

## High Elevation Forest

### Sugar Pine / Ússip / *Pinus lambertiana*



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#### Cultural Importance

Ússip is used by Karuk people for ceremonial and subsistence purposes. The snags possess high quality “black pitch” which is not only a traditional form of money, but is also utilized in the ignition of cultural burns (Hillman 2016). Sugar Pine groves were family owned and managed for nuts (food), pitch (medicine), and roots (basketry) (Scheneck and Gifford 1952).

#### Life Cycle & Habitat

Ússip occurs in mixed-conifer forests, and in Karuk country is of particular value when occurring within or adjacent to tanoak or black oak stands. It reproduces via large, heavy seeds held within cones. It can take sugar pines around 150 years to become good cone producers. The seeds are not highly mobile, and unless moved by animals do not stray far from the parent tree. (Habeck 1992, Hillman 2016).

#### Ússip and Fire

Mature sugar pines are drought-tolerant and resistant to low- to moderate-severity fires. They possess a thick, fire-resistant bark and open canopy limb structure that retards aerial-canopy fire spread. Fire facilitates the release of seeds from the sugar pine's cone. Additionally, the exposed mineral soil after low-severity fire enhances sugar pine seed germination. However, high severity fire can damage sugar pine stands, especially if it reaches the canopy with heavy surface and ladder fuel connectivity. (Habeck 1992, Hillman 2016)

#### Effects of High Severity Fire Across Time

Immediate	2-Year	Long-Term
<ul style="list-style-type: none"> <li>Fire that reaches the canopy via dense understory ladder fuels can decimate sugar pine individuals and stands.</li> </ul>	<ul style="list-style-type: none"> <li>High severity patches can limit seed dispersal and establishment in burn areas. Mature trees stressed by fire are susceptible to insect predation</li> </ul>	<ul style="list-style-type: none"> <li>Brush and down woody material can hinder sugar pine reestablishment and increase risk of reburn prior to trees reaching cone producing age</li> </ul>
Sources: Thompson and Spies 2010	Sources: North et al. 2007, Shatford et al. 2007, Fettig et al. 2013	Sources: Odion et al. 2010

#### Effects of Karuk Cultural Burning Across Time

Immediate	2-Year	Long-Term
<ul style="list-style-type: none"> <li>Exposes mineral soil may benefit sugar pine germination</li> <li>Fire facilitates sugar pine cones' release of seeds</li> <li>Removal of understory vegetation reduces competition for water, nutrients, and light</li> </ul>	<ul style="list-style-type: none"> <li>Low-intensity fire reduced disease and encouraged germination while protecting the canopy</li> <li>The benefits of fire, including pest reduction, result in higher nut quality</li> </ul>	<ul style="list-style-type: none"> <li>Fuel loads are kept manageable in sugar pine stands, reducing the severity of future wildfires and thus protecting stands</li> <li>Maintenance of sugar pines as components of the landscape</li> </ul>
Sources: Habeck 1992, Hillman 2016	Sources: Habeck 1992	Sources: Habeck 1992

#### Effects of Federal Fire Management Strategies on Species' Climate Change and Fire Resilience

Prior to Fire	During Fire	After Fire
<ul style="list-style-type: none"> <li>Suppression increases competition, reduces germination, and allows disease to pester in stands</li> </ul>	<ul style="list-style-type: none"> <li>High fuel loading threatens sugar pines in burnout/back burning activities.</li> <li>Fire suppression actions, sometimes remove sugar pines.</li> </ul>	<ul style="list-style-type: none"> <li>Salvage logging targets economically valued sugar pines that are ecologically and culturally important</li> </ul>
Sources: Hillman 2016	Sources:	Sources: