The Collective Pipeline to Climate-Smart Reforestation

The CA Tree Mortality Data Collection Network – 2021 Workshop | *March 11th 2021*

Britta Dyer, California State Director, American Forests

Road Map

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Who we are & What we do

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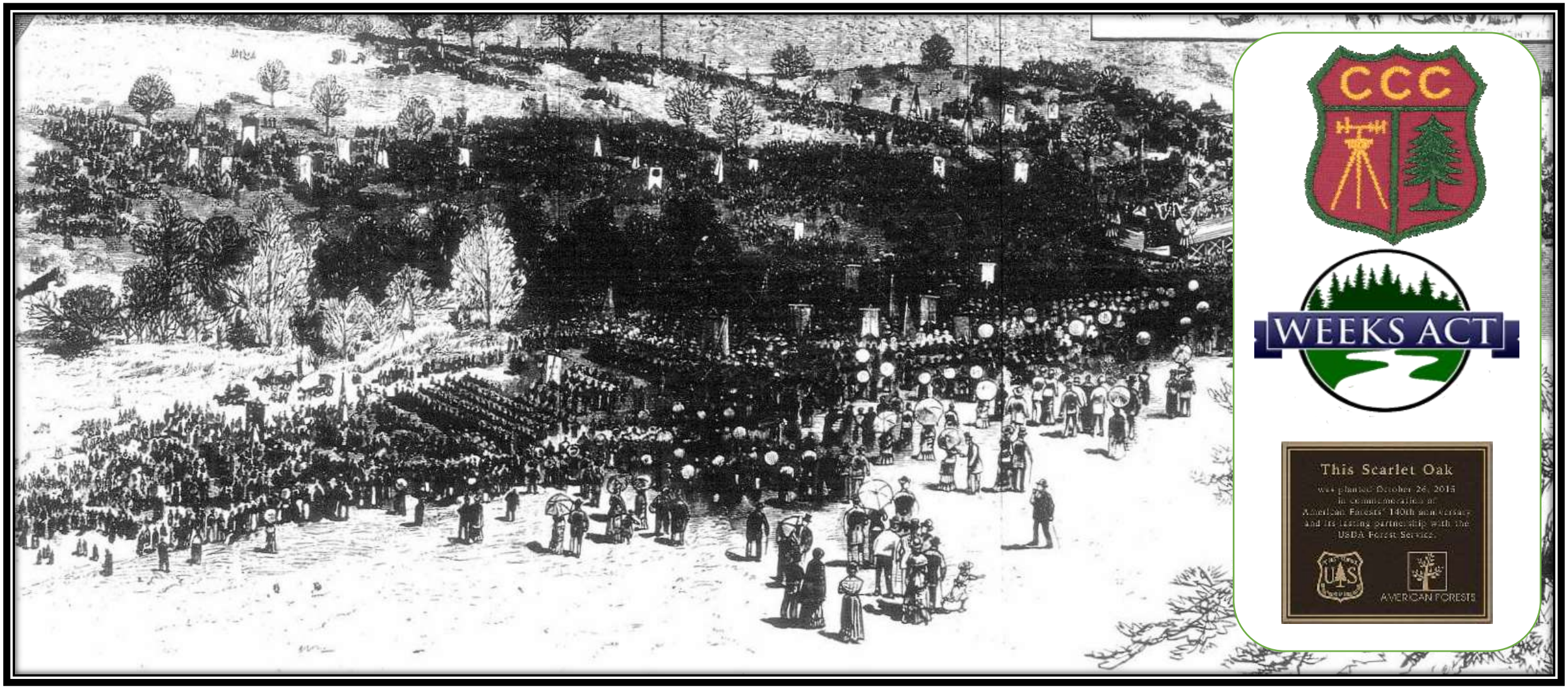

Providing Forest Leadership Since 1875

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Water, Wildlife, People *and* Climate

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Everywhere – Urban to Rural

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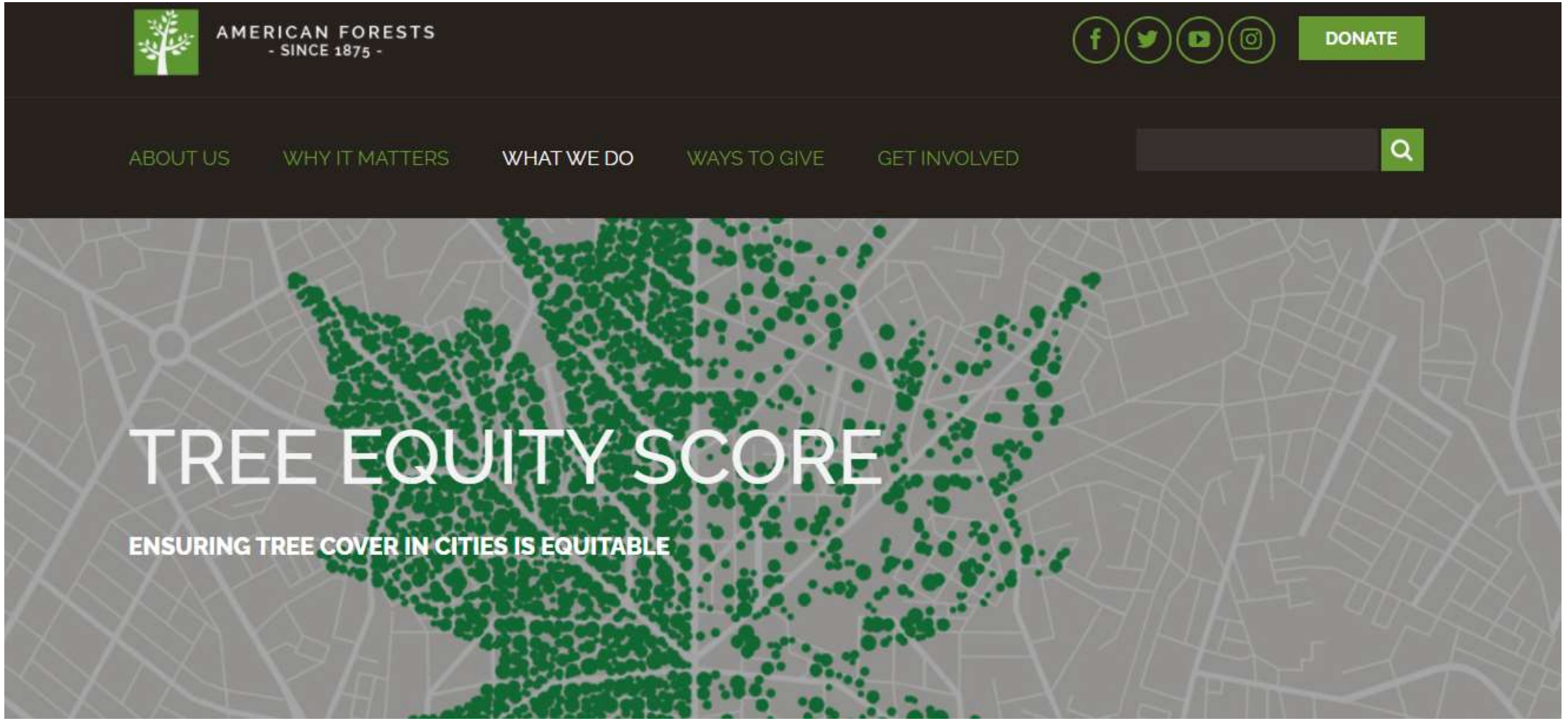

