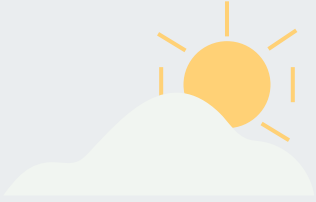


An illustration of a mountain landscape. In the foreground, a white deer with small antlers is drinking from a blue stream. The stream flows through a green valley with rolling hills. In the background, there are blue mountains and a large grey mountain on the left. The sky is light blue with a yellow sun in the top right corner and several white clouds.

Next Steps in Reforestation at HESR

San Bernardino Forestry Challenge 2025



Team #10

Zoey Acuna | Harper Lucido |
Sam Rivas | Avantika Singhal



The background is a stylized landscape. In the top left, there is a bright orange sun with short lines radiating from it, partially obscured by a white cloud. Another white cloud is in the top right. The bottom of the image features rolling hills in shades of green and blue. On the left, a single tree with a thick white trunk and a rounded green canopy stands on a green patch. On the right, several tall, thin evergreen trees are scattered across the hills. The overall style is flat and modern.

Reforestation at Hubert Eaton

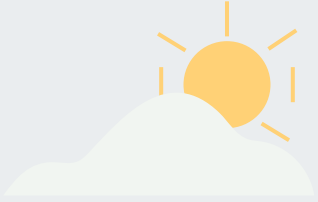


Table of contents

1

Background Info of H.E.S.R.

3

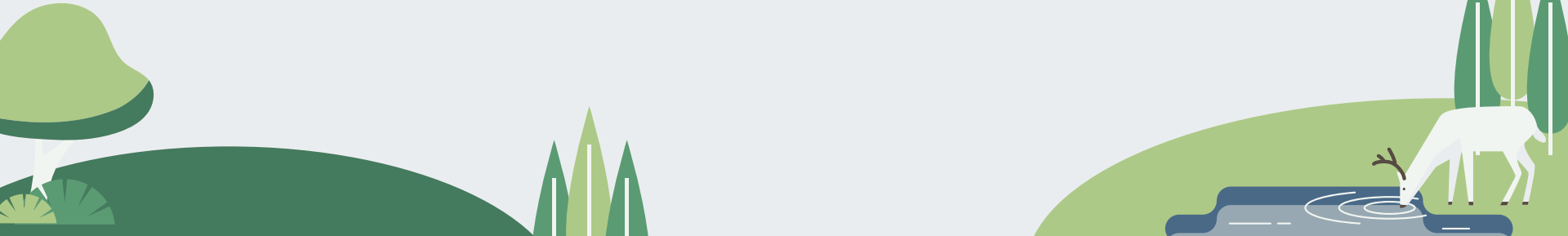
Next Steps

2

Data Collected

4

Conclusion



The background is a stylized landscape. In the top left, there is a bright orange sun with short lines radiating from it, partially obscured by a white cloud. Another white cloud is to its right. The bottom of the image features rolling hills. On the left, a single green tree with a white trunk stands on a green patch. To the right, there are more green hills with three tall, thin, light-green trees. In the far right background, a dark blue mountain peak is visible. The entire scene is set against a light blue-grey sky.

Introduction



01

History of H.E.S.R.



Hubert Eaton SCOUT RESERVATION

LOCATION AND SIZE

- Located in **San Bernadino County, California**
- 3 miles SE of Lake Arrowhead
- Initially a 1,824 acre plot but has become a **1,500 acre plot** (as acres of land have been sold in recent years)

BARK BEETLE HISTORY

- Early 2000s epidemic in Southern California
- Activity peaked from 2002 -2003, but rapidly declined in 2004
- Primarily affected Coulter and Ponderosa pine trees; mortality rate of 73.5 -78%

Forest Lawn Scout Reservation - Location





Hubert Eaton SCOUT RESERVATION

FIRE HISTORY

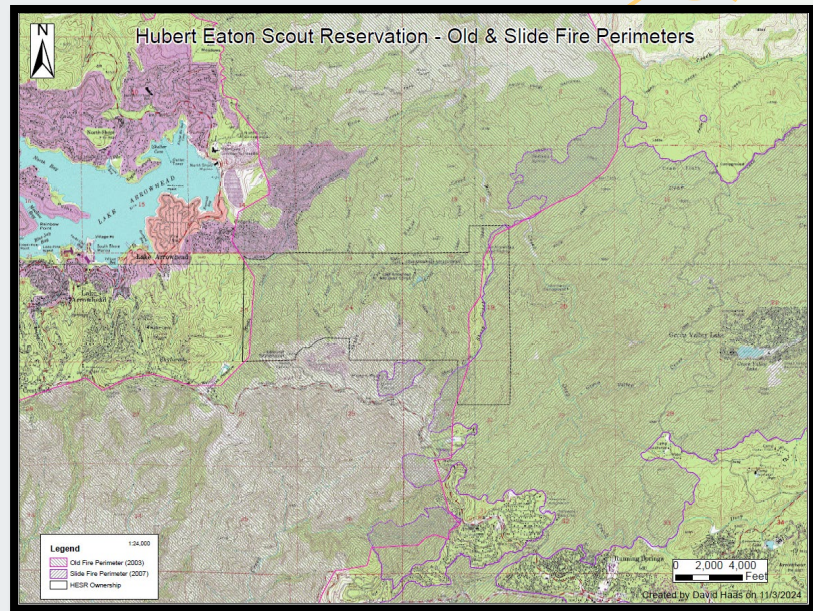
Major & most recent fires:

- Old Fire in 2003
- Slide Fire in 2007

Prior fires:

- Western portion burned in 1922
- Other fires: 1930, 1956, 1991

According to the U.S. Forest Service fire occurrence maps, frequent lightning strikes have caused fires to occur.



3 Main Objectives:

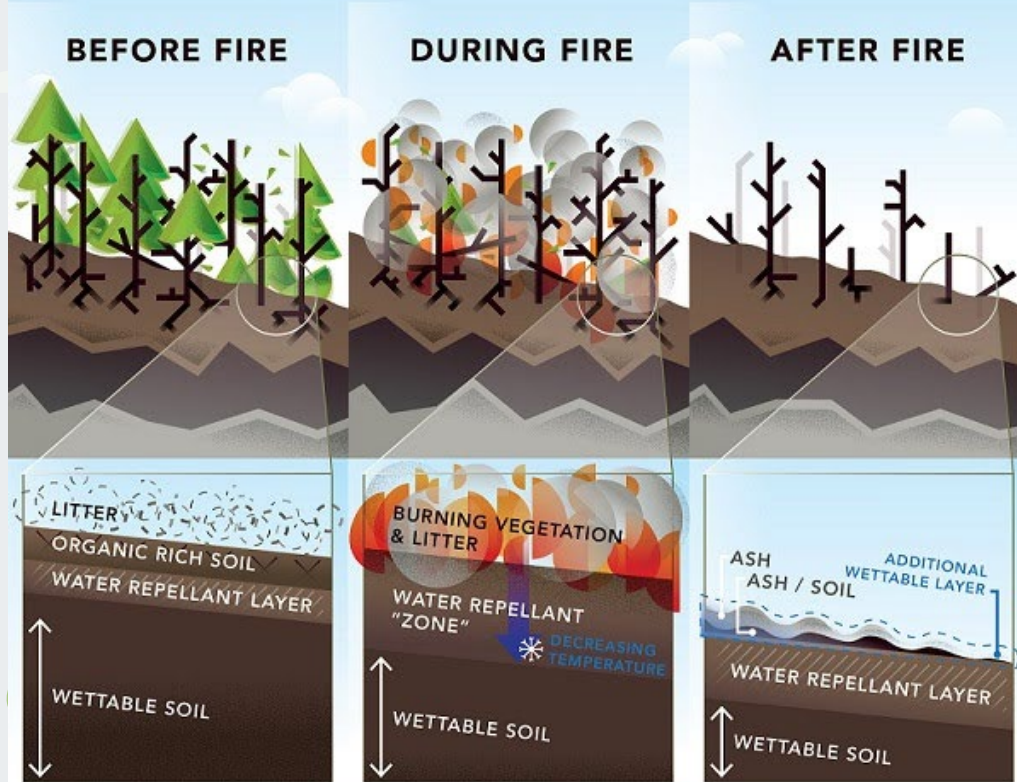
1. Forest Health

- Return the forest to conditions prior to the stand -altering fires and bark beetle impacts





THE NEGATIVE EFFECTS OF HIGH INTENSITY WILDFIRE ON FORESTED LAND



LITTER (needles, leaves, dead grass, bark, etc) | WETTABLE SOIL (receives, filters and stores moisture)

