Pacific silver fir (*Abies amabilis*)

Like western hemlock, Pacific silver fir is extremely shade-tolerant and is often represented in a variety of size classes in old-growth forests. However, it is less tolerant of warm temperatures and drought, and is more typically restricted to the cooler environments found at higher elevations than western hemlock. An exception is near the coast, where it is commonly found at low elevations (Figure 103). The largest recorded Pacific silver fir grew at only 283 m elevation on the coastal plain of the Olympic Peninsula (237 cm diameter, 63.4 m tall, and 74 m^3 volume).

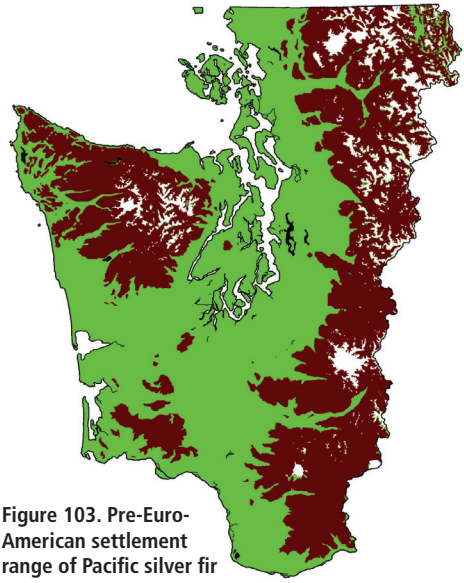

Figure 103. Pre-Euro-American settlement range of Pacific silver fir in western Washington.

The microclimate in the understory of an old-growth forest is heavily moderated by the canopy, being much cooler and moister in the summer and warmer in the winter. Because of this, it is not uncommon to see understory silver firs in portions of the western hemlock zone – places where it is absent or cannot survive in the upper canopy (Figure 104). Many of these understory trees, like their western hemlock associates, can exist for decades or even centuries as small, umbrella-shaped trees.

Figure 104. Small patch of understory Pacific silver fir in a Douglas fir/western hemlock forest in the south Cascades. Many of these small trees are up to 170 years old, yet are still less than 2 m tall.

Figure 105. A very old forest of Pacific silver fir and western hemlock in the Olympic Mountains. Old individuals of silver fir can often be 600-800 years old and develop the flakey bark more characteristic of spruce.

Pacific Silver Fir

Unlike its shade-tolerant associate western hemlock, Pacific silver fir does not prefer logs as a seedbed. The seeds of Pacific silver fir are very large, and can provide sustenance for young seedlings for a year or so while they get their small roots established. In addition, the young sprouts of Pacific silver fir are extremely stiff, and are often able to withstand the debris that small understory plants are subject to – the same debris that often smothers young hemlock seedlings. These factors combine to allow seedlings of Pacific silver fir to do well on many forest floor substrates.

While usually neither the largest or most conspicuous tree in the forests within the Pacific silver fir zone, Pacific silver fir is often the most numerous tree in mature and old forests (Figure 11). Young to mature trees maintain a relatively smooth bark that is often coated with one or several species of white, crustose lichens (Figure 11). Since silver firs are not decay-resistant, and few trees live more than a couple hundred years, these white-barked trees are all that many people ever see. In the cooler and moister parts of its range, however, silver firs can live to great ages. Older trees develop a flakier, sometimes purplish bark reminiscent of Sitka spruce (Figure 105).

In most situations, silver firs will only be a part of the upper canopy in the later stages of succession – just as western hemlock was in the stand development sequence presented earlier. Exceptions to this can occur if the forest blows over, leaving a hemlock and silver fir understory to become the new canopy. A similar situation occurred after the 1980 eruption of Mount Saint Helens. A Pacific silver fir understory was present underneath a dense snowpack in May when the eruption occurred. The overstory was killed by the intense heat, leaving only these small understory trees to start the new forest (Figure 106).

With very shade-tolerant trees such as western hemlock or Pacific silver fir, it is often useful to think of ***functional ages***. In the example cited following the volcanic eruption, or in the example of the 21 Blow windstorm, understory trees grew as unconstrained seedlings as if they had been recently planted. Even though the trees may have been 100-200 years old, their functional age, such as the trees in Figure 13, will date from the time of the canopy removal.

Figure 106. Survivorship at Mount Saint Helens. A deep snowpack allowed a group of Pacific silver fir understory trees to become the new cohort when the remaining canopy was killed by the blast from the 1980 eruption.