Community ReLeaf

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American ReLeaf

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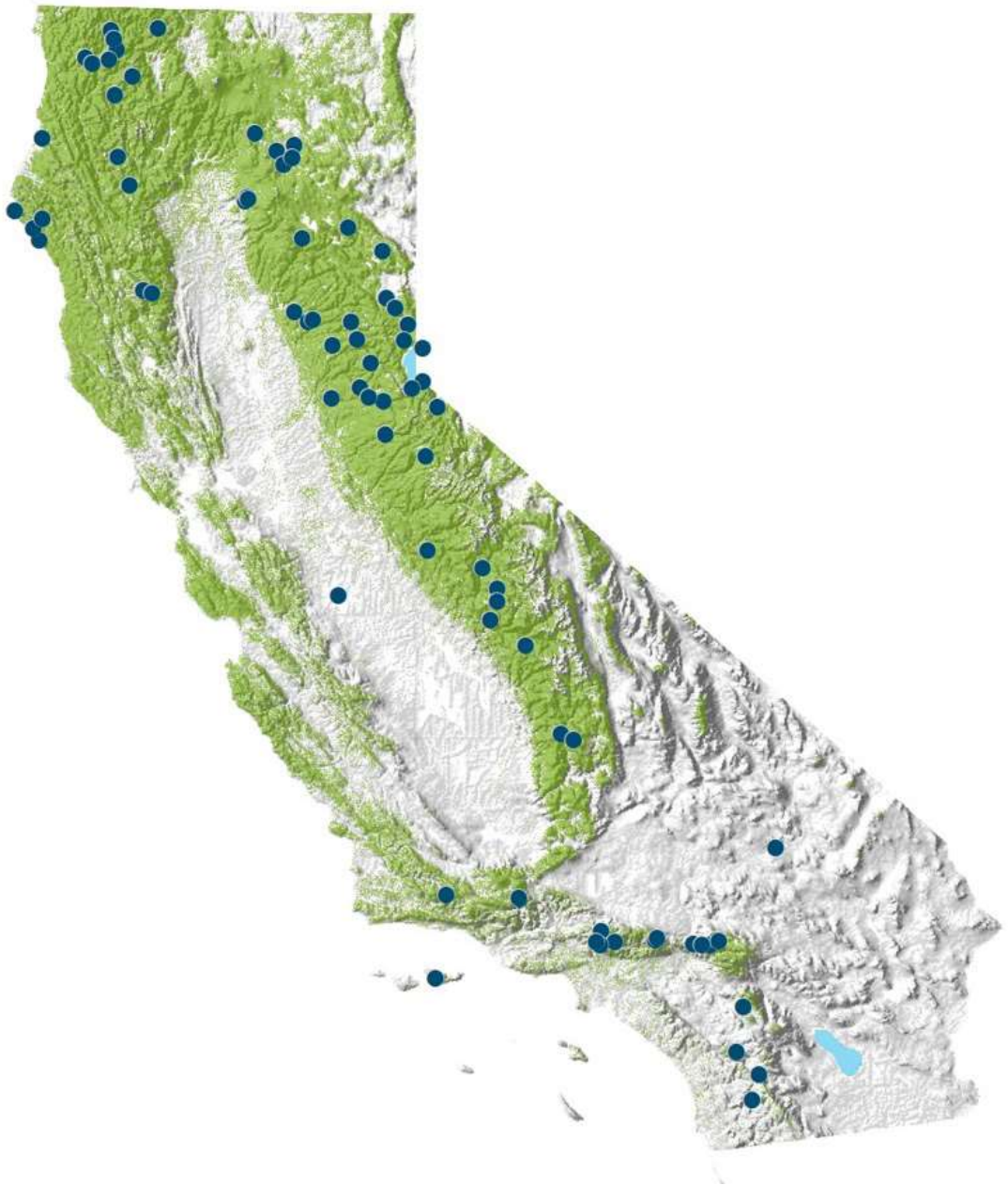

Since 1991, American Forests has completed over 140 reforestation projects in California, planting 8.4 million trees. Partners include:

- U.S. Bureau of Land Management
- U.S. Fish and Wildlife Service
- U.S. Forest Service (15 National Forest Units)
- CA Dept. of Parks and Recreation
- CA Wildlife Conservation Board
- CA Dept. of Forestry and Fire Protection
- Sierra Nevada Conservancy
- Mattole Restoration Council
- Resource Conservation Districts
- Sugar Pine Foundation
- The Forest Foundation
- Southern Sierra All-lands Recovery and Restoration Project Partnership

Niche & Forest Health Philosophy

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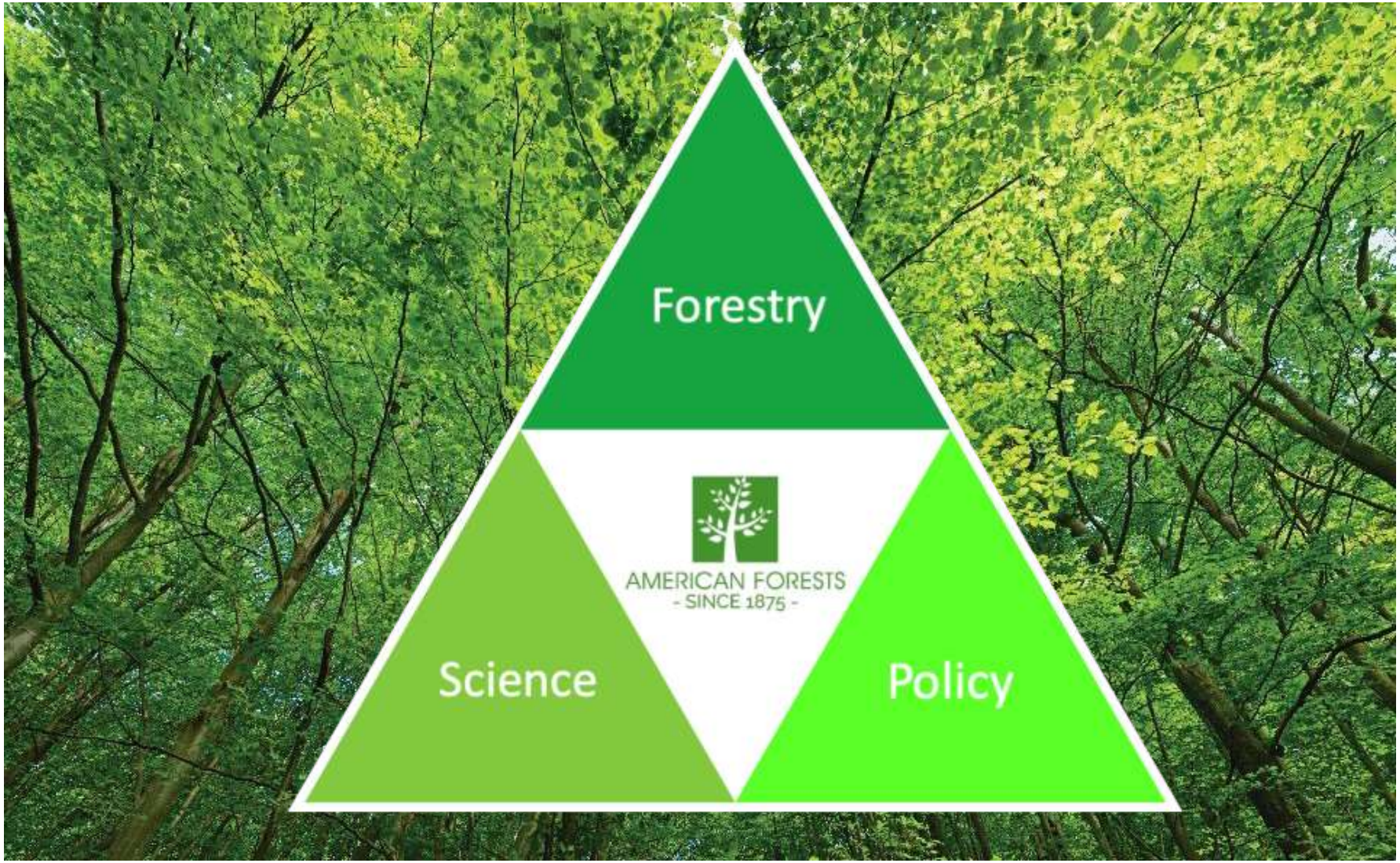

Linking Forestry, Science & Policy

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Restoring Resilience

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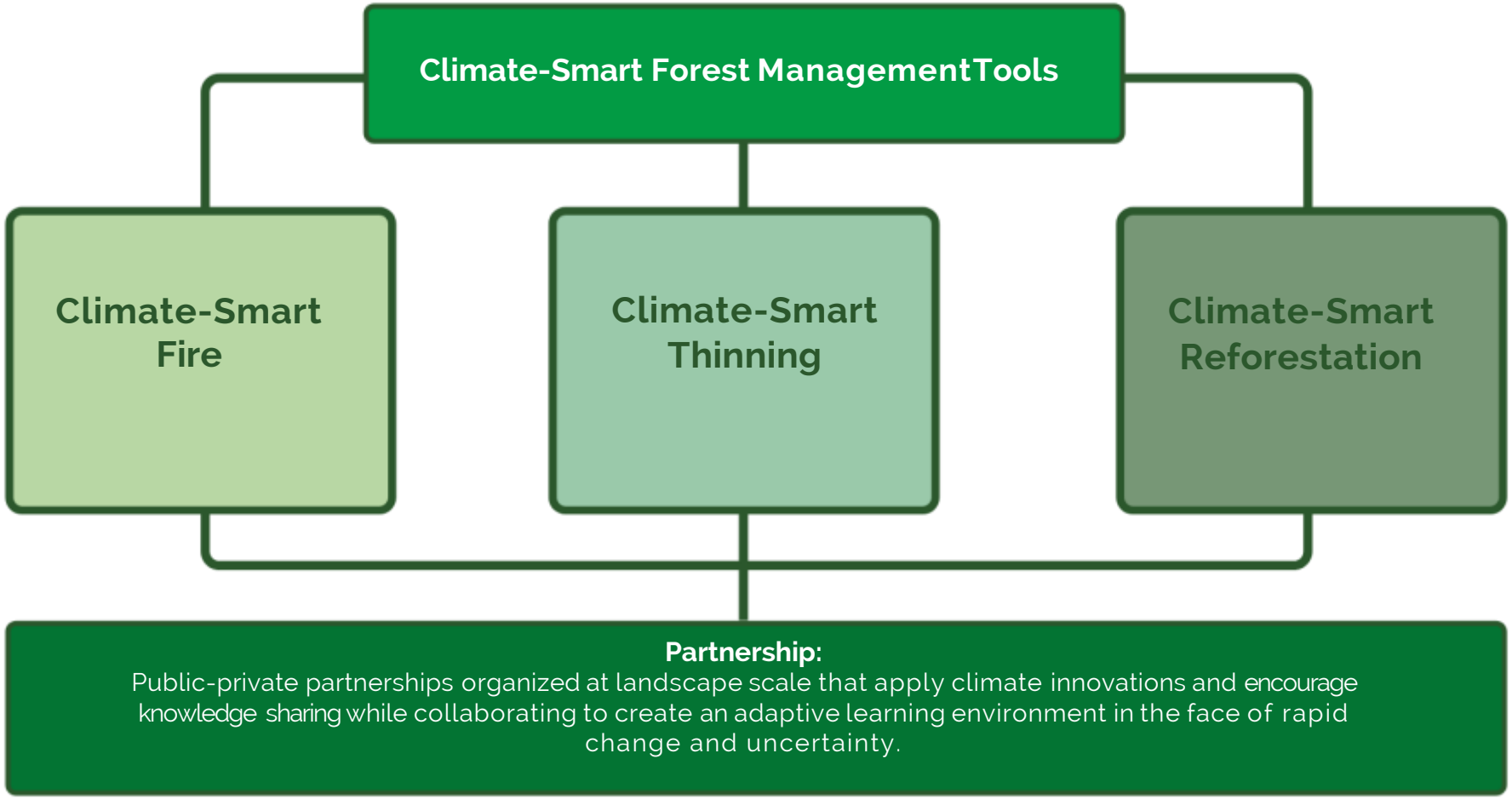
WHY: ***Climate change has increased forest mortality and doubled wildfire risk*** across the West and will rapidly grow worse

