Western redcedar (*Thuja plicata*)

Western redcedar might be considered the long distance runner of our native trees. It persists in small numbers for the first several hundred years and only shows its stamina with great age.

Like western hemlock, redcedar is very shade tolerant and often does not appear in Douglas fir forests until maturity. Western redcedar is the largest tree in the Pacific Northwest, with living individuals recorded up to 599 cm in diameter and 500 m^3 of volume. With the exception of yellow cedar, western redcedar is the longest lived tree species in western Washington. Many specimens over 1,500 years of age have been recorded. Older trees probably exist, but are impossible to date due to their large sizes and often hollow centers. Western redcedar has a very wide ecological amplitude, tolerating of a wide range of soil conditions, from sea-level to near timberline (Figure 97).

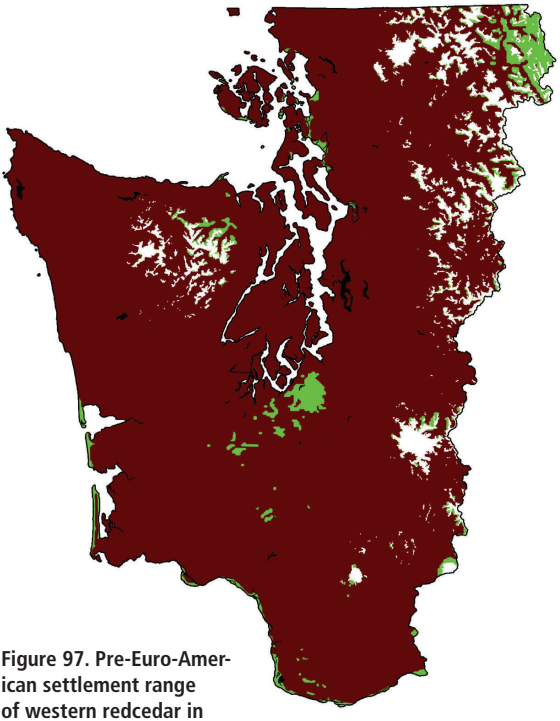

Figure 97. Pre-Euro-American settlement range of western redcedar in western Washington.

Most coniferous trees found in western Washington are members of the pine family. Western redcedar, in contrast, is a member of the cypress family, (*Cupressaceae*). Studies have shown the soils underneath an ancient redcedar are different than those under members of the pine family and influence seedling regeneration though a higher pH. In forests where western hemlock and western redcedar co-occur, seedlings of each species are more abundant under trees of their own

Figure 99. Extensive stands of nearly pure western redcedar are only found along the coasts of Washington and British Columbia. Photo: Bruce Van Pelt.

Figure 98. Away from the coast, pure groves of redcedar are limited to forested wetlands or sections of alluvial forest in the north Cascades, such as this stand from a swamp in the south Cascades.

species, than under trees of the other. Since western redcedar is such a long-lived species, one would expect its numbers to gradually increase over time. This is indeed what happens. Throughout most of western Washington, however, and particularly in the Puget Sound or Cascade provinces, forests over 500 years-old are uncommon. With the exception of some swampy areas, western redcedar is a minor component throughout this entire region (Figure 98).

Extensive forests dominated by western redcedar are found only along the coast (Figure 99, Figure 9). The dominance of redcedar in many coastal forests is only partly due to the moisture; it is also due to the great ages of the forests there. There are (or were) extensive forested areas along the coast where 1,000 years or more has passed since the last major fire event (Figure 100). In some of these coastal forests, several thousand years has passed without fire. No individual trees are that old, but some of these sites have been fire-free for 3-

4000 years or more. Had all of western Washington been kept free of fire for the last 1,500 years, western redcedar would be the dominant tree throughout the region.

Young redcedars preference for soils already occupied by redcedar is evident in some second-growth forests. Redcedar-dominated second-growth stands are only found on coastal sites that were previously ancient redcedar forests (Figure 101).

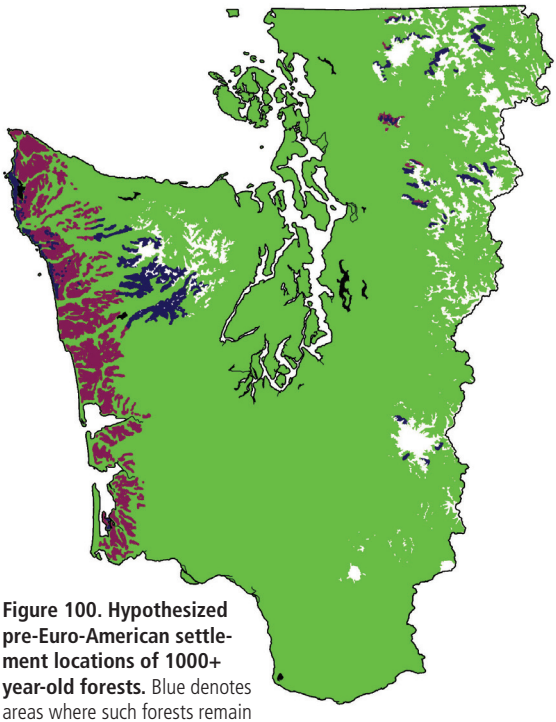

Figure 100. Hypothesized pre-Euro-American settlement locations of 1000+ year-old forests. Blue denotes areas where such forests remain intact.

Redcedar is also different from members of the pine family in the decay-resistance of its wood. As with other cypress family trees such as coast redwood and yellow cedar, western redcedar has highly decay-resistant wood. It is thus unlike its common associates Sitka spruce or western hemlock, in that it can survive major crown damage. When the top of a spruce or hemlock is blown out, the tree will often be unable to outgrow the incipient decay. A redcedar, in contrast, will resprout new leaders and continue on.

Top die-back is common on redcedar in particularly hot, dry summers. After the die-back, a new leader (or leaders) will develop from an existing branch (or branches) below the dead top. The dead leader often will remain on the tree after this recovery, so that after many centuries of this process, many of these dead tops will be present – giving rise to the term ***candelabra top*** (Figure 102). In

many other trees, top dieback followed by reiteration from a side branch also occurs, but with different results. In a hemlock or a spruce, for example, the dead top will rot and fall away, so that after several decades the only evidence of the disturbance will be a slight kink in the trunk at the location of the resprout. The redcedar preserves its history of die-back and resprouting, so an ancient tree is a living record of its past.

Figure 101. Above a young, pure stand of western redcedar that regenerated after a cedar stand was logged.

Figure 102. Changes in crown form of western redcedar over time. Note that trees remain relatively simple for the first several centuries — it is only in great age that the individual character and ***candelabra*** tops often seen in ancient stands emerge.