WATER REPELLANT LAYER (decomposition of waxy material that comes from plant residues - these materials can coat soil, preventing water from filtering through)

3 Main Objectives:

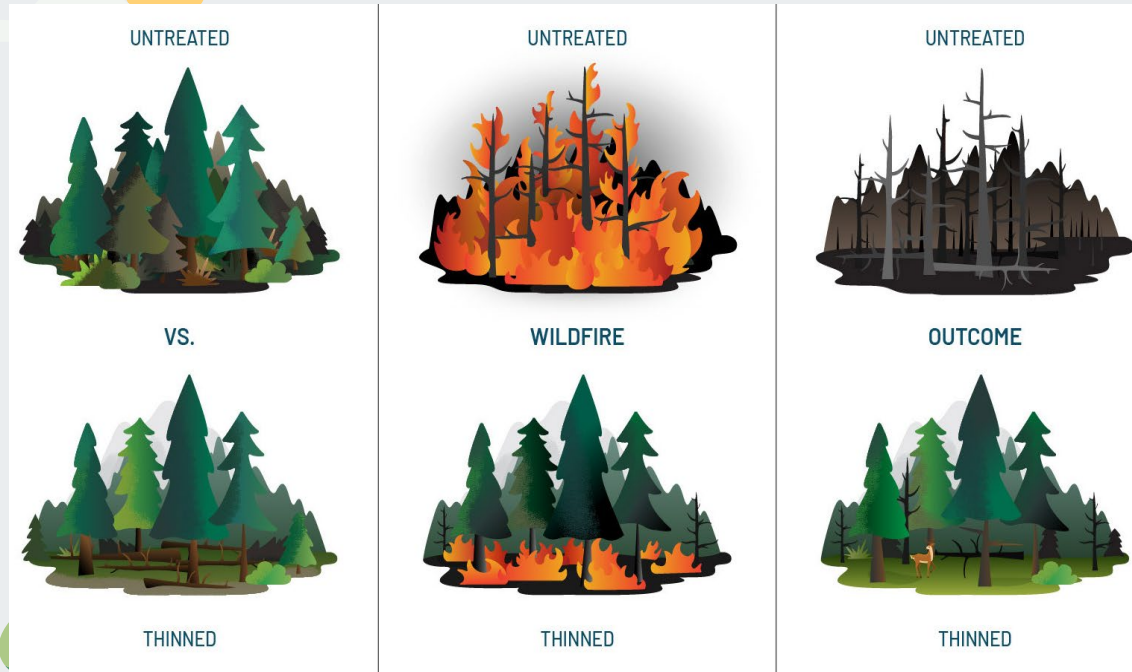
2. Fire Protection

- Reduce the fuel load throughout the forested areas
- This reduces fire intensity, leading to a controlled fire that benefits the land

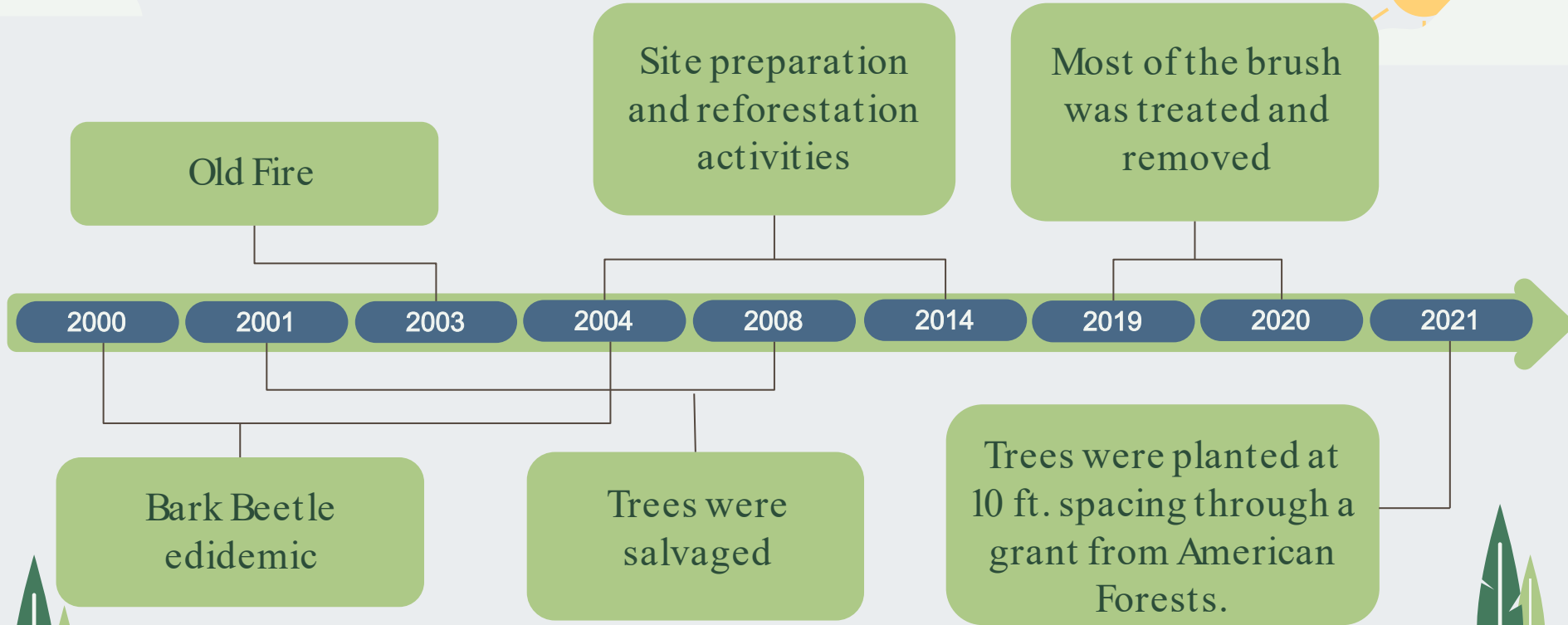
3 Main Objectives:

3. Mitigation of shrub species

- The growth of various shrub species (e.g. ceanothus and manzanita) often dominate sites previously occupied by forests.
- This eventually shifts the vegetative type away from the mixed conifer plant community



Timeline





California Forest Improvement Plan



The CFIP...

- Encourages private & public investment and improve CA forest lands & resource management
- Provides “caped rates” (light/moderate/heavy)
- Approved by CAL FIRE Forestry Assistance Specialist (FAS)
- Contractor or Self-labor: Use RM-8 CFIP Project Budget

Planting:

- Site Preparation Herbicide – Light: \$421
- Site Preparation Herbicide – Moderate: \$644
- Site Preparation Herbicide – Heavy: \$868
- Site Preparation Mechanical – Light: \$670
- Site Preparation Mechanical – Moderate: \$1,008
- Site Preparation Mechanical – Heavy: \$1,340

Publication: CFIP Cap Rate for Practices





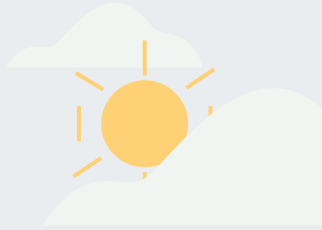
02

Data Collection

Data Collection



Data Results & Parameters



28%

Average Live
Brush Cover

39%

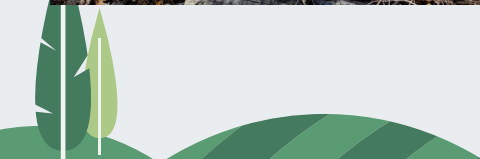
Average Dead
Brush Cover

21.2

Average number
of Stumps

