

The Value of Live Oaks

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Abstract: Live oaks are an ecologically important component of the diverse landscape in South Texas. Live oaks are beneficial to wildlife, including many species that are either of economic value or are threatened or endangered. Live oaks provide valuable mast, browse, and cover for white-tailed deer and are an essential component of wild turkey habitat. More than 80% of the 332 species of long-distance North American migrants travel through the Texas Coastal Bend. A reduction in live oak forests potentially could decrease populations of these birds because they are valuable stopover habitats for migrating birds. Live oaks provide nesting habitat for many bird species, some of which have a very limited range in the U.S. Live oak forests should be a high priority for conservation because of their significant role in the ecology of South Texas and their importance for a broad variety of wildlife.

INTRODUCTION

Live oak forests and mottes are a unique, ecologically important, and ancient component of the diverse landscape of South Texas. Live oak forests occur primarily in the Coastal Sand Plain, a region covering 2 million acres in South Texas and stretching from the Laguna Madre west to Jim Hogg and Starr counties, and along the Texas Coast from the mouth of Nueces Bay to Aransas County. Individual trees in the Coastal Sand Plain may exceed three centuries old. Goose Island State Park in Aransas County is the site of “big tree,” a live oak reputed to be more than 1,000 years old and the largest live oak tree in Texas. Live oaks also occur as co-dominants with other woody plant species in various locations across



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Live oaks occur as co-dominants with other woody plant species in various locations throughout South Texas.

South Texas. For example, live oak occurs as part of a diverse woody plant complex with mesquite and blue-wood in parts of Bee, San Patricio, Goliad, and Refugio counties. South Texas’ live oak forests are critical wildlife habitat because of their high value for game species and migratory birds, and because of the many rare wildlife species that inhabit them.

ECOLOGICAL IMPORTANCE

Live oaks commonly occur in sandy soils. In the Coastal Sand Plain, mottes of live oak stabilize active sand dunes and prevent formation of new dunes. Live oaks aid in increasing plant species diversity by serving as ‘nurse plants’ for other plant species. Live oaks facilitate establishment of other plant species by modifying the microclimate and creating an environment conducive to their establishment. Plant species such as Texas mallow, ground cherry, and Texasgrass commonly occur beneath the canopy of live oaks.

Live oaks are aesthetically valuable. Presence of live oaks is commonly used as a selling point by farm and ranch realtors. Live oaks are widely planted in yards in suburban areas of South Texas, and they provide ‘back-yard’ habitat for urban wildlife.

White-tailed deer, northern bobwhites, Rio Grande wild turkeys, and javelina are the primary game species associated with live oak forests of the Coastal Sand Plain. Live oaks are a component of the habitat needed for these economically important species.

The South Texas Brushland ecoregion has some of the most unique and diverse bird life of any area in the state. Over 525 bird species have been recorded in the region, representing the largest list of birds anywhere in the U.S. except for the overall Texas and California bird lists, respectively. South Texas particularly benefits from its geographic location in that a number of tropical bird species are found at the northern extent of their distribution. South Texas is a major stopover area for a variety of migratory bird species, particularly songbirds that regularly pass through South Texas in spring and fall. The mild temperatures during the winter are also favorable for a wide range of wintering bird species. Many hawk and sparrow species are found throughout the winter season in live oak habitats. Additionally, live oaks provide essential nesting habitat for various avian species such as the ferruginous pygmy-owl and tropical parula, which nest almost exclusively in live oaks.

IMPORTANCE TO SELECTED WILDLIFE SPECIES

Wildlife are of immense economic importance to Texas. In 2001, nearly \$5.4 billion was spent on wildlife-related recreation in Texas. Of this total, hunters spent \$1.5 billion and bird watchers spent \$1.3 billion. In Brooks County in 1997, 58% of the market value of land was attributable to its value for hunting. Thus, land in Brooks County is more valuable for the wildlife it produces than it is for ranching, mineral production, or other land uses. It follows that when an activity degrades the land as wildlife habitat, such impacts directly reduce the real estate value of the land. Many landowners in Texas earn more from hunting leases than from livestock or other ranch enterprises. Hunters commonly pay \$10–20 per acre for hunting rights on South Texas ranches. Many land purchases in South Texas are for wildlife and outdoor recreation, rather than income. Preserving or enhancing wildlife values requires maintaining the habitat needed by wildlife. Live oaks are a necessary component of habitat for many wildlife species landowners enjoy.

White-tailed Deer

Economic importance: Trespass fees paid by hunters to harvest individual trophy white-tailed deer may exceed \$10,000. Smaller, non-trophy bucks may command fees ranging from \$2,000–5,000 per deer.



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White-tailed deer are economically important to South Texas landowners.

Importance of live oak habitats: Live oaks provide food, cover, and shade for white-tailed deer. Acorns are a valuable food resource for white-tailed deer. When acorns are available, they may compose almost half of white-tailed deer diets in the live oak forests of the Coastal Sand Plain. Acorns are particularly important because they are produced during autumn when deer are accumulating body fat in preparation for breeding. Deer in poor body condition could lead to lower fawn production and lower survival of bucks after the breeding season. Live oak leaves and twigs provide food for deer throughout the year. The dense shade produced by large live oak trees helps in thermal regulation. During hot summers in South Texas, deer may spend much of the day bedded under these trees to reduce potentially lethal heat loads. During winter, live oak trees provide protection during cold, windy weather, thus helping deer to conserve energy during this time of the year.

Recommendations for minimizing habitat loss: Live oak forests are damaged by numerous activities including construction of ranch roads and fences, oil and gas

Caution: Herbicides like Velpar® and Spike® (tebuthiuron) are deadly to live oaks. If you plan to use these chemicals to control running live oak, while avoiding larger trees, use a helicopter rather than fixed-wing aircraft. Harm to large live oak trees can also be avoided by ground application using the wettable powder formulation of Spike® or individual plant treatment with Velpar®. Velpar® may also seep into the ground water, so do not use Velpar® within 5 miles of large live oaks.



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In addition to providing acorns, live oaks are a valued browse resource for white-tailed deer.

exploration and drilling activity, brush management, and other ranch activities and improvements. Recent research indicates that white-tailed deer may avoid roads. In one study, deer avoided areas out to about 33 yards on either side of the road. In that case, constructing a road removes about 24 acres of habitat per mile of road. Damage to white-tailed deer populations from road construction and oil field activity can be minimized by (1) avoiding destruction of large trees, (2) keeping caliche pads and other disturbances such as pits for drilling mud no larger than needed, and (3) minimizing the number of roads and traffic on the roads. Damage from brush management can be minimized by clearing only areas dominated by the running form of live oaks and avoiding mottes of larger trees.

Treating areas of dense running live oak with herbicides may improve the overall habitat for white-tailed deer. Tebuthiuron is a soil applied herbicide that can effectively kill oaks. When treating areas to kill running live oak, applicators should be aware that the area of kill may exceed the area of application because roots of adjacent oaks may extend into the treated area and take up the herbicide.

Wild Turkeys

Economic importance: Wild turkeys are a popular gamebird pursued by thousands of sportsmen each year in South Texas. Consequently, wild turkeys are a valuable source of income to landowners. They can lease their property to hunters interested in wild turkeys, and interest peaks during the spring hunting season when luring

gobblers into shotgun range via effective calling is an extremely popular past-time. A typical South Texas ranch with good wild turkey habitat that supports a healthy wild turkey population can yield landowners close to \$1,000 per gobbler harvested. Therefore, property that consists of more than 20,000 acres and represents very good wild turkey habitat could easily provide owners with \$10,000 to \$20,000 annually because 10–20 mature gobblers could be harvested each spring season without impacting the turkey population.

Importance of live oak habitats: Wild turkeys will not roost on the ground. If large trees or similar tall, stable structures with adequate roosting platforms are limited or absent from an area, wild turkeys limit use of the area or even vacate the area. Therefore, large trees such as live oaks are an essential part of wild turkey habitat on South Texas rangelands.

Research conducted in Brooks County during the late 1960s and early 1970s clearly demonstrated that live oak woodlands were used by roosting turkeys. Moreover, more recent research in Brooks County supports these earlier observations because the majority of the locations obtained from wild turkeys fitted with radio transmitters indicate that birds are roosting in live oak woodlands. Furthermore, ongoing research in Kleberg County indicates that large oak mottes provide roosting habitat during fall and winter, especially where oak woodlands and other large trees are limited.