WHAT: Dramatically ***adjust the structure and composition of western forests*** for climate resilience

HOW: Through **3 climate-smart forestry tactics** delivered with a sense of urgency, increased scale & technical rigor



Climate-Smart Forest Management Tools

Sexy Seedlings vs. Solution Seedlings

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The Reforestation Pipeline

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Initial site prep

- Fuel Reduction
- Shrub Control

Planting

- Site Selection
- Species Diversity

Short-term management

- Monitoring
- Interplanting
- Manual Release
- Shrub Control
- Rx Fire

Long-term management

- Ongoing Monitoring
- Reintroduction of Natural Wildfire

Initial Site Prep & Shrub Control

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Planting

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Source: UCANR

Short Term Management

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Long Term Management

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- Tree species selection
- Resilient genetics
- Specialized & site-specific planting techniques
- Densities and patterns that consider future climate
- Recreating the forests of tomorrow with a good fire adapted future

Site Selection

Species Diversity

Strategic Spacing

Climate-Smart Reforestation Menu

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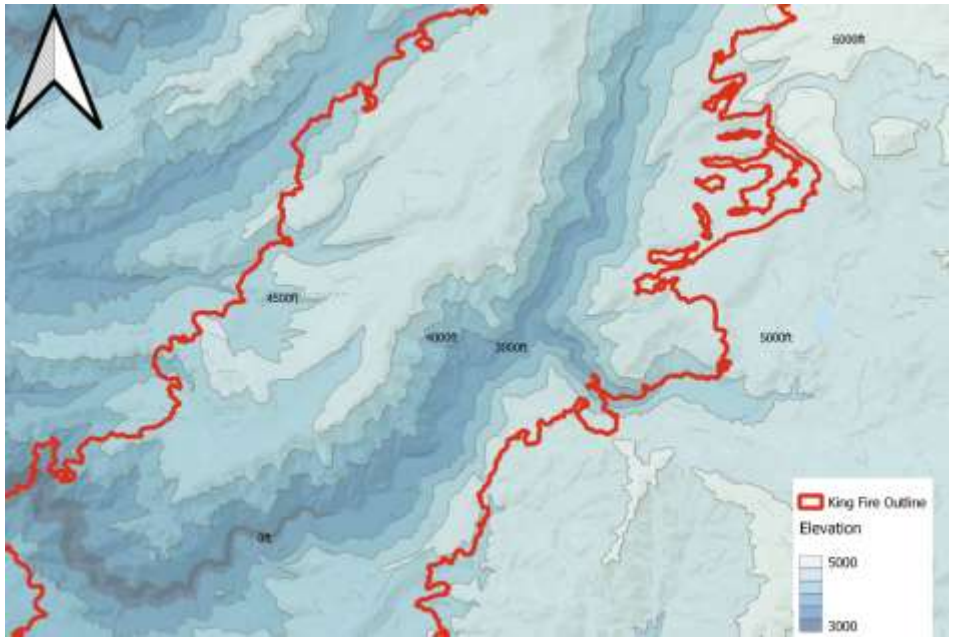

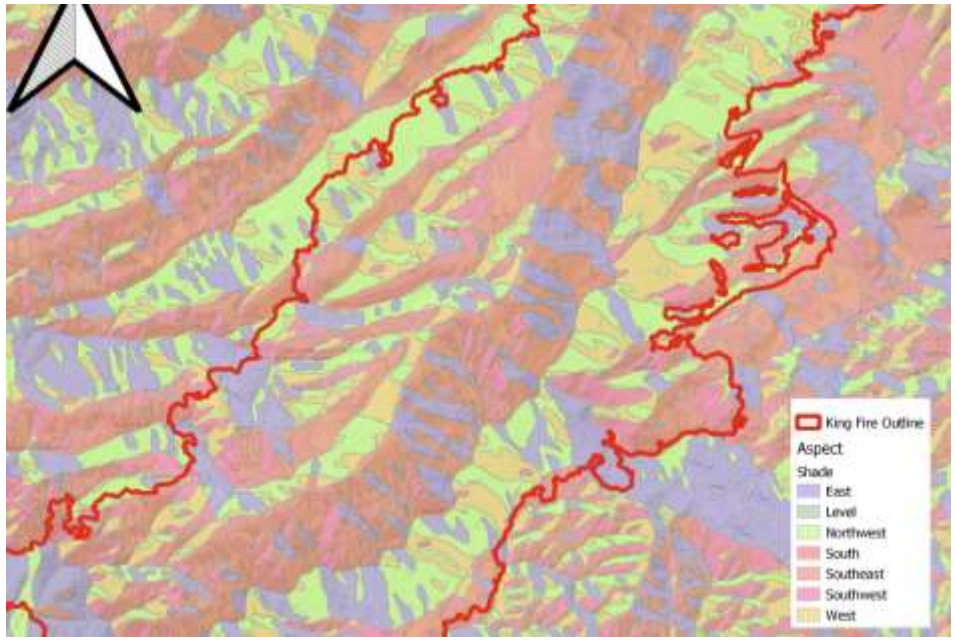

Site Selection

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Species Selection & Diversity

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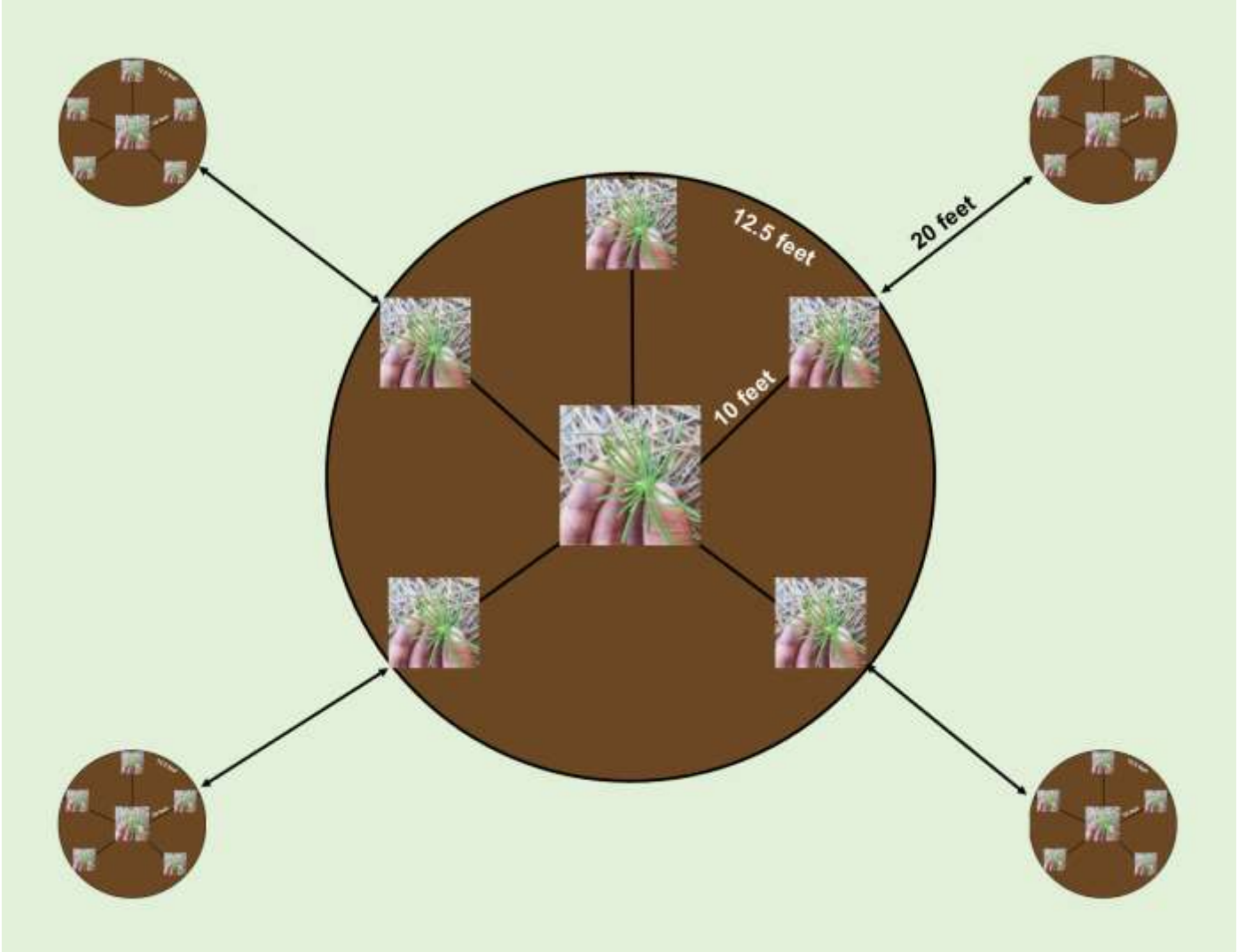

Strategic Spacing

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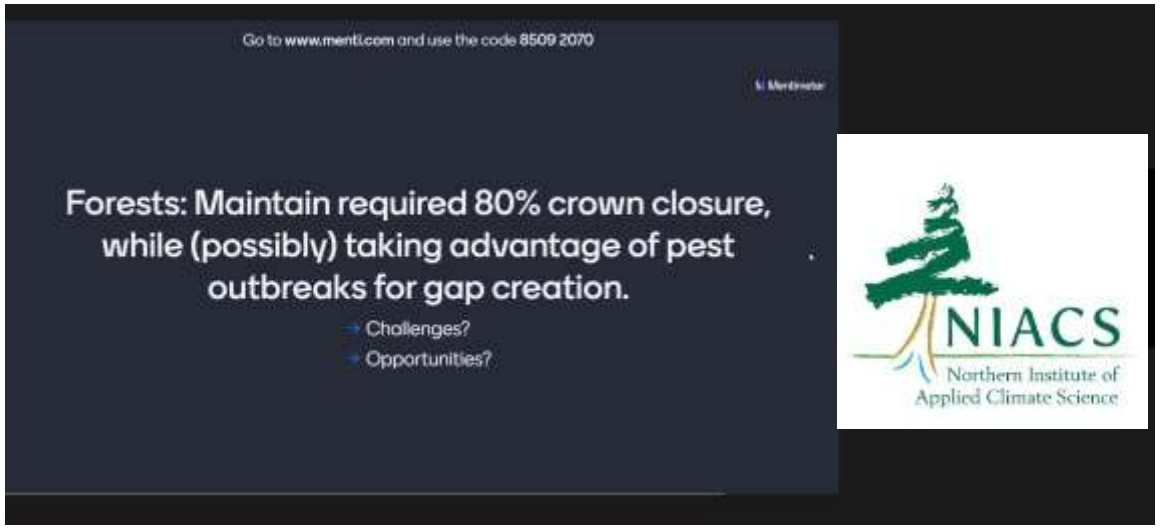

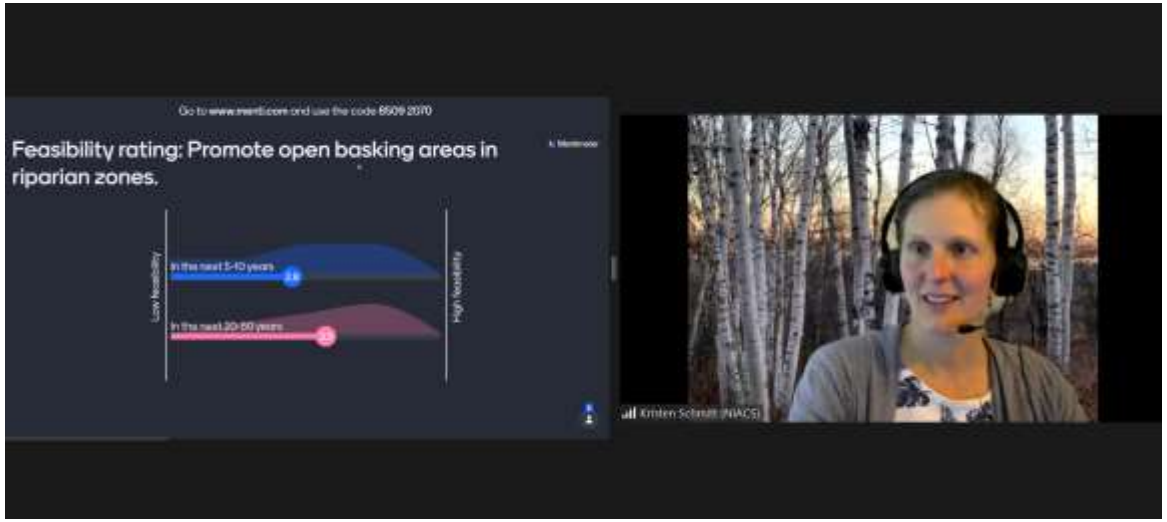

Climate Conversations

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Identifying Needs & Securing Resources

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Top 20 Largest California Wildfires

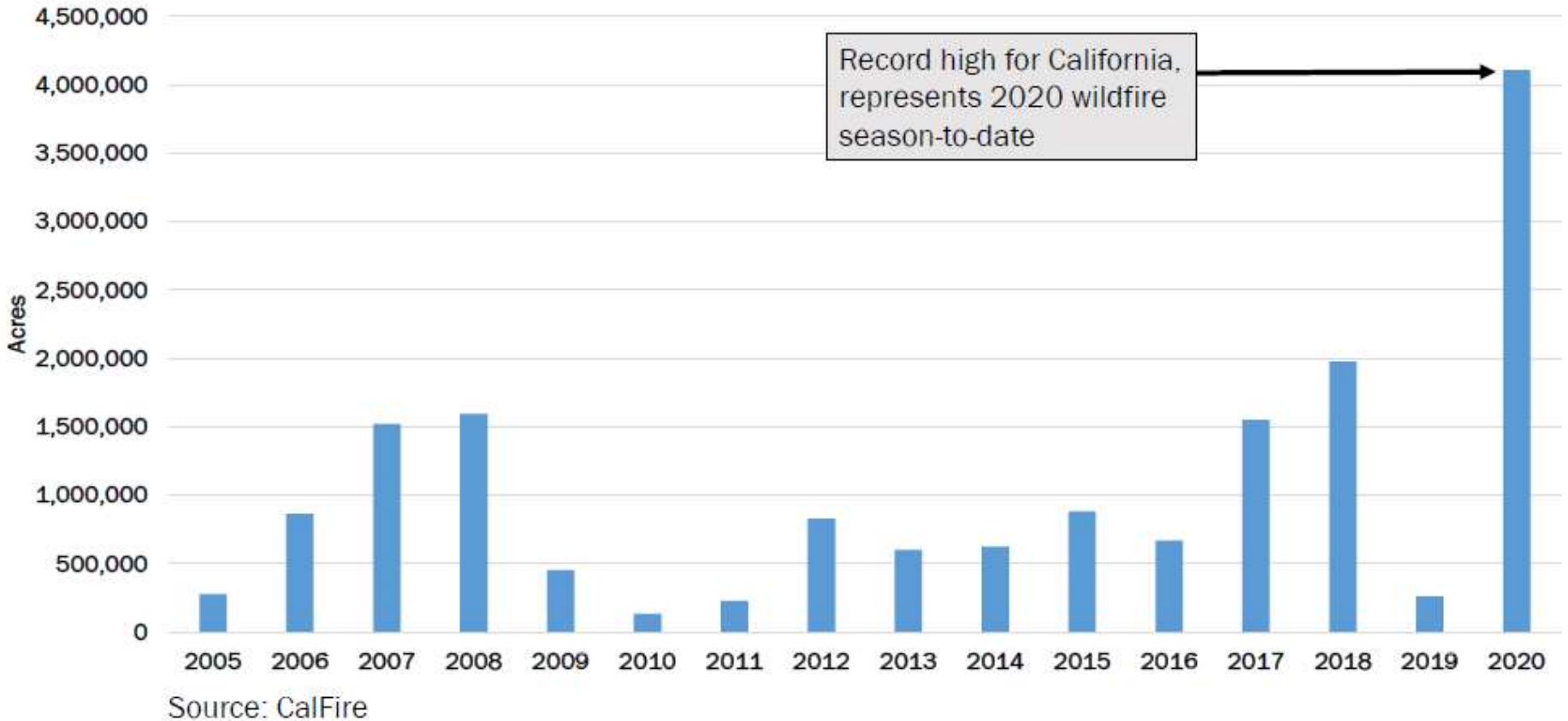
	FIRE NAME (CAUSE)	DATE	COUNTY	ACRES	STRUCTURES	DEATHS
1	**AUGUST COMPLEX** *(Under Investigation)**	August 2020	Mendocino, Humboldt, Trinity, Tehama, Glenn, Lake, & Colusa	**1,032,649**	935	1
2	**MENDOCINO COMPLEX** *(Under Investigation)*	July 2018	Colusa, Lake, Mendocino & Glenn	**459,123**	280	1
3	**SCU LIGHTNING COMPLEX** *(Under Investigation)**	August 2020	Stanislaus, Santa Clara, Alameda, Contra Costa, & San Joaquin	**396,624**	222	0
4	**CREEK FIRE** *(Under Investigation)**	September 2020	Fresno & Madera	**377,693**	853	0
5	**LNU LIGHTNING COMPLEX** *(Under Investigation)**	August 2020	Sonoma, Lake, Napa, Yolo & Solano	**363,220**	1,491	6
6	**NORTH COMPLEX** *(Under Investigation)**	August 2020	Butte, Plumas & Yuba	**318,930**	2,352	15
7	**THOMAS** *(Powerlines)*	December 2017	Ventura & Santa Barbara	**281,893**	1,063	2
8	**CEDAR** *(Human Related)*	October 2003	San Diego	**273,246**	2,820	15
9	**RUSH** *(Lightning)*	August 2012	Lassen	**271,911 CA / 43,666 NV**	0	0
10	**RIM** *(Human Related)*	August 2013	Tuolumne	**257,314**	112	0
11	**ZACA** *(Human Related)*	July 2007	Santa Barbara	**240,207**	1	0
12	**CARR** *(Human Related)*	July 2018	Shasta County & Trinity	**229,651**	1,614	8
13	**MATILIJA** *(Undetermined)*	September 1932	Ventura	**220,000**	0	0
14	**WITCH** *(Powerlines)*	October 2007	San Diego	**197,990**	1,650	2
15	**KLAMATH THEATER COMPLEX** *(Lightning)*	June 2008	Siskiyou	**192,038**	0	2
16	**MARBLE CONE** *(Lightning)*	July 1977	Monterey	**177,866**	0	0
17	**LAGUNA** *(Powerlines)*	September 1970	San Diego	**175,425**	382	5
18	**SQF COMPLEX** *(Lightning)*	August 2020	Tulare	**170,384**	228	0
19	**BASIN COMPLEX** *(Lightning)*	June 2008	Monterey	**162,818**	58	0
20	**DAY FIRE** *(Human Related)*	September 2006	Ventura	**162,702**	11	0

