Calaveras Big Trees State Park
Vegetation Management Plan

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California State Parks
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
• Dryer
• 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
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.
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, 2015
Physical Factors of forest heterogeneity.
- Topography
- Soil
- Aspect

How do we recreate this on a landscape level?

(North et al., 2009)
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°
<table>
<thead>
<tr>
<th>LMU</th>
<th>Target BA ft²/acre (m²/ha)</th>
<th>Desired Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% Shade Intolerant</td>
<td>% Shade tolerant</td>
</tr>
<tr>
<td>Neutral Canyon</td>
<td>300 (68.9)</td>
<td>30 70</td>
</tr>
<tr>
<td>Neutral Slope</td>
<td>230 (52.8)</td>
<td>50 50</td>
</tr>
<tr>
<td>Neutral Ridge</td>
<td>160 (36.7)</td>
<td>80 20</td>
</tr>
<tr>
<td>Northern Canyon</td>
<td>320 (73.5)</td>
<td>10 90</td>
</tr>
<tr>
<td>Northern Slope</td>
<td>260 (59.7)</td>
<td>30 70</td>
</tr>
<tr>
<td>Northern Ridge</td>
<td>200 (45.9)</td>
<td>70 30</td>
</tr>
<tr>
<td>Southern Canyon</td>
<td>280 (64.3)</td>
<td>50 50</td>
</tr>
<tr>
<td>Southern Slope</td>
<td>160 (36.7)</td>
<td>70 30</td>
</tr>
<tr>
<td>Southern Ridge</td>
<td>120 (27.5)</td>
<td>90 10</td>
</tr>
</tbody>
</table>

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.
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!
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?