Building Resilience in Unit 4

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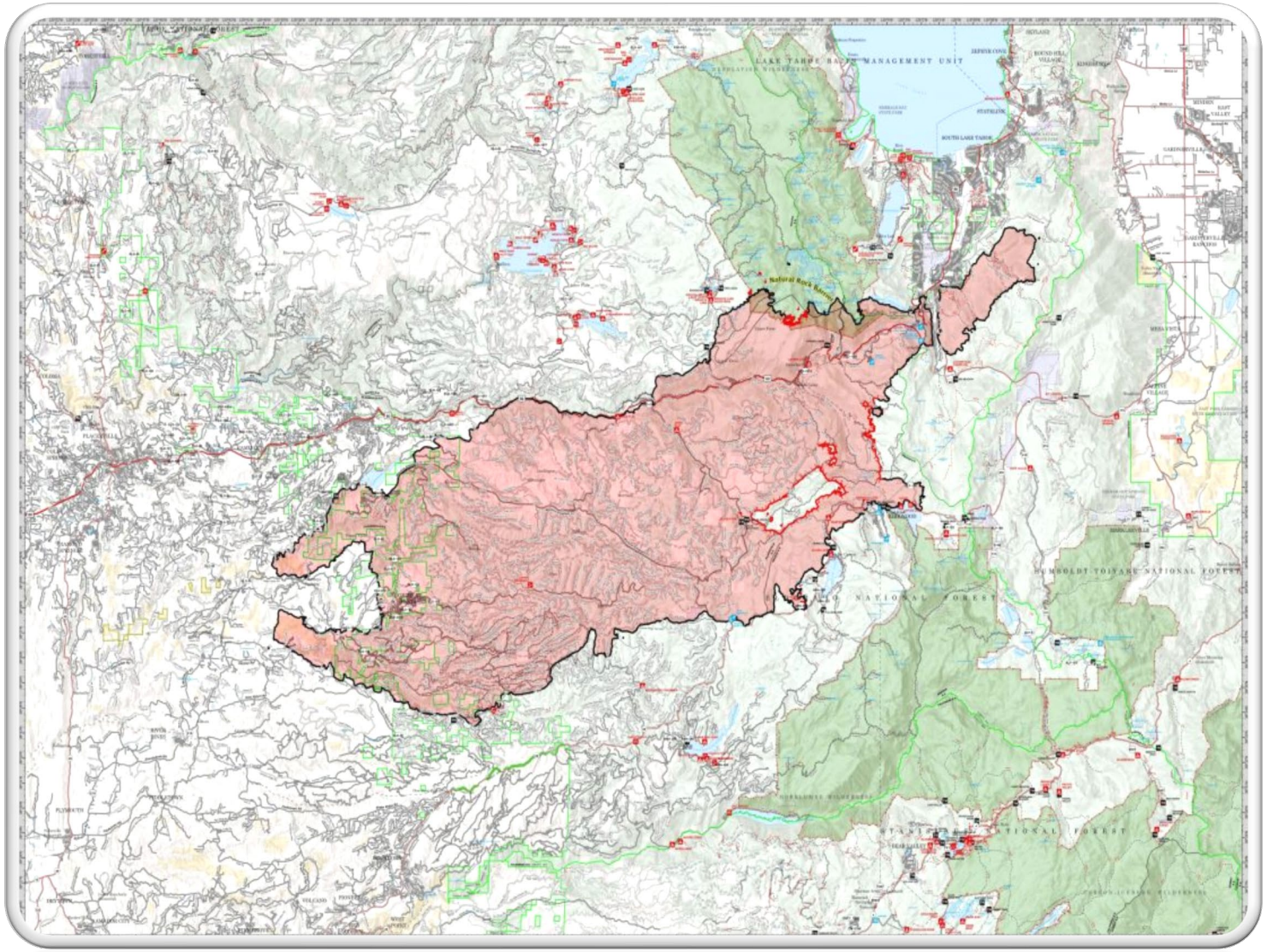
Caldor Fire

