

A photograph of a dry oak forest. The scene is filled with numerous trees, some with thick, textured trunks and others that are thinner and more vertical. The ground is covered with a mix of green grass, dry leaves, and a prominent fallen log in the foreground. The lighting is dappled, suggesting sunlight filtering through the canopy. A semi-transparent white box with the text "Dry Oak Forest" is centered in the upper portion of the image.

Dry Oak Forest

This is often the forest of our dry and rocky hills, especially in the southern and eastern part of the county. Much of it is “ancient forest” and, because of its large expanse and the abundance of oaks, Dry Oak Forest provides superb wildlife habitat. It is also one of the forest types people feel most drawn to for recreation, hunting, and high-end residential development.

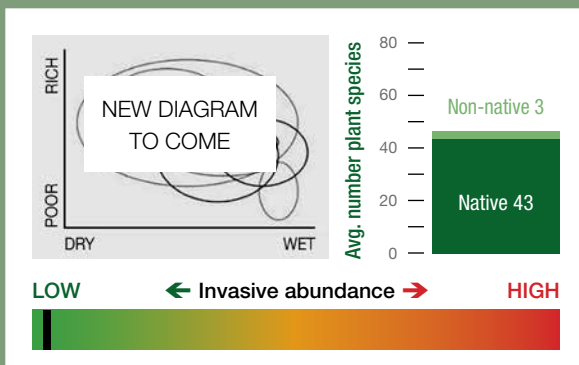
First Glimpse

Most Dry Oak Forests are inviting to walk in, with plenty of sunlight streaming through the irregular and sometimes low canopy. Aside from the occasional dense tangle of Mountain Laurel, the understory tends to be open, with few tall shrubs or vines. Knee-high blueberry bushes are often present and are sometimes even plentiful. It can be difficult to move quietly through these forests because of the dry, crunchy leaf litter formed by the slow-to-decompose oak leaves. On and around the frequent outcroppings of rock, where leaf litter does not accumulate, one sometimes finds soft, light-green patches of Pincushion Moss and other mosses. In other places, lawns of fine-leaved sedges and grasses give this forest type a very pleasant, park-like appearance. Tree trunks sometimes support tufts of beard lichen.

As the browns and subdued burgundies of an autumn Dry Oak Forest hillside attest, these forests are oak-dominated. The largest tree trunks may display the dark, relatively smooth bark of Red Oak, the similar but blockier bark of Black Oak, the lighter-colored, flaky bark of White Oak, and/or the oft-twisted, deeply furrowed skin of Chestnut Oak. Here and there one can find a small American Chestnut growing from the living roots of trunks that succumbed to Chestnut Blight. This is a reminder that a century ago we probably would have called this habitat Oak-Chestnut Forest.



Dry Oak Forest with a patch of Mountain Laurel.

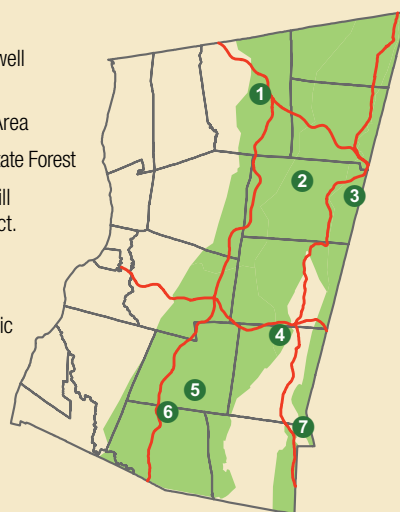


Location

Dry Oak Forest is mostly found along ridges, on hilltops, and on sunny upper slopes in the eastern part of the county (Taconic Range and Foothills), though scattered examples can be found elsewhere. It thrives in dry microclimates, tolerates summer heat as well as harsh conditions in winter, and tends to occur on thin, acidic, and nutrient-poor soils with outcrops of slate, shale, or schist.

Distribution of Dry Oak Forest and Places to Visit

1. Wilson M. Powell Wildl. Sanct.
2. Harris Cons. Area
3. Harvey Mtn. State Forest
4. Rheinstrom Hill Audubon Sanct.
5. New Forge State Forest
6. Lake Taghkanic State Park
7. Taconic State Park



Visiting

Visit Dry Oak Forests throughout the year. In spring, enjoy the early-flowering shadbushes. In June, look for the blossoms of Pink Lady’s Slipper, Mountain Laurel, azalea, and blueberry species. In July, come back to pick the blueberries. In fall, look for wildlife gorging on acorns and hickory nuts. In winter, seek the impressive views that may appear during leaf-off. Large stands of Dry Oak Forest are publicly accessible in Taconic State Park and the Rheinstrom Hill Audubon and Wilson M. Powell Wildlife Sanctuaries.