The importance of adequate roosting habitat can be illustrated in the western Rio Grande Plains of South Texas where wild turkey density is much lower than the eastern Rio Grande Plains. The difference in density



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Live oaks are a component of Rio Grande wild turkey habitat in South Texas.

occurs, in part, because live oak woodlands are absent and other large trees are limited in the western Rio Grande Plains of South Texas. Many well-managed ranches in the western Rio Grande Plains that otherwise provide very good nesting and brooding habitat, adequate escape cover, and abundant food and water do not support wild turkeys because these ranches lack adequate roosting habitat. In these situations, roosting habitat is clearly a limiting factor.

Besides providing excellent turkey roosting habitat, live oaks also provide thermal cover. Most of the radioed wild turkeys that have been monitored during an ongoing Caesar Kleberg Wildlife Research Institute wild turkey research project in South Texas use the shade provided by live oaks during hot periods of the year and in winter during cold, windy, or wet days. Additionally, live oak acorns provide food for wild turkeys during winter when other food items are less abundant.

Recommendations for minimizing habitat loss: Roosting wild turkeys are sensitive to disturbance. A disturbance event that results in the loss of a single turkey at a roost is often sufficient cause for a flock of turkeys to abandon a favored roost site. In addition, there are numerous examples of wild turkey roost sites being abandoned because of human disturbances. In one instance, a large traditional roost site in the Texas Hill Country that accommodated more than 100 wild turkeys for decades was abandoned because of construction activities associated with building a major road close to the roost and the resulting traffic activity it caused. Therefore, it is very likely that all turkeys currently using a roosting site could abandon it because of road construction, oil and gas drilling activity, or other human disturbances. Turkeys that abandon the roost would have to locate alternative roost sites, placing pressure on birds already using these alternative sites.

Northern Bobwhites

Economic importance: Leasing property to quail hunters is a lucrative and stable source of income for landowners in the area that includes oak forests. It is not uncommon for ranchers to receive \$10–12 per acre from sportsmen interested in leasing quail hunting rights on

Live oak woodlands are not critical to northern bobwhites; however, bobwhites use live oaks for thermal and escape cover and they eat acorns produced by live oaks.



© Larry Ditto

The bobwhite is a highly prized gamebird that uses live oaks and other vegetation types found in South Texas.

ranches, and some hunters will pay an additional \$5–10 per acre for grazing rights to ensure that cattle are more effectively managed because they know that overgrazing is detrimental to quail populations.

Importance of live oak habitats: Live oak woodlands are used by northern bobwhites for cover and food, particularly at the periphery of a motte. The shade provided by the live oak canopy is used by bobwhites during hot days to maintain their body temperature. The canopy also provides overhead cover that allows bobwhites to reduce predation risks from hawks. Acorns produced by live oaks also are eaten by bobwhites. Several forbs that produce seeds eaten by bobwhites such as ground cherry grow beneath live oaks.

Recommendations for minimizing habitat loss: Live oak woodlands are not as critical to bobwhites as they are to turkeys. Acorns represent seasonal foods and live oaks provide good thermal and escape cover, but an overabundance of trees is not an essential habitat component for bobwhites as it is for wild turkeys. Bobwhites can fulfill their food and cover requirements from other sources.

Nongame Birds

Economic importance: Nongame birds provide significant opportunities for landowners to allow nature tours or bird photography activities on their properties. While not as lucrative as hunting, it does provide the landowners additional sources of income outside the hunting season.

Given its unique bird life, South Texas is considered a premier destination for many bird watchers. Wildlife

Table 1. Common and scientific names of bird, mammal, and plant species mentioned in this bulletin.