There is no doubt that there were fires with significant acreage burned in years prior to 1932, but those records are less reliable, and this list is meant to give an overview of the large fires in more recent times.
This list does not include fire jurisdiction. These are the Top 20 regardless of whether they were state, federal, or local responsibility.
*Numbers not final.

CAL FIRE

11/3/2020

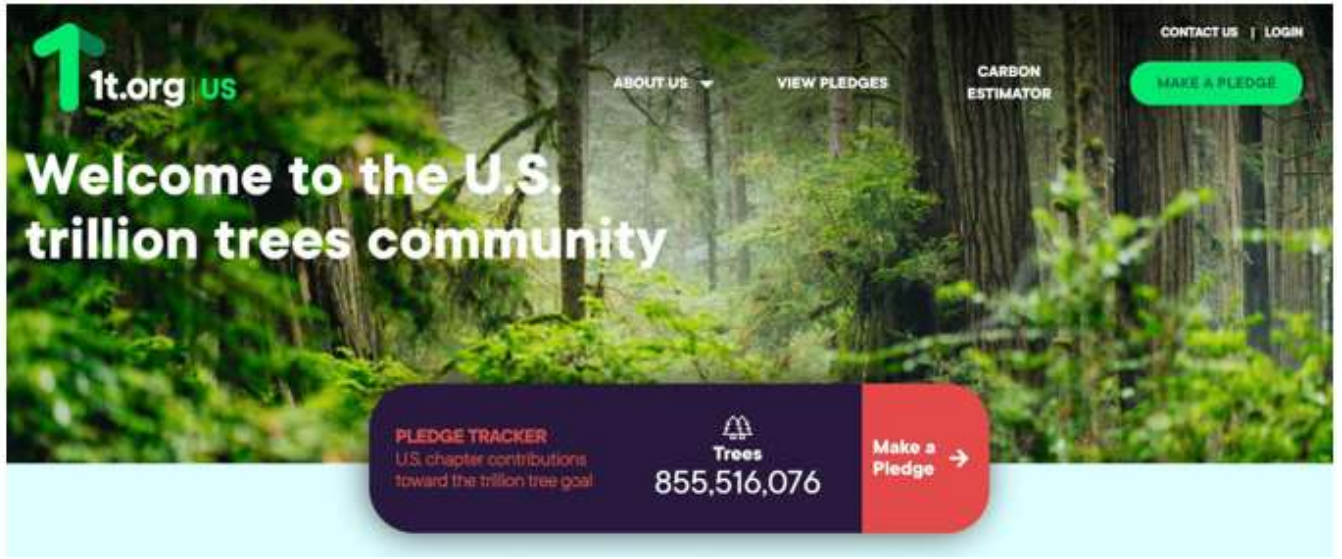
California Wildfire Acres Burned over Past 15 Years



Source: CalFire

WORLD ECONOMIC FORUM

The Nature Conservancy



Identify Needs & Securing Resources

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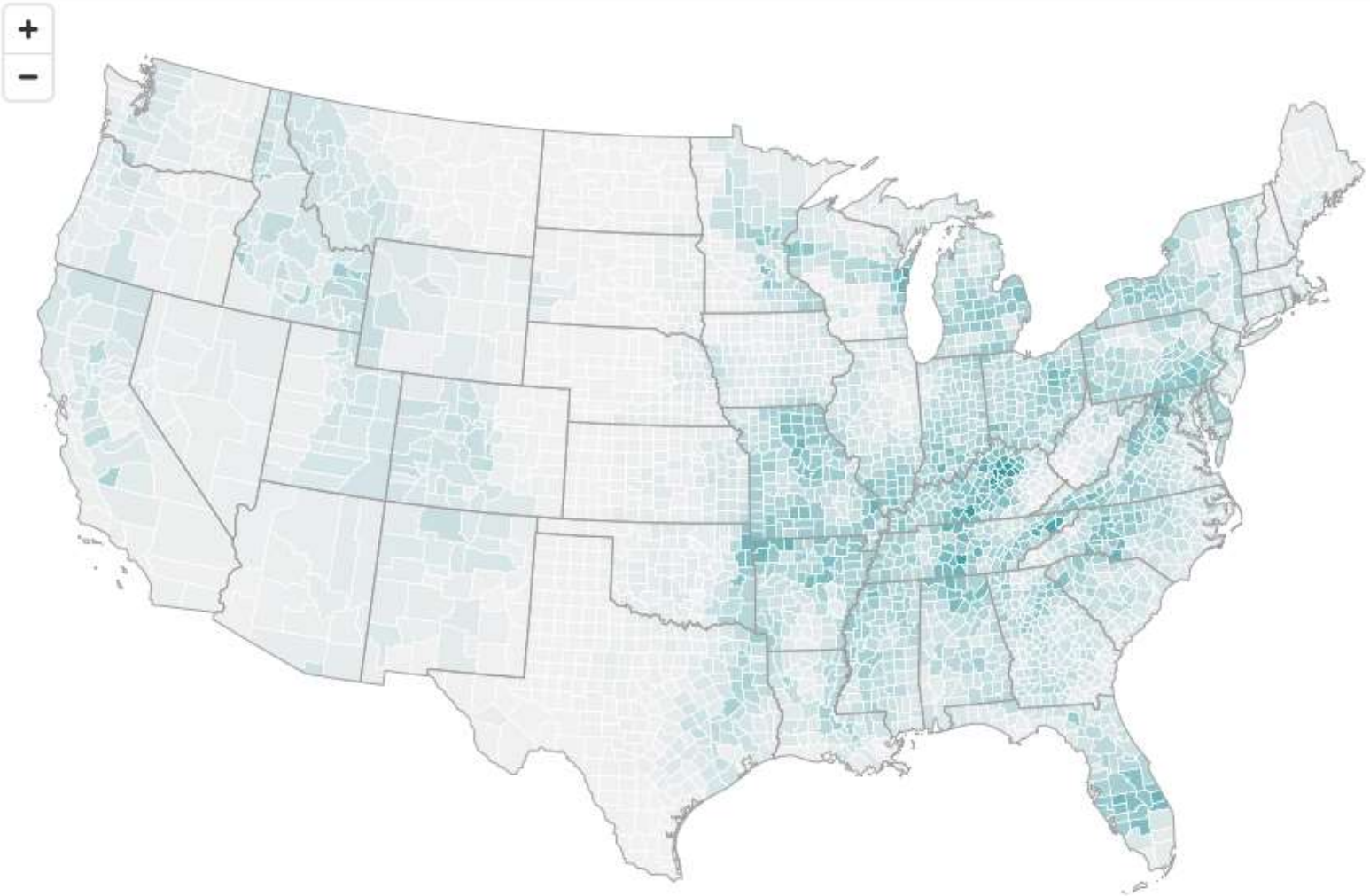
REFORESTATION HUB

About FAQ Select a state



There are up to 133 million acres of opportunity in the United States to restore forest cover for climate mitigation.

Reforesting these areas with approximately 68 billion trees could capture 333 million tonnes of CO_2 per year, equivalent to removing 72 million cars from the road.

Low High

Total Opportunity Acres

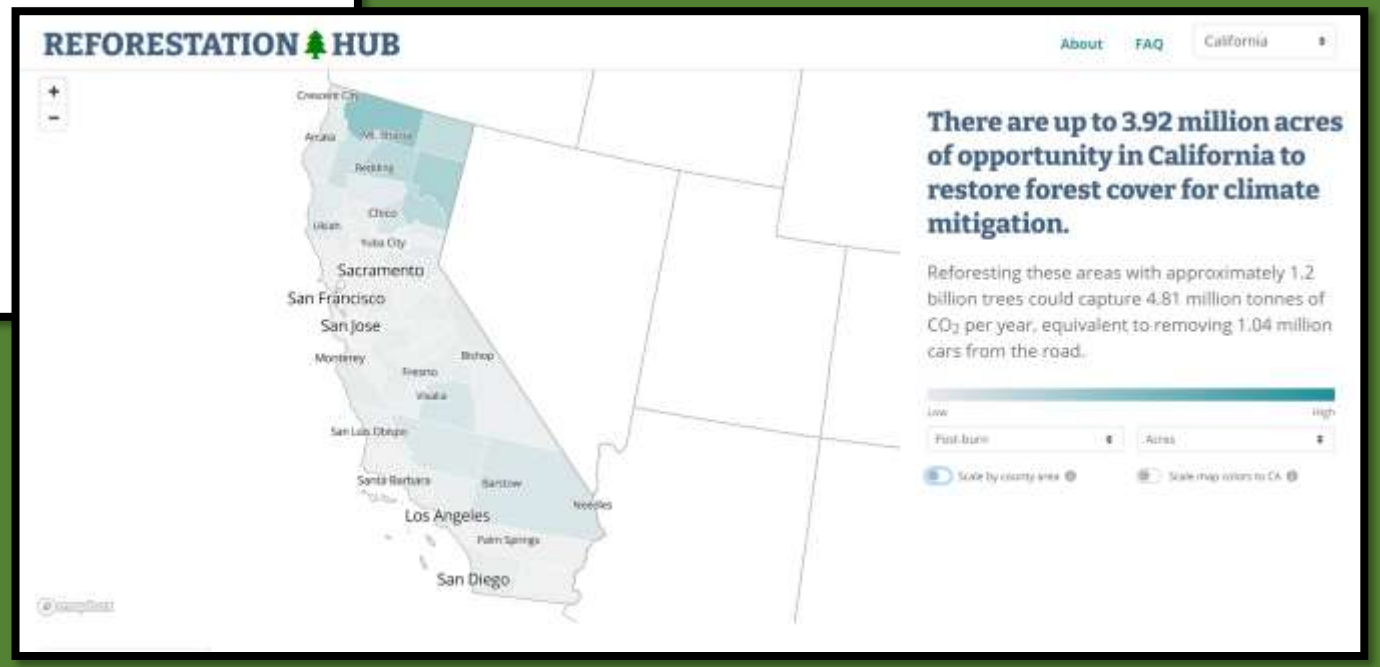
Scale by county area

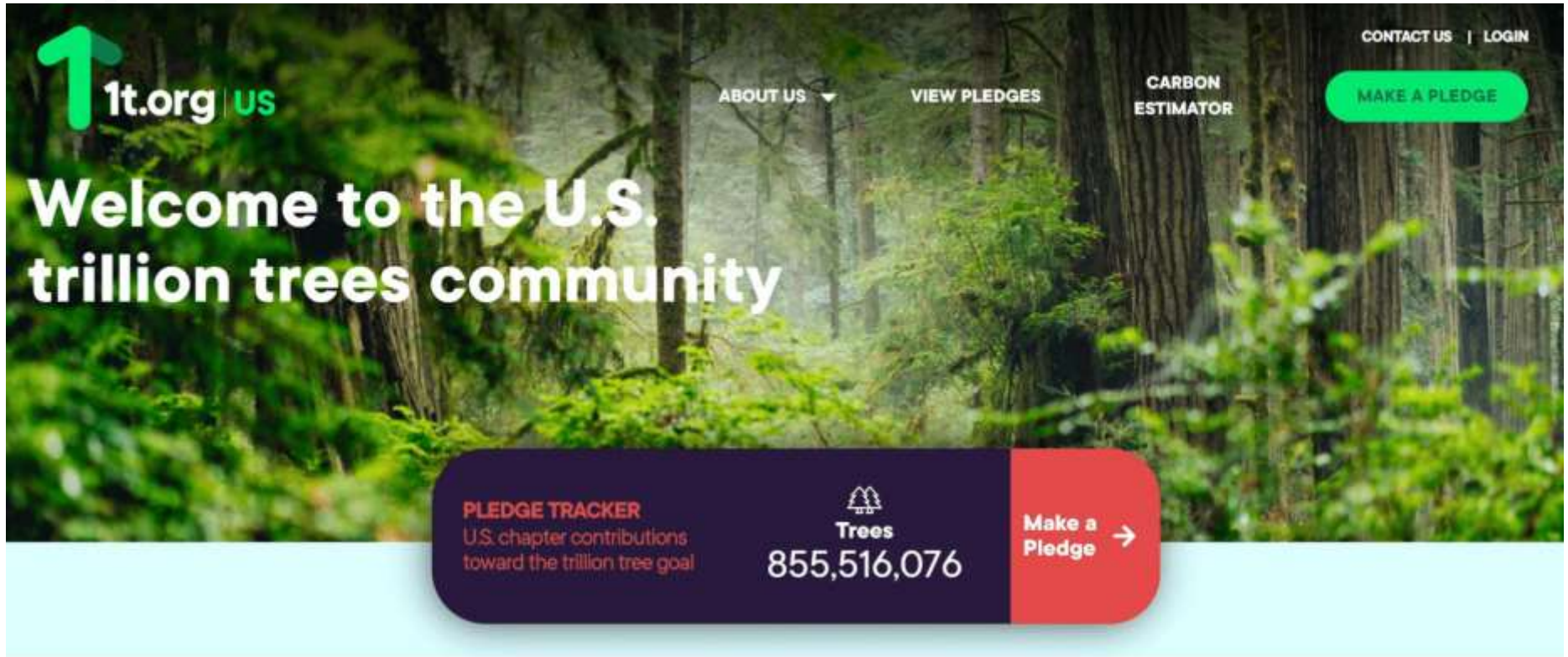
Opportunities

Opportunity	CO_2 (t/yr)	Acres
Total opportunity	4.81 M	3.92 M
Corridors	626,000	455,000
Floodplains	712,000	654,000
Forest	539,000	409,000
Marginal Cropland	660,000	661,000
Grassy Areas	521,000	350,000
Pasture	687,000	624,000
Post-burn	714,000	566,000
Shrub	1.57 M	1.07 M
Streamside Buffers	270,000	211,000
Urban Open Space	428,000	406,000

Ownership

Ownership	CO_2 (t/yr)	Acres
Total opportunity	4.81 M	3.92 M
Federal	1.46 M	991,000
State	66,300	55,300
Private	3.04 M	2.7 M
Other	237,000	163,000
US Forest Service	1.01 M	733,000
Bureau of Land Mgmt	336,000	192,000

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Tucson's Million Trees is now part of a global effort! @1t_org launched the U.S. chapter last week and organizations around the world are coming together to mitigate climate change by conserving, restoring and growing trees.
TUCSON MILLION TREES


Microsoft On the Issues
We're proud to support the launch of the U.S. Chapter of @1t_org and join the #TrillionTrees community to create healthy and resilient forests for future generations.
Learn more about our pledge to #ConserveRestoreGrow msft.it/6000TS7aq
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Now's the time to reset our world around nature


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Protect, Grow & Restore Future Forests

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Tools & Resources

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frontiers in Forests and Global Change

ORIGINAL RESEARCH
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Challenges to the Reforestation Pipeline in the United States

Joseph Fargione[1], Diane L. Haase[2], Owen T. Burney[3], Olga A. Kildisheva[4], Greg Edge[5], Susan C. Cook-Patton[6], Teresa Chapman[7], Austin Rompel[8], Matthew D. Hurteau[9], Kimberley T. Davis[10], Solomon Dobrowski[11], Scott Enebak[12], Rafael De La Torre[13], Arvind A. R. Bhuta[14], Frederick Cubbage[15], Brian Kittler[8], Daowei Zhang[16] and Richard W. Guldin[17]*

