Taxodium distichum

Bald Cypress

Cupressaceae

Taxodium distichum by Kent C. Jensen, 2015

Taxodium distichum **Rare Plant Profile**

New Jersey Department of Environmental Protection
State Parks, Forests & Historic Sites
State Forest Fire Service & Forestry
Office of Natural Lands Management
New Jersey Natural Heritage Program

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Life History

Taxodium distichum (Bald Cypress) is a deciduous needle-leaved conifer in the Cupressaceae. The trees can reach up to 50 meters in height and the trunks often flare at the base forming large, conspicuously ridged buttresses. The bark is reddish-brown to light brown or gray, slightly ridged or furrowed, and often becomes flakey with age. The branches spread horizontally, and the flat, linear leaves (needles) are 5–17 mm long and two-ranked. During the growing season the needles are yellow-green above and white below but they turn orange-yellow in the fall. The pollen-producing male cones are 2–3 mm long and hang in panicles up to 25 cm in length. The seed cones are compact and round or slightly longer than wide and typically measure 2–3 cm in diameter. (See Britton and Brown 1913, Fernald 1950, Gleason and Cronquist 1991, Tiner 2009, Watson 2020).

Left: Britton and Brown 1913, courtesy USDA NRCS 2022a. Center: Pancrace Bessa, 1819. Right: Greg Lasley, 2002.

Bald Cypress trees are well-known for their 'knees'—a distinctive feature that has inspired much debate. *Taxodium distichum* develops several descending roots that serve as primary anchors as well as numerous lateral roots (Wilhite and Toliver 1990). The lateral roots generate vertical downward projections that help to secure the trees in the substrate, and they frequently also produce upward vertical growths known as knees which develop from thickened layers of vascular cambium and emerge above the surface (Lamborn 1890, Kramer et al. 1952). Knees are most likely to develop on trees that are growing in shallow water, but are often absent in trees that are situated on land or in deep water. They have been found on *T. distichum* plants as young as 12 years old, and the tallest knee on record was over 4 meters high. Over the years, many hypotheses have been proposed regarding the purpose of cypress knees including aeration, carbohydrate storage, methane emissions, nutrient trapping, structural support, and vegetative reproduction. The idea that they arose in response to historic environmental conditions that no longer exist has also been put forward (Briand 2001). The earliest widely-held opinion was that the knees transported oxygen to the submerged roots but Lamborn (1890) questioned that assumption based on a lack of evidence, viewing them instead as counterpoints to the downward-growing vertical root branches and thus as part of a mechanism for maintaining stability. In an attempt to settle the question, Kramer et al. (1952) measured the oxygen concentration around attached and detached knees, concluding that the structures did not play a significant role in aeration of the roots. Other anatomical studies cited by Briand (2001) dismissed the oxygenation theory because the knees did not have lenticels or spongy aerenchyma tissue and questioned the mechanical support hypothesis because knees and sinker roots did not always occur together along the lateral roots. During the past decade the issue was finally resolved by Martin and Francke (2015), who measured and compared the oxygen concentrations in roots when the associated knees were submerged and exposed. Their research provided clear evidence that cypress knees can supply oxygen to submerged roots, although the authors pointed out that the structures might have multiple functions.

Whether or not stabilization is one of those additional cypress knee functions remains to be seen. Nevertheless, *Taxodium distichum* trees have a number of features that help them to remain upright during periods of flooding or high winds including their buttressed trunks, the vertical sinker roots, and an ability to quickly shed their leaves during a storm (Connor et al. 2002). After Hurricane Katrina in 2005, *T. distichum* and *Nyssa aquatica* (Water Tupelo) had lower levels of wind damage than all of the other woody species in the affected area (Middleton 2009a).


Left: Courtesy Julie Makin, Lady Bird Johnson Wildflower Center. Right: Courtesy Alan Cressler, Lady Bird Johnson Wildflower Center.

