

# Forest Ecology and Succession

- Fire Effects on Forest Health Series
- Moab, Utah December 10, 2002

**Utah State**  
UNIVERSITY  
EXTENSION

# Succession Happens



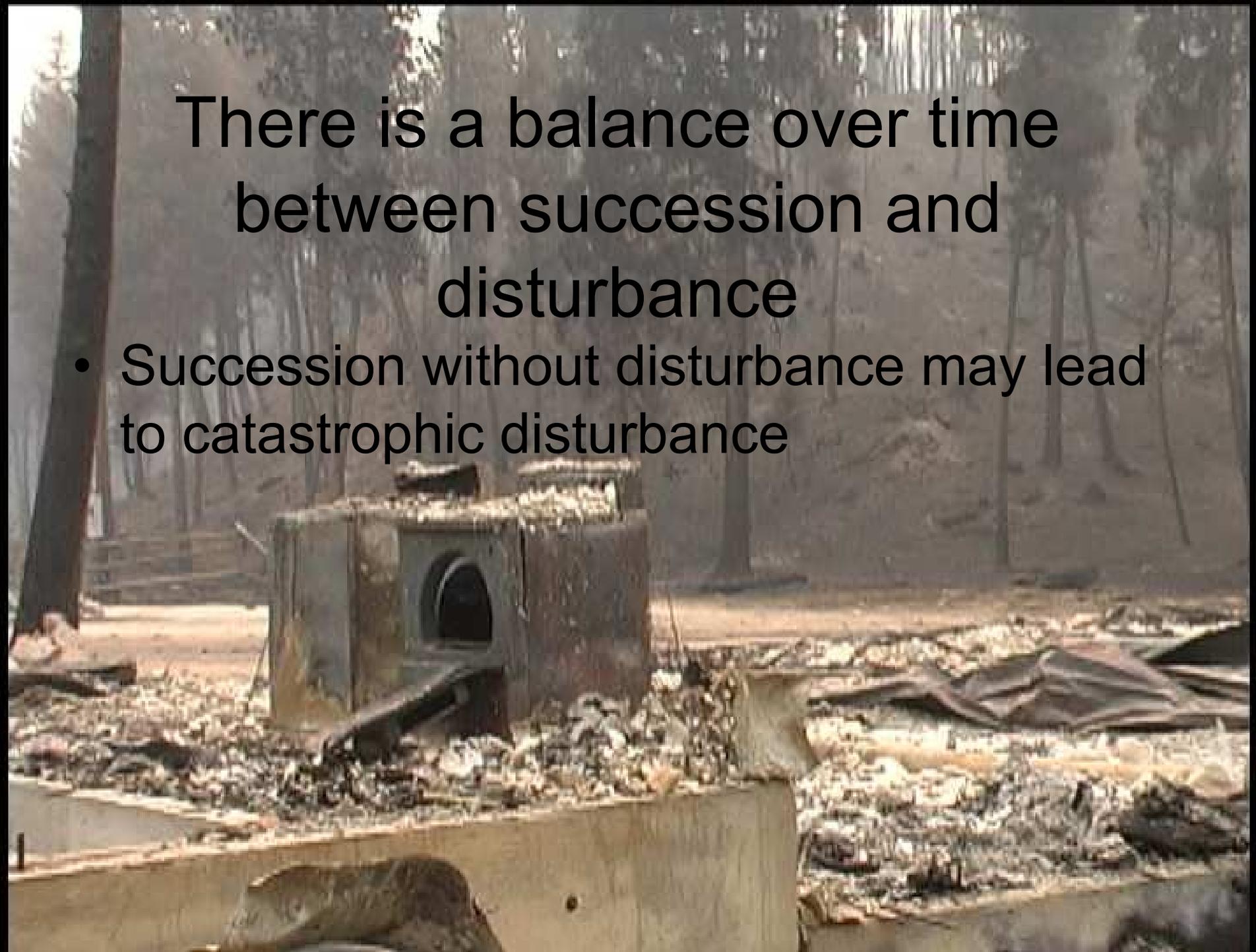
# Definition

- **Succession:** The gradual replacing of one plant community by another



- Forests are dynamic; always changing
- One of the most important parts of ecology





