

Calaveras Big Trees State Park Vegetation Management Plan



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Our Mission

To provide for the health, inspiration and education of the people of California by helping to preserve the state's extraordinary **biological diversity**, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation.

WHY DO WE NEED A PLAN?

The Forests of Big Trees State Park and all the plants and animals within them are protected!

Commercial timber harvest is not permitted.

Why can't we just leave the forest alone?



**We are
Big Trees
State
Park-
our
forest is
healthy!
Right?**



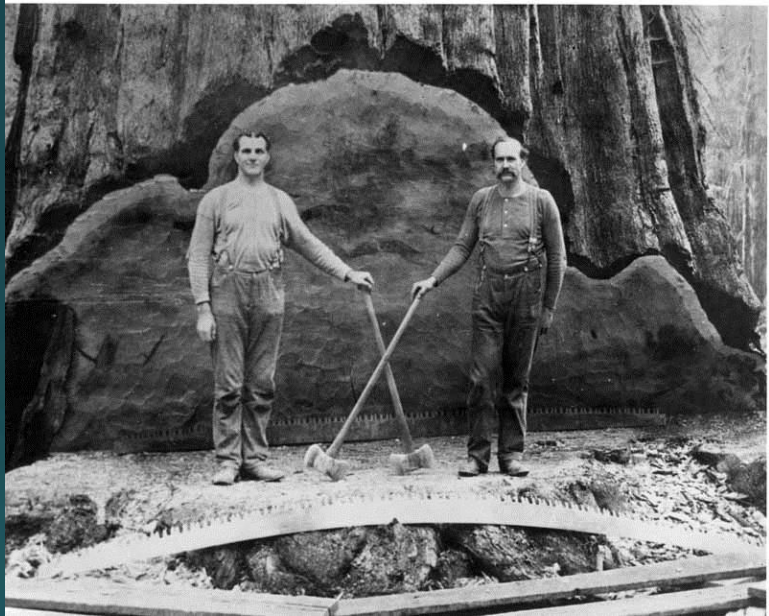
Or is it?

Too dense?

Out of balance?

Why?

Past Impacts



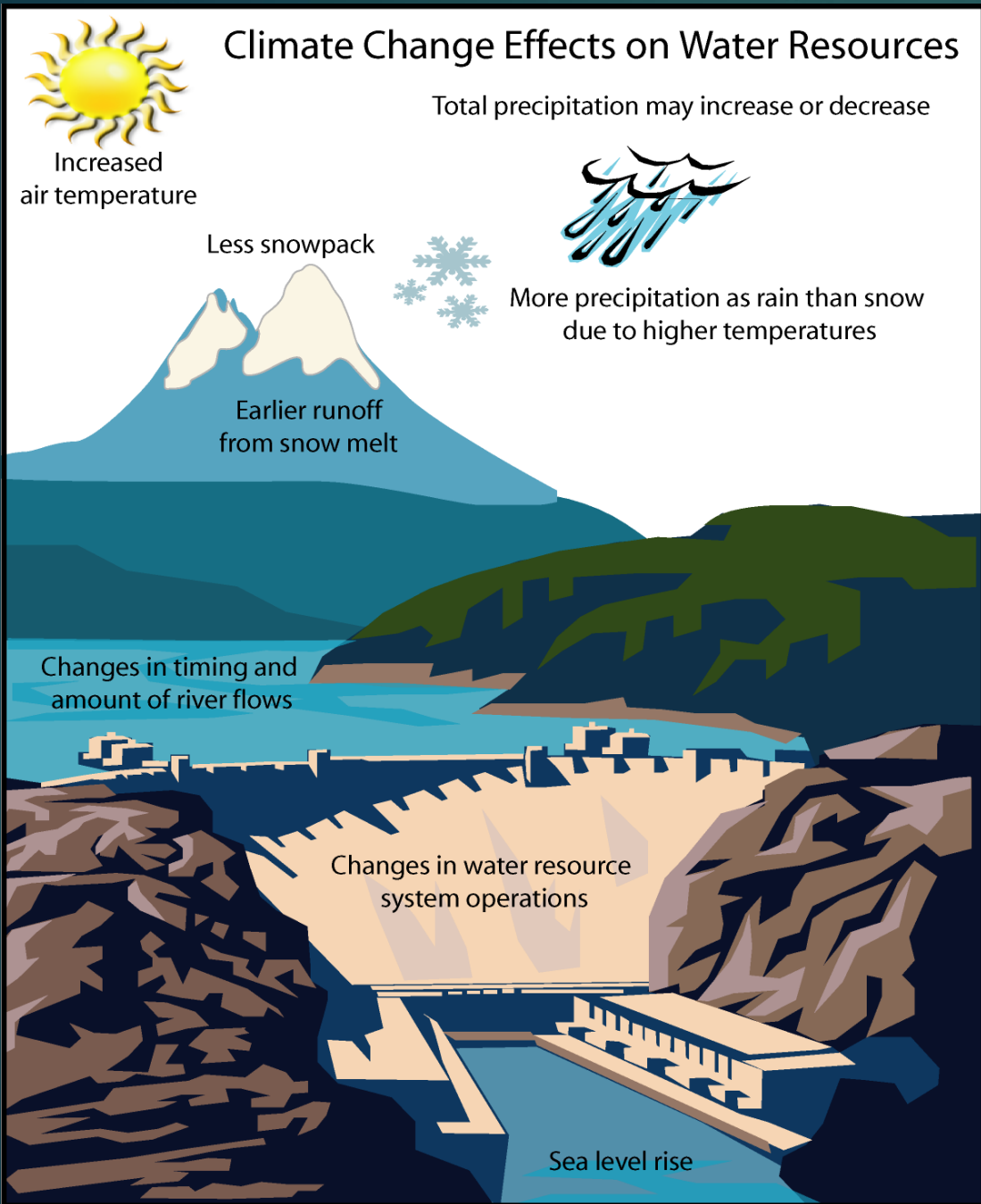
Current Threats- Catastrophic Fire



2013 Rim Fire- the largest wildfire on record in the Sierra Nevada mountain range. 257,314 acres burned.

2014 King Fire burned 97,717 acres. More than 23% high severity- complete mortality!

2015 Butte Fire burned 70,868 acres. Came within 8.5 miles of Big Trees SP!



More Threats

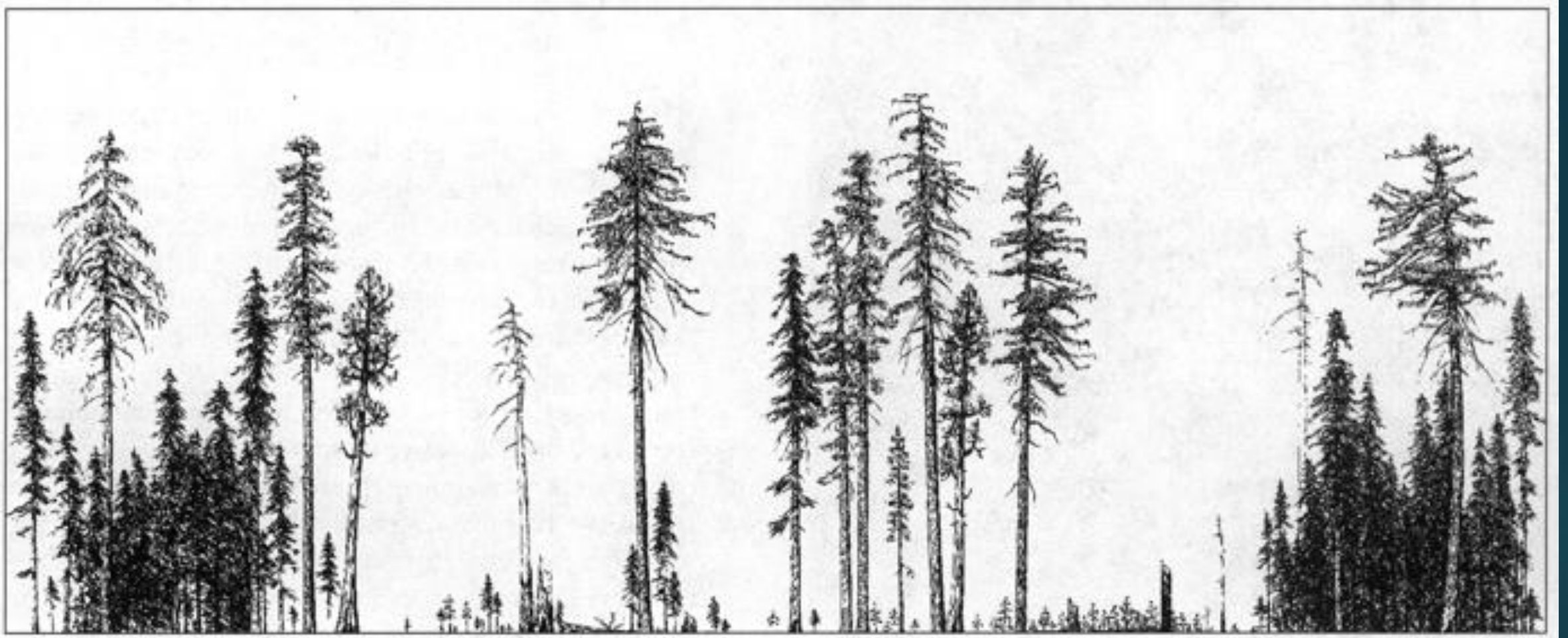
Drought

Pest Invasions- Bark Beetles

Climate Change!

- Hotter
- Drier
- More fires
- More extreme fire weather!

What is a Healthy Forest?



Yosemite NP, Aspen Valley. Fire managed stand (North et al., 2009)

A Healthy Forest is Resilient!