In New Jersey, *Taxodium distichum* leaves reach their peak fall color during mid-November (Snyder 2020). After the leaves have been discarded, the dangling clusters of purplish male cones are conspicuous throughout the winter months (Wilhite and Toliver 1990). Pollen is shed during March and April (Takaso 1990, Tiner 2009, Weakley 2022) and the new leaves begin to expand shortly thereafter (Hall and Penfound 1943, Dorken and Jagel 2014). The growing season for *T. distichum* lasts for about 190 days at the northern end of its range but is essentially continuous in Florida (Wilhite and Toliver 1990). Photosynthesis and transpiration are constant during the early and middle growing season but then decline steadily until needle senescence sets in (Carmichael and Smith 2016). Immature seed cones can be seen early in August (Stone 1911) and they turn from green to brown as they mature during the last three months of the year

(Wilhite and Toliver 1990). The cycle is likely to be repeated many times as *T. distichum* is a long-lived species: Trees in healthy stands often live for hundreds of years and some individuals have reportedly persisted for approximately 1200 years (Wilhite and Toliver 1990).

Taxodium distichum is one of the few conifers that can reproduce vegetatively. The species does not sprout from the knees (Lamborn 1890), but shoots may be produced from the stumps of cut trees up to 60 years in age (Wilhite and Toliver 1990). Sprouts are likely to emerge during the first growing season after a stump has been cut, and large stumps can produce multiple sprouts. At a site monitored by Randall et al. (2005), mortality of new shoots was high during the second year but a small percentage (3.8%) of the stump sprouts grew enough to produce cones two years later.

Pollinator Dynamics

Taxodium distichum is pollinated by wind. During early spring, the flask-shaped ovules on the female cones exude a large drop of liquid known as a pollination drop. Female cones of *T. distichum* are erect or oriented in multiple directions, and wind-blown pollen adheres to the sticky drops. When a *T. distichum* pollen grain lands on a compatible droplet it sinks in and the outer coat ruptures, allowing fertilization to take place, and as the fluid evaporates the pollen is drawn back into the ovule (Gelbert and von Aderkas 2002, Fernando et al. 2005). Several Bald Cypress ovules in close proximity may fuse their pollination drops to aid in pollen capture. Upon receipt of closely related pollen the drops are withdrawn into the ovules, but that does not occur when the pollen has originated from unrelated seed plants. Pollen from other species in the Cupressaceae is likely to be accepted although it may be drawn in more slowly. In *T. distichum*, the observed withdrawal time for pollination drops that received conspecific pollen was 16–23 minutes (Dorken and Jagel 2014).

Seed Dispersal and Establishment

Taxodium distichum cones have 9–15 scales that may each produce 1–2 seeds, and an average of 16 seeds per cone has been reported. The seeds are irregularly triangular and have thick, warty coats. They are not winged although they can have some flat projections (Wilhite and Toliver 1990, Watson 2020). Bald Cypress trees produce some seeds each year but usually have a good crop every 3–5 years. The cone scales break away after irregularly after maturity, often with the resin-coated seeds still attached, and sometimes entire cones fall. The release can be accelerated by squirrels, which eat the seeds but usually drop a few scales from each cone (Wilhite and Toliver 1990). The dispersal period for *T. distichum* spans multiple seasons: In a South Carolina swamp seedfall occurred from September through March with a peak in November (Schneider and Sharitz 1988) whereas dispersal in Illinois typically takes place from November through June (Middleton 2000).

Water is the main dispersal mechanism for *Taxodium distichum*, and both the seeds and cones are buoyant (Givnish 1980, Schneider and Sharitz 1988, Middleton 2000). Of the 82,189 *T. distichum* seeds recovered during a study by Schneider and Sharitz (1988), water aided in the transport of 86% and the remaining 14% were dispersed by gravity alone. Schneider and Sharitz also found that newly released seeds remained buoyant for an average of 42 days, and that prolonged floatation increased the chances for propagules to end up on elevated, less frequently flooded microsites suitable for germination. However, seeds were often deposited next to obstacles such as logs, stumps, or cypress knees where they became concentrated in the seed bank. The researchers estimated that 90% of the Bald Cypress seeds remained within 1800 meters of their parent tree. In a study carried out by Middleton (2000), water-dispersed *T. distichum* seeds achieved an average distance of 225 meters from the source. While there is no evidence that animals make a significant contribution to the dispersal of *T. distichum*, the seeds are consumed by squirrels, turkeys, grosbeaks, ducks, and a few other birds (Wilhite and Toliver 1990) which may occasionally result in the distribution of viable propagules. Torres-Martínez et al. (2020) observed that some microbes in the soils around mature *T. distichum* trees can have a negative effect on seedling growth, suggesting that longer dispersal distances increase the chances for successful recruitment.