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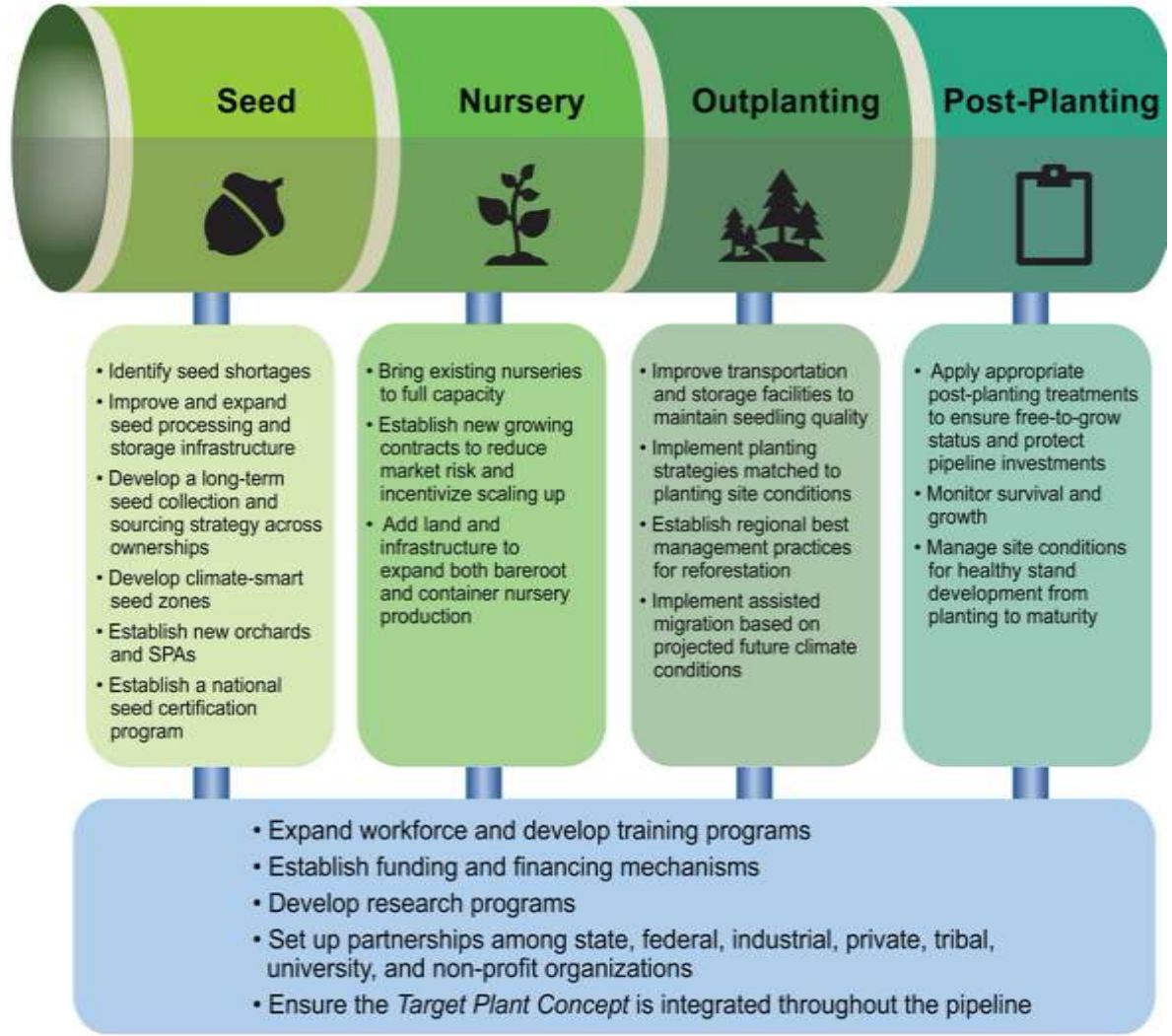
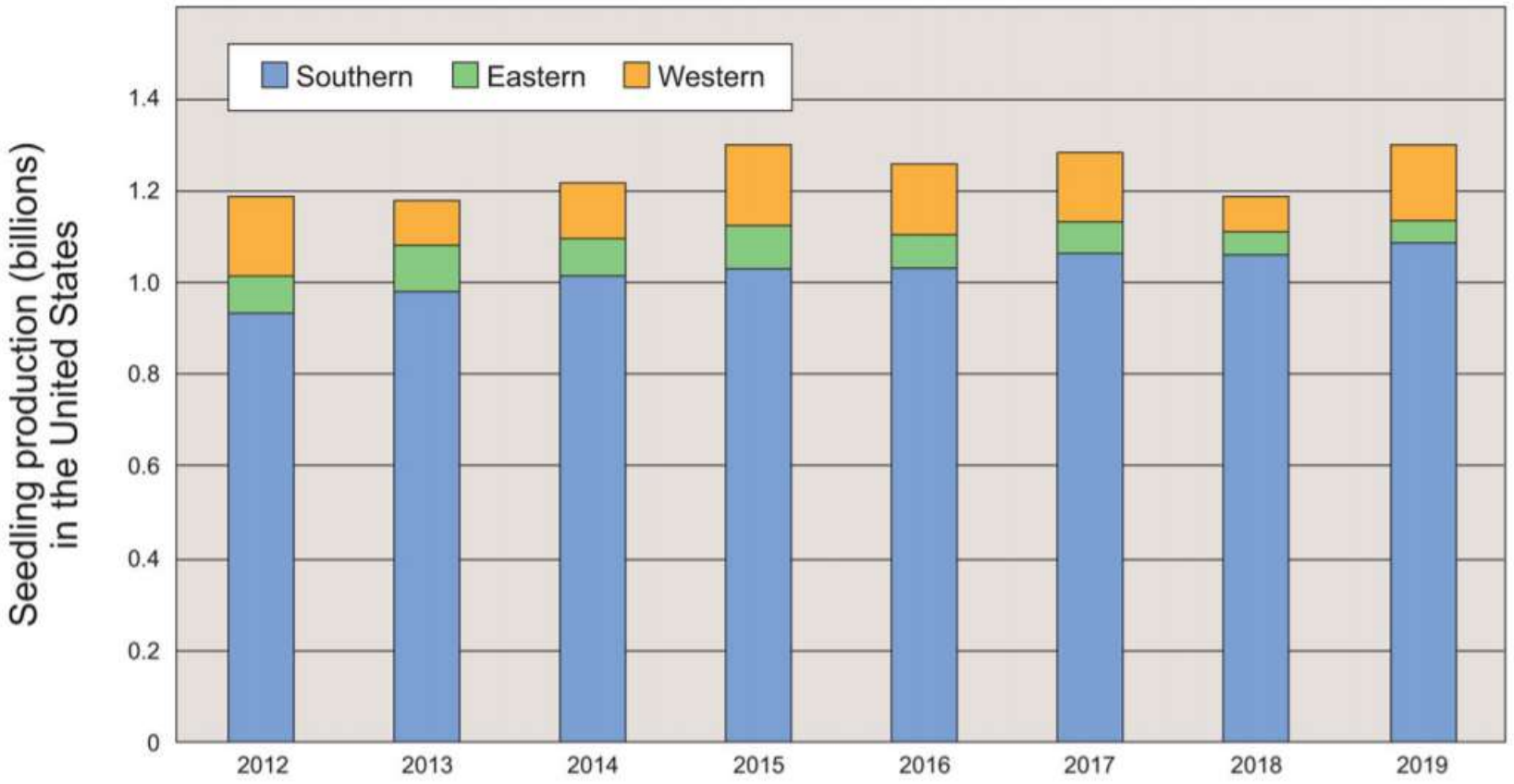
Large-scale global reforestation goals have been proposed to help mitigate climate change and provide other ecosystem services. To explore reforestation potential in the United States, we used GIS analyses, surveys of nursery managers and foresters, and literature synthesis to assess the opportunities and challenges associated with meeting proposed reforestation goals. We considered a scenario where 26 million hectares (64 million acres) of natural and agricultural lands are reforested by 2040 with 30 billion trees at an estimated cost of $33 ($24–$53) billion USD. Cost per hectare will vary by region, site conditions, and other factors. This scenario would require increasing the number of tree seedlings produced each year by 1.7 billion, a 2.3-fold increase over current nursery production levels. Additional investment (not included in the reforestation cost estimate) will be needed to expand capacity for seed collection, seedling production, workforce development, and improvements in pre- and post-planting practices. Achieving this scenario will require public support for investing in these activities and incentives for landowners.

Keywords: afforestation, tree planting, nurseries, seedlings, land use

INTRODUCTION

To constrain global warming, reductions in fossil fuels emissions are critical. In addition, we must also invest in strategies that remove carbon dioxide from the atmosphere (Masson-Delmotte et al., 2018). Reforestation is a promising opportunity to capture carbon dioxide while providing key ecosystem services including clean air and water (The White House, 2016; Griscom et al., 2017; Fargione et al., 2018; Domke et al., 2020). Enthusiasm for tree planting is gaining momentum, with multiple ambitious goals set forth to restore forest cover for climate mitigation





