



Abies procera
Noble Fir

Noble fir (*Abies procera*) is a Cascade Range species (Franklin and Dyrness 1973) that extends south from Stevens Pass, Washington (48° north) to McKenzie Bridge, Oregon (44° north) (Sorensen *et al.* 1990). It also occurs as scattered individuals on a few Coast Range peaks. Noble fir is a major component of the cool temperate Pacific silver fir forest zone and is associated with Pacific silver fir, western hemlock, Douglas-fir, western redcedar, and western white pine. It is primarily a species of the west Cascade slopes, but a few stands are present east of the crest. Generally noble fir occupies a 2000 foot elevation band from about 3000 to 5000 feet.

There is a sharp genetic change, at the McKenzie River in the Oregon Cascades, where noble fir rapidly intergrades into Shasta red fir (*Abies magnifica* var. *shastensis* Lemm.); therefore seed should not be moved north or south across that point (Franklin *et al.* 1978 and Sorensen *et al.* 1990). Progeny from trees north of the McKenzie River grew taller than progeny from trees south of the McKenzie River (data on file for Willamette National Forest genetics program, Eugene, Oregon). A number of European seed source studies suggest patterns of variation for noble fir. Provenances from McKinley Lake, Washington and Molalla, Oregon gave the best growth rates in German tests (Ruetz *et al.* 1990). Provenances generally were not different in early height in the Netherlands (Kranenborg 1988). Washington provenances were taller than provenances from Oregon in Norwegian tests (Magnesen 1995).

Height growth of noble fir in Canadian tests planted three degrees north of its natural range was best for Washington Cascade sources and poorest for Oregon Coast Range sources (Xie and Ying 1994). The authors also reported that when noble fir was planted in the maritime western hemlock zone, survival and growth were suitable for up to 10 years. When the patterns of genetic variation in noble fir were compared with those of other species, it had much less variation within locations and the effect of elevation was not strong (Sorensen *et al.* 1990).

Sorensen and others (1990) concluded that seed can be transferred a relatively long distance north or south with little risk, as long as the planting is restricted to suitable noble fir sites. However, restrictions may be necessary to limit local transfers in elevation and distance from the crest of the Cascades. An unpublished U.S. Forest Service study suggests that no geographic restrictions are needed for noble fir in the Mount Baker-Snoqualmie National Forest, but that two elevational zones are needed (Carol Aubry, personal communication, August 2000). We conclude that safe and adapted noble fir seed can be collected and planted throughout the Cascades from its northern boundary at Stevens Pass south to the McKenzie River. For noble fir in Washington, we recommend a single geographic zone in the Cascades. Seed can be transferred between this zone in Washington and the northern Cascades zone in Oregon. Caution dictates that high elevation areas be planted with high elevation sources (Sorensen *et al.* 1990), thus the Lewis Seed Transfer Zone should be

divided into two elevation bands separated at 4000 feet. In Washington, most noble fir will be planted in the lower elevational band. The isolated population in the Willapa hills should be treated as a separate zone with no elevation break.

New recommendations for seed transfer zone boundaries

WILLAPA (Zone 1): Consists of all of the natural range of noble fir in the Willapa Hills. Includes small portions of the old 030, 041, and 241 seed zones.

LEWIS (Zone 2): Consists of the natural range of noble fir in the Cascades as well as zone 1 from the northern Oregon Cascades. Includes the old 440, 652, 042, 430 seed zones as well as eastern portions of the old 412, 421, and 422 seed zones.

Elevation bands within geographic seed transfer zones

Two elevation bands separated at 4000 feet.