A moist, exposed substrate such as wet mud or sphagnum is required for germination. *Taxodium distichum* seeds will not germinate in dry conditions or underwater, although submerged seeds may retain viability for up to 2.5 years (Wilhite and Toliver 1990). In Illinois, *T. distichum* sprouted readily in non-flooded conditions but seeds from the same seed bank failed to germinate on flooded substrate (Middleton 2009b). When conditions are suitable, seeds on the soil surface are likely to germinate within a year of their production and Middleton (2000) found that less than 5% remained viable beyond that period. Bald Cypress seedlings can tolerate partial shade but overhead light promotes better growth. In order to survive, the young trees need to develop quickly enough to maintain some branches above the water for the majority of the growing season so they often reach heights of 20–70 cm during their first year (Wilhite and Toliver 1990). *Taxodium distichum* roots examined by Kandalepas et al. (2010) were heavily colonized by arbuscular mycorrhizal fungi, although it is not clear whether fungal associates are required for seedling establishment.

The development of *Taxodium distichum* from seed has been studied thoroughly because the species is widely valued for lumber, landscaping, and wetland restoration. When grown in a controlled setting, *T. distichum* seeds require a period of stratification before they will germinate (Leopold 2005). Conner and Inabinette (2005) found that stratified seeds began to sprout within two weeks of planting and 87% of the seeds that germinated did so within three weeks. However, mortality was high (58%) in seeds that germinated in under two weeks and those that sprouted later were more successful. Because overall germination is generally low in the species, various means for enhancing the rates have been investigated (see Liu et al. 2009, Popovic et al. 2012).

Habitat

Taxodium distichum is normally found at elevations between 0–160 meters, with an exception in Texas where it has been known to grow at 500 meters above sea level (Watson 2020), but 90% of the occurrences are at or below 30 meters (Wilhite and Toliver 1990). Natural habitats include freshwater (or occasionally slightly brackish) tidal and nontidal wetlands such as swamps, riverbanks, and lake margins, and the sites are often subject to seasonal changes in water level or intermittent flooding (Tiner 2009, Watson 2020, Weakley et al. 2022). Extensive soil deposition or removal during flood events can alter the depth to groundwater multiple times during the life of a stand. *T. distichum* is also frequently planted as a shade tree or ornamental in drier upland soils (Wilhite and Toliver 1990).

Throughout much of its range *Taxodium distichum* co-occurs with Tupelo Gum (*Nyssa aquatica*), and at sites with shallow water a layer of Swamp Black Gum (*N. biflora*) may also be present (Hall and Penfound 1943). Other common associates noted by Wilhite and Toliver (1990) include Red Maple (*Acer rubrum*), Sweetbay (*Magnolia virginiana*), Southern Magnolia (*M. grandifolia*), Sweetgum (*Liquidambar styraciflua*), and various oaks (*Quercus* spp.), ashes (*Fraxinus* spp.), or pines (*Pinus* spp.). In New Jersey, the vegetative communities most likely to support *T. distichum* are *Acer rubrum—Fraxinus pennsylvanica* (Red Maple—Green Ash) seasonally flooded forest alliance and *Acer rubrum—Fraxinus pennsylvanica* (Red Maple—Green Ash) tidal woodland alliance (Breden et al. 2001).

Bald Cypress appears to be most sensitive to habitat conditions during the seedling stage. *Taxodium distichum* seedlings can tolerate low levels of salinity (2 parts per thousand) but growth and development are inhibited at higher levels (Allen 1994, Allen et al. 1997, Pezeshki et al. 1987). Young plants are drought-sensitive, although they can recover from mild drought conditions. In response to rising water levels the seedlings are likely to invest more resources in height than in trunk diameter (Elcan and Pezeshki 2002, Myers et al. 1995). Submergence for more than a month is stressful for newly germinated plants and extended periods (45+ days) can result in substantial mortality, but many seedlings a year or more in age can remain underwater for 3–5 months (Souther and Shaffer 2000). In older trees, short-term flooding of any kind may initially augment growth but in the long-term growth increases in response to riverine flooding and decreases in response to stagnant flooding (Young et al. 1995, Keim and Blake 2012). In general, *T. distichum* adapts well to periodic floods because the plants can adjust their balance between growth and energy storage in response to seasonal changes in water level (Wang et al. 2019).