Ecosystem Resilience

The capacity of an ecosystem to absorb disturbance without shifting to an alternative state and losing function and services.

Carpenter et. Al. 2001



Resilient?





**Is this a resilient
forest?**

**How do we
restore
Resilience?**



For our forests- the answer is fire!



However!



We know what to do, and it is a lot of work!



Thinning
(Fire Surrogate)
followed by
prescribed fire.

But what about the forest inhabitants?

- Many species are in decline.
- Others are still absent from historic habitat.



Homogenous versus Heterogeneous Forests

Centuries of logging and fire suppression has resulted in overly dense forests with:

- higher density of smaller trees
- a reduced density of large diameter trees and logs
- fewer canopy gaps or openings.



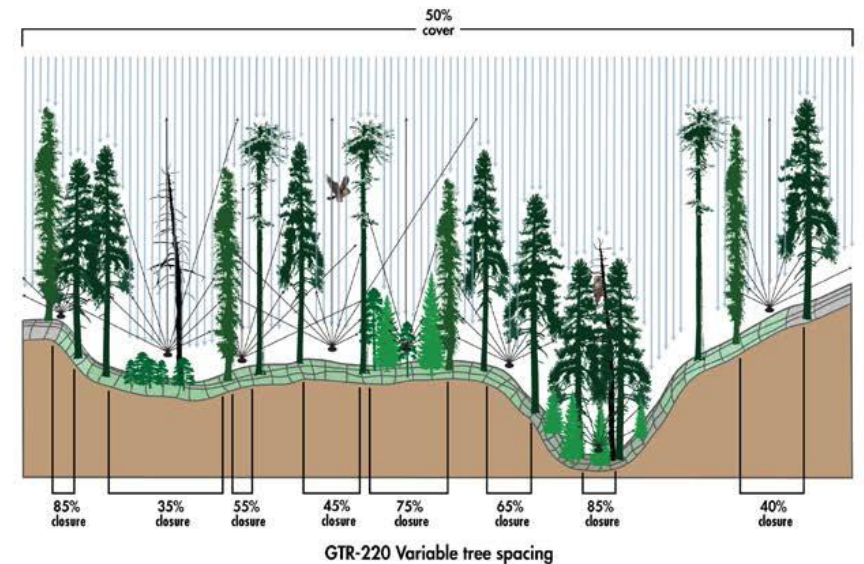
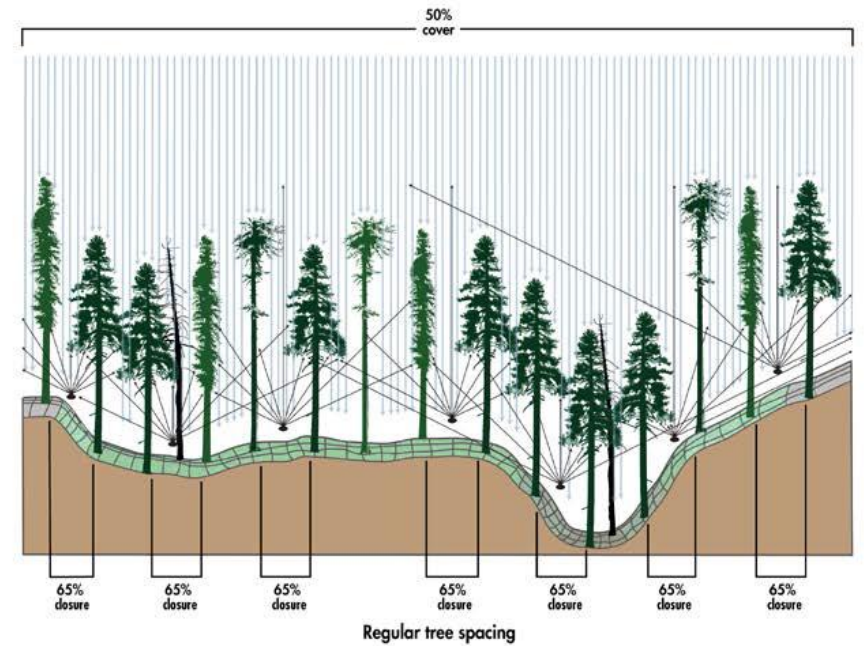


