

# ***Reducing Risk of Wildfire Damage to Planted Forests: Some management examples and lessons learned***

***Planted in 1997 after wildfire in Plumas County:  
then burned in the 2007 Moonlight Fire  
and again in 2021 Dixie Fire***

**Bob Rynearson  
(Retired)  
W. M. Beaty & Associates, Inc.**



## NE California

46 years  
experience  
reforesting after  
wildfires &  
monitoring

Mostly for 6-gen  
large family  
ownerships

Also:

Small ownerships

Westcarb II

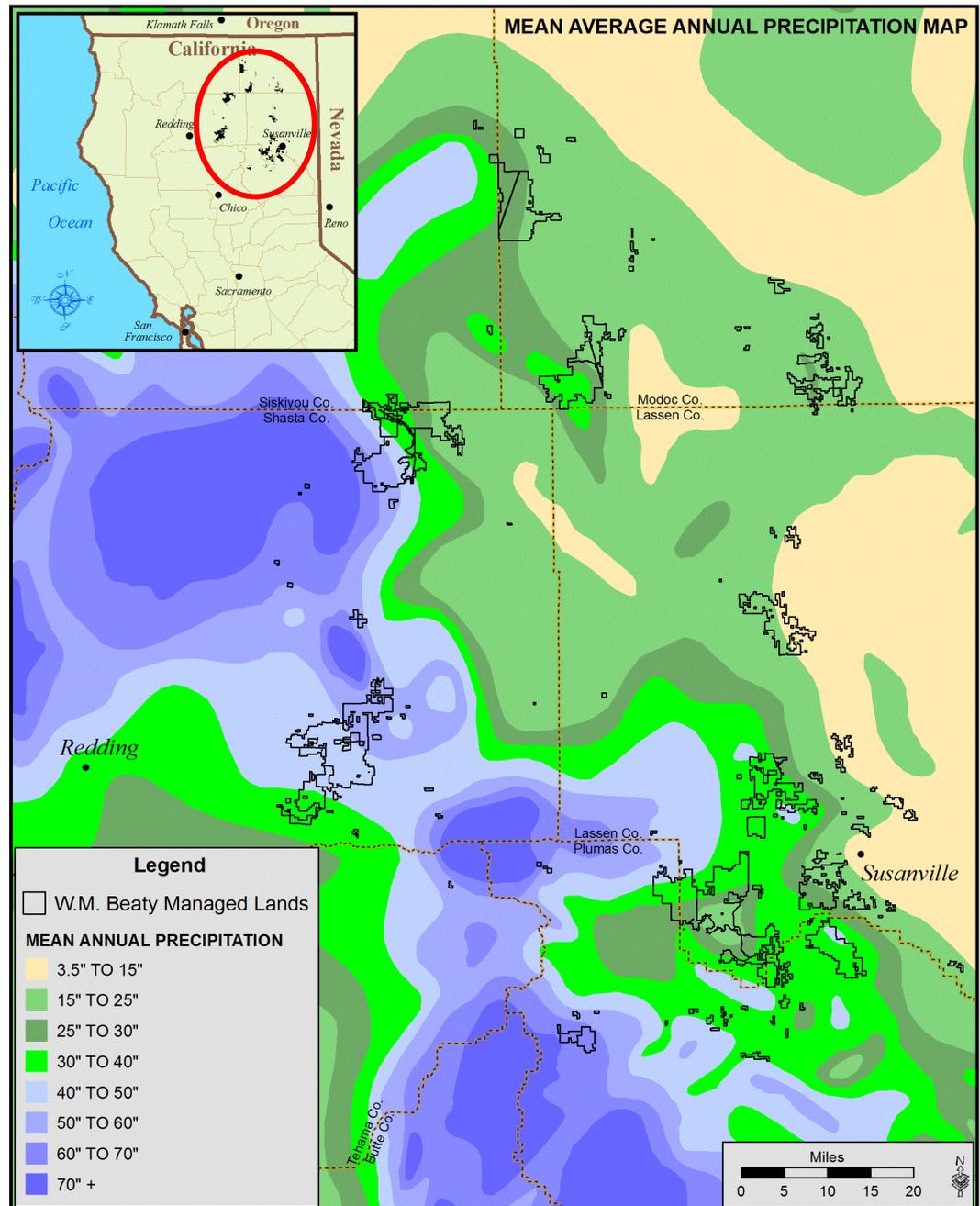
Lebanon  
(volunteer)



Average Annual PPT:  
15" to 60", much in  
the form of snow

Reforestation success  
very high, even during  
severe drought years  
on very harsh sites

Observations &  
Lessons learned from  
long term monitoring





**A “Mediterranean climate” is characterized by warm to hot, dry summers (due to subtropical high pressure cells) and mild to cool, wet winters.**

“drought” & fire season every summer in Med. Climate:

- Soil moisture is limiting factor for seedling establishment
- Reducing risk of loss from wildfire is a major consideration in managing forest plantations
- Managing tree spacing is critical to healthy forests

# *Key Factors to Reduce Losses from Wildfire*

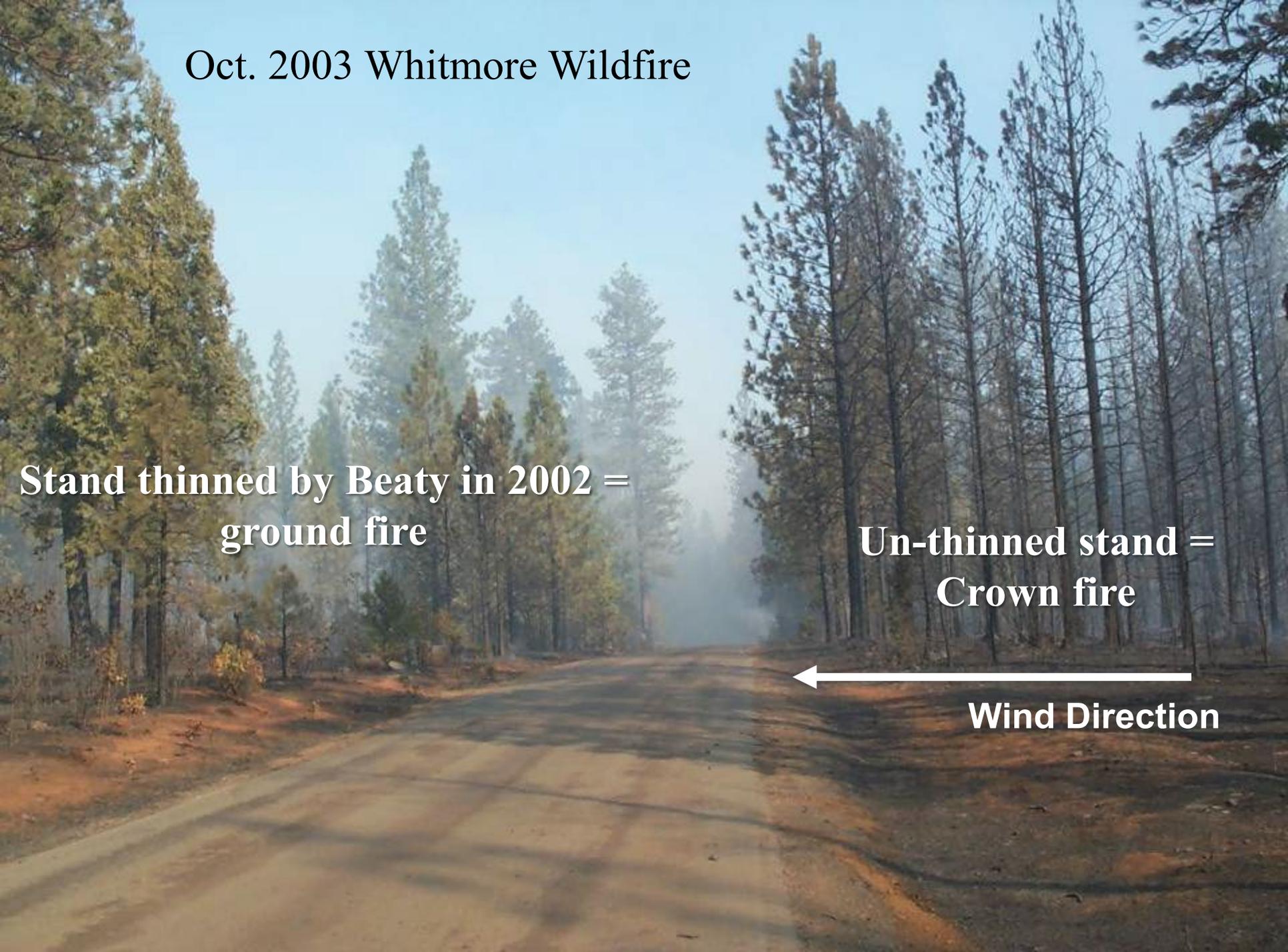
- **Management of Adjacent Timberlands**
- **Maximize individual growth** for resiliency to wildfire & lessen time of exposure to economic loss
- **Manage fuel loads/configuration & tree spacing** to reduce damage or facilitate fire suppression
- **Manage infrastructure** to facilitate fire suppression
- **Integrate the use of all applicable “tools” over the life of the planted forest**

Oct. 2003 Whitmore Wildfire

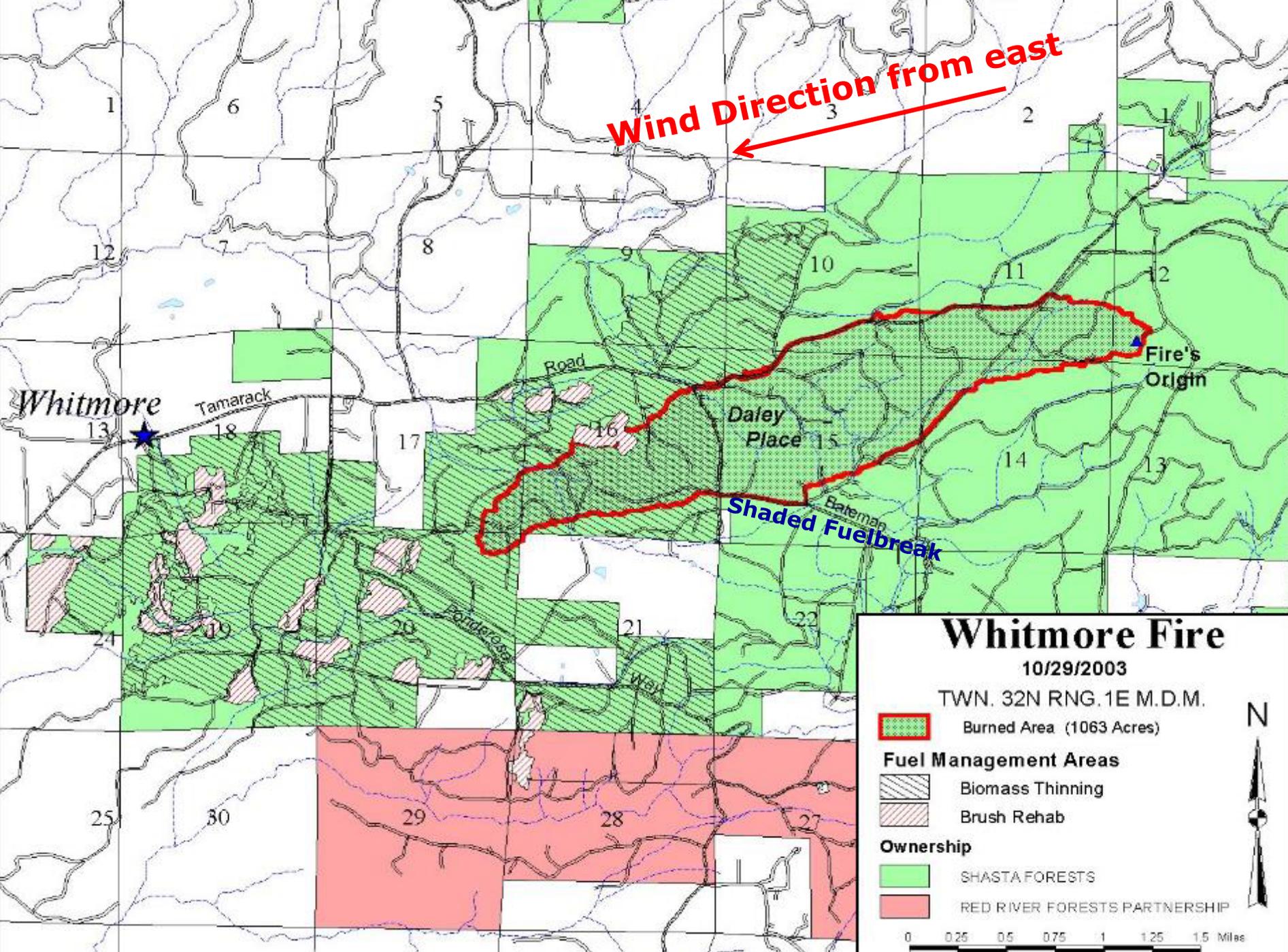
Stand thinned by Beaty in 2002 =  
ground fire

Un-thinned stand =  
Crown fire

←  
Wind Direction



Wind Direction from east



# Whitmore Fire

10/29/2003

TWN. 32N RNG. 1E M.D.M.

