

White-Tailed Deer of Florida¹

Joe Schaefer and Martin B. Main²

This document contains an overview of the deer populations of Florida, their history and contemporary management issues.

Background

The white-tailed deer (*Odocoileus virginianus*) is the most economically important big game mammal in North America and Florida. In 2011, over \$50 billion was spent on deer hunting in the United States. Florida deer are also a major prey species for the endangered Florida panther (*Felis concolor*). As a consequence, deer have been the object of much management, research, and controversy.

Within the past century, Florida's deer herd has gone through many changes. In the late 1930s, there were only about 20,000 deer in the state and they were nearly extirpated in south Florida during an effort to eradicate tick-borne diseases. The Florida Game and Fresh Water Fish Commission (GFC) responded to this by purchasing deer from various sources-- including a game farm in Wisconsin--and transplanting them to unoccupied areas in Florida. Also, killing adult females (does) was prohibited during the early restocking period, to further ensure success.

These efforts were successful and now population estimates exceed 700,000 deer statewide. This number, in combination with a growing human population, presents new challenges. In several areas, deer have become so numerous, landowners complain of damage to agricultural crops and ornamental plantings. A similar repopulation has taken place with Key deer (see text box).

Key Deer in Florida.

The endangered deer subspecies population, (*O. v. clavium*) or Key deer, also has gone through some changes over the decades. By the 1930s, poaching had reduced the Key deer herd to about 50 animals. Because of stricter law enforcement and certain conservation practices--land acquisition and prescribed burning of certain habitats--the Key deer population stabilized at about 350 during the 1970s; and now approximately 300 deer are found on the lower Florida Keys.

Taxonomy and Distribution

The white-tailed deer is one of 171 species in the taxonomic order Artiodactyla, which means "even-toed." The hooves--actually toenails of the third and fourth toes of each foot--support the animal's entire weight. Other species in Artiodactyla include various other deer, camels, oxen, hippopotami, and pigs.

Within Artiodactyla, 37 species belong to the family Cervidae--the true deer who share such characteristics as deciduous antlers (except two species); only males having antlers (except one species); the same dental arrangement; reduced second and fifth toes; and a four-chambered ruminating stomach.

Species within the family Cervidae include elk (*Cervus elaphus*), moose (*Alces alces*), and caribou (*Rangifer tarandus*). The two most closely related deer species are white-tailed and mule deer (*O. hemionus*), both of which belong to the genus *Odocoileus*. White-tailed deer are widely distributed in North, Central, and South America (see Figure 1) ranging from 60 degrees north latitude near the Arctic Circle in Canada, to 18 degrees south latitude in Peru. There are 30 subspecies of white-tailed deer, of which three are found in Florida: the Florida coastal white-tailed deer (*O. v. osceola*), which occurs primarily in the Florida panhandle; the Florida white-tailed deer (*O. v. seminolus*) which occurs in peninsular Florida; and the Florida Key

1. This document is WEC133, one of a series of the Wildlife Ecology and Conservation Department, UF/IFAS Extension. Original publication date June 1997. Revised August 2001. Revised December 2014. Visit the EDIS website at <http://edis.ifas.ufl.edu>.

deer, with a distribution limited to Big Pine Key in the southern Florida keys (see text box).



Figure 1. Range of white-tailed deer.

Credits: By Cephias [GFDL or CC-BY-SA-3.0], via Wikimedia Commons

Description

AGE

Life expectancy of deer is influenced by hunting pressure and other mortality factors. Although 20-year-old whitetails have been documented, deer surviving beyond six years typically represent a small proportion of the herd and may be very rare in heavily hunted populations.

COLORATION

The coloration of white-tailed deer aids in their camouflage, thermoregulation, and even communication. Coloration and appearance of the pelage (coat) changes with seasonal molts, with summer coats being thinner and lighter to help deer stay cool. Although a great deal of individual and subspecific variation exists in the coloration of white-tailed deer throughout its range, all tend to be cryptically colored in various shades of brown ranging from tawny to cinnamon to almost-black.