There is a balance over time  
between succession and  
disturbance

- Succession without disturbance may lead to catastrophic disturbance



# Plant Communities: Pioneers vs. Shade Tolerant, or Pine vs. Fir

- Not all evergreens are created equal
- All Pinaceae Family, but not all pines



# Pines are Pioneers



- Lodgepole pine regeneration following a fire in the Teton Range

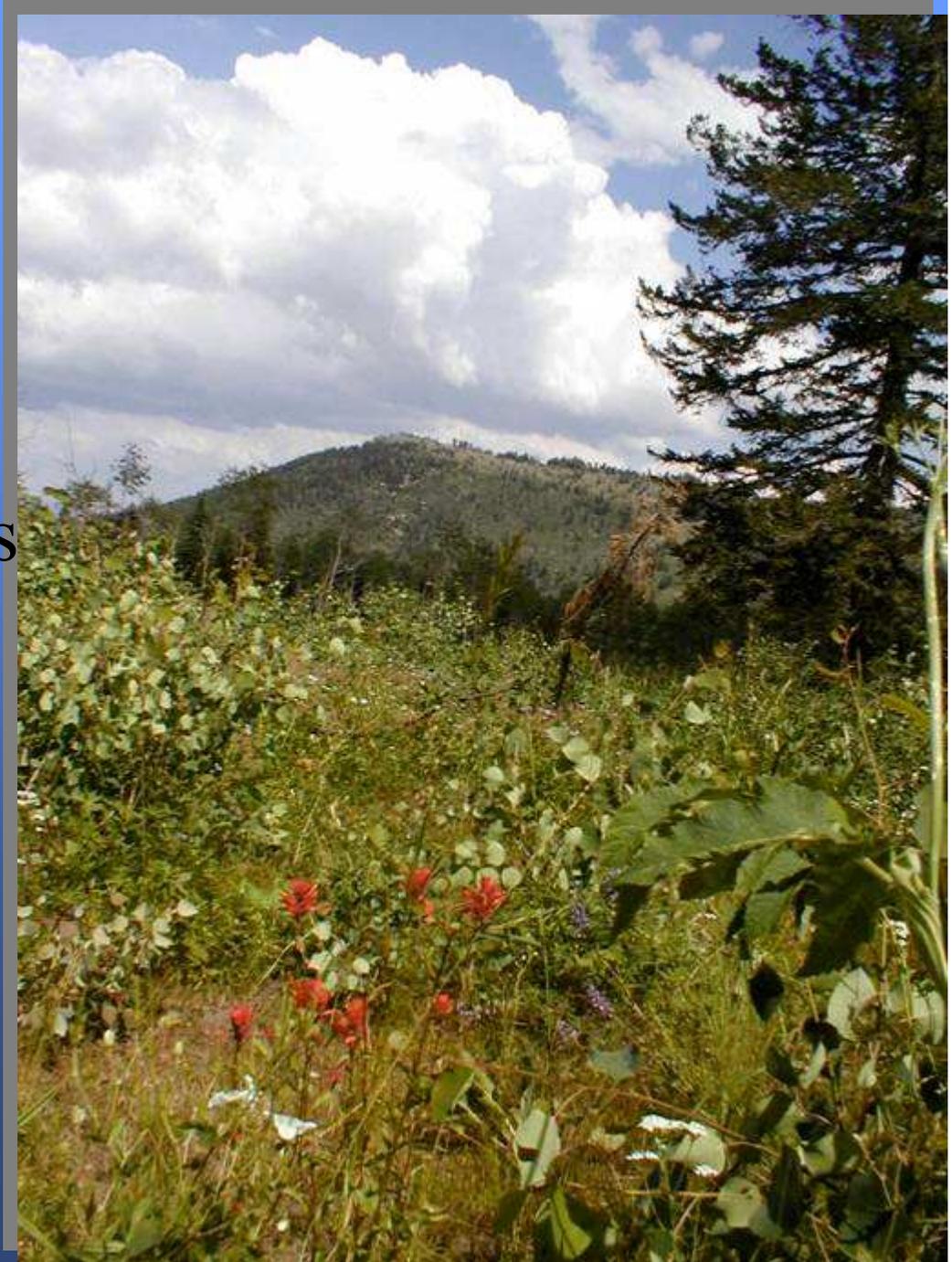


# Limber Pine



# Pioneers

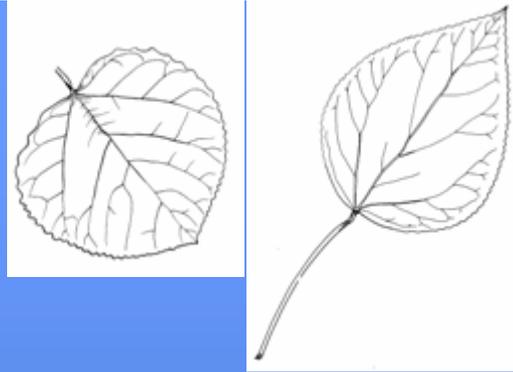
- Tolerate direct sun
- Follow disturbance
- Establish themselves