Burned Area (1063 Acres)

### Fuel Management Areas

Biomass Thinning

Brush Rehab

### Ownership

SHASTA FORESTS

RED RIVER FORESTS PARTNERSHIP



# 16 year old plantation Modoc Co.: both areas planted after wildfire

## No weed control (L) vs. weed control (R)



# 20 year old plantation - Pondsosa Fire eastern Siskiyou County

Pine reproduction weevil  
killed most of the p. pine  
which were stressed by  
manzanita & drought at  
age 5 to 10

Vegetation control (with herbicides)

Site prepped & planted but no  
follow-up vegetation control



# 6-year-old mixed conifer plantation in Modoc County



2014 Day Fire in Modoc County

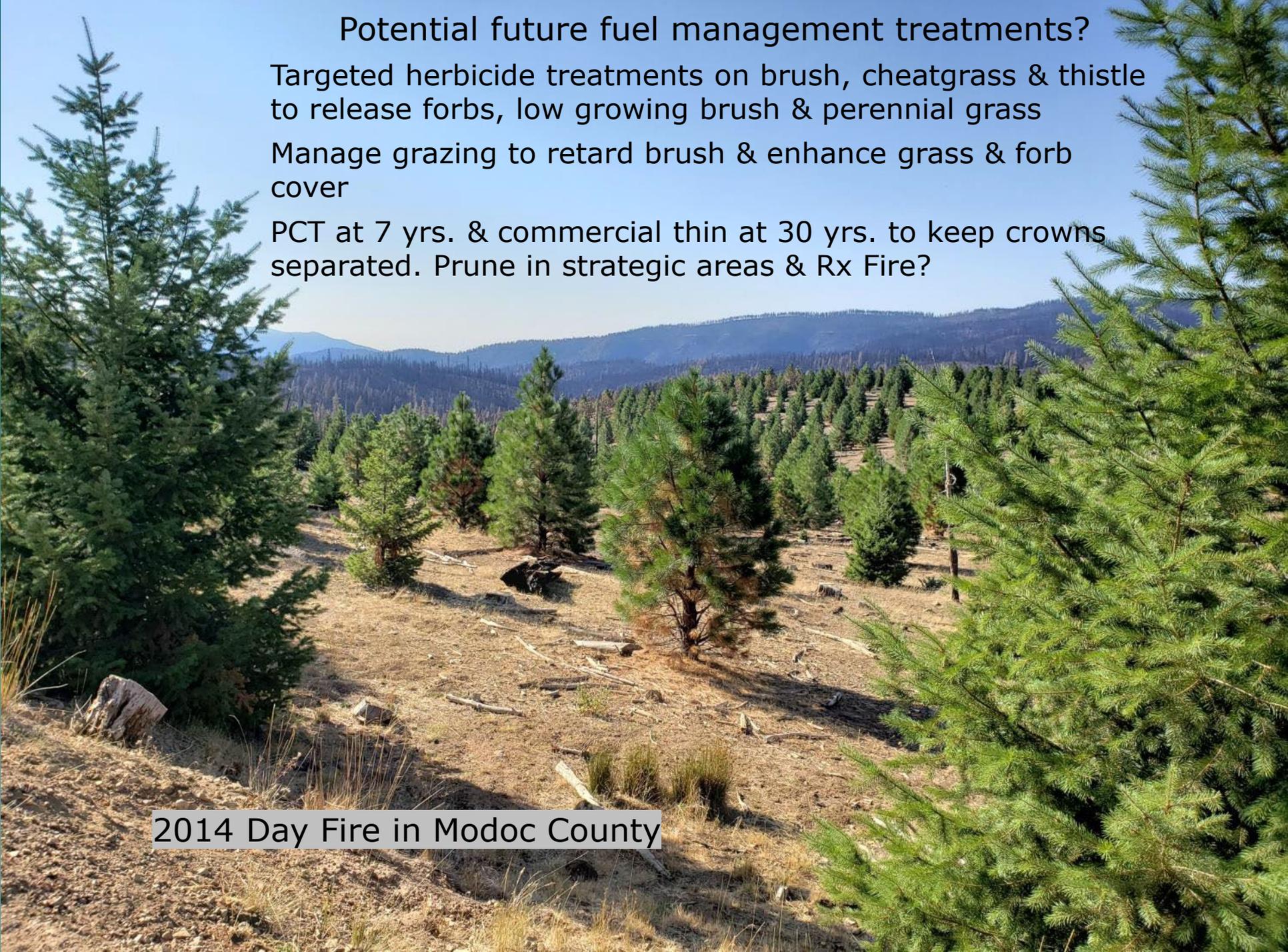
## Potential future fuel management treatments?

Targeted herbicide treatments on brush, cheatgrass & thistle to release forbs, low growing brush & perennial grass

Manage grazing to retard brush & enhance grass & forb cover

PCT at 7 yrs. & commercial thin at 30 yrs. to keep crowns separated. Prune in strategic areas & Rx Fire?

2014 Day Fire in Modoc County





Areas limited by regulatory, economic &/or operational restrictions.

Plant & circle spray in Watercourse Buffer Zone:

- Excellent conifer seedling survival & decent growth
- High risk of conifer tree loss & conversion to brush from wildfire
- Less short-term erosion..... Increase risk of reburn & long-term erosion

No spray or conifer planting to  
enhance Aspen Regeneration



# Examples of planted forests and wildfires

2009 Release spray of brush (retain forbs & grasses) to maximize vigor/growth & reduce long term risk of loss from wildfire