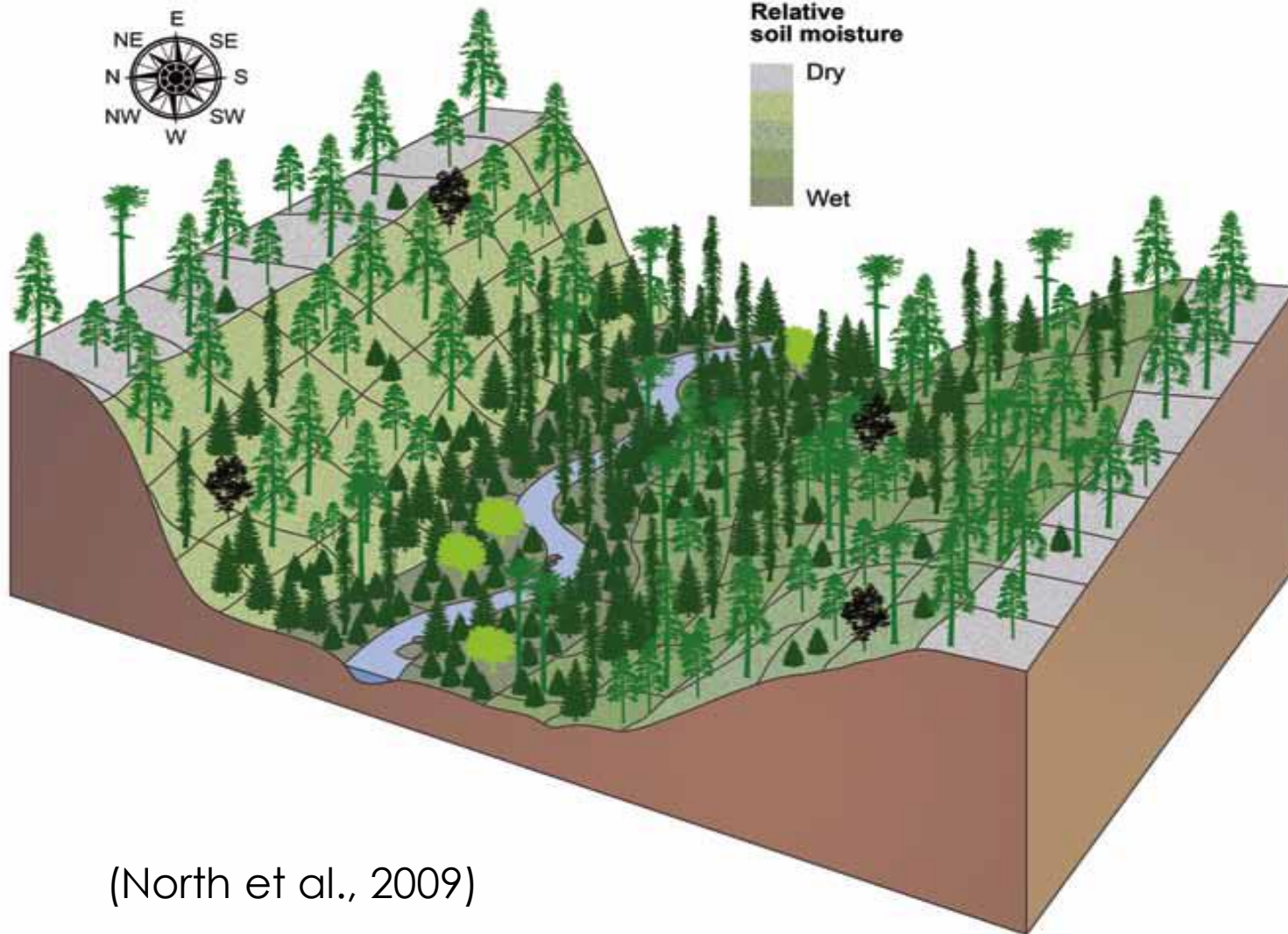
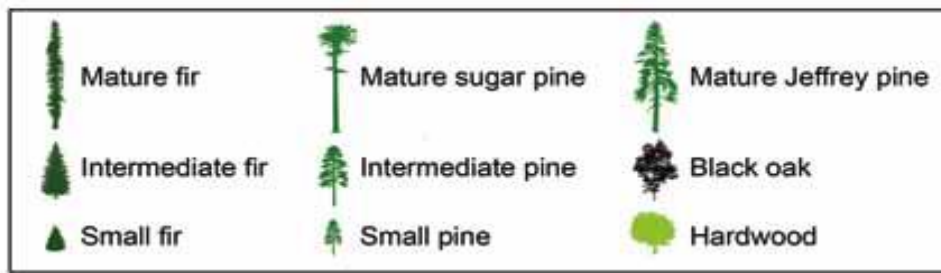
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Wildfires historically did not burn uniformly. Some areas burned hot creating openings while some spots remained unburned. This diverse or heterogeneous forest supported the greatest diversity of life by maintaining a variety of habitats in various stages of succession.

If we are not careful, our forest restoration work may increase forest resilience to fire but not restore heterogeneity.

- Even aged
- Even spacing
- Clear cut from below- complete loss of understory and herbaceous vegetation.





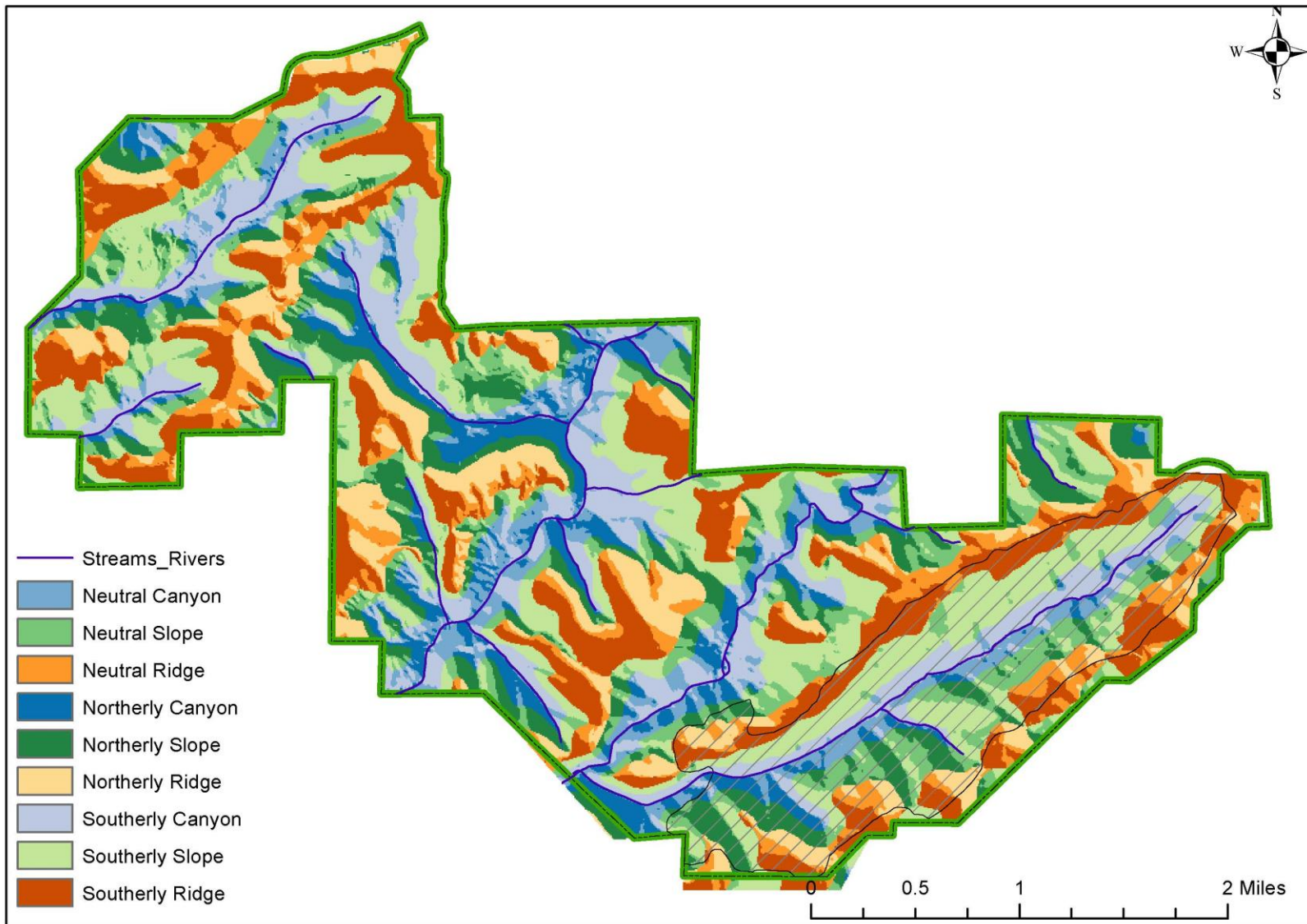
(North et al., 2009)

Physical Factors of forest heterogeneity.

- Topography
- Soil
- Aspect

How do we recreate this on a landscape level?