The inside of the ears, throat, belly, rump, and underside of tail are white. When white-tailed deer sense danger, the tail is held upright exposing the white underside and rump. This conspicuous reaction known as “flagging” quietly alerts other deer nearby. The white flag of the does’ tail also serves as a beacon that guides her fawns as they try to

follow in dimly lit forests. During their first 3-4 months, fawns sport spotted coats that provide excellent camouflage. This spotted pelage disappears to be replaced by the adult brown coat at about the same time the fawn is weaned.

True albino whitetails with white coats and pink eyes are exceedingly rare under natural conditions. Partially white or “piebald” deer occur more commonly than albinos, but still at a frequency of less than 1 percent.

SIZE

Whitetails tend to be larger in the northern states. An adult white-tail buck (male) from northern states may exceed 136kg (300lbs) and stand 100cm (40in) at the shoulder; a typical adult buck from Florida weighs about 56kg (125lbs) and the average adult female (doe) weighs about 43kg (95 lbs). Adult Florida deer are about 90cm (36in) tall. Deer raised in the south tend to be smallest of all: the Florida Key deer is one of the smallest of all 30 subspecies of white-tailed deer. They typically weigh less than 39kg (80lbs) with a shoulder height of about 70cm (27in). Only the Coiba Island white-tail (*O. v. rothschildi*), which occurs off the Pacific Coast of Panama, is smaller.

ANTLERS

Antlers are a fascinating component of deer anatomy (see Figure 2). Typically, only bucks grow antlers. This is because the male hormone, testosterone, is the primary hormone that controls antler growth. However, there also are documented cases of does with antlers, although these are rare. The most important function of antlers is believed to be in determining which males will breed successfully (See Courtship and Reproduction).



Figure 2. Whitetail deer bucks locking antlers during late rut in Cades Cove, in the Great Smoky Mountains of Blount County, Tennessee, United States.

Credits: By Brian Stansberry (Own work) [CC-BY-3.0], via Wikimedia Commons

Antlers are not true horns, but are outgrowths that originate from bony plates on the skull known as pedicels. Unlike true horns (which are permanent structures) antlers are shed every year and must be regrown at considerable expenditures of energy.

Antlers begin growing in the spring, shortly after the previous set is cast. New antlers possess a velvet-like covering that provides a blood supply carrying essential minerals. During this growing, or velvet stage, antlers are very sensitive and if injured will bleed profusely.

After about 5 months--and just prior to the mating season, the blood supply terminates and the velvet dries and is shed as the deer rubs the antlers against trees and shrubs. This is when the antlers become hard, sharp weapons.

Antlers are shed during the winter and the formation of new ones seems to be linked to day-length, with new growth forming as days start becoming longer (which is usually a couple of weeks after the old ones are dropped). Cast antlers are seldom found in the woods because rodents gnaw them and Florida's humid, warm climate enhances their deterioration.

The size of antlers is influenced by genetic factors, nutrition, and the age of the animal. Antlers generally increase in size (up to a point) as the deer gets older. A young "button buck" born during the spring or summer will have antlers only about 2.5cm (1in) long during its first rut. In yearling bucks (16 to 18 months old), antlers tend to occur as spikes, although animals on nutritious forage may have forked antlers as yearlings.

Mature bucks typically have branched antlers and an average buck about four years of age often will have eight points. Antlers of old bucks that are past their prime may become smaller and may form abnormally. Due to the variability in antler formation among deer of the same age and due to nutritional effects on antler growth, the size of a deer's antlers is not an accurate indication of age. Measurements of tooth eruption and tooth wear are much more reliable aging indicators.

SOUNDS

Although deer have several different calls, compared to smell and visual cues, vocalizations play a relatively minor role in deer communication. Sounds that are important include bleating or "mewing" by fawns which are used to summon their does.

Fawns will bawl when in extreme danger which will often elicit an aggressive defense by the doe. Bucks will also occasionally bleat or grunt when chasing does during rut. The most familiar deer-sounds are the grunts, snorts and foot-stomping used as alarm calls by a disturbed or frightened animal.

