

DELAWARE

The Delaware Natural Heritage Inventory has in the past conducted a limited amount of field work to identify "old-growth" forests within the state's three counties, New Castle, Kent, and Sussex (McAvoy 1993, 2001). Now the Natural Areas Program of the Division of Parks and Recreation is carrying out an identification project with photographs. It has mapped the state with aerial photographs and will compare them with aerial photographs made in 1937. The greatest clearing in Delaware occurred about 1880. Forest that had a mature canopy in 1937 and that shows up in all subsequent aerial photographs must be at least mature second growth. The comparisons will thus tell field researchers where to look for old growth. The Natural Areas Program expected to complete its study of the photographs in late 2002 or early 2003 (Line 2002).

Researchers believe that most mature to old-growth forests in Delaware are located in northern New Castle County in the piedmont physiographic region. Known sites here have not been disturbed for 100 to 200 years and are in the form of fragmented woodland in six stream valleys. Usually Tulip Tree or American Beech dominates the stands. Black Oak, Northern Red Oak, White Oak, and hickories are often mature canopy associates (McAvoy 1993, 2001).

Most mature to old-growth sites identified in the piedmont are in private hands. An exception is **Tulip Tree Woods**, with trees up to 220 or more years in age, which is a 24-acre, state-dedicated natural area in Brandywine Creek State Park (McAvoy 1993, 2001). The density of the Tulip Trees suggests that the site may have been cleared long ago, however (Line 2002). Furthermore, because of a "horrendous" deer population, the trees are not reproducing (Kaden 2001).

In Kent County to an even greater extent than in the remainder of the state, forestry, development, and agriculture have fragmented and eliminated woodlands. Nevertheless, three mature to old-growth sites have been identified. Two of the sites are described below. The third site, in the **Bombay Hook National Wildlife Refuge**, consists of approximately 20 acres of mature to old-growth mixed hardwoods, with a variety of oak species (Northern Red, Chestnut, White, and Southern Red) as major elements in the canopy. It has a sparse understory, with Flowering Dogwood and Spicebush common in the shrub layer.

Sussex County, Delaware's southernmost county, contains at least three types of mature to old-growth forest: Baldcypress swamps, Atlantic White-cedar swamps, and Loblolly Pine woods (McAvoy 1993, 2001). However, Sussex County has been ditched. As a result, the county is left, for the most part, with old trees rather than with functioning ecosystems (Martin 2001).

The James Branch, a tributary of the Nanticoke River, supports an extensive population of Baldcypress, near the northern limit of its native range. Researchers have found 60 to 70-foot trees with large, buttressed bases and tall, widely dispersed "knees" (McAvoy 1993, 2001). What appears to be the oldest and largest Baldcypress in James Branch is estimated to be over 540 years old (Kaden 1998) and is 50 inches in diameter above its buttress. The cypress, which grew along mill streams, are not reproducing,

because of changes in the water regime (Martin 2001). James Branch Nature Preserve protects five miles of the riparian corridor of James Branch.

Most of Delaware's Atlantic White-cedar swamps are in Sussex County along stream corridors. Researchers have identified mature to old-growth stands with trees estimated to be more than 100 years old, with dbhs (diameters at breast height) of 20 inches, and heights of up to 90 feet (McAvoy 1993, 2001). A stand of Atlantic White-cedar near Milton is believed to be almost 250 years in age (Kaden 1998).

Mature to old-growth Loblolly Pine sites have been identified in the Inland Bays region and within the drainage of the Nanticoke River. Here the pine is near the northern limit of its native range, yet it reaches up to 30 inches in diameter and up to 80 feet in height. Mature specimens of Loblolly Pine are scattered throughout the Assawoman State Wildlife Area. A mature to old-growth Loblolly Pine site is **Barnes Woods**, a 23-acre state-dedicated natural area on a tributary of the Nanticoke. As far as is known, the only logging that Barnes Woods has suffered was selective cutting in the 1920s. Geologic investigations have shown that the soils of the Woods have never been tilled. Acreage of the Loblolly Pine sites is small (McAvoy 1993, 2001).

The Great Cypress Swamp in southern Sussex County is an approximately 9500-acre preserve of contiguous forest owned by the private conservation group Delaware Wild Lands. Though it is not now considered to be either old growth or mature, it includes remnant, mature, individual Baldcypress and Loblolly Pine trees up to 120 years in age (Martin 2001). Before timbering, fire, and agricultural drainage, the Great Cypress Swamp covered 50,000 acres. Preservation of the 10,000-acre remnant ensures that in the future Delaware will have an extensive area with old-growth characteristics (McAvoy 1993).

Milford Neck Conservation Area,* eastern Delaware (Kent County)

Within the 10,000-acre Conservation Area, some 60-65 acres of old-growth Loblolly Pine spared by loggers (Martin 2003). The loblollies are 32 inches in diameter at the base, between 115 and 120 feet tall, and on average between 140 and 150 years in age (Kaden 1998). The stand may have originated after fire. Loblolly are scattered through hundreds of additional acres. Fire has been suppressed, and the Gypsy Moth has ravaged the oaks that grew up in the stand.

The pines are on 3600 acres belonging to Delaware Wild Lands. The state, The Nature Conservancy, and Delaware Wild Lands banded together to purchase the Conservation Area. They divided the land among themselves, but collaborate on land management. Delaware Wild Lands is unable to initiate prescribed burning in the area of the pines, because their land is split up into parcels among which houses and farms are interspersed (Martin 2003).

American Beech Forest, just west of Dover (Kent County)

An old-growth forest composed largely of American Beech. Additional trees include Tulip Tree, White Oak, and Northern Red Oak. The trees are estimated to be more than 140 years in age (McAvoy 1993). The old growth has been characterized as 8 acres (Line 2002) and as approximately 50 acres (McAvoy 1993). The private owner would like the site to be preserved; and, as of early 2003, the state was trying to find the money to purchase 300 plus acres that include the beech forest (Kaden 2003).

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