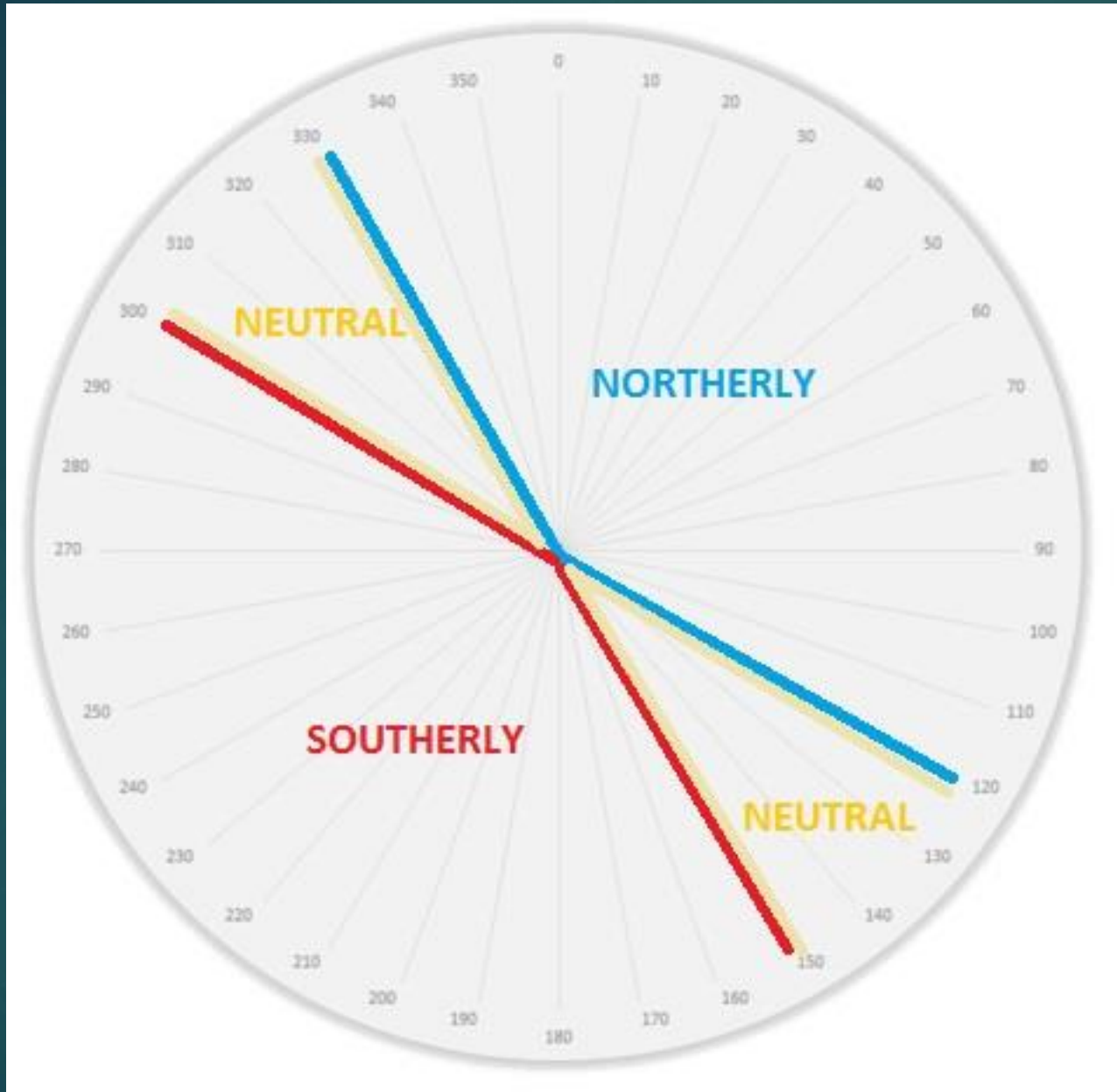




The Land management unit model (LMU).

Underwood et al., 2010

This method uses Geographic Information Systems (GIS) to spatially parse the landscape based on topography and aspect. Applying this method creates nine management units.



Three classes of aspect

- Northern 330°-120°
- Southern 150°-300°
- Neutral 120°-150° and 300°-330°



LMU	Target BA ft ² /acre (m ² /ha)	Desired Condition	
		% Shade Intolerant	% Shade tolerant
Neutral Canyon	300 (68.9)	30	70
Neutral Slope	230 (52.8)	50	50
Neutral Ridge	160 (36.7)	80	20
Northern Canyon	320 (73.5)	10	90
Northern Slope	260 (59.7)	30	70
Northern Ridge	200 (45.9)	70	30
Southern Canyon	280 (64.3)	50	50
Southern Slope	160 (36.7)	70	30
Southern Ridge	120 (27.5)	90	10

Shade intolerant species

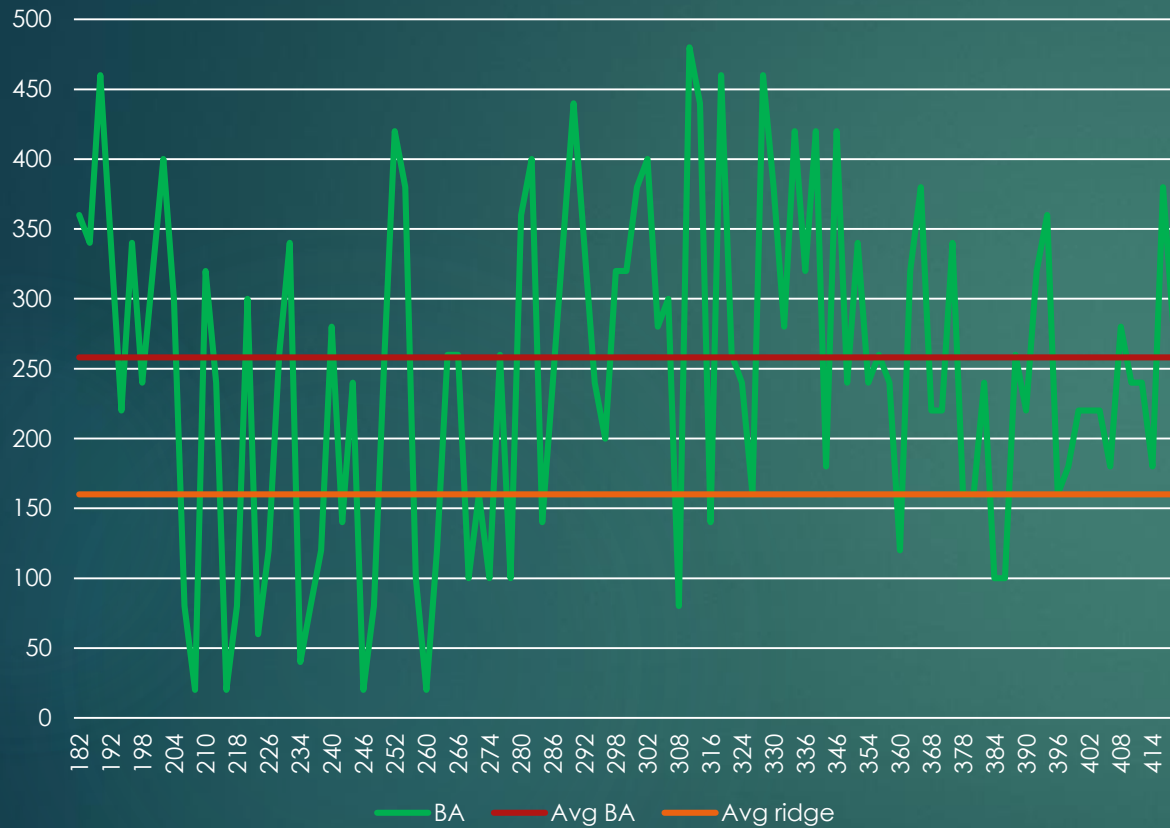
- ponderosa pine
- oak species.
- Giant sequoia, also a shade intolerant species is not to be managed under these guidelines and where they exist should be the dominant species by basal area.

Shade tolerant species

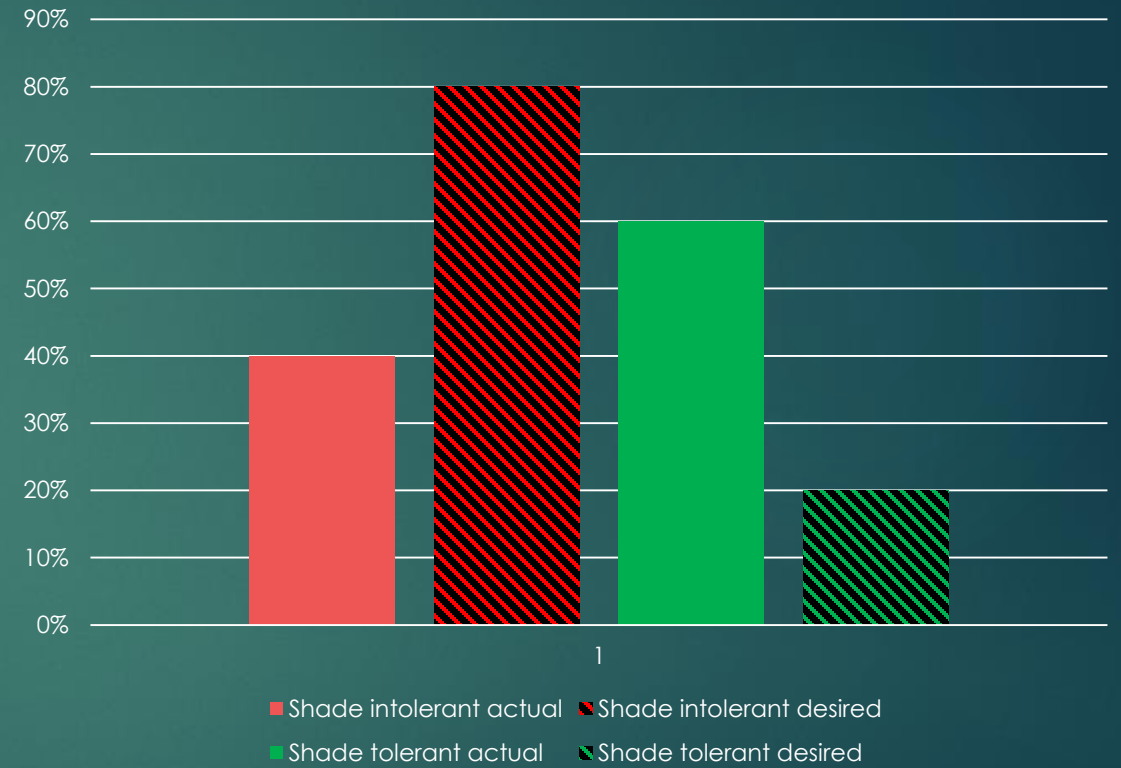
- white fir
- incense cedar
- understory species are not considered

Sugar pine is a species that is intermediate between shade tolerance and intolerance.

South Grove Ridge Stand Density



South Grove Ridge Tree Composition



To achieve desired stand conditions on the South Grove Ridge

- Reduce forest fuels by about 38%
- This equals 3600ft³ per acre.
- 23,389,200ft³ for the entire Park.

That is enough
material to fill two
supertankers!



**COST of the loss of
an Ecosystem
Process!**



Ecosystem Processes

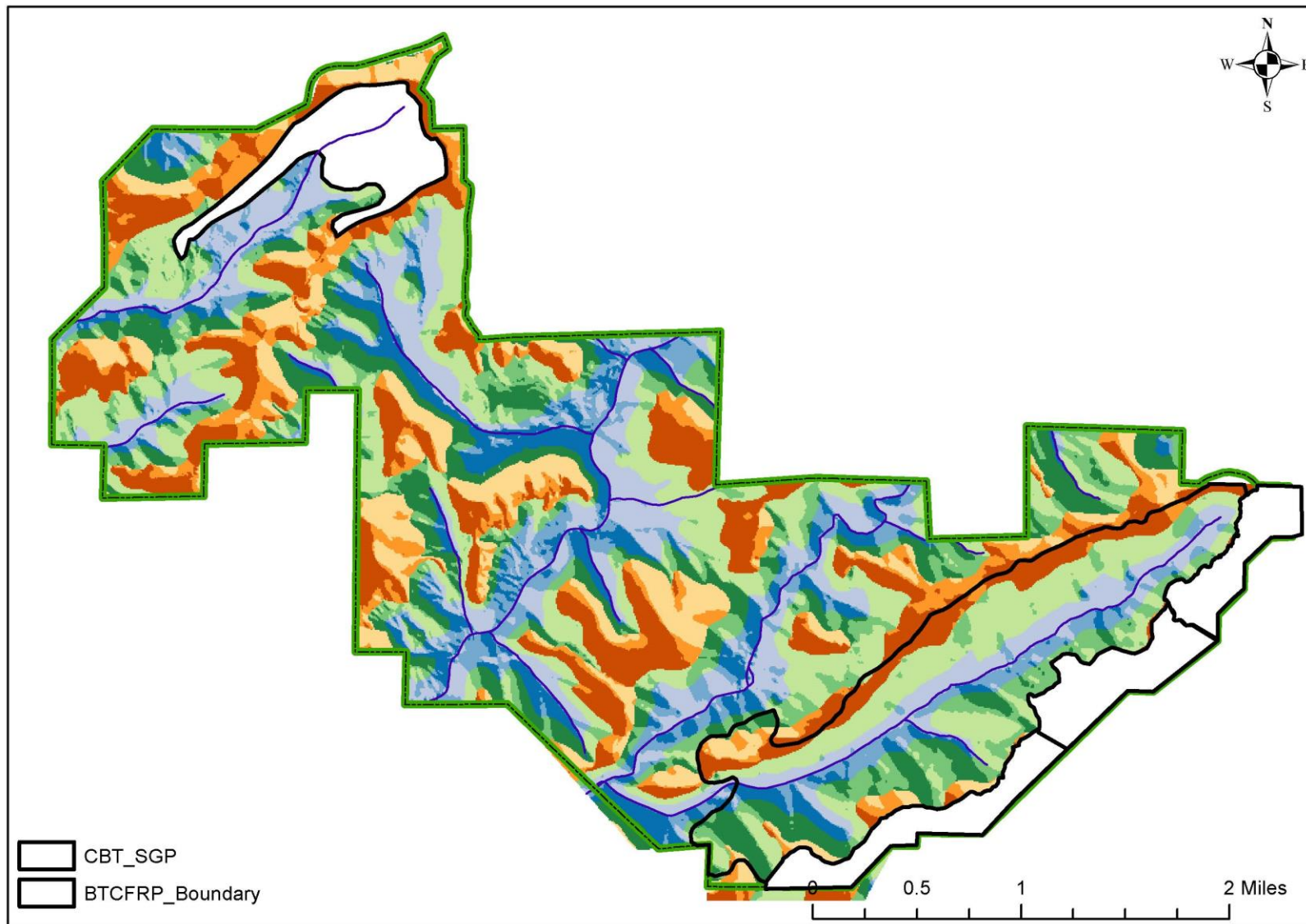
An intrinsic ecosystem characteristic whereby an ecosystem maintains its integrity (**Resilience**).

Hassan and Ash. 2005

Fire is an essential ecosystem process that has been interrupted.

Our work will attempt to **mimic fire** through the use of the LMU and **reintroduce fire** as much as possible in an ever crowded world.

Current Forest Restoration Projects



Future Projects???



Using this plan,
the best
available
science (LMU),
and adaptive
management,
we hope to
restore the forests
of Big Trees SP
through,

Fire Surrogates

Prescribed Fires

Managed
Wildfires



Any Questions?