What to Look For

Plants: This is a great place to see a variety of oak species growing next to each other. Scan the leaf litter for the pointy-lobed leaves of Red and Black Oak, the round-lobed leaves of White Oak, and the scallop-edged leaves of Chestnut Oak. Red Maple is often abundant, while Sugar Maple is found only occasionally in this forest type. In addition to other species included on the Characteristic Plants list, White Pine, Hemlock, and several deciduous trees may also occur in small numbers. Notable is the scarcity of invasive plants together with the diversity and abundance of plants in the heath family, such as various blueberry species, Black Huckleberry, Wintergreen, and Trailing Arbutus.

Although this forest is comparatively low in overall plant diversity, it does harbor a number of rare species. For example, Dry Oak Forest is the only place where we have found the orchid Large Whorled Pogonia which, according to McVaugh's *Flora of Columbia County*, was last reported in 1869.



Above:
Comparison of the leaves of Red Oak, Chestnut Oak, and White Oak (left to right).
at right:
Pink Lady's Slipper is a native orchid sometimes found in Dry Oak Forest. Deer like to eat its flowers and may have contributed to its decline.



Characteristic Plants

The following species are common in this habitat, but not necessarily unique to it.

- * Indicator species ○ Non-native species
- Invasive species

TREES

- Black Birch
- Chestnut Oak *
- Red Maple
- Red Oak
- Shagbark Hickory
- White Oak *

SHRUBS

- Black Huckleberry
- Hop-hornbeam
- Lowbush blueberry species *
- Shadbush species *
- Witch-hazel

FORBS (e.g. WILDFLOWERS)

- Canada Mayflower
- Starflower *
- Wild Sarsaparilla *

GRASSES, SEDGES, & RUSHES

- Pennsylvania Sedge
- Poverty Oat Grass *

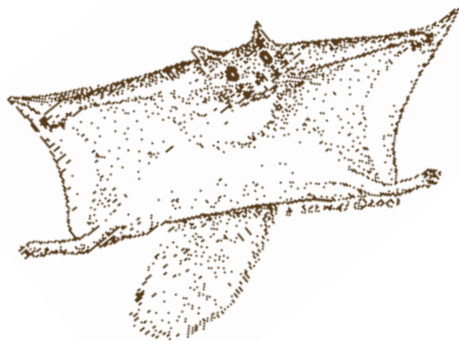


Starflower blooms in late spring in Dry Oak Forest.



Large Whorled Pogonia is one of our rare orchids and is currently known in our county only from its occurrence in Dry Oak Forest.

Mammals, Birds, and Acorns: The acorns and hickory nuts (and, previously, chestnuts) of these forests are important food for wildlife. Among the larger resident mammals eating these nuts are Deer, Black Bear, and Red and Gray Foxes. Added to this are many rodents, such as Gray and Red Squirrels, both of our flying squirrels, Chipmunk and White-footed Mouse, and a surprising number of birds including Turkey, Blue Jay, White-breasted Nuthatch, Brown Thrasher, and Eastern Towhee. Passenger Pigeons may have once feasted here. During summer, crannies in the bark of Shagbark Hickory can provide day roosts for bats, including the federally endangered Indiana Bat.



Southern Flying Squirrel (by Kathy Schmidt). These small and nocturnal squirrels are omnivores, but acorns—which they collect and store for the winter—play a special role in their diet.

Amphibians and Reptiles: Although they are not feeding on the oaks themselves, forest amphibians and reptiles do use Dry Oak Forests. It is not uncommon to find Red-backed Salamanders, Spring Peepers, Wood Frogs, American Toads, Red Efts, and Garter Snakes. The few remaining Timber Rattlesnakes in our county probably tend to occur in this forest type, although they are now absent from most of our area.

Insects and Other Invertebrates: Of all our forest trees, oaks seem to be the most heavily used by insects, with hundreds of species known to live on them. Among the most evident are the tiny wasps, flies, and mites responsible for the conspicuous swellings of the leaf and acorn galls. Dry Oak Forest is also a hotspot for moth diversity. Of the 630 moth species that we have so far identified in the county, the caterpillars of 178 species feed on oaks and 110 on hickories, although most of these species have diets that include other plants. Oaks seem to be one of the preferred foods of Gypsy Moths (although these moths feed on other hardwood species too).

We know of four butterfly species in the county whose caterpillars feed on oak leaves—Juvenal’s and Horace’s Duskywings, and Banded and White M Hairstreaks—and



The Oak Apple Gall Wasp causes oak trees to produce apple-like galls when eggs are laid in leaf buds. Like the many other types of galls, they serve as nurseries for insect larvae, which feed on the plant tissue inside the galls but don’t seem to hurt the tree.

Some Species of Conservation Concern

Geographic region of conservation concern is indicated by **CC** (Columbia County), **HV** (Hudson Valley), **NYS** (New York State), **US** (United States); see Introduction for explanation.

PLANTS

Early and Pink Azalea	HV
Large Whorled Pogonia	NYS
Spotted Wintergreen	HV
Violet Wood Sorrel	NYS
Wild Indigo	HV
Wild Pink	NYS

BIRDS

Black-throated Blue Warbler	NYS
Hermit Thrush	
Scarlet Tanager	NYS
Worm-eating Warbler	NYS

REPTILES

Timber Rattlesnake	NYS
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INSECTS

Brown Elfin (Butterfly)	CC
Horace’s Duskywing (Butterfly)	CC
Oak Hairstreak (Butterfly)	NYS
Orange-striped Oakworm Moth	NYS
Packard’s Wave (Moth)	CC
Scalloped Sack-bearer (Moth)	CC



Juvenal's Duskywing is one of many native butterflies whose caterpillars feed on oak leaves.

two whose caterpillars are hickory-eaters—Banded and Hickory Hairstreaks. However, the adults of these species are more likely to be seen nectaring on flowers along the edge of a Dry Oak Forest than in the forest itself. The Brown Elfin, whose caterpillars feed on heaths, also occurs in this forest type.

None of the ground beetles or ants we observed in Dry Oak Forest was confined to this forest type. The ground beetles *Pterostichus tristis* and *Pterostichus adoxus* were relatively common in the Dry Oak Forest, but also were abundant in some other forest types. Both of these eat caterpillars and might be taking advantage of the abundance of moth caterpillars associated with oaks. The ants of Dry Oak Forests seem to be a relatively standardized set of forest species, with the common Black Carpenter Ant being especially numerous.

Similar Habitats and Variation within the Habitat

Rocky outcrops are a common element in Dry Oak Forest, as well as in some other forest types, and are described in more detail in the Wooded Rock Outcrop chapter. Dry Oak Forest can be similar to certain stands of Oak-Maple Forest. However, compared to Oak-Maple Forest, it usually has a scarcity of Sugar Maple and twice the abundance of White Oak and Red Maple. In turn, blueberries, which characterize many stands of Dry Oak Forest, are rare or absent in the Oak-Maple Forest. Around rocky summits at higher elevations, Dry Oak Forests sometimes grade into a type of Upland Shrubland habitat characterized by a low canopy of Scrub Oak and Pitch Pine. On rocky hillsides they can mix into Hemlock Forests.

Variations of the typical Dry Oak Forest are occasionally found on dry, but seemingly non-acidic, soils in the Harlem Valley and in the northwestern part of the county. On the higher hills in the eastern part of the county, Beech is sometimes a common tree in the Dry Oak Forest.

Stewardship

Dry Oak Forest is one of our most common types of ancient forest. It grows on soils not well suited for the plow, and much of it might never have been completely cleared for farming (although some areas might have been briefly used for pasture). Furthermore, it tends to occur in more extensive stands than most of our other forest types, creating large forest patches and corridors that are important for certain species of wildlife. This forest type currently seems to maintain itself where undisturbed, regenerate to a similar species composition when logged, and not be overly susceptible to colonization by invasive plants. However, it is found in fire-prone locations, and several of its characteristic plants might historically have benefited from occasional forest fires. Forest biologists Greg Nowacki and Mark Abrams found evidence that the lack of forest fires allows fire-sensitive tree species to establish themselves in formerly oak-dominated habitats. This might, eventually, change the character of the Dry Oak Forests to make them look more like Oak-Maple Forests. On the other hand, climate change is likely to create growing conditions favorable to the oaks, but may simultaneously favor Gypsy Moths, which can damage oaks.

Less ambiguous is the impact on Dry Oak Forests from the modern trend to build houses high up on hills in search of the perfect view and facilitated by modern road building, well drilling, and septic system technologies. Such residential development not only destroys precious ancient forest at the house site itself, but can also introduce domestic pets, avian brood parasites, and invasive plants to our hilltop forests. Long driveways are often required, which lead to forest fragmentation and to the loss or degradation of valuable wildlife habitat. Establishment of conservation overlay zones (in the local zoning code) for high-elevation areas and large forests can help to protect some of the Dry Oak Forests from fragmentation and other impacts of development.



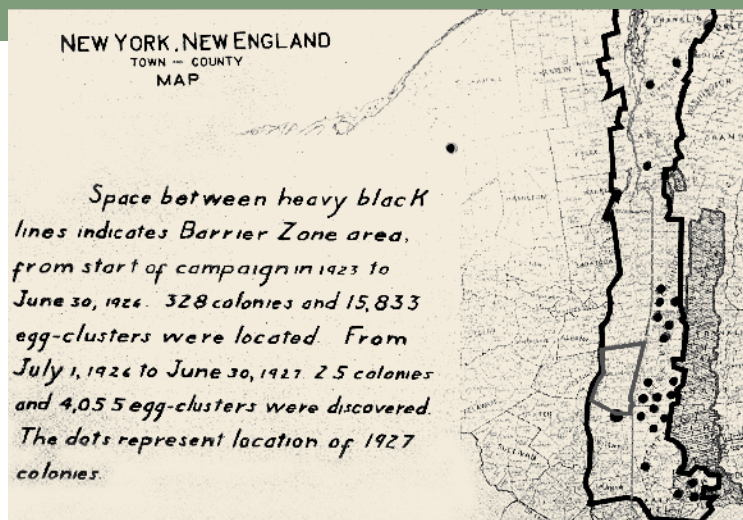
A view southwest from the Taconic Ridge, covered in Dry Oak Forest. Taconic State Park protects a section of this ridge from residential development.

History

Of all our trees, “oak” probably appears in the titles of the most books. This reflects the deep cultural value of these trees and, consequently, the large influence that human action has had on their distributions. Humans have long managed for or against oaks in a variety of intentional and unintentional ways. Reflecting the differentiated impacts of these factors, one of the most dramatic changes in Northeastern forest composition over the last 300 years has been the decline of White Oak, a pattern evident in Columbia County and beyond. Exploring this decline can help us better understand the history of our oak forests.

Oak bark was used by regional Native Americans (and colonists) as a medicine, and acorns, together with hickory nuts and chestnuts from these same forests, were apparently an important food. Some have proposed that indigenous land management, including periodic understory fires, was partially an effort to promote oaks and make acorn gathering easier. Others have suggested that when Native Americans cleared land for agriculture, they preferentially left (or even planted) oaks. White Oak is particularly fire tolerant and has relatively sweet acorns, and thus, if there was any effect, Native American activities probably favored this species.

European settlers had a direct hand in changing oak forests in the county for at least two reasons. Unlike Native Americans, whose agriculture was probably largely confined to lowlands where oaks are relatively rare, colonial and nineteenth-century agriculture, especially sheep farming, spread into the drier uplands where oaks were more common. Furthermore, oaks (and especially White Oak) were some of the most sought-after tree species for building, made good firewood and charcoal, and provided a favored food of free-ranging hogs.



This 1927 map (slightly retouched) shows the Gypsy Moth Barrier Zone, where Gypsy Moth scouting and control was especially intense. Columbia County is outlined in purple. A few years after this map was made, Gypsy Moths had been found throughout much of the county.

Many historical accounts reflect this perceived use value. Adriaen Van der Donck, a seventeenth-century Hudson Valley Dutchman, mentions oaks first when describing the wealth of New Netherland’s forests. In the late eighteenth-century, Robert Livingston viewed his oak and hickory forests in southern Columbia County as resources for charcoal production. And William Thomson, a Scottish visitor to Dutchess County in the 1840s, reported that oak woodland had the same value as cleared farmland. The impact of human use on White Oak was quick. Torrey, in an 1842 flora of New York, stated that because of “great demand ... it [White Oak] is rapidly disappearing from our forests.” Describing Massachusetts forests in 1846, William Emerson wrote, “the great value of this tree [White Oak] has caused the destruction of almost all trunks suitable for timber.” As noted under the Stewardship section, as forest burning subsided because of fewer set fires and better fire control, White Oak may have lost ground. Oaks in general, and White more than Red, are also the preferred food of the introduced Gypsy Moth, which spread into our area in the early 1900s.

The combined impact of these factors is evident. Based on the “witness trees” mentioned in early land deeds, White Oak was one of the top two most common trees in six out of the seven Columbia County regions we studied. Today, it ranks ninth in average occurrence across our forest types, with Red Maple, Sugar Maple, and Red Oak all being nearly twice as common.

Gypsy Moth control occurred in Columbia County during much of the late 1920s and the 1930s. Trucks like this were used to spray lead arsenate in an effort to stop the spread of Gypsy Moths from New England.

Perspectives

The Dry Oak Forest stands out among habitats for its importance to humans. In our landscape photo survey, it was perceived positively across all categories and had clear recreational value and appeal. Ninety percent of survey-takers identified recreational activities they could imagine doing here; walking and hiking by far topped this list.