- Burned 221,835 acres
- Incinerated 1,005 structures, 636 homes
- Dangerous fuel remains a problem
- To protect the community, intervention is required



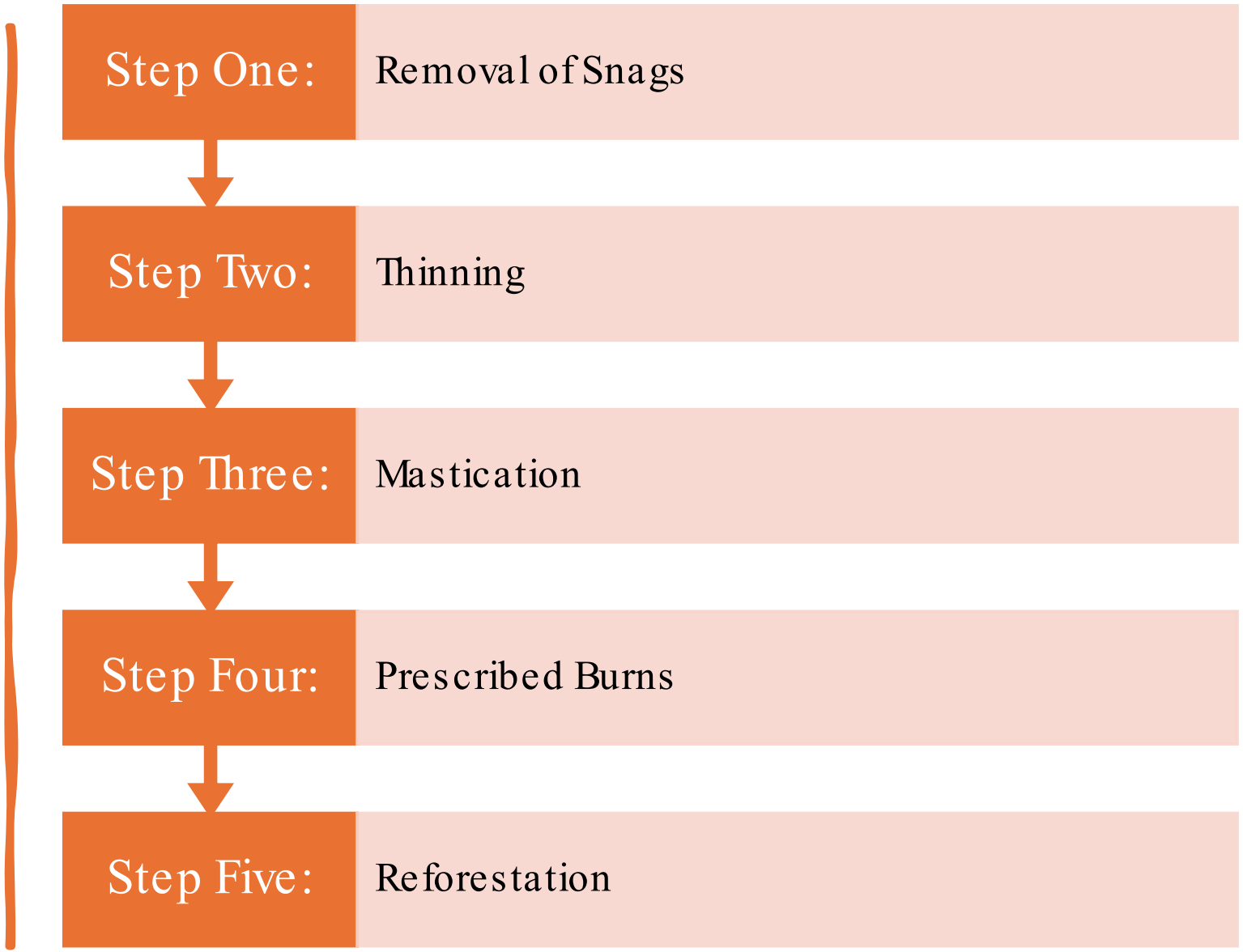
Shaded Fuelbreak

- According to Ryan Wimmer, Cal Fire forester, a shaded fuelbreak is:
  - An area with a reduction in fuels beneath the forest canopy