Nursery Limitations

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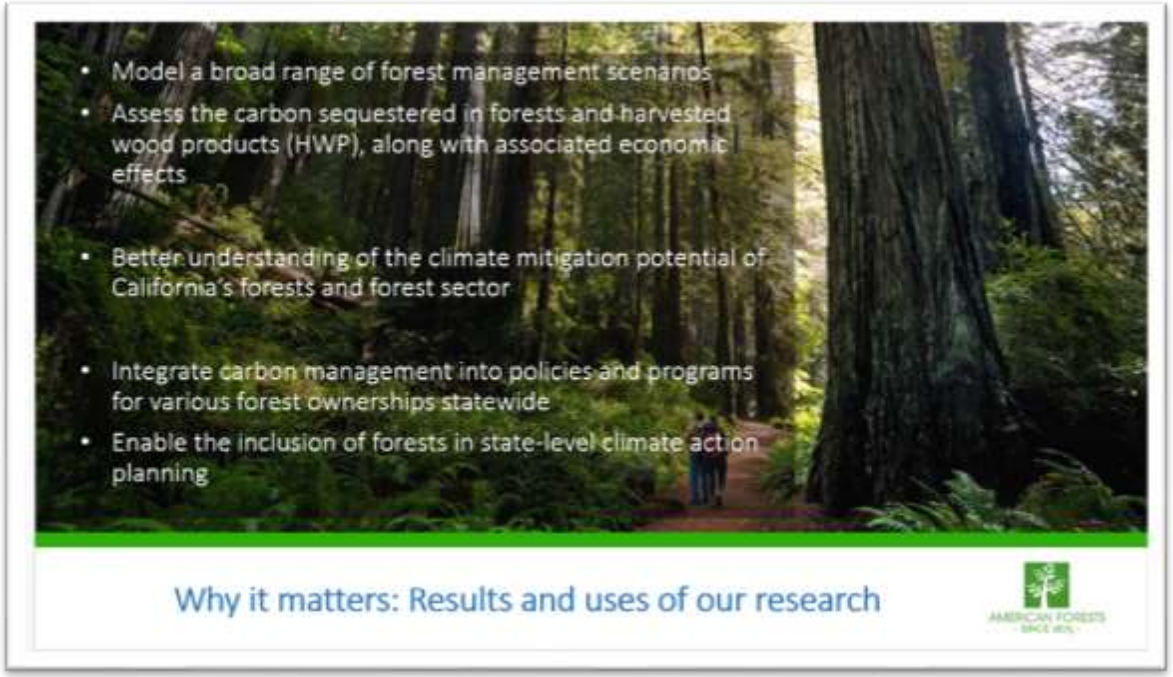

Carbon Budget Model

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☞ The Carbon Budget Model of the Canadian Forest Sector

- Model of forest ecosystem carbon dynamics at various levels:

  stand → operational → state → regional → national

- Links to associated CBM-Framework for Harvested Wood Products model
- Model is spatially referenced – not tied to specific locations, but can reference types of forest stands using *inventory classifiers*

What we're doing: The CBM-CFS3

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Work Force Capacity Limitations

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- Planning
- Implementation
- Availability of Skilled Workforce

Work Force Capacity Bottlenecks

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A Collective Way Forward

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"Shared Stewardship is about working together in an integrated way to make decisions and take actions on the land."

- **USDA Forest Service Chief, Vicki Christiansen**

Movement Building

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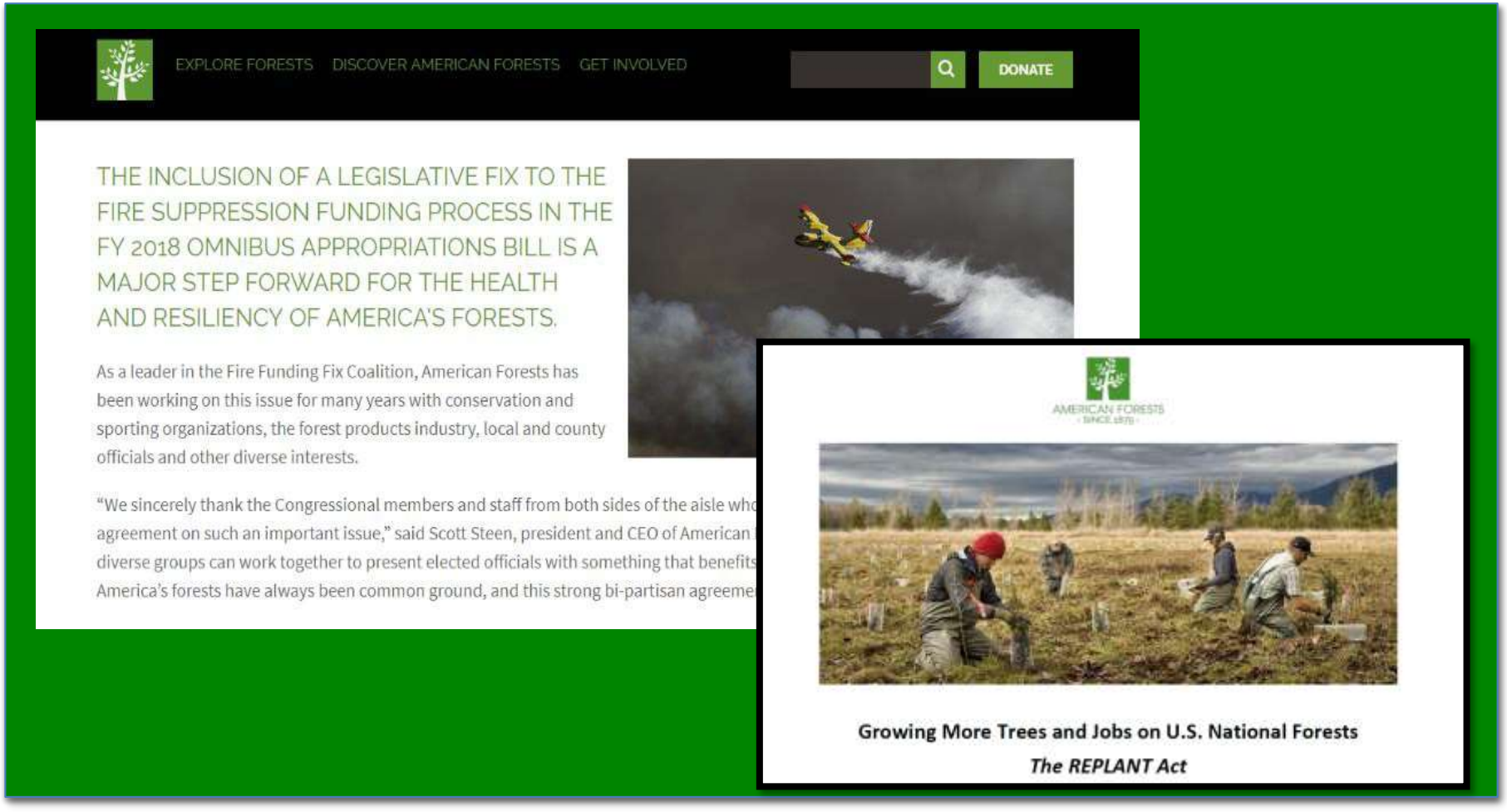

Bipartisan Policy Leadership

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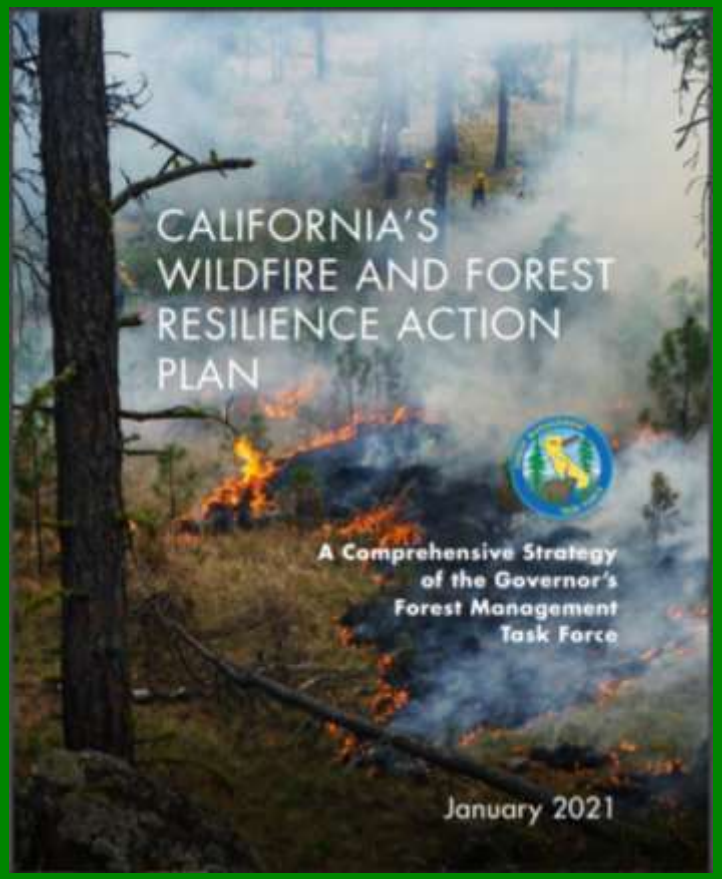

Reforest Burned Areas

Recent catastrophic wildfires have damaged critical wildlife habitat, imperiled fisheries, watersheds, municipal water sources, threatened public safety due to mudslides and impacted rural, tourism-based economies. These events also threaten the long-term productivity of forest soils through erosion and changes in soil properties.

An average of about 35,000 acres has been reforested each year over the past decade, mainly following timber harvests. The USFS recently estimated that approximately 274,000 acres need to be reforested, and the recent 2020 wildfires have significantly increased this deficit.

The vast majority of recent wildland fires have occurred on federal lands. The USFS, in a partnership with American Forests, has made significant progress in restoring areas burned with high-intensity fire. Still, the remaining need is large and growing. In addition to carbon sequestration and water supply benefits, reforestation activities boost job creation. For every $1 million invested in rural reforestation and vegetation management, approximately 17.3 jobs (13.5 direct and 3.8 indirect) are generated.

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.

Comprehensive Strategy

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Collective Responsibility for Wicked Problems

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