A mature *Taxodium distichum* tree is likely to serve as a habitat for numerous other species, many of which may also benefit their host. Kimbrough et al. (2018) obtained and identified 364 kinds of endophytic fungi and bacteria from the roots and leaves of 48 Bald Cypress trees growing in four different locations, noting that the suites of endophytes differed between sites. The composition of bacterial communities at different sites can be influenced by environmental factors such as water depth, salinity, and volume of woody debris (Lumibao et al. 2020). Torres-Martínez et al. (2020) found that water levels also influence the types of fungi that colonize the roots of *T. distichum* seedlings. The researchers categorized root symbionts as either arbuscular mycorrhizal fungi (AMF) or dark septate endophytes (DSE). While total fungal colonization did not vary between water levels, the relative proportion of AMF was higher in plants that were growing in flooded conditions. AMF are generally thought of as advantageous to the host species, although they are likely to be multifunctional, but the role of DSE is not as well understood (Jumpponen 2001). A number of potential benefits of DSE colonization have been proposed and some positive effects on growth have been documented in other plant species (Mandyam and Jumpponen 2005, Newsham 2011). The diversity and variability of the endophytic communities in Bald Cypress trees underscores both the complexity of ecosystems and the adaptability of *T. distichum*.

Wetland Indicator Status

Taxodium distichum is an obligate wetland species, meaning that natural occurrences are almost always found in wetlands (U. S. Army Corps of Engineers 2020).

USDA Plants Code (USDA, NRCS 2022b)

TADI2

Coefficient of Conservatism (Walz et al. 2018)

CoC = 7. Criteria for a value of 6 to 8: Native with a narrow range of ecological tolerances and typically associated with a stable community (Faber-Langendoen 2018).

Distribution and Range

The native global range of *Taxodium distichum* is restricted to the United States, but the species has also been introduced in parts of South America, Europe, and Bangladesh (POWO 2022). The map in Figure 1 depicts the extent of *T. distichum* in North America. Bald Cypress is often planted both within and outside of its natural range—persisting for many years and sometimes spreading—which can make it challenging to evaluate the native status of some North American occurrences (Rhoads and Block 2007, Snyder 2020, Weakley et al. 2022).

Taxodium distichum has been reported from a number of New Jersey counties, as shown in Figure 2. The data are likely to include historic observations of plants that were deliberately introduced and do not reflect the natural distribution of the species as it is currently understood.