  - Prevents fire to climb the canopy
  - Creates an open floor plan/canopy
  - Allows for less intense fire
  - Firefighters can create control lines with less risks

Figure 2. Example of Desired Fuels and Canopy Conditions.

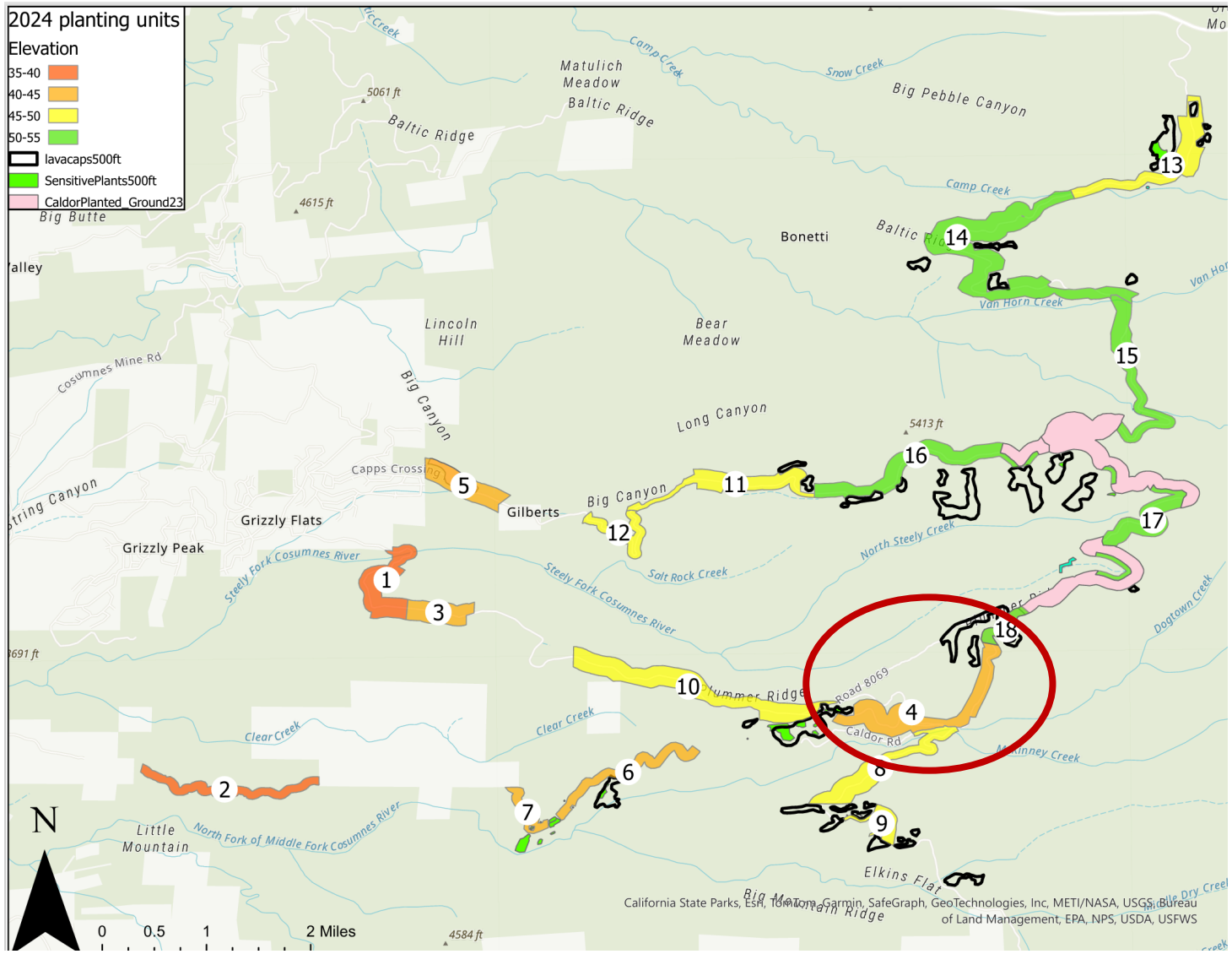
Figure 3. Example of Undesirable Fuels and Canopy Conditions.