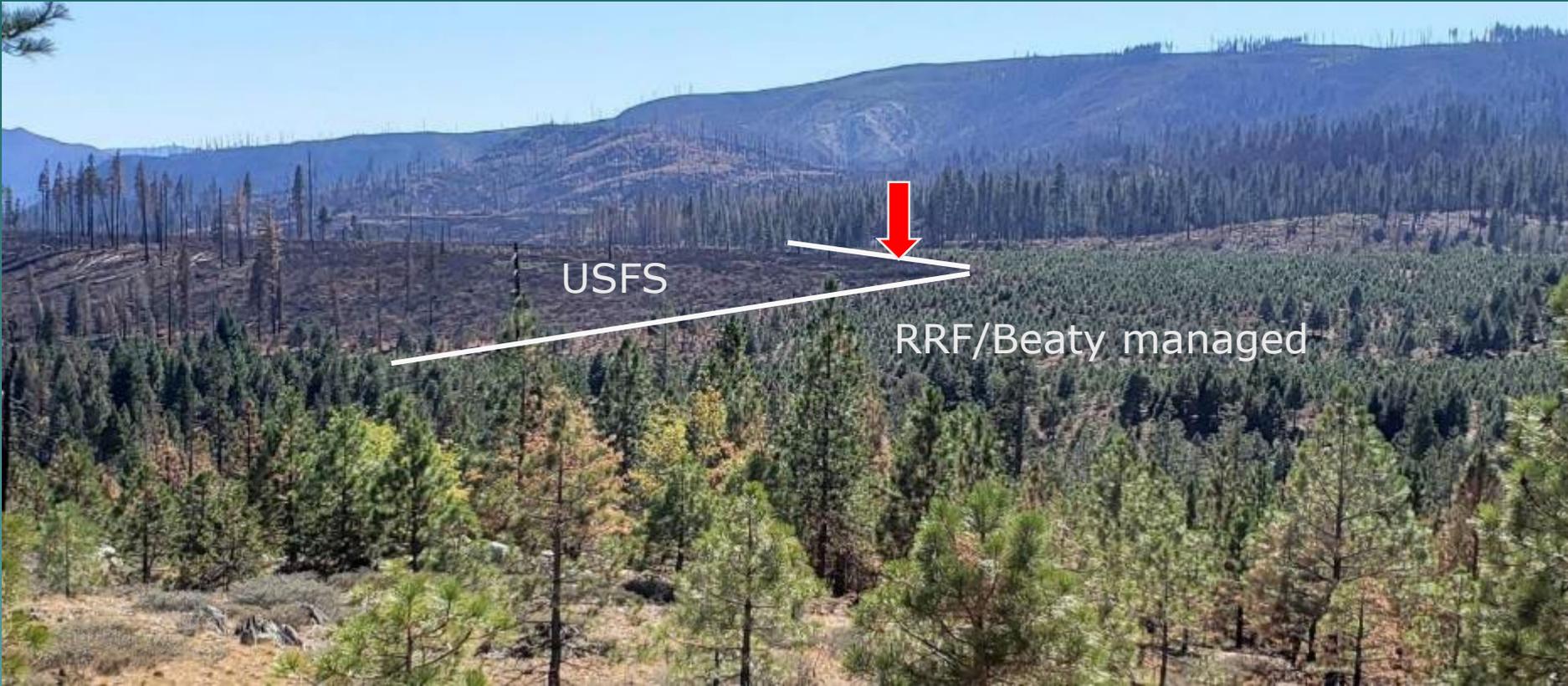
## Storrie Fire Plantation



One month after the 2021 Dixie Fire, 9 years after the 2012 Chips Fire  
and 12 years after brush spray on Storrie Fire Plantation



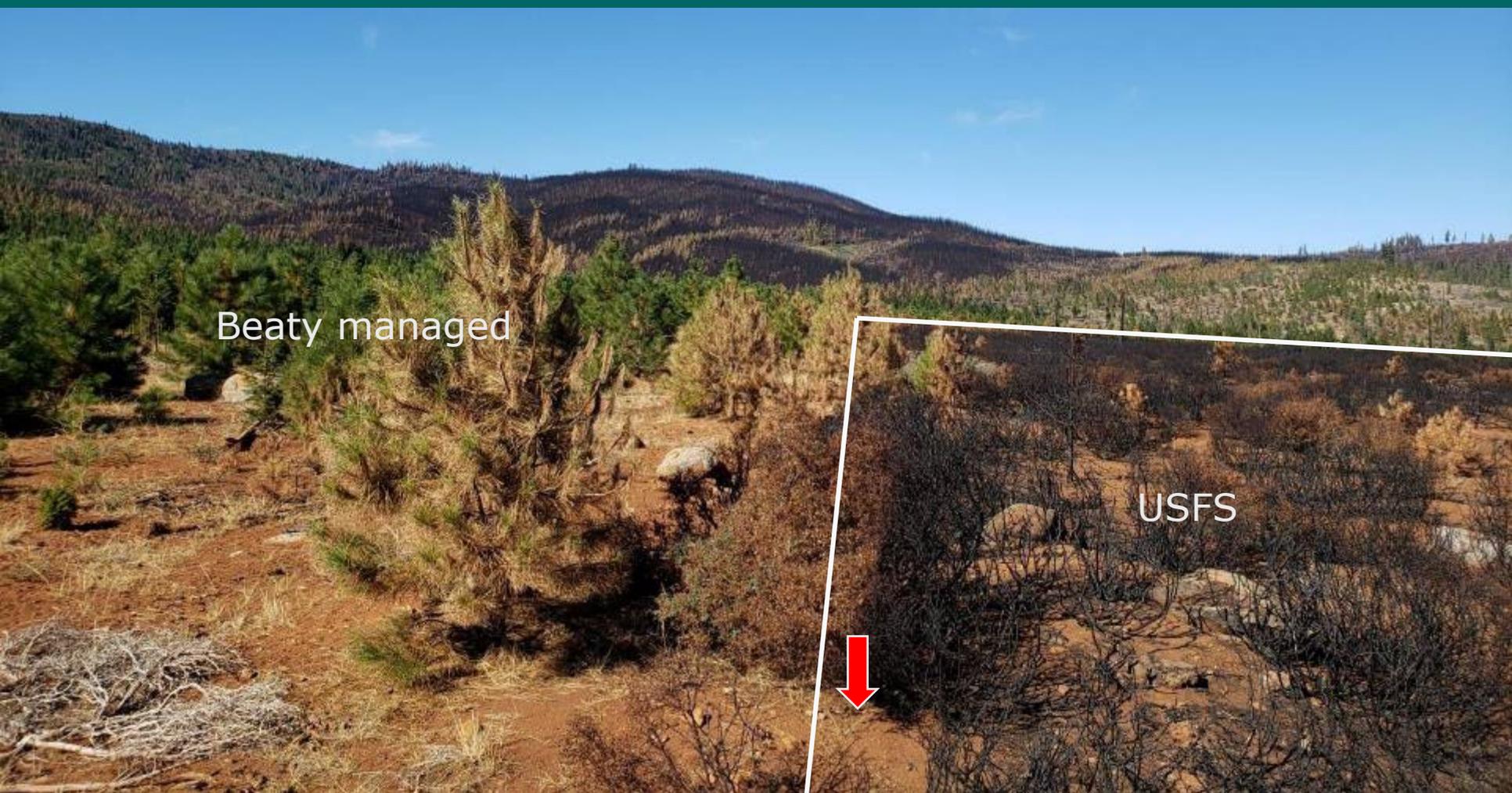
# 2021 Dixie Fire burned 9 years after the 2012 Chips Fire



After the 2012 Chips Fire both ownerships had relatively low levels of dead fuels and both planted. But brush not sprayed on USFS

2015: USFS Ponderosa Pine seedling w/ vexar tube planted after the 2012 Chips Fire near private Chips Fire plantation





Beaty managed

USFS



Sept 2021 after Dixie Fire (no fire suppression)  
Looking north along property line  
RRF's Chips Fire Plantation on lower left & upper right  
USFS Chips Fire Plantation on lower right



Sept 2021 after Dixie Fire (no fire suppression); Looking east from property line towards USFS Chips Fire Plantation w/ minimal brush control



Sept 2021 after Dixie Fire (no fire suppression)  
Looking west from same location on property line  
towards Beaty managed Chips Fire Plantation  
Brush control & trees well spaced



Chips Fire Plantation after 2021 Dixie Fire w/ no fire suppression  
Salvaged logged after 2012 Chips Fire  
Planted in 2014 after site prep spray and followed by brush control



## Storrie Fire 2002 Plantation after 2021 Dixie Fire Beaty in left foreground USFS right background

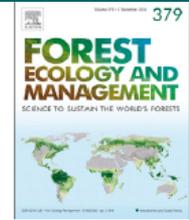
- No fire suppression during Dixie Fire
- Heavy brush had not been treated for > 10 yrs.
- Left too many trees per acre after PCT in 2009

# Salvage & Restoration after Wildfire on Private Lands in NE California

California Forest Pest Council  
Annual Meeting - Sacramento, CA  
November 21, 2013

2007 Moonlight Fire  
Plumas County

Bob Rynearson  
W.M. Beaty & Associates, Inc



## Land ownership impacts post-wildfire forest regeneration in Sierra Nevada mixed-conifer forests

Connor W. Stephens<sup>a,b,\*</sup>, Brandon M. Collins<sup>c</sup>, John Rogan<sup>d</sup>

<sup>a</sup> Department of International Development, Community, and Environment, Clark University, 950 Main Street, Worcester, MA 01610, United States

<sup>b</sup> Department of Forest and Wildlife Ecology, University of Wisconsin-Madison, WI 53706, United States

<sup>c</sup> Center for Fire Research and Outreach, University of California, Berkeley, CA 94720, United States

<sup>d</sup> Department of Geography, Clark University, 950 Main Street, Worcester, MA 01610, United States

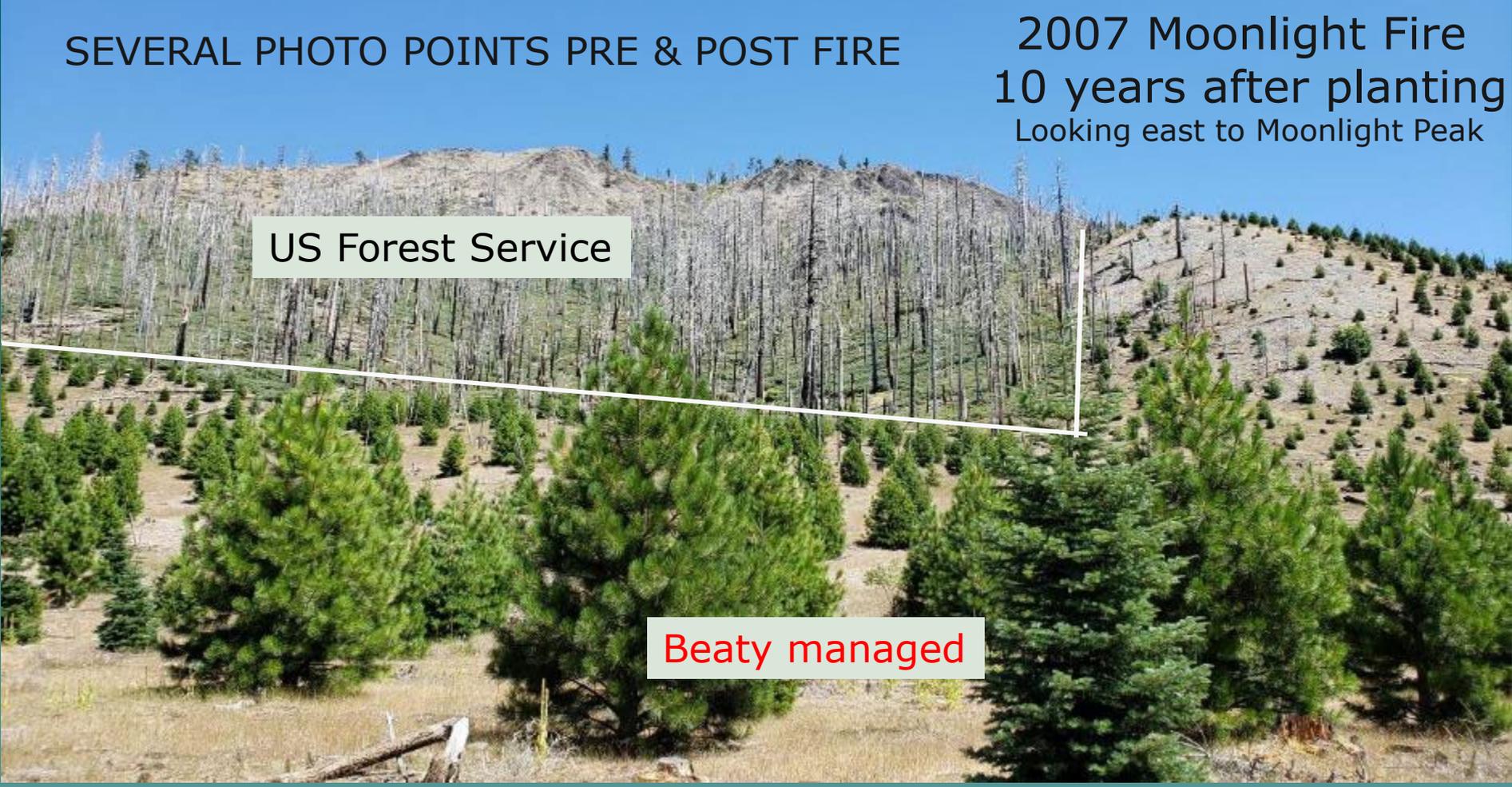
### Results of forest regeneration $\pm$ 12 years after the Moonlight Fire (Published 2020):

*“...a significant proportion of publicly owned lands have transitioned from a conifer-dominated ecosystem to a shrub dominated ecosystem.”* contrasted with:

*“...The abundance of this land-cover class (i.e. “young forest land cover class”) in the context of mixed conifer forest succession suggests that the majority of mature forests lost on private lands are successfully regenerating.”*

SEVERAL PHOTO POINTS PRE & POST FIRE

2007 Moonlight Fire  
10 years after planting  
Looking east to Moonlight Peak



US Forest Service

Beaty managed

Mixed species planted at 220 TPA then PCT to 17' x 17' with no tightening of spacing for firs. Brush treated before & after planting.

Looking east to Moonlight Peak

2021 Dixie Fire in 2007  
Moonlight Fire footprint  
No fire suppression in this area

US Forest Service

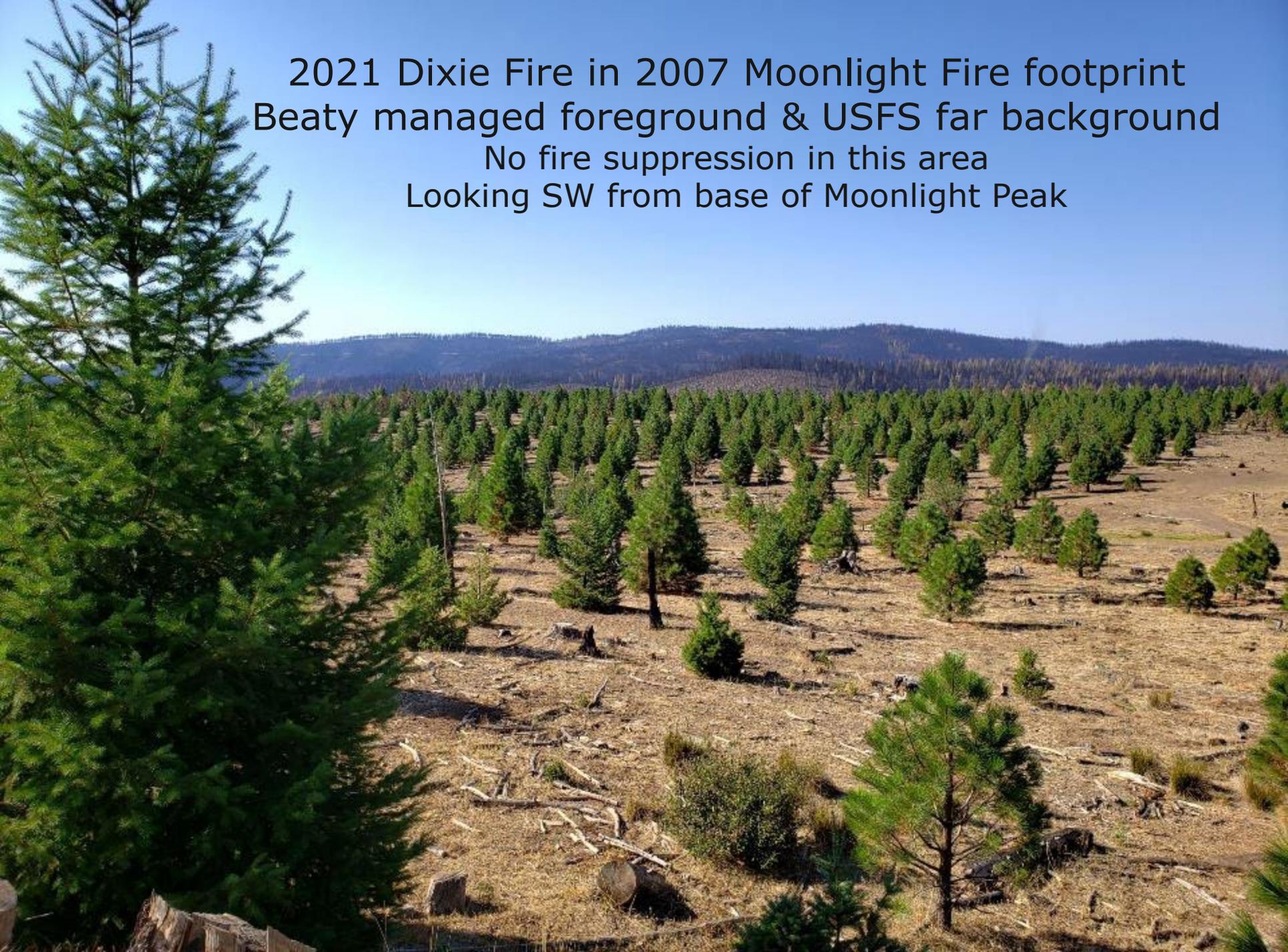
Beaty managed 12 year old plantation

Mixed species planted at 220 TPA then PCT to 17' x 17' with no tightening of spacing for firs. Brush treated before & after planting. Even with no fire suppression in middle of Dixie Fire many trees survived.

2021 Dixie Fire in 2007 Moonlight Fire footprint  
Beaty managed foreground & USFS far background  
No fire suppression in this area  
Looking SW from base of Indicator Peak



2021 Dixie Fire in 2007 Moonlight Fire footprint  
Beaty managed foreground & USFS far background  
No fire suppression in this area  
Looking SW from base of Moonlight Peak





Just before planting mixed species at 220 TPA.  
Competing vegetation treated before planting  
& brush treated after planting.

In the general vicinity of Moonlight Vallet

Photo point 2009



Neighbor: planted  
w/ minimal salvage  
or vegetation  
management

Beaty: planted with vegetation management.  
Later additional brush spray treatment for fuel  
management, targeting high growing brush  
(e.g. manzanita, whitethorn etc.) & avoiding  
grass, forbs & low growing brush (e.g. mahala  
mat, snowberry etc.)

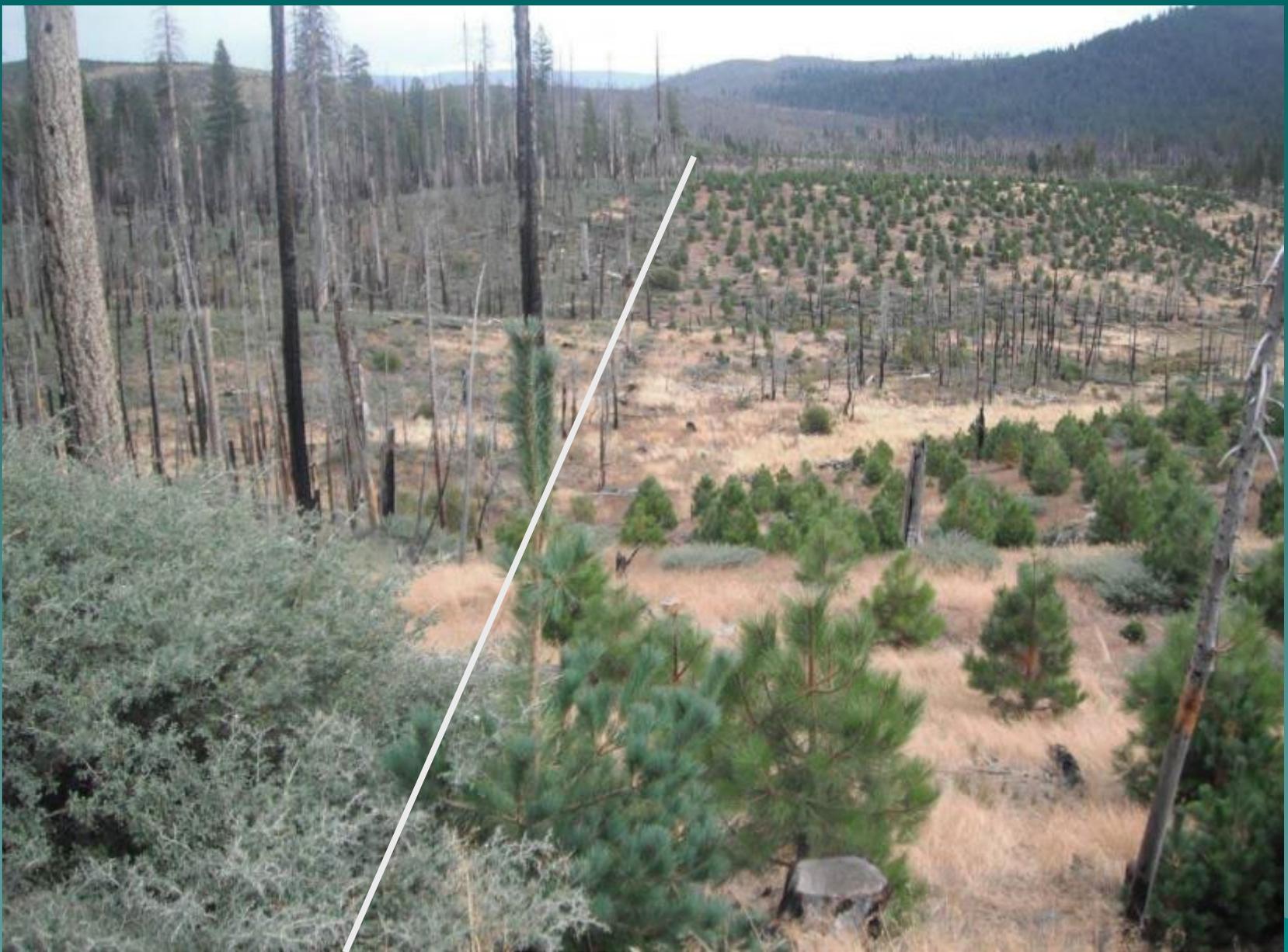
Photo point 2015



## 2021 Dixie Fire

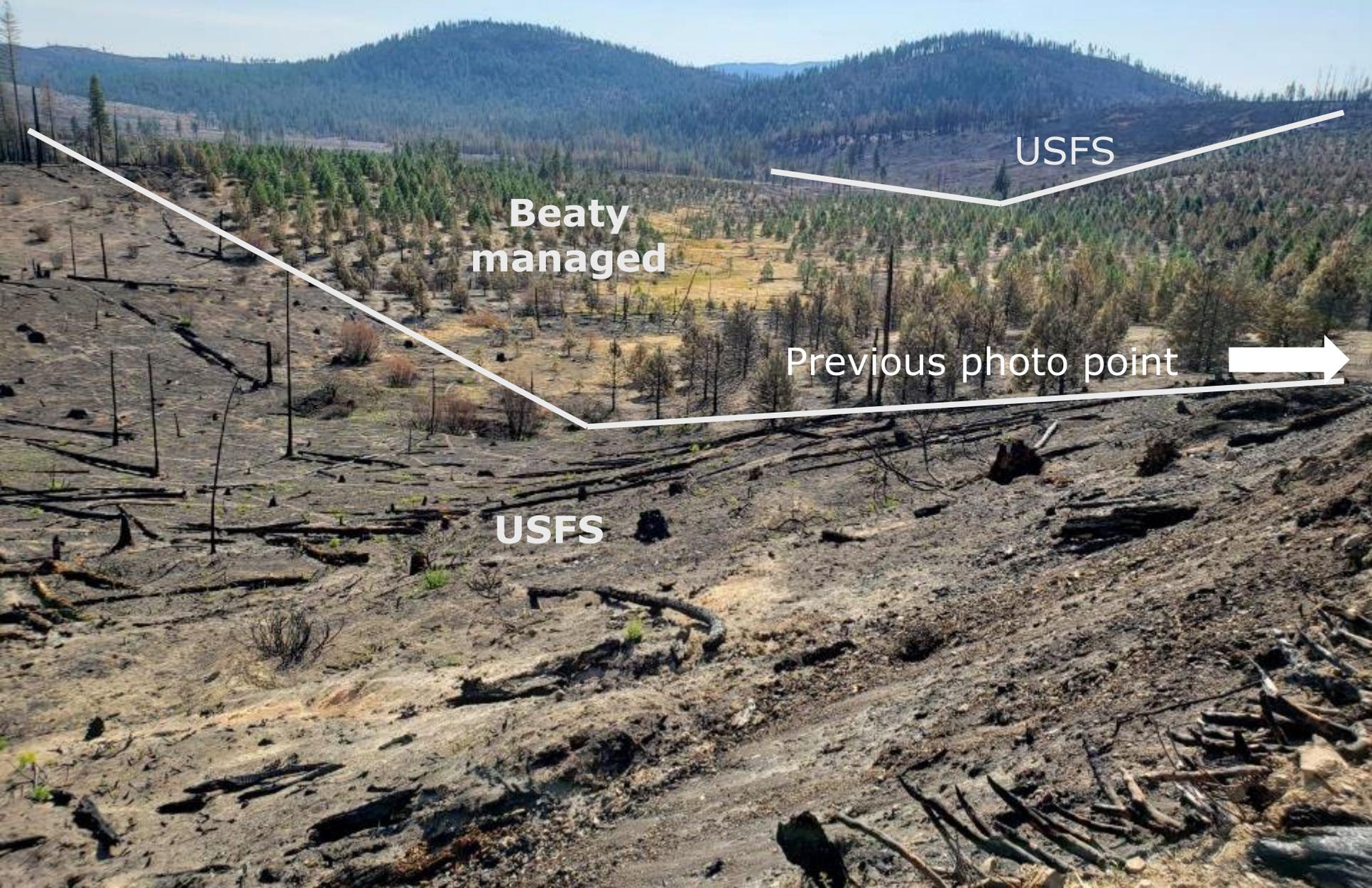
There was no fire suppression activities in this area of the fire

Photo point 2022



Beaty managed Moonlight Fire Plantation in 2015 on right

2007 Moonlight Fire area after 2021 Dixie Fire (no fire suppression)  
foreground: no brush control  
mid-background: brush control in 12 yr. old plantation



USFS

Beaty  
managed

Previous photo point

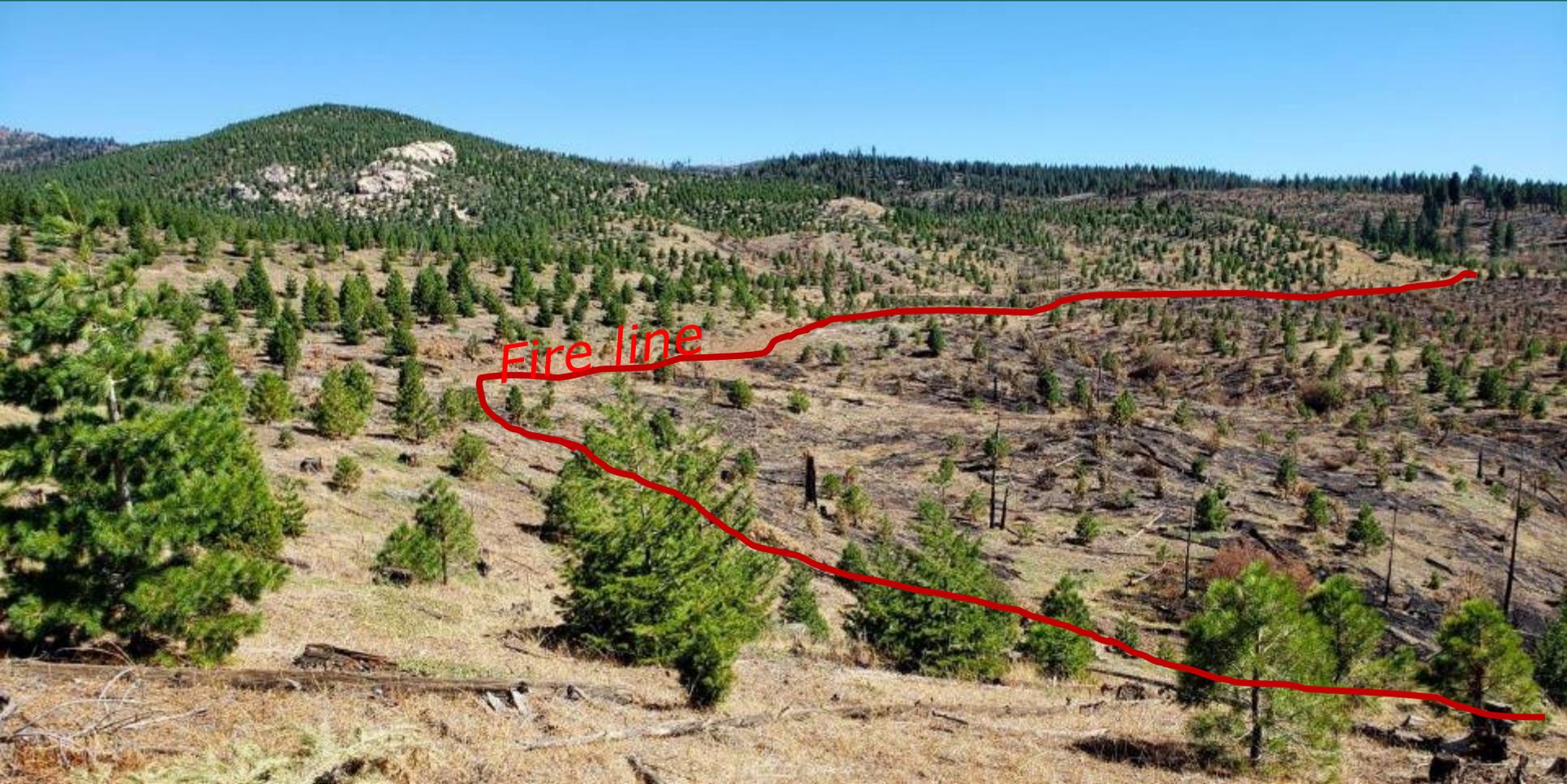


USFS

2021 Dixie Fire burned heavy brush and dead trees in  
2007 Moonlight Fire footprint



Using the low fuels / lower fire intensity in Beaty managed  $\pm 2$  miles wide x  $\pm 5$  miles long Moonlight Fire Plantation, fire suppression forces finally engaged & put in, and held, fire line preventing the Dixie Fire from burning tens of thousand more acres of private & USFS lands.