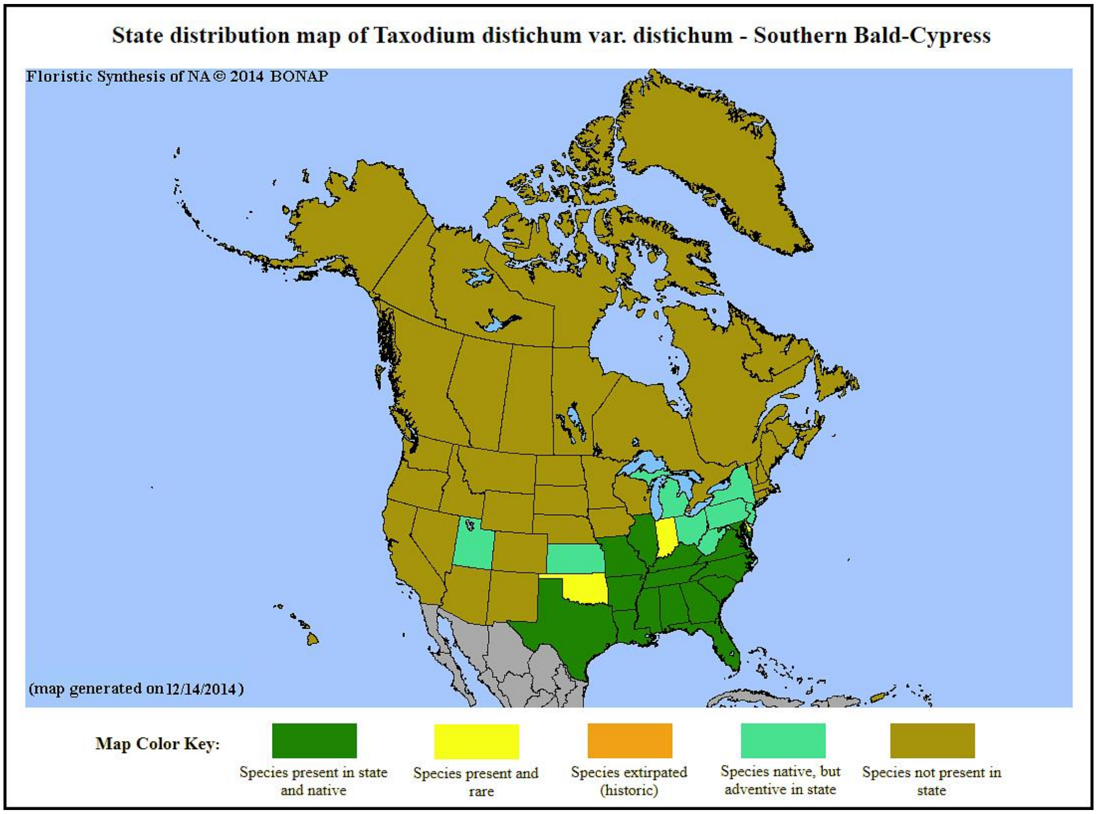

Figure 1. Distribution of T. distichum in North America, adapted from BONAP (Kartesz 2015).

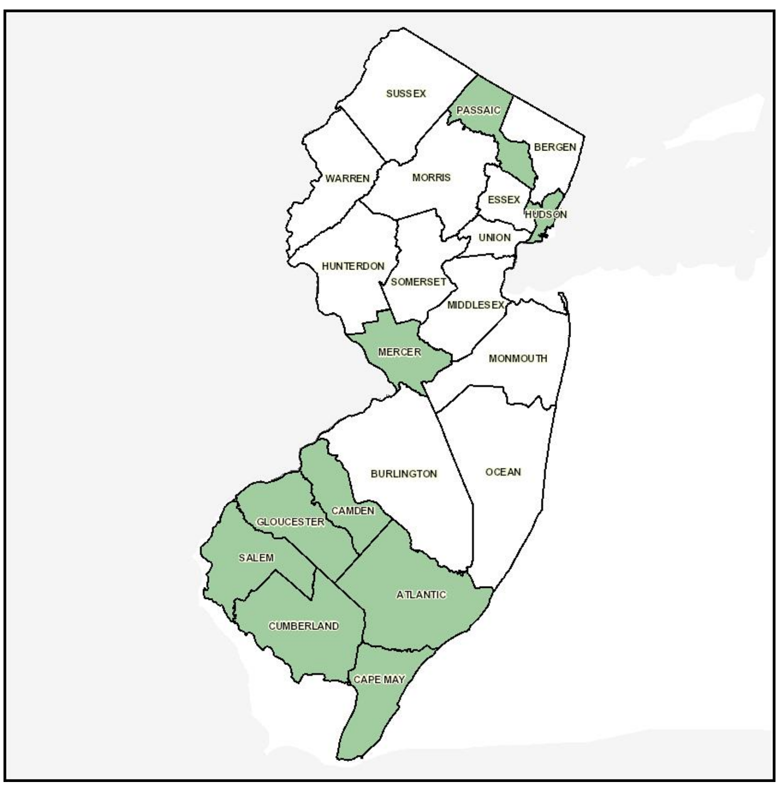

Figure 2. County records of T. distichum in New Jersey. Data sources include Kartesz 2015, Mid-Atlantic Herbaria 2022, and NJNHP 2022.

Conservation Status

Taxodium distichum is considered globally secure. The G5 rank means the species has a very low risk of extinction or collapse due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats (NatureServe 2022). The map below (Figure 3) illustrates the conservation status of *T. distichum* throughout its range. The species is secure, apparently secure or unranked throughout most of its range. It has been ranked as imperiled (high risk of extinction) in three states and it is considered exotic in New York and Pennsylvania.

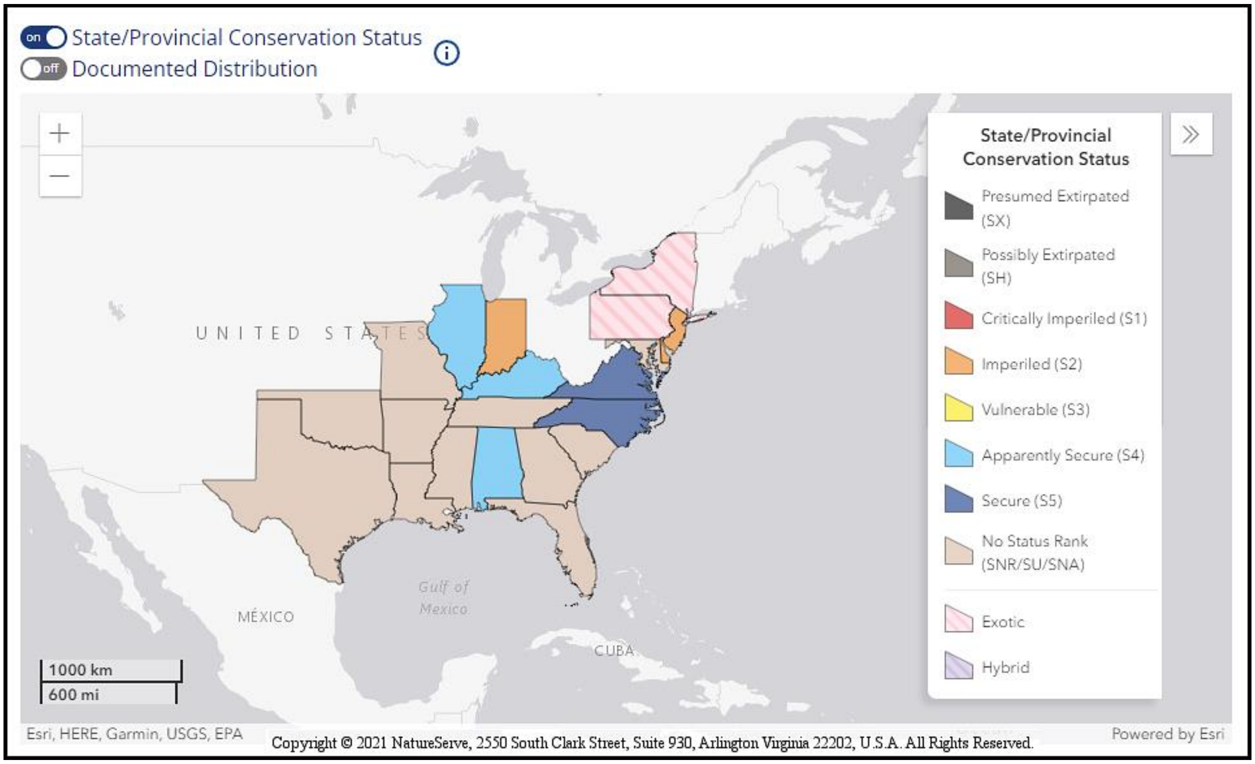

Figure 3. Conservation status of T. distichum in North America (NatureServe 2022).

Taxodium distichum has been ranked as S2? in New Jersey (NJNHP 2022). The S2 rank indicates that the species is very rare in the state, with 6 to 20 occurrences. Species with an S2 rank may have once been more abundant in the state but now persist in only a few of their former locations. The question mark (?**)** after the rank indicates some uncertainty regarding the state status; however, the assigned rank is considered most likely. *T. distichum* has also been assigned a regional status code of HL, signifying that the cypress is eligible for protection under the jurisdiction of the Highlands Preservation Area (NJNHP 2010).

Taxodium distichum is primarily a southeastern species and certain northern occurrences are treated as adventive (see Figures 1 and 3). Since the early 1800s, some authors included New Jersey as part of the species' natural range but others indicated that Bald Cypress reached its northern limit in Delaware (Bernard 1965, Stalter 1981). Stone (1911) accepted a Cape May occurrence as native but expressed some uncertainty regarding the origin of trees in other parts of the state, while Taylor (1915) opined that *T. distichum* had not been satisfactorily demonstrated to be indigenous in New Jersey. Bernard (1965) discovered that the tree discussed by Stone had been brought up from Georgia and installed in Cape May after he had tracked down the nephew of the person who had obtained and planted it, and Hough (1983) did not include the species in her state flora. Bald Cypress has been widely introduced throughout New Jersey and in many places occurrences are limited to single trees, but occasionally populations originating from cultivated specimens have become established in natural habitats (Snyder 2020). In recent years, numerous *Taxodium distichum* seedlings have been distributed around the state as part of a tree seedling giveaway program developed through a partnership between the Arbor Day Foundation and the New Jersey State Forestry Service to replace trees that were lost during Superstorm Sandy (Arbor Day Foundation 2022). However, there is one population of *T. distichum* in the state that seems likely to be a natural occurrence as it is large, well-established, regenerative, and situated in a fairly inaccessible location (Snyder 2020). Documentation of that population resulted in the recent addition of *Taxodium distichum* to the state's special plant list (NJNHP 2021) and it is currently the only occurrence of the species tracked in the rare plant database (NJNHP 2022).

Threats

Stalter (1981) reported that most of the sites which once supported *Taxodium distichum* habitat in Delaware had been destroyed by logging, severe fires, or the conversion of forested tracts to agricultural fields. Souther and Shaffer (2000) noted a lack of natural renewal at sites where *T. distichum* has been logged, and Randall et al. (2005) pointed out that while root sprouting could be an important form of regeneration for the trees it was not adequate to reestablish a population after a harvest. Landscape changes that lead to permanent flooding or draining of a habitat can also threaten established Bald Cypress populations. A study of a Louisiana occurrence found that when road construction blocked natural water flow and resulted in permanent impoundment, an initial burst of growth was followed by a long-term decline (Young et al. 1995). When a severe fire follows the drainage or logging of a site the roots and seeds of *T. distichum* are destroyed, favoring the establishment of willows and hardwoods (USDA NRCS 2002).

Changes in water quality resulting from the introduction of nutrients do not appear to harm *Taxodium distichum*. Enhanced growth has been reported following both the addition of fertilizer in experimental treatments and a retrospective analysis of trees at a site where municipal wastewater had been discharged for 40 years (Myers et al. 1995, Hesse et al. 1998).

Although *Taxodium distichum* grows well in dense stands, competition for light can hamper the establishment of seedlings. Seeds that germinate in heavily shaded locations often fail to reach maturity (Wilhite and Toliver 1990), and at disturbed sites seedling growth can be inhibited by faster growing herbaceous and shrubby species (Dunn and Sharitz 1987). However, Myers et al. (1995) found that the presence of some entangling vines around *T. distichum* seedlings stimulated the young trees to grow taller but invest less in trunk diameter, suggesting that they allocated resources preferentially in order to obtain light.

The aboveground portions of *Taxodium distichum* seedlings are often browsed by rabbits or deer, but most of the time the young plants can resprout and continue to grow. Herbivory by Nutria

(*Myocastor copyu*) is more of a threat because they tend to clip or uproot seedlings before their root systems have become established. This can be a considerable obstacle to restoration efforts, as entire plantings can be destroyed in a few days when the animals are abundant (Wilhite and Toliver 1990). Similar threats have been noted from Beavers (*Castor canadensis*), and continuous flooding can exacerbate herbivory because both species prefer to feed in wetter areas (Keeland et al. 2011). Protecting Bald Cypress seedlings and saplings from herbivores improves their growth and survival (Myers et al. 1995, Keeland et al. 2011).

Taxodium distichum is susceptible to a number of other pests and diseases, although they seldom result in extensive damage. The Cypress Weevil (*Eudociminus mannerheimii*) has been cited as a *T. distichum* herbivore (Harms and Grodowitz 2009) but the insects usually breed in scarred, weakened, or fallen trees (Mayfield 2021). Damage by most other insects is usually minor, although large-scale outbreaks of moths with needle-feeding larvae such as the Fruit-tree Leafroller (*Archips argyrospila*) or the Forest Tent Caterpillar (*Malacosma disstria*) can occasionally cause significant dieback that results in tree death. Pecky Cypress Fungus (*Stereum taxodi*) attacks the heartwood of living trees, particularly older ones, but few other fungi are known to cause serious harm to Bald Cypress (Wilhite and Toliver 1990, USDA NRCS 2002).

The potential impacts of climate change on *Taxodium distichum* have been well-studied, likely because of the species' economic value. Changes in temperature, water availability, and salinity are all likely to have an impact on Bald Cypress. Wilhite and Toliver (1990) noted that *T. distichum* grows best in warm climates, and that few seeds have produced mature trees in the northernmost part of its range. Middleton (2004, 2006) predicted that the species will face different threats along its northern and southern boundaries, resulting in a shrinking range. Northern limits are likely to be defined by colder temperatures and a shorter growing season. Seed dispersal in lowland habitats is biased in a southward direction by water flow patterns, which may hamper northward range expansion as temperatures rise. *T. distichum* ceases production during periods of drought or excessive heat, which could decrease reproduction and survival along its southern boundary.

Many populations in coastal areas are expected to experience salt-water incursion as sea levels continue to rise. The visible decline of one long-established tree in New Jersey has been attributed to increasing salinity (Snyder 2020). The adaptability of *Taxodium distichum* to higher concentrations of salt varies between populations (Allen 1994, Allen et al. 1997, Conner and Inabinette 2005). The degree of salinity tolerance in Bald Cypress seedlings can also vary depending on the time of year that exposure occurs (Iwanaga et al. 2011). Changes resulting from enhanced salinity and longer periods of inundation are also likely to alter the endophytic communities associated with *T. distichum* trees, causing additional stress to the species (Lumibao et al. 2020).

Management Summary and Recommendations

No threats have been identified for New Jersey's one natural population of *Taxodium distichum*, which appears to be vigorous and secure (Snyder 2020, NJNHP 2022). Due to its recent discovery, the occurrence still needs to be fully surveyed.

Outside of New Jersey, the primary anthropogenic threats to *T. distichum* come from habitat conversion and logging. Because the species also faces a broad array of potential impacts from climate change, particular efforts should be made to identify and protect exemplary stands in different parts of its range. In places where Bald Cypress is harvested and replanted, active management is likely to be needed in order to assure the successful establishment of seedlings. Depending on individual site characteristics, reestablishment planning may include the manipulation of water levels to promote seed germination and growth, herbivore exclusion, and/or control of competition (Stalter 1981, USDA NRCS 2002).

Synonyms

The accepted botanical name of the species is *Taxodium distichum* (L.) Rich. Orthographic variants, synonyms, and common names are listed below (ITIS 2022, POWO 2022, USDA NRCS 2022b). Opinions vary as to whether *Taxodium ascendens* and *T. mucronata* should be accepted as species or treated as varieties of *T. distichum* (var. *imbricarium* and var. *mexicanum*, respectively). Harper (1902) made a strong case for distinguishing *T. distichum* and *T. ascendens* based on morphological characteristics and many subsequent authors have agreed (e.g. Neufield 1986), but more recently the results of a genetic analysis by Lickey and Walker (2002) suggested that the two were not distinct species. Most current sources continue to recognize three species in the genus *Taxodium* (e.g. Weakley 2022) although some do not (e.g. Watson 2020). In sources that divide *T. distichum* into varieties, the one that occurs in New Jersey is *T. distichum* var. *distichum*.

Botanical Synonyms	**Common Names**
Taxodium distichum var. *distichum* (L.) Rich.	Bald Cypress
Cupressus disticha L.	Southern Bald-cypress
Cupressus americana Catesby ex Endl.	Southern Cypress
Cupressus disticha var. *nutans* Aiton	Swamp Cypress
Cupressus disticha var. *patens* Aiton	Red-cypress
Cupressus montezumae Humb. & Bonpl. ex Parl.	Yellow-cypress
Glyptostrobus columnaris Carrière	White-cypress
Taxodium ascendens f. *nutans* (Aiton) Rehder	Tidewater Red-cypress
Taxodium ascendens var. *nutans* (Aiton) Rehder	Gulf Cypress
Taxodium denudatum Carrière	
Taxodium distichum f. *confusum* E. J. Palmer & Steyerm.	
Taxodium distichum ssp. *nutans* (Aiton) A. E. Murray	
Taxodium distichum var. *nutans* (Aiton) Sweet	
Taxodium distichum var. *patens* (Aiton) Sweet	
Taxodium distichum f. *pendens* Rehder	
Taxodium distichum f. *pendulum-elegans* Beissn.	
Taxodium distichum f. *pendulum-novum* P. Sm. ex Beissn.	
Taxodium distichum recurvum C. Van Geert	
Taxodium knightii K. Koch	
Taxodium pyramidatum Beissn.	

Taxodium sinense Nois. ex Gordon & Glend.

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