Shaded Fuelbreak Creation



Grizzly Flats Fuelbreak

- Goal: establish a shaded fuelbreak limiting fire intensity and spread
- Shaded fuel breaks make fire easier to suppress and contain
- Evacuation of residents and the transport of firefighters in and out of the area will be made possible
- Extends across 2,878 acres
- Along 38 miles of ingress and egress routes east of Grizzly Flats
- We collected data on Unit 4 (circled in red)

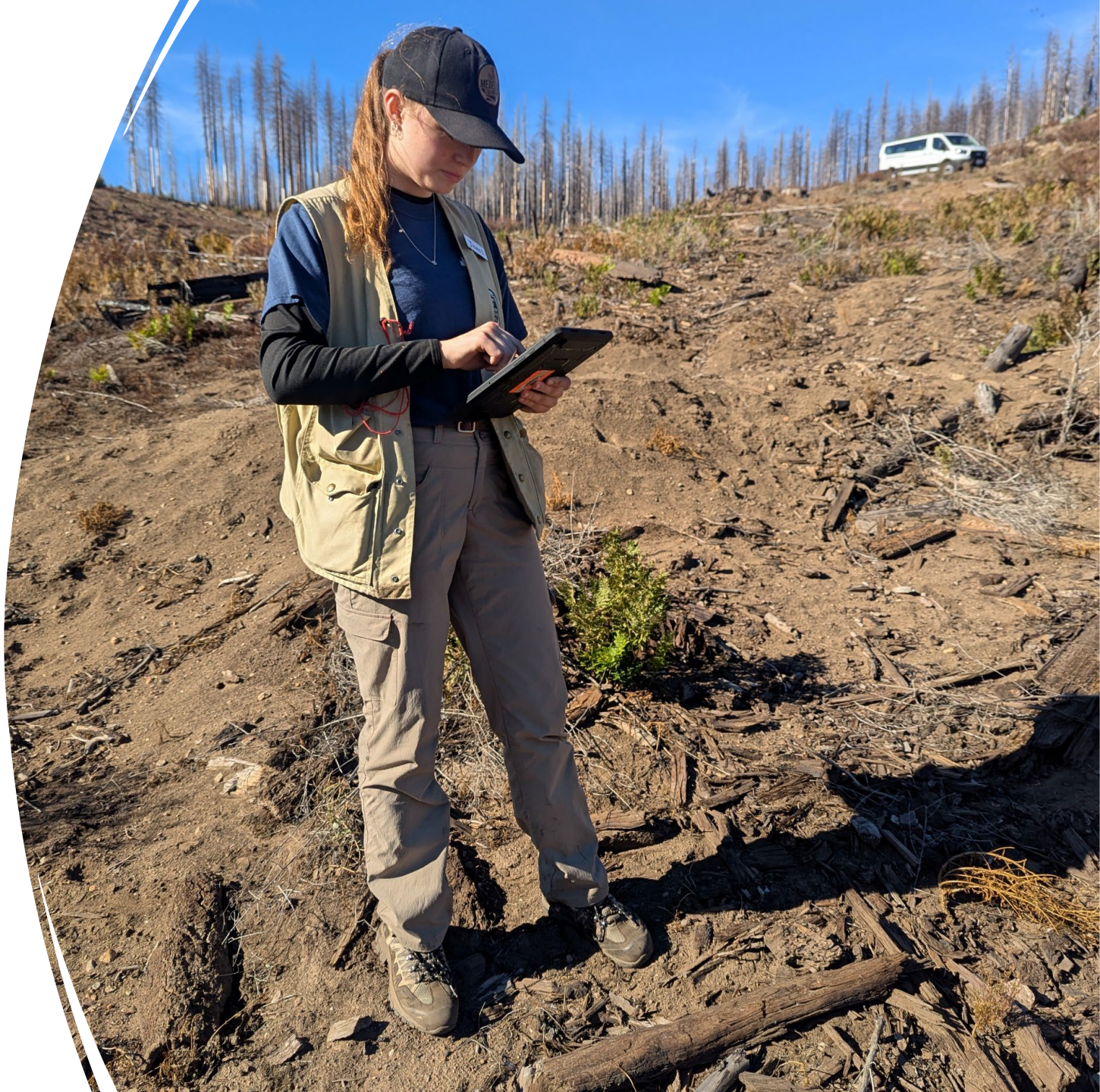


Stocking

- Minimum stocking in planted areas prior to pre-commercial thinning is 150 trees per acre over at least 50% of the area.
- The recommended stocking target is 200 trees per acre
- Post pre-commercial thinning, mortality from prescribed burning should not exceed 20% of the existing trees per acre
- From left to right: understocked conifer forest, healthy conifer forest, overstocked conifer forest

Data Collection

- Thursday went out to Unit 4 to gather data
- We gathered data on 2 plots
- 87 plots total
- 1/50 acre each
- Used a GPS system to find our plot centers



Gathering Data

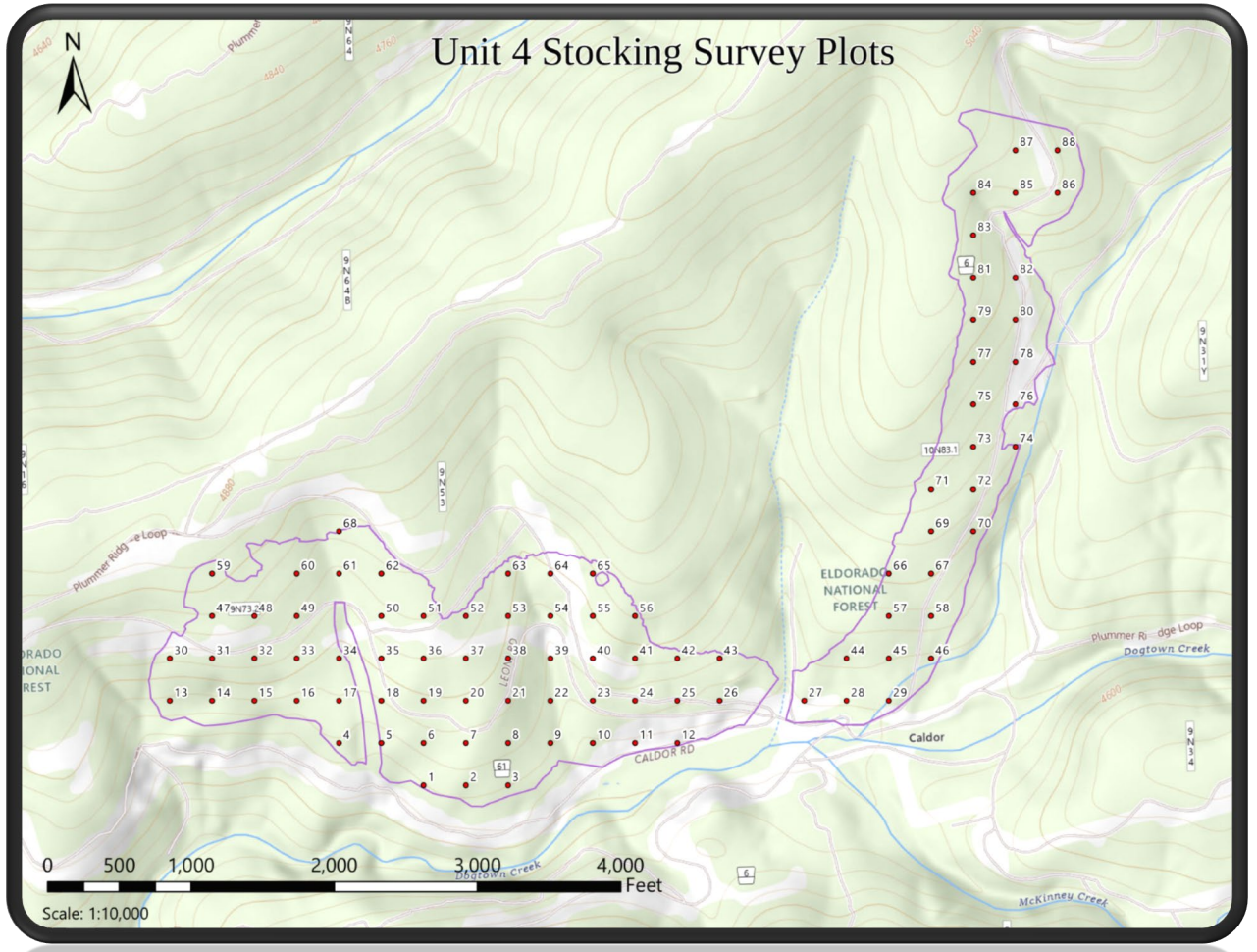
- Swept around plot with a radius of 16.7 feet
  - Identified number and type of species present in plot
  - Assessed vigor of seedlings as well as any damage caused by the herbicide spray
- Found the number of black oak seedlings over 3 ft tall

