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DISTRIBUTION

John R. Jones

Quaking aspen is the most widely distributed native North American tree species (Little 1971, Sargent 1890). It grows in a great diversity of regions, environments, and communities (Harshberger 1911). Only one deciduous tree species in the world, the closely related Eurasian aspen (*Populus tremula*), has a wider range (Weigle and Frothingham 1911).

In the humid East, aspen is distributed relatively continuously. In the West, it is confined to suitable sites on mountains and high plateaus. Aspen is one of the most common trees in the interior West, where its range (fig. 1) coincides rather closely with that of Douglas-fir (*Pseudotsuga menziesii*). In some areas, aspen forms extensive pure stands, while in others, it is a minor component of the forest landscape. For example, the geographic area over which aspen can be found is much greater in Idaho than in Colorado; but in Colorado, aspen forests cover a much greater acreage.

Despite the spotty western distribution, two Rocky Mountain states—Colorado and Utah—are among those

with more than 1 million acres of aspen forest. Commercial aspen acreage in both Colorado and Utah comprises more than 25% of all commercial forests in these states. (See the WOOD RESOURCE chapter.)

Aspen occupies more of Utah's forested land than does any other tree species (Green and Setzer 1974). In contrast, Montana's 255,000 acres of aspen are scattered among the middle-elevation conifer forests and at the lower forest boundaries. Almost two-thirds of the aspen acreage in the West is in public ownership.

In Colorado, aspen forests are most prominent west of the Front Range and Sangre de Cristo crests. Miller and Choate (1964) describe aspen as a conspicuous forest type in Colorado, on high plateaus and mesas and on rolling mountains of intermediate elevations.

In Wyoming, Reed (1971) found aspen more prevalent on the west slope of the Wind River Range than on the east slope. In Glacier National Park, Montana, in contrast, Standley (1921) reported aspen abundant only on the east side. Lynch (1955) described the plains margin at the foot of the mountains east of Glacier National Park as the southwestern extremity of the extensive aspen parkland region of Canada.

Merriam (1891) and Patten (1963) described aspen in parts of the northern Rockies as forming scattered groves and small stands, quite different from the extensive aspen forests of northern New Mexico, western Wyoming, and especially Colorado and Utah.

Aspen is a component of several vegetation types. (See the VEGETATION ASSOCIATIONS chapter.) It is found in many young ponderosa pine (*Pinus ponderosa*) stands of the Front Range of Colorado (Gary 1975, Vestal 1917) and the Black Hills of South Dakota (Thilenius 1972). Clements (1910) described it as sharing dominance with young lodgepole pine (*Pinus contorta*) on burns in northern Colorado. Horton (1956) described mixed stands of aspen and lodgepole pine on foothill burns in Alberta, Canada. Moir (1969) found a few aspen sprouts in the understories of almost all climax lodgepole pine stands of the Front Range of Colorado. Aspen groves and individual trees are widespread and often abundant in forests of mixed conifers in the southern Rocky Mountains and Southwest (Jones 1974b). Aspen individuals and clones also are found in many spruce-fir stands in the central and southern Rockies (Alexander 1974), particularly at the lower subalpine elevations. On the Kaibab Plateau, in northern Arizona, aspen forms small, thick stands in drainageways in the ponderosa pine zone; and, in the mixed conifer and spruce-fir zones, it often forms conspicuous margins around islands of grassland (Russo 1964).

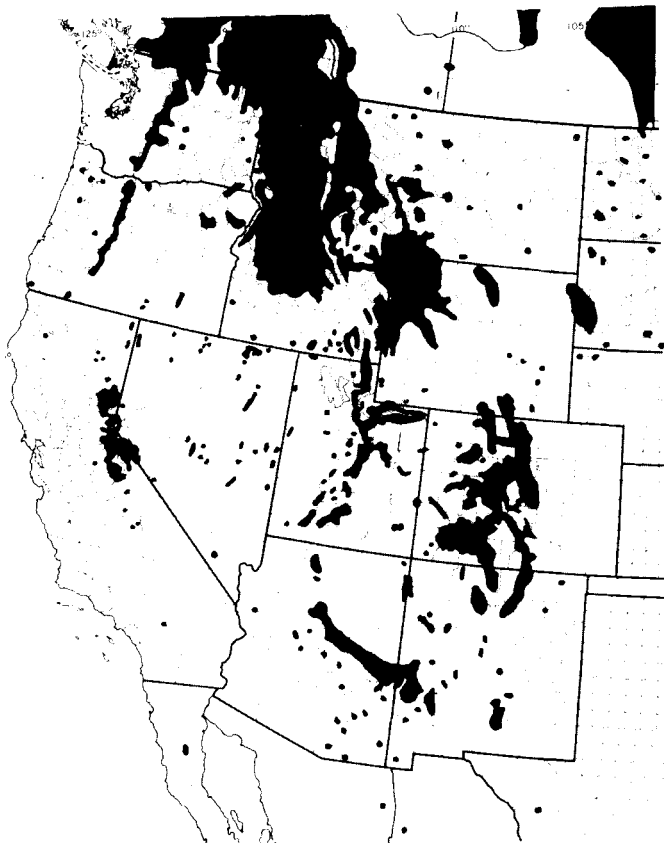


Figure 1.—The range of aspen in the conterminous western United States (Little 1971).

Beetle (1974) Langenheim (1962), Marr (1961), and Reed (1971) noted the tendency of aspen to grow on certain slope aspects, at different elevations in the interior West. Generally, in the northern or the upper altitudinal limits of its range, aspen occupies southerly exposures. For example, in interior Alaska, it is common to south slopes up to 3,000 feet (900 m) altitude (Viereck and Little 1972). Farther south, or at intermediate elevations, it grows on easterly and even northerly facing slopes as well. In the middle portions of its range, aspen can be found on virtually all exposures. Toward the southern limits of its range, aspen favors the cool northern slopes.

Aspen grows in a broad range of elevations. For example, in north-central Colorado, at about 40° north latitude, it ranges from 5,500 feet to 11,250 feet (1,700 m to 3,400 m) (Greene 1971). Cox (1933), Jones and Markstrom (1973), and Marr (1961) reported it in the Colorado "krummholz," the distorted and dwarfed stands of tree-shrubs near altitudinal timberline. Farther south, in the Pikes Peak area, Schneider (1909) gave the limits of aspen as 6,300 to 10,400 feet (1,900 m to 3,150 m).

Baker (1925) mentioned an upper limit for aspen of 12,000 feet (3,650 m) in Colorado, and equated aspen's upper limit with the spruce-fir timberline. Sudworth (1934) also stated a maximum elevation for aspen of 12,000 feet (3,650 m).

Langenheim (1962) reported that the aspen community type west of the continental divide, near Gunnison, Colo., was found as high as 11,200 feet (3,400 m), but only as low as 8,500 feet (2,600 m). In the same area, an extensive spruce-fir forest reached 11,500 feet (3,500 m).

In the Intermountain Region, aspen has been reported as high as 11,000 feet (3,350 m), probably in Utah, and as low as 3,000 feet (900 m), presumably in central Idaho.¹ Houston (1954) gave the upper and lower limits as 8,000 and 5,500 feet (2,450 m and 1,700 m) in southern Idaho. On the high plateaus of south-central

Utah, Dixon (1935) mentioned finding dwarf aspens as high as 10,700 feet (3,250 m), in an area where Engelmann spruce (*Picea engelmannii*) was the dominant vegetation up to 11,000 feet (3,350 m).

Strain and Johnson (1963) gave the elevational range as 7,000 to 10,000 feet (2,150 m to 3,050 m) in southeastern Wyoming, where timberline is 11,000 feet (3,350 m). Similar upper elevational limits were given by Reed (1971) for the Wind River Range of west-central Wyoming. In southern Alberta, Day and Duffy (1963) reported aspen only as high as 6,000 feet (1,850 m); where the upper limit of spruce-fir forest is about 7,000 feet (2,150 m), and Douglas-fir about 5,500 feet (1,700 m).

In comparison, Sudworth (1908), described aspen in western Washington as occurring from sea level to 4,000 feet (1,200 m), and in southern California between 6,000 and 10,000 feet (1,850 m and 3,050 m). Strain (1964) described a stand of shrubby aspen at 10,700 feet (3,250 m) in southern California. Sudworth (1908) also reported that aspen in Baja California was restricted to a few locales above 8,000 feet (2,450 m) on the Sierra San Pedro Martir.

Aspen commonly reaches its lowest elevations in canyons and ravines, as noted by Vestal (1917) in Colorado, and Baker (1925) and Dixon (1935) in Utah. These observations have been confirmed by many others in various parts of the West. Seepage flow from higher elevations appears to subirrigate many of these low-elevation aspen sites.

In summary, in the interior West, aspen is confined to relatively moist sites (16 to 40-plus inches (41 cm to 102+ cm) annual precipitation) that have cold winters and a reasonably long growing season. These conditions restrict aspen to low elevations in the northern and eastern portions of its range. Aspen grows at progressively higher elevations southward along the Rocky Mountains. At the southern end of its range, it is virtually restricted to mountaintops. Most commercial sawtimber concentrations are confined to elevations between 7,000 and 10,000 feet (2,150 m and 3,050 m) in the central Rocky Mountains (Colorado, northern New Mexico, and southern Utah).

¹Aspen Committee. 1965. *Guidelines for coordination of uses in aspen areas*. 13 p. U.S. Department of Agriculture, Forest Service, Intermountain Region, Ogden, Utah.