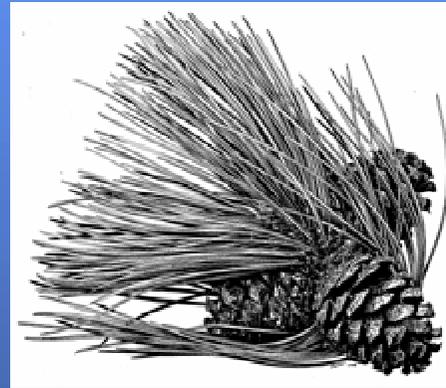
# Quakies are Pioneers



- Aspen



- Ponderosa Pine



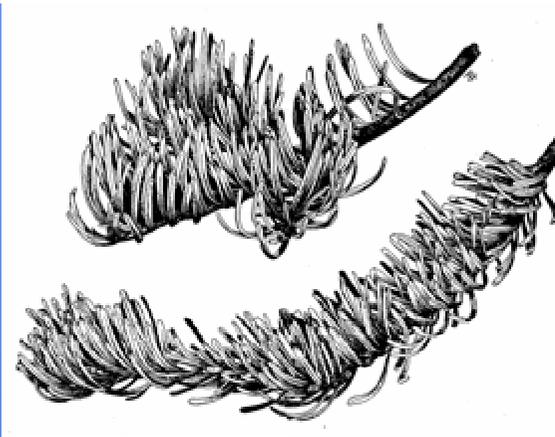
- Lodgepole Pine



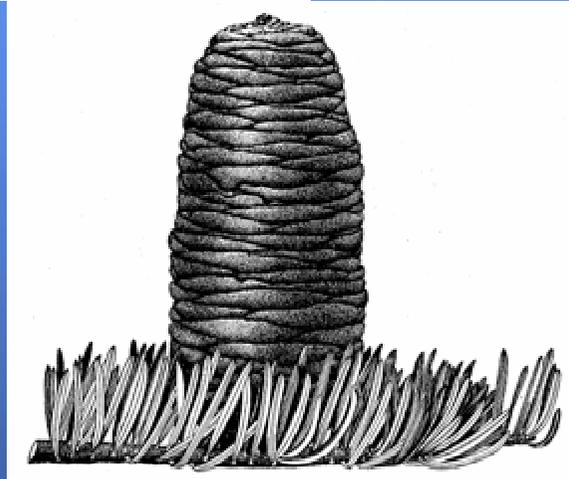
# Shade Tolerant Fir



- Subalpine fir



- White fir



- Douglas Fir



# Fir needles (with frost damage)



# Firs Replacing Pines



# Succession Examples

Shade  
Intolerant  
Pines

Shade  
Tolerant  
Firs



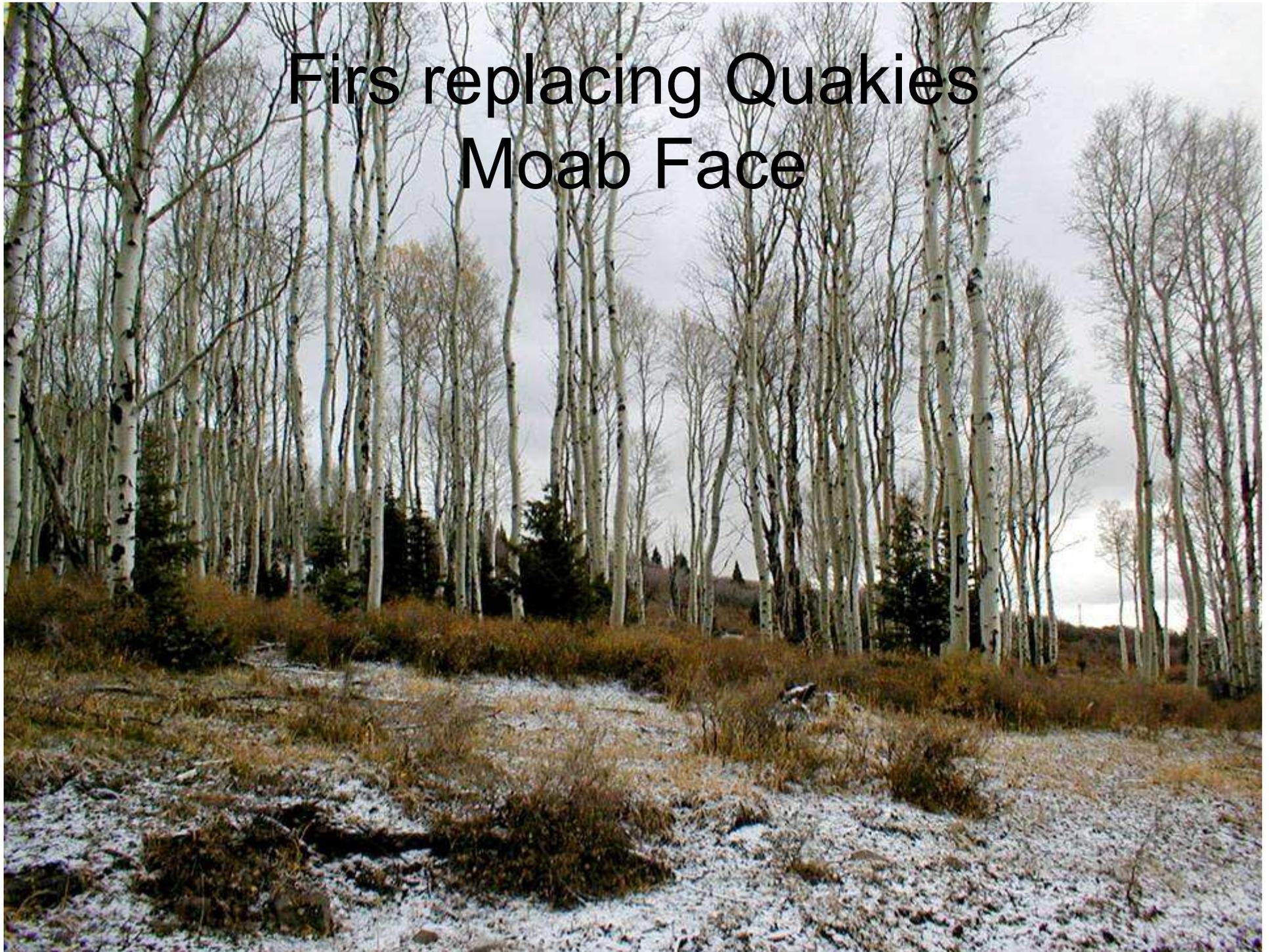