Assessing Land

- Percent of ground covered by living brush species
  - Mullen, Deer Brush, Grass, Bracken Fern, Whitethorn
- Landscape barriers:
  - Downed trees
  - Steep slopes
  - Log decks
  - Rocky terrain
  - Loose soil

Data Coverage

- Total area of Unit 4 is 260 acres
  - We only gathered data on 1.74 acres
- Assessed a total of 87 plots
  - 0.67% of stand assessed



Main Data Points

- Ponderosa Pine = 77%
- Sugar Pine = 13%
- Douglas-Fir = 2%
- White Fir = 7%

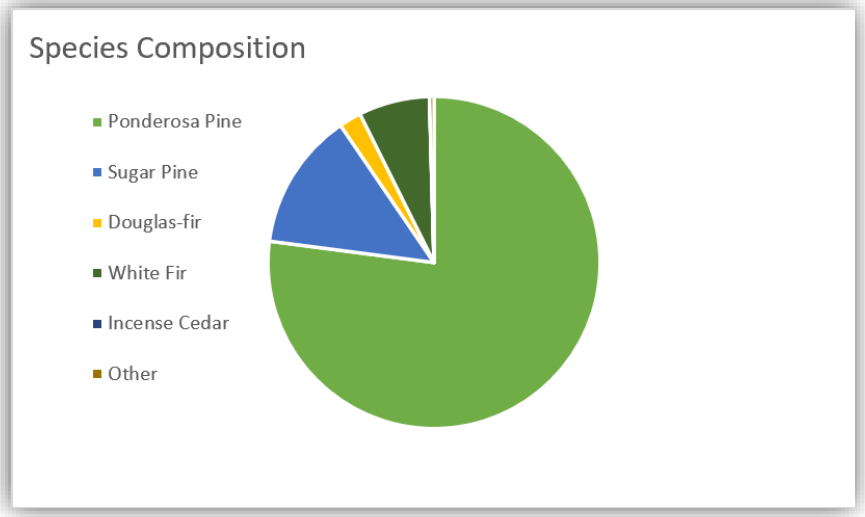
- 31% of Ponderosa Pine had herbicide damage
- 52% of Sugar Pine damaged
- 25% of White Fir damaged

- Total of 132 trees per acre, originally 300 trees per acre were planted

Black oak Seedlings	7		With herbicide damage	
Total Number of Conifer Seedli	231		76	
Ponderosa Pine	178	77%	56	31%
Sugar Pine	31	13%	16	52%
Douglas-fir	5	2%	0	0%
White Fir	16	7%	4	25%
Incense Cedar	0	0%	0	0%
Other	1	0%	0	0%
trees per acre	132.8			
Ponderosa Pine	102.3			
Sugar Pine	17.8			
Douglas-fir	2.9			
White Fir	9.2			
Incense Cedar	0.0			
Other	0.6			
Black Oak	4.0			

Main Data Points Continued

- Stand is mainly composed of Ponderosa Pine, followed by Sugar Pine
- Vigor Rates
  - Based on vigor assessed, only 114 trees of the stand are estimated to survive



Vigor						
0	1	2	3	5	7	9
1	2	10	21	33	85	80
0	2	7	16	18	68	67
0	0	2	2	9	14	4
0	0	0	0	3	0	2
0	0	1	3	2	3	7
0	0	0	0	0	0	0
0	0	0	0	1	0	0

Where We Come In

The Forest Service needs a solution to tackle the fire break

The data collected by this competition will be used to find that solution

In original project, "Interplanting will occur where stocking falls below 150 TPA."

The choice is clear: we are going to fix this firebreak

Disclaimer

There is simply not enough data to ensure the accuracy of the numbers. However, based off what we have been given, there is a plan.

Math Background

- Originally 300 trees planted per acre
- Now out of 133 living trees per acre, only 113 are healthy enough to survive
- 44% survival rate: NOT GOOD
- The absolute minimum per acre is 150 trees
- Desired is 200 trees per acre
- According to Jack Little, a Cal Fire peace Corp officer, planting cedar or white fir trees is a complete waste; they will simply grow in once the firebreak matures.

Math Time!

- At survival rate 44%, 84 trees per acre need to be planted to reach 150 per acre
- Sugar Pine is best growing (besides Ponderosa Pine), so 84 Sugar Pine per acre will be most cost effective
- In 5 years, increased soil stability and shade will give Douglas-Fir a normal survival rate (70%)
- Only need to plant 71 Douglas-Fir per acre at that rate to ensure desired quantity

More Math!

Phase 1: Planting 84 Sugar Pines per acre gives each tree, including those already there, 221 sq. feet (15'x15' box)

Phase 2: Planting 71 Douglas-Fir per acre in 2031 gives each tree 161 sq. feet (12.7'x12.7' box)

Phase 3: Revert to original plan by 2036 to thin excess Ponderosa Pines as necessary

Results: 2026 will see firebreak have 150 trees/acre

Results in 5 Years: 2031 will see 200 trees/acre with increased biodiversity

Why This Plan?

- Increased diversity: 87 Ponderosa Pine per acre, 63 Sugar Pine per acre, 52 Douglas-Fir per acre by 2031, with Incense-Cedar and White Fir to grow in the future years
- Not one layer for fire to burn through; small Douglas-Fir will not be in same line as Ponderosa Pine and Sugar Pine
- Soil stability and extra shade will encourage greater survival rate for Douglas-Fir
- Result of greater survival rate: Forest Service will save time, money, and future resources while simultaneously protecting against fires.
- Reduces “wolfing out” of the trees, as Jack Little of Cal Fire described

Possible Barriers

- Access difficulty
- Cost: trees are expensive!
- Involves revising original plan


Got Questions?