SENSES

Deer are crepuscular in their activity patterns. This means they are most active during periods of dawn and dusk. As an adaptation to this lifestyle in wooded areas where visibility is limited, deer have excellent senses of smell and hearing. Their keen sense of smell is vital in all aspects of safety, feeding, raising young, and mating. Their sense of hearing is also extremely important for detecting danger and communicating with other deer. The eyesight of deer is also well-suited to their lifestyle, with eyes designed to detect motion and that possess rod to cone ratios that enhance their ability to see in low levels of light. Like many mammals, deer are believed to be color-blind and detect colors as shades of gray. Consequently, deer cannot detect bright orange hunting jackets.

Habitat

The availability of suitable food, cover, water, and space defines the quality of habitat, which influences the population size or carrying capacity of the herd. Soil richness, which affects food quality, also plays a role. The sandy soils found in most of Florida are nutrient-poor and do not provide high-quality forage throughout the year. Consequently, these lands support relatively low populations of deer. An exception is areas modified by agricultural practices, which tend to provide deer with a nutritious supply of forage.

The availability of fresh water is also important and appears to be a limiting factor influencing the distribution of Key deer. The majority of the 600 remaining Key deer are found in the 3,000 ha (7,500 acre) National Key Deer Refuge on Big Pine Key where permanent sources of water are available.

The lack of permanent sources of fresh water may restrict carrying capacity to low numbers in other areas. Similarly, rapid changes in the availability of suitable habitat can quickly reduce deer populations. For example, the hundreds of thousands of acres of deer habitat in the Everglades can shrink to almost nothing during flood events. This reduces the carrying capacity and concentrates deer on high ground where many animals eventually die of starvation.

Deer usually reach highest densities where the woody cover is at least as much as the open grassland. They thrive in agricultural areas interspersed with woodlots and riparian habitats. They favor early successional stages that keep brush and sapling foods within reach.

Several studies have helped us to better understand deer-habitat relationships throughout Florida's diverse landscape. Both females and males in north Florida's Osceola National Forest prefer swamp and immature timber (pine, 11-30 years) habitats, and avoid clear-cut (pine, 0-3 years) and mature timber (pine, >30 years) habitats.

The average annual home range size for adult females is about 250 ha (1.0 mi²), and 650ha (2.5 mi²) for yearling and adult males. Does' largest monthly home range size in north Florida occurs in October during the peak of the rut. Bucks in the same area begin to move over larger areas in July and maintain their expanded home ranges through October. In the open habitats of the south Florida Everglades where the carrying capacity is relatively high, deer do not have to travel over as large an area to satisfy their life-sustaining requirements. The mean annual home range size for bucks in the Everglades National Park is about 300 ha (1.2 mi²), which is half that found in the northern Osceola National Forest. Deer with relatively large home range sizes commonly occur in habitats of poorer quality. They simply have to travel farther to obtain sufficient food resources.

Yearling males may travel up to 10 km (6 mi) from their natal areas to establish new ranges. After this dispersal period, most deer show a strong lifetime fidelity to their home ranges.

Food

Florida deer eat about 1.8 kg (4 lbs) of food (3% of their body weight) each day. Like cattle, deer process their food through four connected stomachs and 65 feet of intestines. It takes from 24 to 36 hours for food to pass completely through them.

The first and largest of these stomachs is the rumen. It does not produce acid like a true stomach. Instead, the rumen acts as a holding tank full of microbes that digest most of the plant material and make the nutrients available to the deer. The relatively small rumen in deer requires more nutritious and easily digested forage than is required by cattle which possess a large rumen. Consequently, deer are highly selective feeders.

Their diet consists of leaves and tender tips of many woody shrubs and vines, succulent green plants, grasses, acorns,

mushrooms, aquatic plants and many other types and parts of plants within about 1.5 m (4.5 ft) above the ground. Due to their selective feeding habits, deer can change the relative abundance of plant species in an area. As their favorite foods become less available, their diets gradually shift to less nutritious and less preferred foods which can have an adverse effect on reproductive success.

The theory that supplemental feed will improve antler growth of deer in a certain area is questionable. One north Florida study showed that they visited feeders infrequently and yearling males dispersed so far that many were not on the same property during the fall hunt. However, supplemental feeding may benefit does and increase productivity of a local deer population.

Courtship and Reproduction

The breeding season (also called the "rut") consists of several phases extending over 3 or 4 months, starting with sparring activity among bucks (as soon as the antler velvet falls off) and ending after mating.

Sparring matches are mildly aggressive encounters which are actually pushing contests that seem to help establish a hierarchy or pecking order prior to the actual breeding phase. Courtship or chasing of does by bucks begins about 4 to 6 weeks after the onset of sparring. During the courtship phase, aggressive signals between bucks are common. Usually, one of the two will assume a submissive posture and turn away from the more dominant buck. However, when two males are equally matched and visual displays fail to dissuade one of the suitors, they will lower their heads and charge each other, lock antlers and push until one is driven back and forced to retreat. Occasionally, these battles result in serious injury to one or both combatants. Although most antler fights do not last more than 30 seconds, they become more fierce and aggressive as more does come into estrus and mating rights are at stake for the bucks. Only rarely do two bucks permanently lock antlers while fighting and perish from exhaustion or starvation because they cannot separate from one another.

North of Florida, rut behavior of males is highly synchronized and triggered by the shortening day-lengths in late fall. However, in Florida and other southern latitudes (such as Texas and Venezuela), breeding is not as synchronized and occurs in all months. The timing of rut differs by region within the state of Florida and may also differ from one year to the next within the same region. Rut in the Nassau, Duval counties' area usually occurs from October through January. The onset of rut in the Panhandle is commonly a

month or two later than that in the northeast. Breeding in south Florida occurs year-round with a peak of rut activity from June through November. Key deer rut occurs from September through December.

This variability indicates that the reproductive patterns of Florida's deer have evolved to unique environmental pressures. For instance, peak periods of fawning in the Everglades in south Florida have been found to occur during the January-March dry season. Fawns from northern states are typically born during June, a period of heavy rainfall and seasonal flooding in south Florida. Does that do not become pregnant during their first estrus will come into estrus again 28 days later. Because of this and due to milder climates, breeding in Florida may occur over much longer periods than seen among northern herds.

Depending on the availability of dominant bucks, young ones may not have an opportunity to breed until they are several years old.

Once impregnated, the doe's gestation lasts about 200 days (6.5 months). The peak birthing months in north Florida are April through June and in south Florida from January through May. Key deer are born in March through June. Because of the severe energetic costs of lactation, the birth of fawns is typically correlated to the availability of highly nutritious forage. Productivity rates of Florida deer are low and variable compared to herds in northern states where more nutrient-rich soils provide higher-quality foods. Pregnancy rates in different south Florida deer populations have ranged from 62-96%. Nutritional status also influences the number of offspring a doe can have and, whereas twinning is common in northern herds, it is relatively rare in Florida.

Most fawns are born on edges of open fields or in thickets. For the first few days after birth, fawns are nursed 2-3 times during daylight hours. Nursing becomes less frequent until they are weaned at about four months. (A gland between the two parts of the hoof secretes a scented substance, by which the doe can track her fawn if it wanders off).

When fawns are found lying alone they should not be assumed to be orphaned. Wildlife do not have baby-sitters so when does leave their young to feed or for other reasons the young are left home alone. This behavior may also reduce the risk that the fawn will be detected by a predator.

A doe will not abandon her fawn if it has been handled by a human. They are not panicked by human scent because they encounter human odors every day.

Fawns will stay with the doe through their first year, but are chased off by does just prior to the birth of new fawns. The yearling females are generally allowed to return shortly after birth of the new fawn, but yearling males typically disperse, sometimes great distances, and rarely rejoin these family groups. Eventually, female offspring will establish a home range near the area where they were born and occasionally associate with related individuals.

Injuries, Diseases and Predation

Many deer suffer injury and even death from collisions with automobiles, entanglements in fences, drownings, and other miscellaneous accidents. One study published in 1964 reported an estimated 800 deer killed on Florida highways during that year. The Florida Department of Transportation (DOT) places deer-crossing signs in areas where the frequency of deer collisions with vehicles is relatively high. The purpose of these signs is to warn drivers of this potential hazard so they will proceed with caution.

