



Tsuga heterophylla
Western Hemlock

Western hemlock (*Tsuga heterophylla*.) is a major component of the Washington coastal forests. This species ranges from the coast to the west slopes of the Cascade Range. In addition, a few scattered western hemlock occur along streams and north slopes in the northeastern corner of the state (Fowells 1965). In the Cascades, it occurs up to elevations of 2000 to 2300 feet. In the Olympics, it ranges from sea level to 3600 feet (Franklin and Dyrness, 1973). Conifer species in this zone include western hemlock, Douglas-fir, western redcedar, grand fir, Sitka spruce, western white pine, and lodgepole pine. Hardwoods include red alder, bigleaf maple, black cottonwood, and Oregon ash.

Some coastal British Columbia populations grew taller than others when tested on Vancouver Island, but there was no relationship between elevation of the populations and height growth (Piesch 1976). There was no difference in height growth of seed sources from Tillamook, Seaside, Cathlamet, and Clallam Bay when tested at Tillamook, Oregon (Foster and Lester 1983). The climate is very similar for these four areas. Pollard and Portlock (1986) found that seed for coastal Vancouver Island provenances could be moved as much as two degrees in latitude and from sea level to 1900 feet. Kuser and Ching (1980) recommended that western hemlock seed not be moved more than two degrees north or more than 1300 feet higher than the place of origin. Their work indicated that coastal, Cascade, and Priest River, Idaho populations are different and that seed should not be transferred among those areas. Low elevation Priest River seed sources (1300 feet) were not the same as high elevation (2300 feet) sources from along the same river. Dates of bud burst for Cascade sources separated by as much as 95 miles varied by about six days.

Seed germination was earlier, by about four days per degree of latitude, for both coast and Cascade sources. High elevation Coast Range sources germinated earlier than low elevation sources (Campbell and Redlined 1982). However, germination date was not related to elevation for the Cascade sources. The difference between sources from the Coast Range and sources from the Cascade Mountains in the relationship between germination date and elevation supports establishing separate breeding zones for these two areas.

Foster and Lester (1983) concluded that the coastal area from Clallam Bay, Washington south to Tillamook, Oregon should be one breeding zone. The elevation for this area varies from sea level to 1000 feet. The British Columbia Forest Code (1995) permits unrestricted movement within the Georgia lowlands, three degree north or south transfer with 300 meter elevation change in the maritime zone, and two degree latitude and 200 meter elevation transfer within the sub-maritime zone.

New recommendations for seed transfer zone boundaries:

HOH (Zone 1): The western part of the Olympic Peninsula. Consists of the old seed zones 011 and 012, and the portion of old seed zone 221 west of Angeles Point.

TWIN HARBORS (Zone 2): Coastal areas south of the Olympic Peninsula. Consists of the old seed zone 030, and those portions of 041 west of Kelso.

NORTH SOUND (Zone 3): The eastern part of the Olympic Peninsula and areas surrounding the northern part of the Puget Sound. The eastern boundary starts at the eastern limit of the species distribution along the Canadian border near Black Mountain and follows the eastern limit of the species distribution southwest until it reaches the edge of the old 201 seed zone, then goes south along the eastern edge of the old 201 and 202 seed zones to an area about 6 miles east of Granite Falls, then continues south through Sultan until it meets Interstate 90 near Snoqualmie, east to Ragnar and south through Selleck and Enumclaw to the Three Sisters. The southern border goes from the Three Sisters west along the northern border of the old 421 seed zone to Sumner, then west to Tacoma, north to Bremerton and Mount Jupiter and south to The Brothers, Mount Washington, and Rock Peak, then west to the edge of the old 030 seed zone. The western boundary follows the western edge of the old 030 and 012 seed zones north to just north of Fairholm, then east along the edge of the old 221 seed zone to a point west of Elwha and north to Angeles Point. Consists of the old seed zones 201, 202, 211, and 212; 221 east of Angeles Point; and portions of 222, 231, 232, 411, and 412.

UPPER CHEHALIS (Zone 4): The Puget Trough south of Seattle. Northern boundary starts at the border of the old 030 seed zone west of Rock Peak, goes east to Rock Peak, north to Mount Washington, The Brothers, and Mount Jupiter, then southwest to Bremerton, Tacoma, Sumner, and along the old 421 seed zone boundary to the Three Sisters. The eastern boundary starts at the Three Sisters and goes south to the confluence of the Mowich and Puyallup Rivers and National; then west to Porcupine Ridge and Meridian Hill, then east to Alpha and Morton; and south to Crazy Man Mountain, Hatchet Mountain, Wolf Point, Green Knob, Spotted Deer Mountain and the Columbia River just west of Mount Pleasant. Southern boundary is Columbia River from Mount Pleasant to Kelso. Western boundary is Kelso to the intersection of the Cowlitz, Wahkiakum, and Lewis County lines, and north to the west edge of the old 030 seed zone at Pe Ell, then north along the old 030 seed zone boundary to a point just west of Rock Peak. Consists of the old seed zone 241, parts of 222, 231 and 232, western portions of 042, 242, 421, 422 430, and 440, and 041 east of Kelso.

SKAGIT (Zone 5): Areas where western hemlock occurs in the northern Washington Cascades. Northern and eastern boundaries are the edge of the species distribution, southern boundary is Interstate 90 from the eastern limit of the species distribution to a point near Snoqualmie. Western boundary starts at Interstate 90 near Snoqualmie and goes north through Sultan to a point 6 miles east of Granite Falls and along the old 202 and 201 seed zone boundaries to the northern limit of the Western hemlock distribution near Van Zandt. Consists of the old seed zone 403, southern parts of 401 and 402, the eastern half of 411, the northeast portion of 412, and areas of 621, 622 and 631 where western hemlock occurs.

TOUTLE (Zone 6): Areas where western hemlock occurs in the southern Washington Cascades. The northern boundary is Interstate 90 from near Snoqualmie to the eastern limit of the species distribution. The eastern boundary is the eastern limit of the species distribution. The southern boundary is the Columbia River from the eastern limit of the species distribution to just west of Mount Pleasant. The western boundary starts at the Columbia River just west of Mount Pleasant and goes north through Spotted Deer Mountain, Green Knob, Wolf Point, Hatchet Mountain, Crazy Man Mountain, and Morton; then west to Alpha and Meridian Hill and east to Porcupine Ridge and National and north to the confluence of the Mowich and Puyallup Rivers, Three Sisters, and Interstate 90 near Snoqualmie. Consists of old seed zone 652; the eastern portions of 042, 421 and 430; the southeast portion of 412; the southern half of 422; and the western portions of 641,651 and 653.

UPPER COLUMBIA (Zone 7): Includes portions of old seed zones 614, 801,802, 811, 812, 821, 822 and 830 within the natural range of western hemlock.

Elevation bands within geographic seed transfer zones

In all seed movement zones, 1200-foot elevation bands should be established.