# Firs replacing Quakies





# Firs replacing Quakies Moab Face







▲ MOAB 31  
← MINERS BASIN 3  
PINHOOK BATTLEGROUND → 2



# Final Stages



# Sub alpine Fir Overtaking Aspen Northern Utah



- White fir under Douglas-Fir



# Pinion Juniper Succession Moab Face





- Lack of disturbance leads to less diversity, less stability





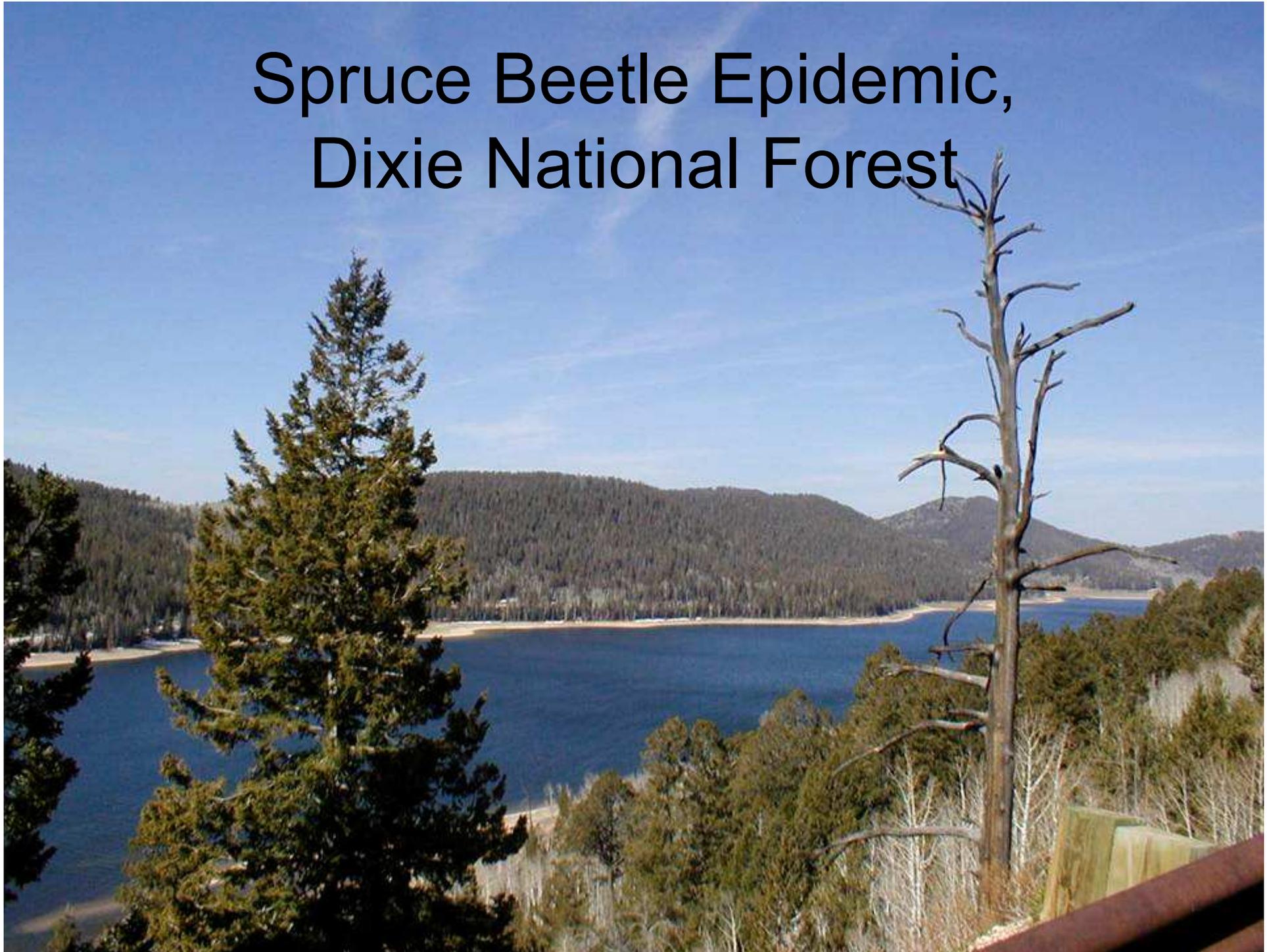


# Natural Disturbances

- In Utah: Fire and Insects primarily
- Secondary disturbance agents:
- Avalanches, floods, wind-throw, mud slides



# Spruce Beetle Epidemic, Dixie National Forest





- Hurricane Hugo





# No Human Disturbance May Lead to More Natural Disturbance



# Root Diseases



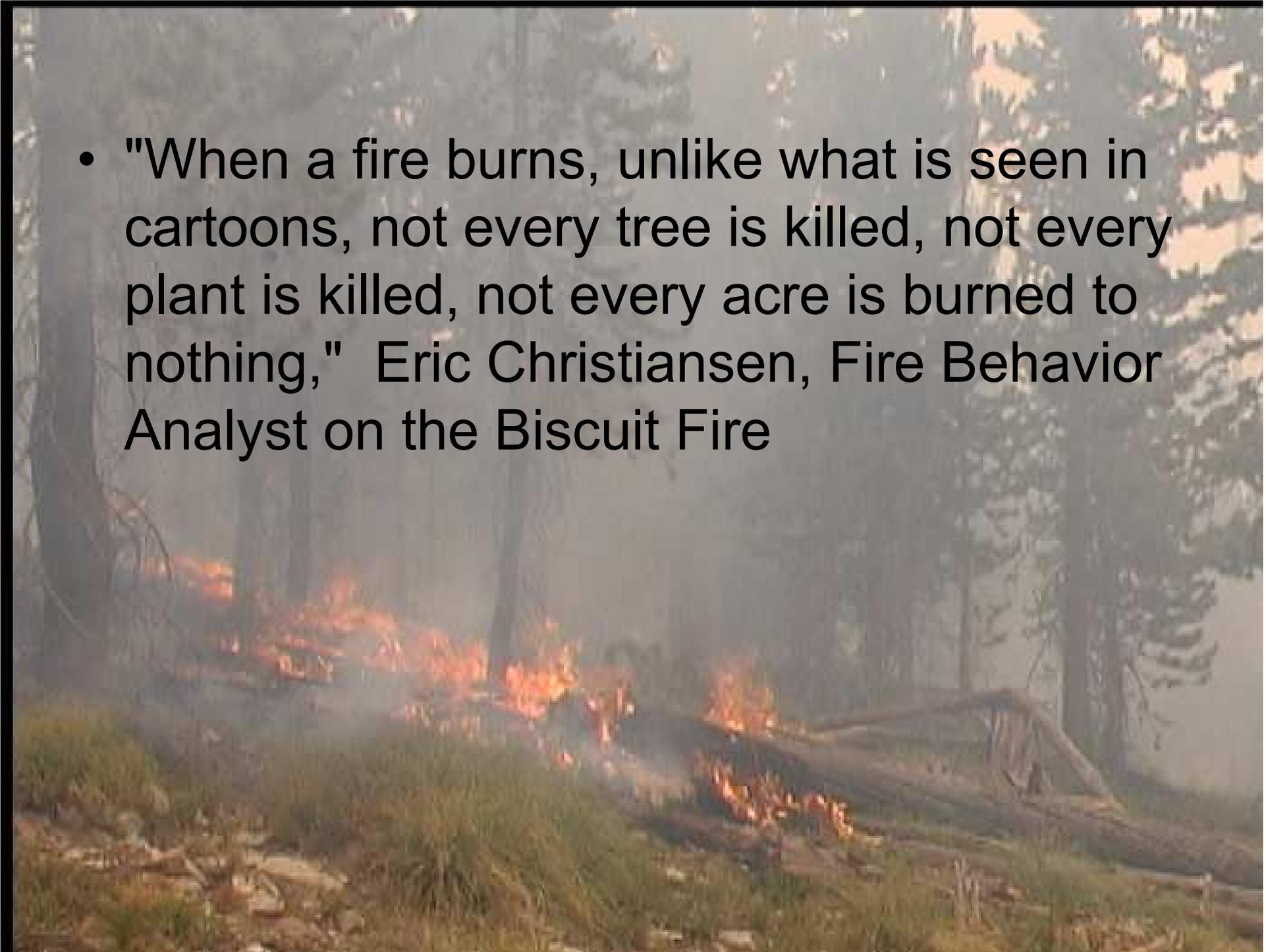
# Extreme Wildfire



# Fire Effects

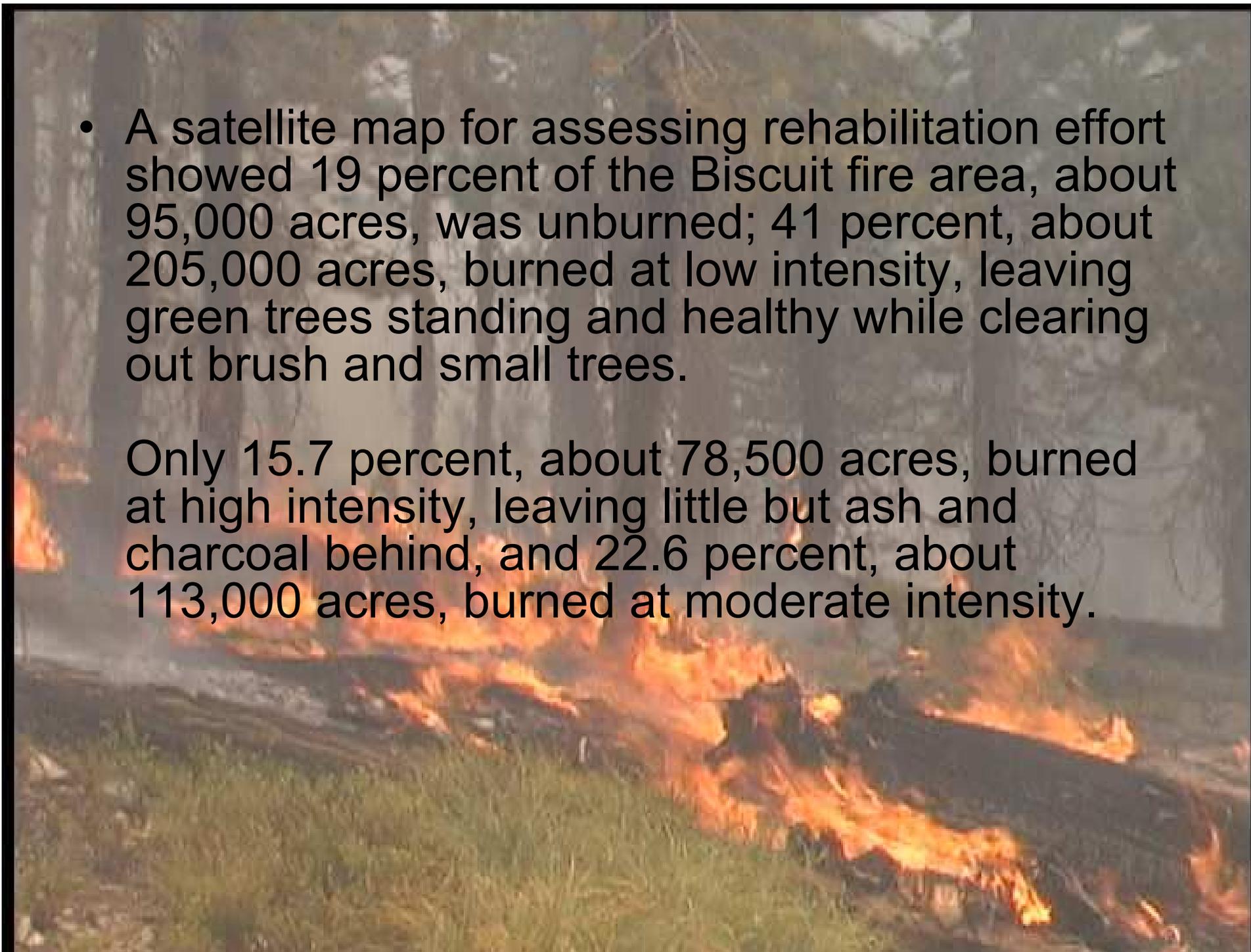


- "When a fire burns, unlike what is seen in cartoons, not every tree is killed, not every plant is killed, not every acre is burned to nothing," Eric Christiansen, Fire Behavior Analyst on the Biscuit Fire



- A satellite map for assessing rehabilitation effort showed 19 percent of the Biscuit fire area, about 95,000 acres, was unburned; 41 percent, about 205,000 acres, burned at low intensity, leaving green trees standing and healthy while clearing out brush and small trees.

Only 15.7 percent, about 78,500 acres, burned at high intensity, leaving little but ash and charcoal behind, and 22.6 percent, about 113,000 acres, burned at moderate intensity.



- "The worst thing that we could have is to be so enamored of our forests that we eliminate the processes that change them," said Tom Atzet, the U.S. Forest Service ecologist on the Biscuit Fire.