Nearly all deer collisions with vehicles occur during the hours of darkness. When blinded by headlights, deer can move very abruptly and unpredictably. If you see a deer on a highway right-of-way, slow down and be prepared to stop suddenly. Deer seldom travel alone, and seeing one cross the road should signal the need for extreme caution because other deer are likely present. In many cases, the risk of deer-auto collisions must be managed solely by modifying driver behavior. However, over 45 Key deer, (about 7.5% of the population) have died from vehicle collisions each year during this decade.

Key deer are adversely affected by another human-caused health problem: hand-feeding of marshmallows and other poor-quality foods. Many individuals of this subspecies are very tame and will eat out of people's hands. When they become habituated to this style of feeding, their nutrient consumption is low which causes poor health and reproductive performance.

Local flooding in the Everglades concentrates deer on high ground and forces them to consume low-quality foods. During these periodic events, many die of malnutrition and starvation.

Other potential causes of injury and poor health are poisonous plants, heavy metals, and pesticides. Approximately 100 species of poisonous plants occur in the southeastern U.S. and every deer habitat has one or more of these plants. Mercury and chromium have been found in live Florida deer but sub-lethal effects are not known. Pesticide residues

are known to increase postpartum mortality, slow down development of immature deer, and impair initial conception by young does. However, these impacts have not been documented or studied in Florida.

White-tailed deer are hosts to many parasites and infectious agents. Biologists have documented 120 different parasites, infections, and disease conditions of Florida deer. Although every deer in Florida is not plagued with all 120 disease agents and conditions at one time, the average animal will be host to a number of parasites and infectious agents at any time. Many of these, by themselves, will not cause sickness or death. However, they can cause harm if other factors such as stress and malnutrition weaken an animal's resistance to infection. Simultaneously, infections of more than one agent can have interactive effects on the host that may be considerably more serious than the effects of each of them separately. Several of the diseases and parasites of Florida deer are of public health concern and also can be transmitted to cattle.

A few mammalian predators prey on deer in Florida. Whitetails are the second most common prey next to wild hogs (*Sus scrofa*) for panthers. Bobcats (*Felis rufus*) are another important predator. Researchers concluded that 5 of 20 deer found dead in the Big Cypress National Preserve during 1993 were killed by bobcats. During high-water levels in south Florida, when deer are more concentrated, they are also more susceptible to bobcat predation.

Coyotes (*Canis latrans*) have become more plentiful in Florida during the past decade and likely prey on Florida deer but no studies have examined the impact of this mortality. Black bear (*Ursus americanus*) occasionally take newborn fawns but do not have a major effect on deer populations. Free-ranging dogs are a primary cause of mortality for Key deer.

Management and Harvest Information

The Florida Game and Fresh Water Fish Commission manages over 1.5 million hectares (4 million acres) of publicly owned land and 0.5 million hectares (1.3 million acres) of private property for deer and other wildlife species. The goal of the Commission's deer management program is to properly use the species as a natural, renewable resource in such a manner as to maintain herds in a condition of quality health and reproductive performance.

To maintain a certain population level, mortality caused by disease, predation, accidents and harvesting must not exceed the number of deer born. When densities of deer

become too high for the habitat to support, deer become very destructive to habitat. This negatively affects the health of deer as well as other species and, unless deer numbers are reduced, the herd will destroy the food base upon which it depends and may decline to very low numbers. Consequently, the management of deer through harvest of both sexes is often necessary and also provides economic return for local economies and provides funding to state programs that benefit all wildlife.

Because one buck can mate with several does during one season, harvesting bucks has a smaller impact on population growth. However, maintaining a high male density also has a positive impact on productivity because the energy exerted by females to find males is less, allowing more energy for other functions such as predator avoidance. Does are harvested to maintain a healthy herd where the population is greater than the habitat's carrying capacity.

In the early 1980s, the Commission began to allow the harvesting of does as well as bucks. The total annual deer harvest is estimated to be about 100,000. Of these, about 94% are bucks.

Annually, the Commission oversees the monitoring of deer condition and population trends. Commission biologists collect data at check stations during hunting seasons by aging and weighing harvested deer, collecting stomachs, measuring antlers, and examining reproductive tracts to estimate reproductive rates. The biologists also conduct numerous surveys throughout the year to estimate population trends, sex ratios and fawns produced per doe. These and other data are all used to evaluate the condition of a deer herd, its response to hunting, and to establish suitable harvest levels and hunting seasons. In addition to information on deer, management decisions must take into account the effects of recent environmental conditions on habitat quality and the needs of native predators that rely on deer for survival.