**Beaty managed Moonlight Fire Plantation after 2021 Dixie Fire**

Retired CalFire  
Siskiyou Unit  
Battalion Chief  
Darin Quigley's  
audio/video  
where 2021 Dixie  
Fire burned from  
USFS into Beaty  
managed 2007  
Moonlight Fire  
plantation



5 year old NSTIA pond pine planted in  
1997 after "Cooks Fire" NE Plumas County

Photo point



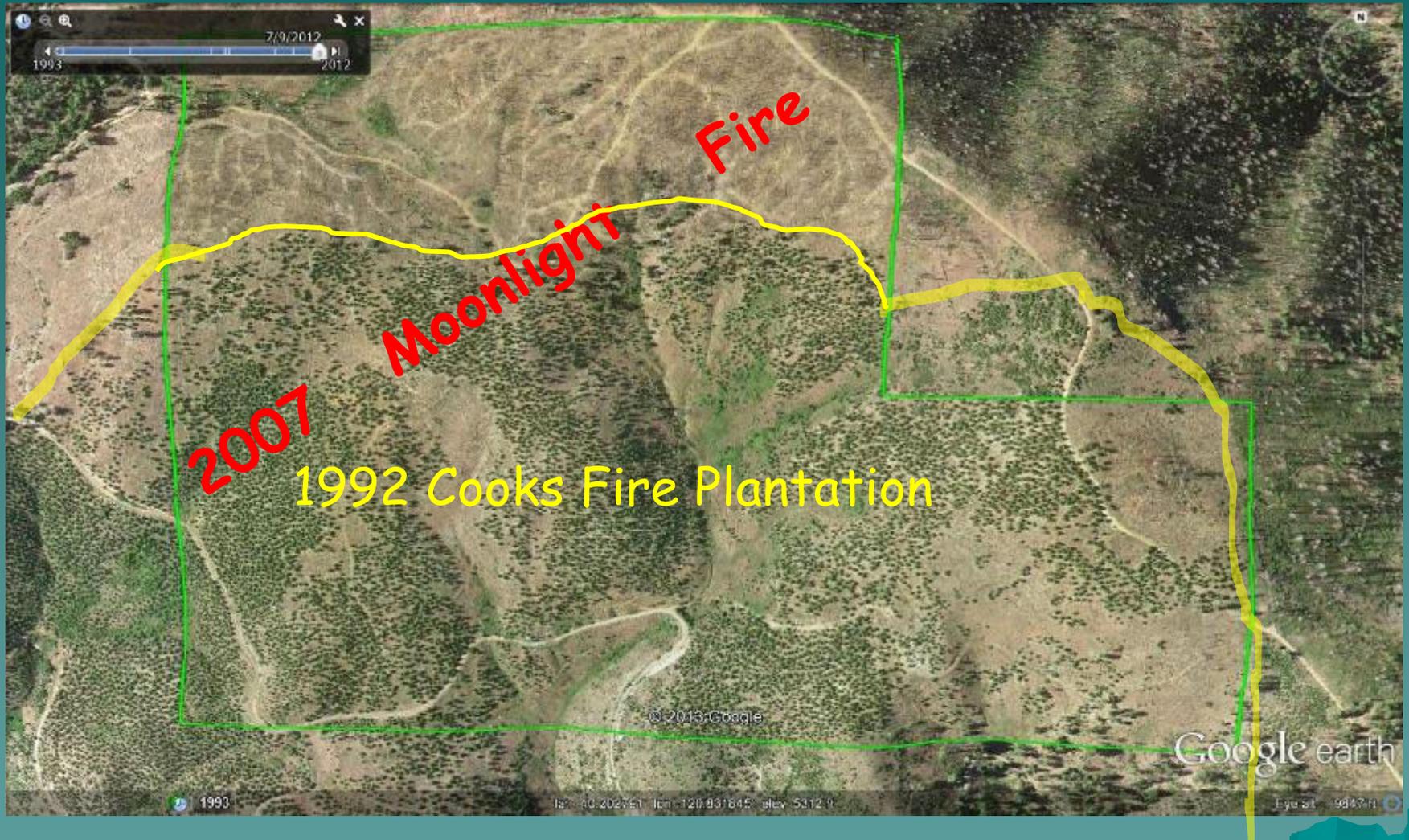
4 years later (9 yrs. old)  
@ 300 TPA prior to PCT



## 12 year-old SFT Cooks Fire Plantation after 2007 Moonlight Fire



**site prep, brush control & thinning to lower TPA  
reduced damage from 2007 Moonlight Fire vs. unit  
with heavy brush**



## Photo 2012

Where dead wood was salvaged, brush controlled & TPA reduced in 10 year-old Plantation most of the young trees survived the Moonlight Fire



23 yr. old plantation in  
2019  
(2006 PCT to 160 TPA &  
2007 Moonlight Fire)



26 year-old Cooks Fire  
Plantation after  
2021 Dixie Fire  
(no fire suppression)  
&  
14 years after 2007  
Moonlight Fire

Damage ranged from very  
low to moderate & severe

26 year-old Cooks Fire Plantation after 2021 Dixie Fire & 14 years after 2007 Moonlight Fire. Now we plant at wider spacing but also are considering PCT to wider spacing (20' x 20'?) & additional brush spray at age 10-20 yrs &/or Rx burn using VMP &/or more intensive grazing?



In addition to other fuel management activities (salvage, brush & stocking control etc.) did the 2007 Moonlight Fire “under burn” play any role in survival during the 2021 Dixie Fire w/ no fire suppression??



## **Conclusion**

*No guaranty a planted forest will survive wildfire. But we can significantly reduce the risk of loss. Do not take the path of least resistance & be satisfied with just replanting after fire.*

*Work with, not against, “mother nature” & integrate the use of ALL appropriate methods throughout the life of a planted forest :*

- “Manage” Adjacent timberlands in the Watershed.
- Maximize individual tree growth, and manage fuel loads & configuration to increase resiliency to fire
- Manage to facilitate fire suppression efforts

# ANY QUESTIONS?



2022  
CFPC Weed Committee Field Tour  
Show Plantation  
McCloud Flats Siskiyou County