Common name	Scientific name
Birds	
Audubon's oriole	<i>Icterus graduacauda</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Common nighthawk	<i>Nyctidromus albicollis</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Couch's kingbird	<i>Tyrannus couchii</i>
Ferruginous pygmy-owl	<i>Glaucidium brasilianum</i>
Great kiskadee	<i>Pitangus sulphuratus</i>
Green jay	<i>Cyanocorax yncas</i>
Long-billed thrasher	<i>Toxostoma longirostre</i>
Northern beardless-tyrannulet	<i>Camptostoma imberbe</i>
Northern bobwhite	<i>Colinus virginianus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Rio Grande wild turkey	<i>Meleagris gallopavo</i>
Summer tanager	<i>Piranga rubra</i>
Tropical parula	<i>Parula pitaiayumi</i>
White-tipped dove	<i>Leptotila verreauxi</i>
Whooping crane	<i>Grus americana</i>
Mammals	
Javelina	<i>Tayassu tajacu</i>
White-tailed deer	<i>Odocoileus virginianus</i>
Plants	
Bailey ball-moss	<i>Tillandsia baileyi</i>
Bluewood	<i>Condalia obovata</i>
Ground cherry	<i>Physalis cinerascens</i>
Live oak	<i>Quercus virginiana</i>
Mesquite	<i>Prosopis glandulosa</i>
Small ball-moss	<i>Tillandsia recurvata</i>
Spanish moss	<i>Tillandsia usneoides</i>
Texasgrass	<i>Vaseyochloa multinervisosa</i>
Texas mallow	<i>Malvaviscus arboreus</i>

watchers, particularly birders, generate substantial income for rural communities and landowners. South Texas has a well documented history of visitation by those interested in observing the bird life of the region. The Santa Ana Wildlife Refuge near McAllen attracted some 100,000 birders from November 1993 to October 1994. These visitors spent \$14 million in the area. About \$5.6 million was spent by the 48,000 people who visited Laguna Atascosa National Wildlife Refuge in Cameron County from November 1993 to October 1994.

Several ranches in South Texas have year-round nature tour programs, and the majority of the tours are for bird-watching. These tours can range in price from \$25 per person for a half day outing to well over \$100 per person for an entire day. Driving this interest is the many tropical bird species that reach their northern range in South Texas. Some of these species occur nowhere else in the U.S. Tropical species that use oak habitats and are sought by bird watchers include ferruginous pygmy-owl, common nighthawk, white-tipped dove, green jay, great kiskadee, Couch's kingbird, long-billed thrasher, tropical parula, northern beardless-tyrannulet, and Audubon's oriole. Other South Texas landowners have established bird photography blinds on their property and typically charge \$100–150 per day for use of the blind.

Importance of live oak habitats: The abundance and diversity of migratory bird species seen at popular birding areas such as Padre Island and wildlife refuges along the Texas Coast and in the lower Rio Grande Valley depend directly on the live oak forests of South Texas. In spring, these migratory birds travel hundreds of miles to their breeding grounds further north, or in the fall as they travel south to their wintering grounds, often well south of the U.S. Spring migration routes can take them over large expanses of the Gulf of Mexico in their rush to reach their breeding grounds. Consequently, oak mottes and woodlands close to the coast provide needed stopover habitat for a variety of migratory songbirds, including numerous warbler species as evidenced by a Caesar Kleberg Wildlife Research Institute study in the early 1990s. These birds upon landing in the oaks find good cover for resting and an abundance of insects for food.



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Green jays are tropical birds that use live oak habitats in South Texas.



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Kiskadees use live oak habitats in South Texas and are sought by bird watchers.

Therefore, live oak mottes and forests are resting and gathering places where migratory songbirds can rebuild fat reserves before continuing their migration. Without stopover habitats near the coast, given the rigors of migration, these migrant songbirds would be at a greater risk of starvation or being preyed upon. More than 80% of the 332 species of long-distance North American migrants travel through the Texas Coastal Bend. Reduction of live oak forests potentially could reduce populations of these birds. Live oak woodlands in South Texas, while limited in overall occurrence, also provide nesting habitat for many bird species, some of which have a very limited range in the U.S.

Large contiguous blocks of oak forest are necessary for certain nesting species including tropical parula, summer tanager, and Audubon's oriole. Forest fragmentation into smaller blocks through road construction, brush management, and other activities can facilitate avian brood parasites, particularly the brown-headed cowbird, by providing better access routes deeper into large woodland areas to locate host species' nests. This results in reduced nest success for the parasitized species.

Live oak woodlands provide nesting habitat for raptors that inhabit the oak forests of South Texas. Research on raptors conducted in the Coastal Sand Plain clearly

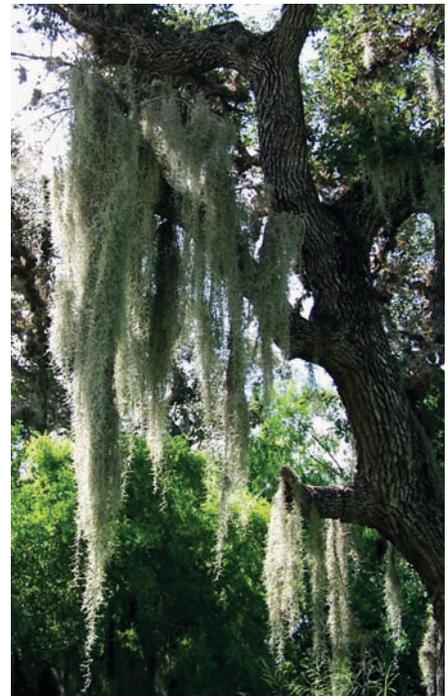
More than 80% of the 332 species of long-distance North American migrants travel through the Texas Coastal Bend. A reduction of live oak forests in this region could reduce populations of these bird species.

demonstrates that live oak trees on the edge of live oak mottes or woodlands serve as nesting structures for red-tailed hawks. More than 80% of the red-tailed hawk nests were in the tops of mature live oak trees. Cooper's hawk nests have also been located in live oak woodlands. Therefore, removing mature live oaks from an area will reduce red-tailed hawk and Cooper's hawk nesting habitat. In addition, the disturbance associated with constructing roads and oil and gas drilling platforms can result in nest abandonment.

Live oaks are also important to the endangered whooping crane. Acorns produced by these trees are part of the diet of whooping cranes that winter at the Aransas National Wildlife Refuge.

Bromeliads represent a vital component of oak woodlands because they are used by many nesting birds. Bromeliads or epiphytes, as they are sometimes known, are plants that attach to a tree branch or trunk and get most of their nutrients from the atmosphere. They typically do well in the upper and middle canopy of the forest, which protects them from direct sunlight and provides them with good air circulation. Thus, live oaks provide habitat that facilitates the establishment of bromeliads. The three primary species of bromeliad that utilize oaks in South Texas are Spanish moss, small ball-moss, and Bailey ball-moss. While

fairly common in many oak areas in eastern portions of the Coastal Plain, Bailey ball-moss has a very limited distribution in the U.S., occurring only in South Texas. These bromeliads provide a valuable nesting substrate for birds. They also provide a foraging area for a variety of insectivorous birds and hummingbirds.



© Thomas Langschied

Bromeliads or epiphytes, as they are sometimes known, attach to a tree branch or trunk and get most of their nutrients from the atmosphere.

Recommendations for minimizing habitat loss: A regional bird conservation plan developed by Partners in Flight, a cooperative effort between government agencies, professional organizations, and private individuals, has identified the major negative factors affecting bird conservation in South Texas. Two of these are loss of habitat from land clearing activities and degradation of existing habitats. Alterations such as road construction, oil and gas activities, and brush management result in fragmentation of nesting habitat of various bird species. Every effort should be made to minimize the number of roads or right-of-ways and overall clearing of areas of live oaks for drilling pads and ranch improvements.



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Live oaks provide shade from the sun during the hot South Texas summers.

MANAGEMENT RECOMMENDATIONS

Below are some specific suggestions that can be employed to maintain or improve live oak management in South Texas. These include the following:

- Avoid destruction of large live oak trees
- Avoid fragmenting live oak forests; only clear areas with running live oaks rather than areas supporting large oak trees
- Place roads around live oak mottes and oak forests when possible, instead of through them
- Avoid constructing unnecessary roads in areas with live oaks
- Keep caliche pads and other disturbances such as drilling mud pits no larger than needed; place them away from live oaks if possible
- Be careful when applying herbicides to running live oaks because soil active herbicides may kill large oak trees adjacent to the treated area; ground application of herbicide is preferable to aerial application
- Avoid disturbances such as roads and oil and gas drilling near turkey roosts in live oaks
- Live oak forests near the coast are particularly vital for migrating birds; avoiding damage to these forests is essential



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