Because the quality of Florida's deer habitats are so diverse and the time of rut varies across the state, determining harvest regulations that will maintain healthy deer populations while providing the best recreational opportunities for hunters is extremely challenging. Hunting technique is another variable to consider. *Example, airboat hunting in the Everglades area increases hunting success and could cause extreme decreases in the population during wet years.* The following are only some of the deer harvest rules. The state is divided into three deer harvest zones: Northwest, Central, and South. Although the length of the firearm harvest season within all zones is about 70 days, the opening day varies

among the zones. Archery season opens 40 to 50 days prior to the opening day for firearms and lasts about a month. A shorter muzzle-loading season opens only a week or two before the firearm season. And the northwest zone even has a second archery season after the firearm season. The daily bag limit during the firearm and muzzle-loading seasons is two antlered deer, and one of either sex; or two antlered deer during archery seasons.

All decisions and rules for hunting of white-tailed deer in Florida are determined by the Commission and published each year in a hunting regulations handbook available free of charge in sporting goods stores and at many state and county services offices.

Legal Aspects

The white-tailed deer is defined as a game mammal in the state of Florida and as such it is protected by several statutes and rules. Some of the related illegal activities described in Florida Statute 372.99 include: 1) killing or possessing a freshly killed deer during the closed season; and 2) taking or attempting to take a deer in or out of season by use of gun and light.

Rules 39.12 and 39.13 in the Florida Administrative Code address issues such as baiting, hunting with dogs, hunting hours, bag limits, methods of taking, open season, sale of venison, tagging, and transporting.

Suggested Readings

Bellis, E. D. and H. B. Graves. 1971. Collision of vehicles with deer studied on Pennsylvania interstate road section. *Highway Res. News* 42:13-17.

Brown, R. D. (ed.). 1983. *Antler development in the Cervidae*. Caesar Kleberg Wildlife Institute, Kingsville, TX.

Curtis, P. S. and M. E. Richmond. 1992. Future challenges of suburban white-tailed deer management. *Trans. N. Amer. Wildl. & Nat. Res. Conf.* 57:104-114.

Gerlach, D., S. Atwater and J. Schnell (eds.). 1994. *Deer*. Stackpole Books, Mechanicsburg, PA. 384 pp.

Goss, R.J. 1983. *Deer antlers: regeneration, function, and evolution*. Academic Press, New York.

Halls, L.K. 1984. *White-tailed deer: ecology and management*. Stackpole Books, Harrisburg, PA.

Harlow, R.F. 1959. An evaluation of white-tailed deer habitat in Florida. *Tech. Bull.* 5, Fl. Game & Fresh Water Fish Comm., Tallahassee, FL. 69 pp.

Harlow, R.F. 1961. Fall and winter foods of Florida white-tailed deer. *Q. J. Fl. Acad. Sci.* 24:19-38.

Harlow, R.F. 1972. Reproductive rates of white-tailed deer in Florida. *Q. J. Fl. Acad. Sci.* 35:165-170.

Harlow, R.F. and F.K. Jones (eds.). 1965. The white-tailed deer in Florida. *Tech. Bull.* 9, Fl. Game & Fresh Water Fish Comm., Tallahassee, FL. 240 pp.

Henderson, F.R. and C. Lee. 1992. Controlling deer damage. *Coop. Ext. Serv. Fact Sheet* C-728, Kansas State Univ., Manhattan, KS. 8 pp.

Hygnstrom, S.E. and S R. Craven. 1988. Electric fences and commercial repellents for reducing deer damage in corn fields. *Wildl. Soc. Bull.* 16:291-296.

Logan, T. H. and A. Egbert. 1981. The Florida deer story. *Fl. Wildl.* (Nov. -Dec.).

Richter, A.R. and R.F. Labisky. 1985. Reproductive dynamics among disjunct white-tailed deer herds. *Fl. J. Wildl. Manage.* 49:964-971.

Severinghaus, C.W. and E.L. Cheatum. 1969. The life and times of the white-tailed deer. