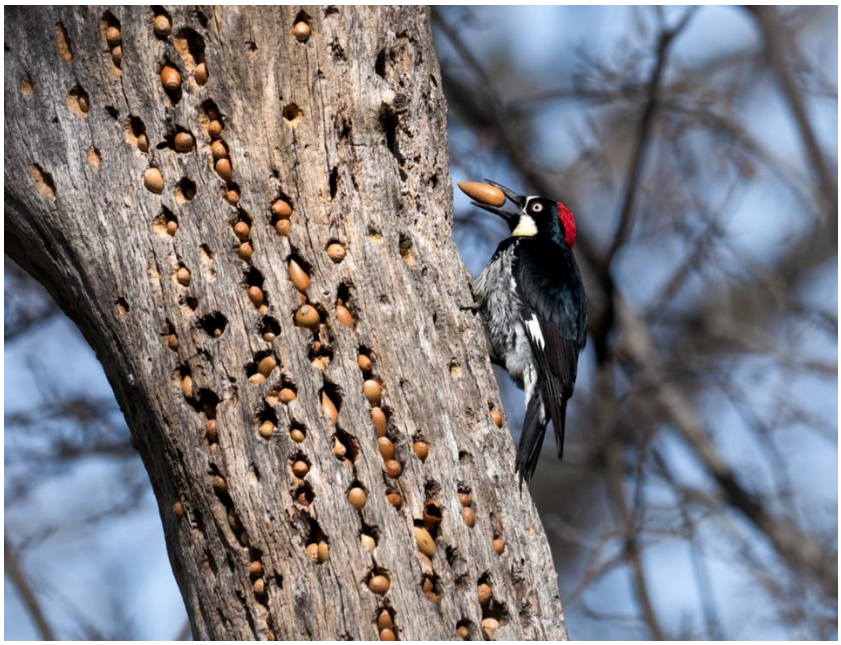
The Oak Tree



“A giant of the plant kingdom sustaining a crucial and complex web of wildlife above ground as well as underground producing enormous root systems that make them champions of carbon sequestration, soil stabilization, and watershed management.”

Douglas J. Talamy
Professor of Entomology and Wildlife Ecology
University of Delaware

Oak trees are vital for biodiversity and support ecosystems by providing food, shelter and habitat for over 2300 species of wildlife including birds, insects and mammals such as:

- 38 bird species
- 229 bryophytes (mosses and liverworts, or non-vascular rootless plants)
- 108 fungi (mushrooms, yeast and molds that lack chlorophyll)
- 1,178 invertebrates (animals without backbones like insects, spiders and worms)
- 716 lichens (type of organism that is between fungi and bacteria)
- 31 mammals (warm blooded vertebrates)

Oaks are essential for ecological balance and support more life forms than any other North American tree, with some species relying exclusively on them for survival.

Benefits of oak trees

Climate Resilience

- Their extensive root systems stabilize soil and prevent erosion. They improve soil quality by contributing organic matter through leaf litter which adds nutrients to the soil thereby enhancing its structure
- They remove pollutants from the environment. One tree can sequester more than one ton of carbon dioxide in its lifetime
- They reduce the “heat island effect” in urban areas, the solar energy absorbed by dark roofs and pavement. Their shade can reduce energy demands and the need for air conditioning

Habitat and Food Source

- They provide nesting sites for a variety of animal populations
- Their acorns serve as a significant food source for many animals, including birds and mammals

One blue jay can carry an acorn over a mile from the parent oak and not all to the same place. A single jay can gather and bury up to 4,500 acorns each fall but typically remembers where only about one quarter, or 1,125 acorns are buried, which means each jay plants approximately 3,360 oaks every year of its 7-to-17-year life span. Blue jays have enabled oaks to move about the earth faster than any other tree species.

Cultural Significance

- They hold cultural importance, symbolizing strength and endurance in many societies
- They have been integral to human history and culture, often associated with traditions and folklore
- Trees bring communities together. Being around trees can have a relaxing effect on humans, reducing stress and creating a sense of well-being

The Four Seasons of the Oak Tree

Oaks in Winter

(December, January, February)

- Acorn's rich in protein, carbohydrate, fat as well as essential minerals provide food for mammals like grey squirrels, red and flying squirrels, chipmunks, rabbits, black bears, white-tailed deer (acorns make up 75% of their diet in late fall), opossums, racoons, white footed mice and voles, weevils, ants and moths
- Oak tree branches hold onto dead leaves long after other trees are completely bare and well into winter to protect buds from browsing mammals and to trap more snow which increases the soil moisture beneath the tree in the spring when tree growth is the fastest. By holding onto their leaves all winter, they are slower to decompose so when they fall in the spring, they provide nutrient rich mulch under the tree when it is most needed
- Many species of moths spend the winter in the caterpillar stage hiding in the nooks and crannies of the oaks bark and provide a food source for over a dozen species of birds during winter when food is scarce

Oaks in Spring

(March, April, May)

- Oaks host more life under it than on it including worms, beetles, dozens of moth caterpillars, mites, snails, slugs, centipedes, millipedes, and spiders to name a few of the millions of species and their predators who all have their part to play in the decomposition under the oak leaf litter
- Oak buds swell and open releasing new leaves on which close to 800 species of gall wasps that have specialized relationships ONLY with oaks, lay their eggs inducing the oak tissue to change their normal growth patterns to provide housing, protection and food for wasps to be. Who Knew!
- Oaks do not begin to flower until they are at least 17 years old. They are pollinated by wind and need pollen from a different tree to fertilize a female flower and initiate acorn development
- Birds forage for food to feed their young in oak trees three times longer than in any other tree. Oaks produce the greatest number of caterpillars of any other species of tree
- Migrating birds stop to refuel on nutrient rich caterpillars and resident birds having started to breed feed hundreds of caterpillars a day to growing chicks

Oaks in Summer

(June, July, August)

- Oaks continue to host the life cycles of countless species of wildlife particularly cicadas and cicada killers, tree hoppers, spiders, acorn weevils, ants, butterflies, moths, katydids, leaf eating wasps, caterpillars
- They break the force of heavy rain from intense downpours during summer storms and absorb some of the water providing valuable service to the ecosystem

Oaks in Fall

(September, October, November)

- Though nutrients are depleted, they continue to provide the last of the food from their thick, tough green leaves
- Several species of birds hide seeds within the shallow crevices and deep cavities of the oak trees shaggy bark (as shown below!)