Inventory Database
- Analytics
- Materials Interest Form
- Request Prioritization Framework
- Listserv & Marketing
- Stakeholder List & Networks
- Seed Needs Assessment...



### Planning process:

This extensive seed needs list represents a spatial analysis baseline of the number of bushels required to reforest 25% of private, non-industrial land to account for typical reforestation along with burned areas where fires burned >100 acres within each seed zone and 500' elevation band.

### To establish priority:

1. Areas are sorted by acres burned—highest to lowest.
2. Colors indicate priority of bushels needed for each species at each elevation band for each CAL FIRE Unit.

Key		
Color	Priority	No. of bushels
Red	HIGHEST	>100
Yellow	MEDIUM	11>100
White	LOW	<10

3. Each species within each unit/seed zone is grouped from highest to lowest elevation.

Number of bushels are matched to LAMRC inventory. Positive numbers indicate deficits and negative numbers indicate surplus.

Summary tab and Grand Totals are summations of **all positive** numbers.

Data can be sorted and narrowed down in either the “Filtered by units” (yellow tab) or “2022 Needs list” (green tab).

r Pine	525	6000-6500	98	98
r Pine	525	7000-7500	81	81
r Pine	525	7500-8000	30	30
e Fir	525	3500-4000	24	24

EXPLANATION	Summary	Filtered by units	2022 Needs list	+
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# CAL FIRE

# Seed Assessment

*(in draft)*



# Summary of Needs

*(as of May 2022)*

- Throughout all private state lands
- Across all elevation bands
- Including all seed zones
- Respective of LAMRC Inventory
- Spatial analysis/maps in process w/expected final draft imminent

Seed Zone	(All)
Row Labels	Sum of Positive bushel count
Big-Cone Douglas Fir	342
Coast Redwood	4494
Coulter Pine	1168
Douglas Fir	18297
Incense Cedar	15612
Jeffrey Pine	2995
Knobcone Pine	402
Lodgepole Pine	846
Ponderosa Pine	12685
Red Fir	2672
Sierra Red Fir	1214
Sierra Redwood	96
Subalpine Fir	119
Sugar Pine	10918
Western White Pine	673
White Fir	3770
(blank)	
<b>Grand Total</b>	<b>76304</b>



# Reforestation Strategy

## Working Group



# CALIFORNIA'S WILDFIRE AND FOREST RESILIENCE ACTION PLAN



### Key Actions:

#### 1.33 Develop Restoration Strategy for

**Federal Lands:** Given the recent fires, including 2020's unprecedented fire year, 650,000 to one million acres of federal land need some degree of reforestation. In spring 2021, the USFS, in partnership with American Forests and key stakeholders, will develop a strategy to restore its highest priority areas. This ecologically based strategy will focus on silvicultural practices to increase carbon

storage, protect biodiversity, and build climate resilience.

#### 1.34 Develop Coordinated State Restoration

**Strategy:** CNRA will partner with Cal OES, OPR, and other federal, state, and local agencies to develop a coordinated strategy to prioritize and restore non-federal burned areas and communities as part of the state's overall long-term recovery and resilience strategies.

**A Comprehensive Strategy  
of the Governor's  
Forest Management  
Task Force**



# Reforestation Strategy

## Working Group



AMERICAN FORESTS  
GRANT W / CAL FIRE



## Findings

- Nearly 5M acres of forestland in CA burned between 2019-2021 alone
- 1.5M of these considered high-severity burns, far enough from natural seed source but close enough to roads.
- Equates to between \$2-\$5B in reforestation costs across public, private industrial and non-industrial ownerships.
- Expected that approx. 225K of these high priority acres will actually be reforested by 2025.

- \$1M Award thru 2025
- Reforestation Pipeline Cooperative
- Cone Corps







# Financial Assistance



- Climate Adapted Seed Tool Contracts
- Workforce Development Grants
- Emergency Forest Restoration Teams
- Tree Improvement Investments
- Surveying & Collection Contracts
- Statewide Capacity Building

**NOTHING**



- ❖ No More Fires
- ❖ Consistent Funding
- ❖ Supporting Local Capacity & Partnerships
- ❖ Seed Orchard Investments
- ❖ Expanding species avail.
- ❖ Technological Support
- ❖ Network Collaboration



# Future Aspirations



Meeting the Reforestation Challenge in California  
within the confines of Government is a Daunting Task.

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You've gotta  
appreciate the....





Thank You

Stewart McMorrow

[Stewart.mcmorrow@fire.ca.gov](mailto:Stewart.mcmorrow@fire.ca.gov)

707-486-6408

<https://www.fire.ca.gov/programs/resource-management/resource-protection-improvement/wildfire-resilience/reforestation-center/>