When we brought a group of people into a Dry Oak Forest to experience this habitat, the airy openness of the forest struck many as pleasing. One participant explained, “You very rarely get to see ... that opening of light and sky through the woods like that. So that was really special.” Another wrote about this habitat: “When we closed our eyes, I delighted in the feel of the breeze on my face and arms. I could also hear the wind going through the trees. With eyes open, I enjoyed the contrast of light.”

Some in the group confessed that they weren’t sure why we were pausing in such a nondescript habitat, until they stopped to experience it through a series of sensory exercises. One who had thought it “barren” found that it “came alive” with diversity once he tuned in. Another who initially thought it “boring” soon felt a strong sense of peacefulness and safety.

In our interviews with hunters, foragers, and foresters, oaks—the anchors of this habitat—were referenced over 150 times and held distinct value for each group’s activities and uses. “Oak trees are always nice—they produce food,” is the way one hunter summed up a forest full of oaks. Hunters take note of



This “botanical portrait” of a Dry Oak Forest was created by artist Jill Jakimetz using material collected by participants in the habitat outing to a Dry Oak Forest. The assignment was to collect items that best captured each person’s experience of the habitat. The material for this portrait was gathered from the same Dry Oak Forest depicted in the photo. How does the portrait reflect the photo, or your own experience of a Dry Oak Forest?

how abundant the acorns are in a given year, as this influences where the Deer might be. One hunter we talked to explained that, in a recent year of acorn abundance, the Deer “didn’t leave the woods ... it was a very easy life for them.” By contrast, when acorn production was low the year before, “They had to go to the fields ... so that totally changes the type of hunt you do.”

There seems to be agreement that White Oak acorns are preferred to Red Oak by many creatures, including people. “It [White Oak] produces and drops its acorn before the Red Oak, and it’s a sweet acorn and the Deer like that more than they like the Red Oak,” explained a long-time hunter. A forager who makes hummus and baked goods out of acorn flour agrees: “If we can ever find the spots with White Oaks, then we get as much as we can of those and save them for a



This photograph of a Dry Oak Forest was taken by one of the habitat outing participants to convey a place she found to be “particularly rich in native plants and animals.”



Interact with a Dry Oak Forest

Gather Shagbark Hickory nuts for a toasted treat

There is perhaps no better habitat for foraging wild nuts. A good crop of acorns or hickory nuts can provide a rare source of wild starch—the stuff of breads, puddings, and other filling foods. White Oak acorns and Shagbark Hickory nuts are particularly prized for their sweet flavor. Shagbark Hickory nuts have the added advantage of being suitable to eat raw, without added processing. Want to try? Learn to recognize the distinctive shaggy bark of this tree, and you can spend the winter, spring, and summer scouting for good nutting areas. Check back in the early fall to see what the harvest yields. Our oaks and hickories don't produce crops of nuts each year, but when they do there is a feast to be had. Shagbark Hickory nuts are enveloped in a thick husk whose color ranges with age from green to brown to black. The husk splits open when ripe to reveal the nut. The biggest challenge is cracking the shell—some recommend using a hammer. Once extracted, the meat can be eaten directly, ground for flour, or otherwise processed; many think the flavor is enhanced by toasting or roasting. Use this simple recipe to enjoy hickory nuts as a unique topping for salads, soups, cakes, and more. As always when foraging, be sure to correctly identify the plants you are using.

Recipe: Toasted Shagbark Hickory Nuts

Once you have extracted the nutmeat from the shells, spread it in an even layer across a dry pan on the stove top and toast over medium heat, stirring occasionally, until lightly brown on all sides.

White Oak vs. Red Oak

As foragers can attest, White Oak acorns (and those of the similar Chestnut Oak) and Red Oak acorns (and those of the similar Black and Scarlet Oaks) are not the same in their life cycle or flavor. White Oak acorns only take a year to mature, whereas it usually takes two years to produce a Red Oak acorn. Furthermore, White Oak acorns usually germinate shortly after falling to the ground, while Red Oak acorns don't do so until the following spring. Red Oak acorns also have substantially more tannins. Tannins cause a bitter taste and can reduce digestibility. They also help preserve stored food and, as Native Americans apparently knew, the tannins can be removed by leaching in the ground. Squirrels tend to eat White Oak acorns fresh, but bury Red Oak acorns. Can you think why?



Above right: A basket of foraged Shagbark Hickory nuts. Photo courtesy of Russ Cohen. At right: A Red Oak acorn (left) and White Oak acorn (right) rest on their respective leaves. Note the differences in acorn and leaf shape.