Status of Aspen in the Sierra Nevada and Cascades

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United States Forest Service
United States National Park Service
Most widely distributed native tree species in North America

*Populus tremuloides* Michx
Occurrence in California

Sheppard et al. 2006
Ecological Importance

- **Keystone Species?** – Supports a large number of plant, insect, avian, and mammal species.
- **Biodiversity** – 2nd only to riparian areas in western US.
- **Sierra Nevada & Cascades** – “oasis of diversity” in a coniferous landscape.

Sheppard et al. 2006
Kuhn et al. 2007 – herbaceous plant survey of 30 spatially associated aspen-meadow-conifer forest sites.
### Jaccard's Index of Dissimilarity

<table>
<thead>
<tr>
<th></th>
<th>Aspen</th>
<th>Forest</th>
<th>Meadow</th>
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</thead>
<tbody>
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### Sørensen's Index of Dissimilarity

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</thead>
<tbody>
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<td>0.688</td>
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% Dissimilarity = (1 - Jaccard’s)
The Decline of Aspen Acreage in Western States

Bartos 2001. Rocky Mountain Research Station’s Forest Inventory and Analysis Project.
The Decline of Aspen in CA

- Lassen NF – ELRD.
- >600 stands inventoried.
- ~3,700 stand acres.
- <1% of district area.

Risk Factor | %
---|---
Conifer encroachment | 96
Excessive browse | 54

Risk of Stand Extinction:
- High: 80%
- Moderate: 16%
- Low: 4%
Reasons: Fire Suppression

- Aspen are shade intolerant, fire tolerant.
- Reduced fire frequency allows conifer to encroach aspen stands.
- Climate change?
Lack of recruitment = decay of the stand within 40 to 80 years

Lassen National Forest
Lassen Volcanic National Park: 1952 to 2005
conifer cover dynamics in aspen stands

30 Stands (blocked by volcanic zone):
Range in Conifer Cover Change -50% to +80%
Mean Conifer Cover Change +18%

McCullough et al. In Progress
Conifer cover in aspen stands is negatively correlated to understory herbaceous plant diversity.

\[
\text{diversity} \sim 1.26 - 0.007(\% \text{ conifer cover}) \quad P < 0.001
\]

McCullough et al. In Progress

2007 field data
Reasons: Grazing

- Introduction of sheep and cattle in high numbers.
- Dynamics in deer and elk populations.
- Suppresses recruitment.
Historic Use - Heavy

Sheep herd in dead aspen stand – Utah ~1922
Current Use – Can be Heavy

Deer pruning – Lassen Volcanic NP

Nice set of angus in aspen – Lassen NF
Aspen has high forage quality

Jones et al. 2007. Pine Creek Valley, Lassen County CA
Degraded stands become susceptible to damaging agents, lost w/out recruitment

- fungal canker diseases (Ceratosystis spp., Cenangium spp., Cryptosphaeria)
- trunk rot fungus (Phellinus tremulae)
- root diseases (Armillaria spp.)
- foliage diseases (Ciborina whetzelii)
- defoliating (C. conflictana, M. californicum) and boring (A. planipennis) insects

Sheppard et al. 2006