# Human-caused Disturbance

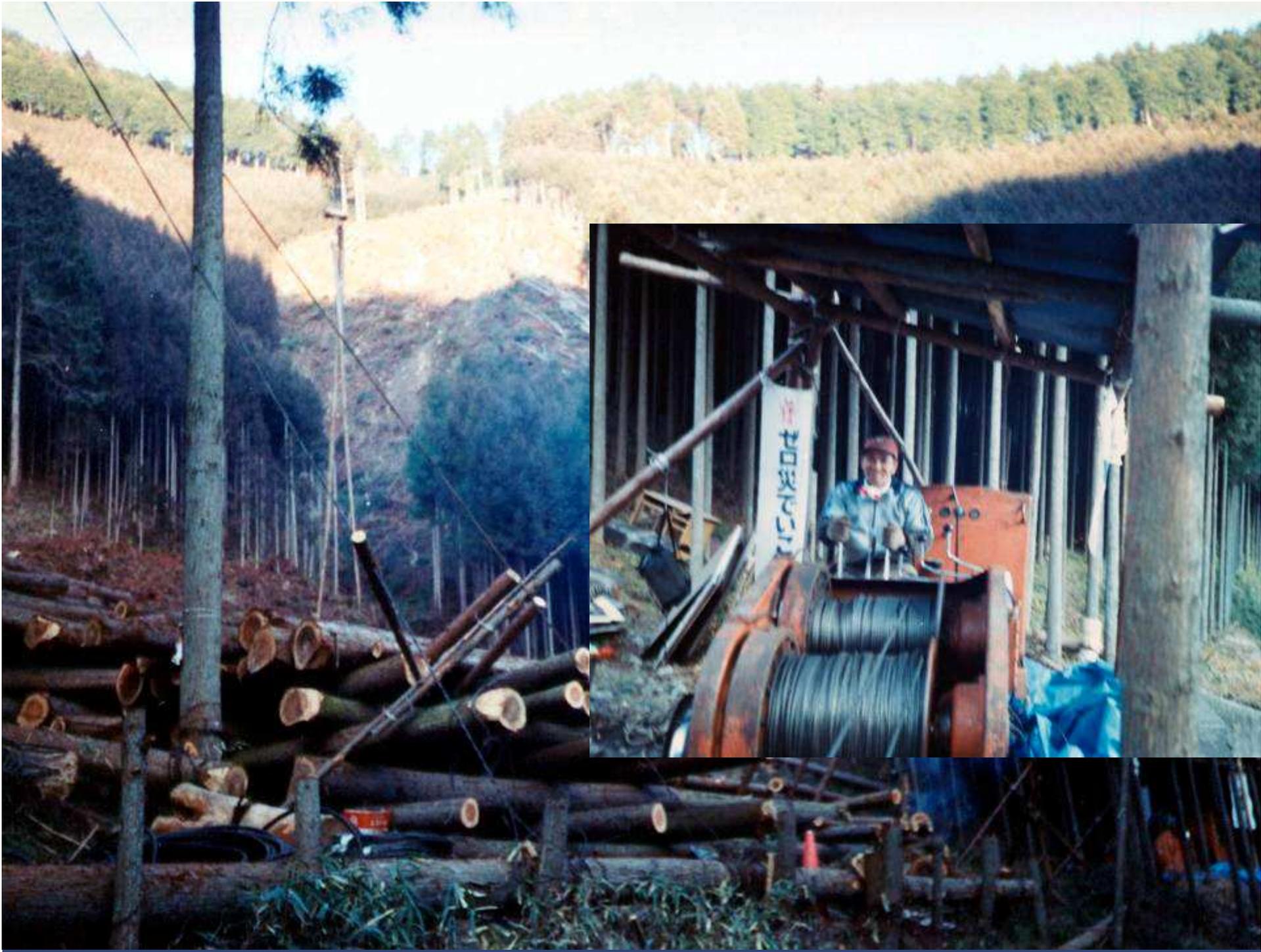
- Logging, thinning,  
prescribed fire











# Disturbance History



# The 1902 Wasatch Survey: Diary of A. F. Potter

- July 3, 1902- ...much cutting of timber has been done and no large trees remain.

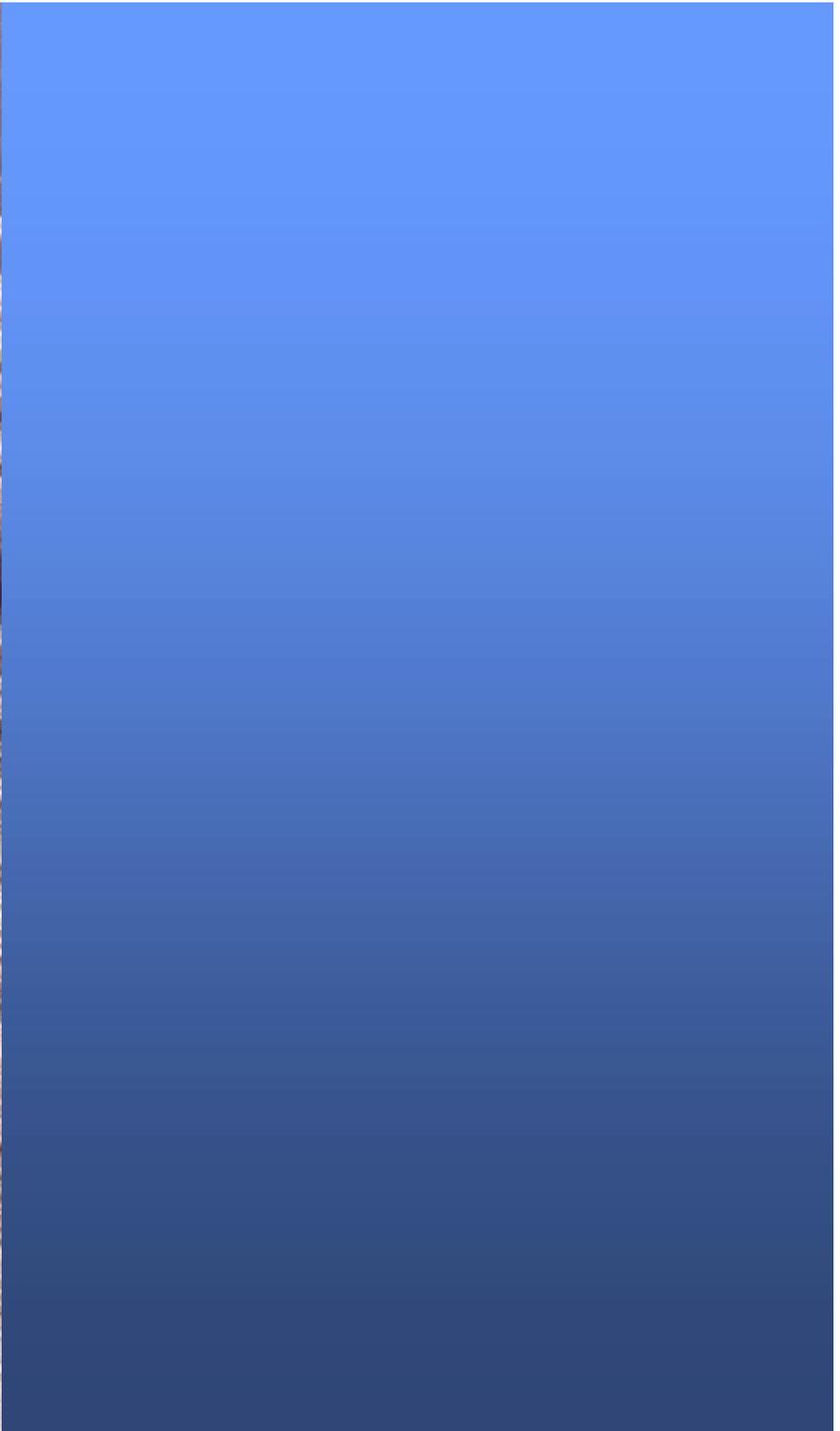
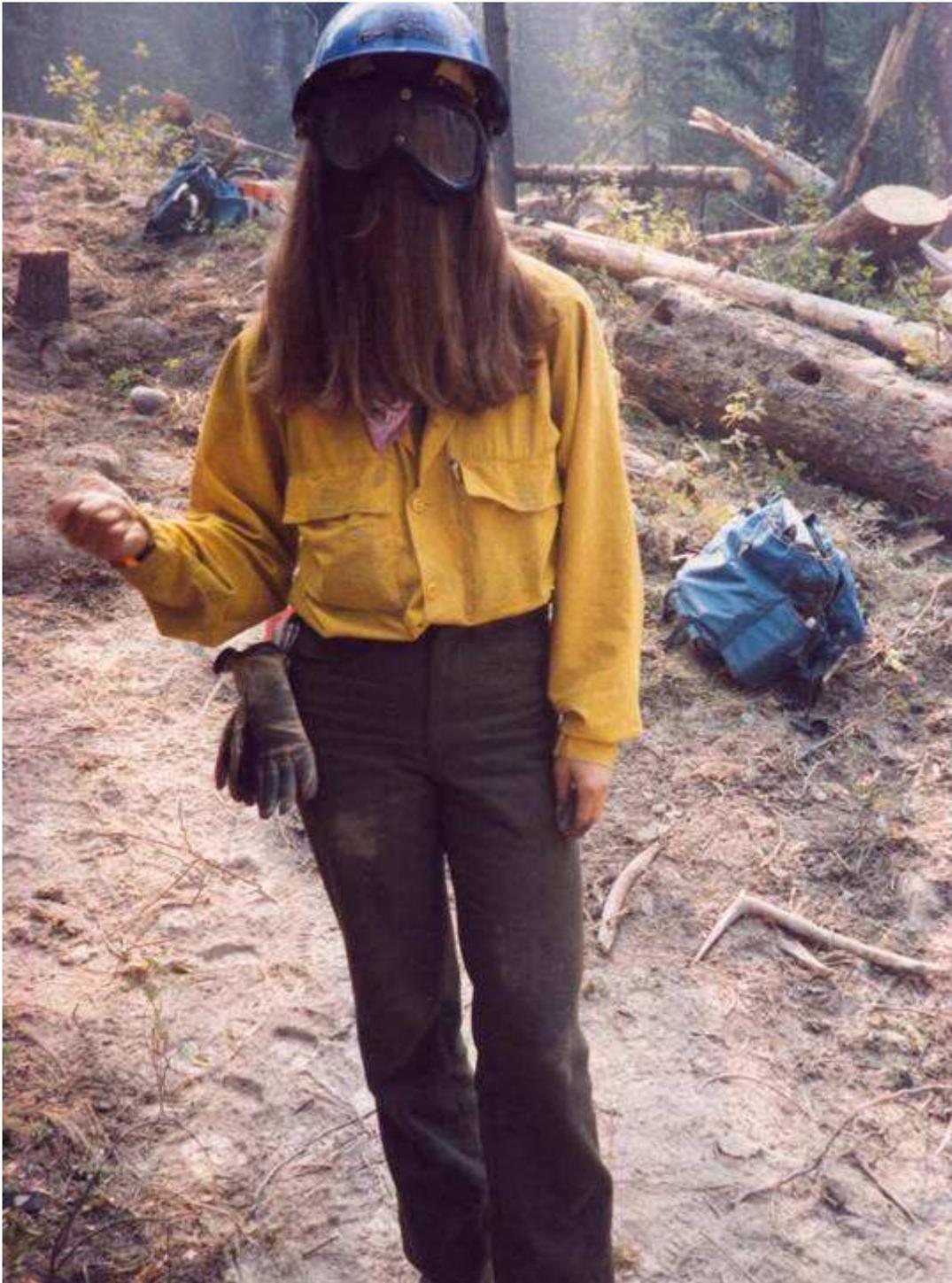


# Grazing History













George Gruell repeat photography:  
1894



George Gruell repeat photography:  
1994

# Past Activity = Management



# Choices between Proactive and Reactive Management



# Do Nothing

- Often the best choice





# Management Alternatives

Thin from  
Below













# Restoration



Fire Use





# Wildland-Urban Interface

- Changes idea of sustainability









Rick Wilking / Reuters



Photo Jack Cohen









# Management Examples





















# Conclusion