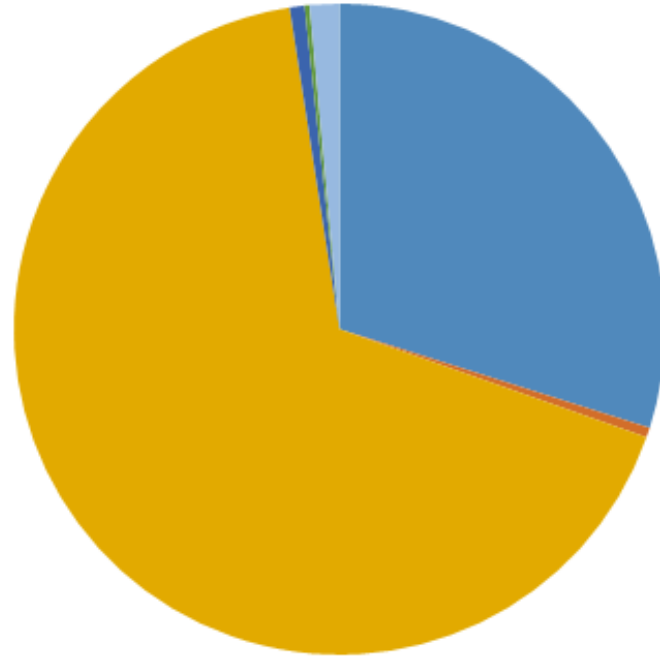
36%

Average
Canopy Cover



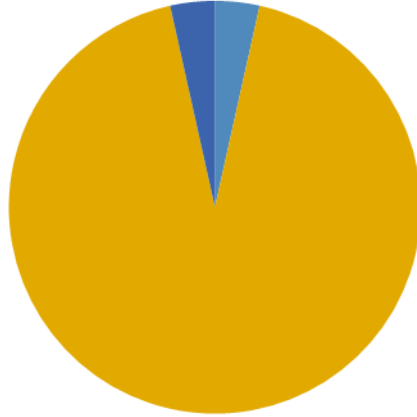
Total Species Comp

- Ponderosa/Coulter/Jeffrey Pine
- Sugar Pine
- White Fir
- Black Oak
- Live Oak
- Incense-cedar
- Giant Sequoia



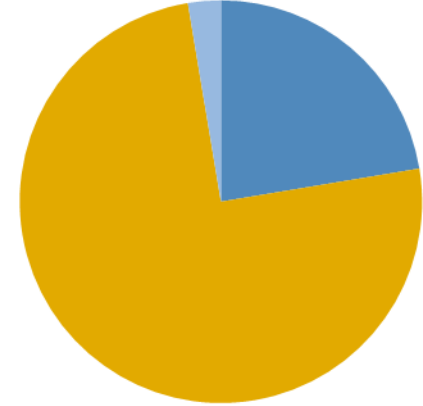
Species Comp Surviving the Old Fire

- Ponderosa/Coulter/Jeffrey Pine
- Sugar Pine
- White Fir
- Black Oak
- Live Oak
- Incense-cedar
- Giant Sequoia



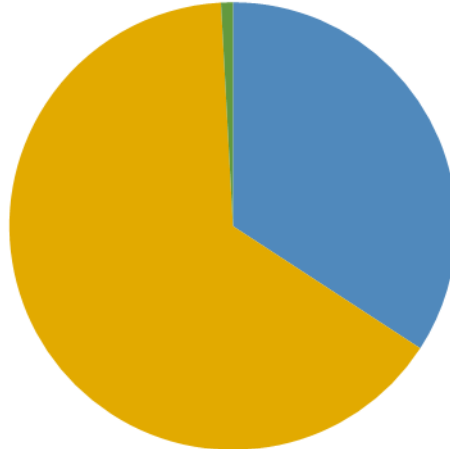
Species Comp Planted After the Old Fire

- Ponderosa/Coulter/Jeffrey Pine
- Sugar Pine
- White Fir
- Black Oak
- Live Oak
- Incense-cedar
- Giant Sequoia



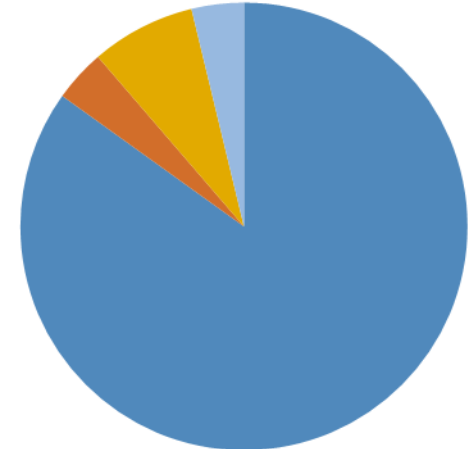
Species Comp Natural Regen

- Ponderosa/Coulter/Jeffrey Pine
- Sugar Pine
- White Fir
- Black Oak
- Live Oak
- Incense-cedar
- Giant Sequoia



Species Comp Planted After 21

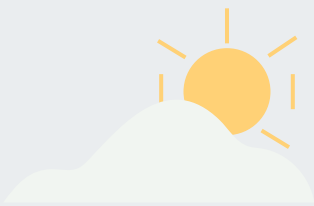
- Ponderosa/Coulter/Jeffrey Pine
- Sugar Pine
- White Fir
- Black Oak
- Live Oak
- Incense-cedar
- Giant Sequoia





03

Management Steps



Step 1: Mastication

What is **mastication** ?

- The mechanical removal of woody material

How would we use it?

- Mainly focus on **shrubs and vegetation**
- Abundance of dead shrubs (39%) and the lack of live shrubs (28%) in the plots of the data collected
- Limitation of potential tree growth/increased competition for existing trees

Goal:

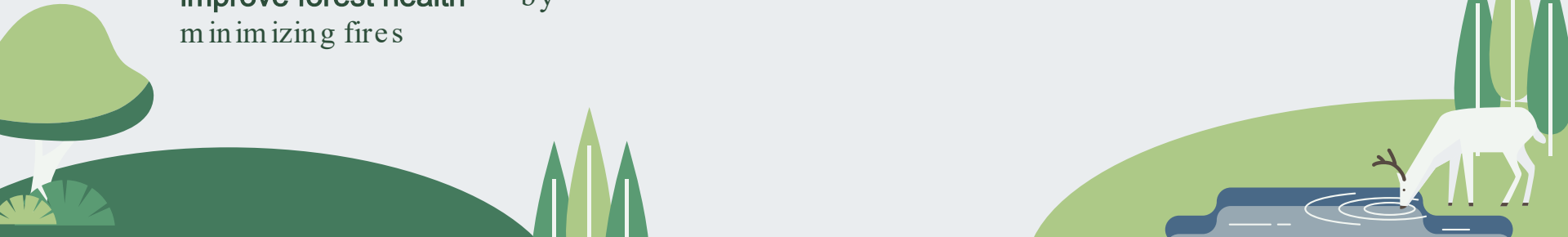
- **85-90 trees per acre**
- Maintain shrubs near islands and along waterways





Step 2: Prescribed Fires

- Manages ladder fuels using a drip torch to the risk of fires
- Implement **release treatment** prior to prescribed fires to protect flora and fauna.
- Step 2 aligns with the **Fire Protection** forest management objective
- This will reduce fuel load and **improve forest health** by minimizing fires





Step 3: Planting

Goal:

- Increase the amount of **Ponderosa, Coulter, and Jeffry pine** trees

Plan:

- **Heavy** planting in masticated and fire burned areas
- Emulate 2021 planting
- Due to 30% survival rate for trees planted
- **Conducted in the Fall/rainy season** because of severe drought in previous years





Step 4: Herbicides

Importance:

- The **follow -up** treatment for mastication and prescribed burns
- Prevents shrub regrowth, aligning with the **objective of the mitigation of shrub species**

Plan:

- **Moderate** for maintenance
- Spray **every couple of years for 15 years**
- Chemically inhibits the growth of new shrubs



Budget



Step	CFIP Title	Level	CFIP Cap Rate (per acre)
1. Mastication	Mechanical Site Preparation	Heavy	\$1,340.00
2. Prescribed Fire	(Prior) Mechanical Release Treatment	Moderate	CFIP = \$1,008.00 CAL FIRE < \$1,000.00
3. Planting	Trees & Planting	Heavy	
4. Herbicides	Follow-up Herbicides	Moderate	
TOTAL			\$5,493,000

Barriers of Management Steps



Step 1:
Steep slopes
Not near
waterways



To overcome:
prescribed fire;
some manual crews
if needed

Step 2:
Cultural/Social
pushback
Slope & waterway
limitations



To overcome:
increased
education and
increase caution in
limited sites

Step 3:
High intensity
Labor &
unpredictable
weather

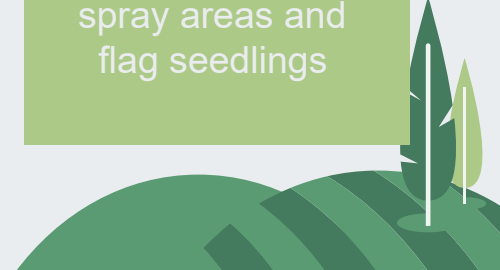



To overcome:
Community
involvement and
planting involved

Step 4:
Water
contamination and
seedling
development



To overcome:
Demarcate no
spray areas and
flag seedlings





“Mastication reduces fire risk, allowing for more planting and increased diversity. This protects infrastructure across all the camps to contribute to a greater community.

- Rich Wade, Forester #2016

A scenic landscape photograph featuring a mix of green and yellow trees in the foreground and middle ground. In the background, there are rolling hills or mountains under a clear blue sky. A green text box is overlaid on the right side of the image, containing the text "Doing something is better than doing nothing".

Doing something is better
than doing nothing



Thank you for
listening!

