

surveyed units (table 4). The chestnut oak type group, however, was clearly the most vulnerable. Decline occurred in 28 percent of chestnut oak stands, compared with only 16 percent of oak-hickory stands. Oak-pine types had the lowest incidence. Low vulnerability in oak-pine types was somewhat unexpected because oak decline is common under the relatively harsh site conditions (Starkey and others 1989) typical of oak-pine stands. The amount of oak within forest type groups influenced vulnerability. The percentage of volume made up by oaks was consistently higher in affected than in unaffected stands (table 5).

Although chestnut oak stands were the most vulnerable, they did not carry the highest risk of loss when decline occurred (table 5). The oak-hickory type group had the highest annual oak mortality overall. Further, oak mortality volume was not much greater in affected than in unaffected chestnut oak stands. Oak mortality volume was much larger in affected than in unaffected oak-hickory stands. Oak-pine types had the lowest overall loss for affected areas. These results are in general agreement with those of Stringer and others (1989) and Starkey and others (1989), who reported low mortality in oak-pine and chestnut oak stands, and greatest losses in red oak-white oak and oak-hickory stands.

Site quality—Oak decline is usually more prevalent on somewhat dry upland sites, which have relatively low site indices. This relationship was confirmed by the analysis of decline incidence by site index (SI) class, which showed that oak decline vulnerability was inversely related to SI (fig. 3). Below-average site qualities (SI < 70 feet) were twice as likely as average and better sites to be affected (23 vs. 10 percent incidence). Over one-third of poor-quality sites (SI < 50 feet) had decline.

Despite low vulnerability, high-quality sites had the highest risk of loss when decline did occur (table 6). Annual oak mortality on SI > 90 land with decline was over 30 cubic feet per acre. This loss was over 2 percent of the total 1977 oak volume, and almost 10 times as high as the annual oak mortality on unaffected high-quality sites. Average and better sites (SI > 70 feet) accounted for about 36 percent of the oak mortality in affected areas and 33 percent of the affected acreage.

Age—The incidence of decline increased as age class increased (fig. 4). Decline was present in only 3 percent of the stands < 40 years old, but was in 29 percent of the stands > 80 years. The average stand age in unaffected areas was 54 years, while that in affected areas was 70 years.

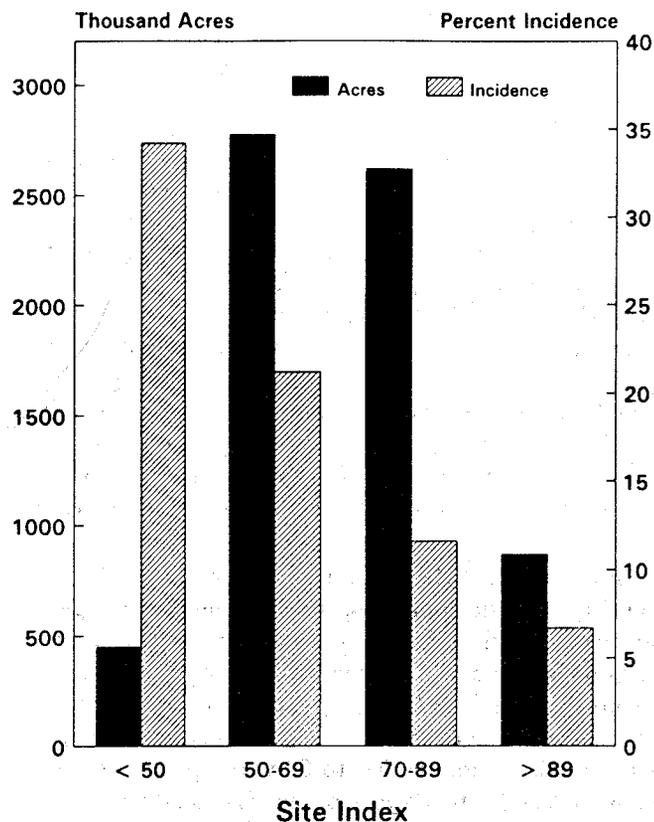


Figure 3—Acres and percentage of oak decline incidence by site index class in the Mountain and Northern Piedmont Survey Units of Virginia, 1986.

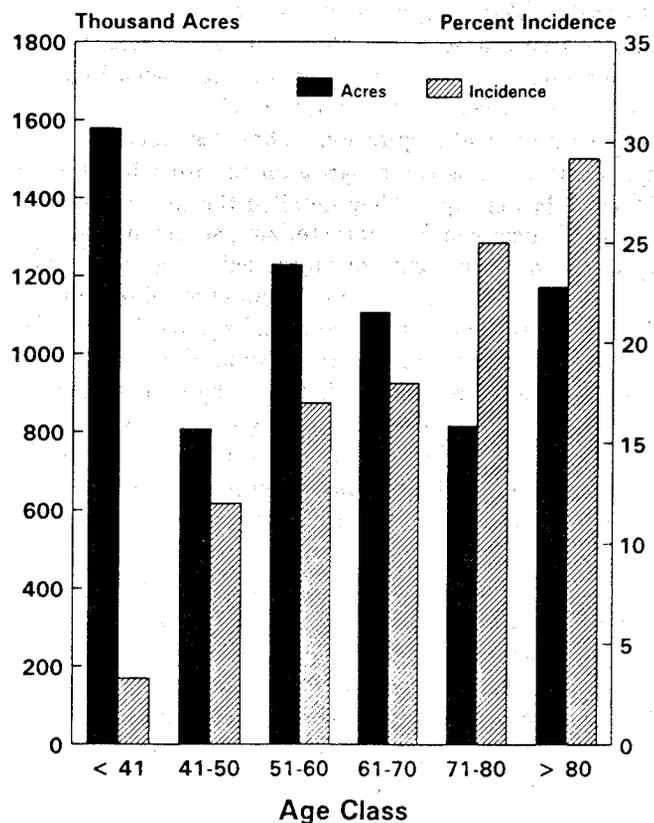


Figure 4—Acres and percentage of oak decline incidence by age class in the Mountain and Northern Piedmont Survey Units of Virginia, 1986.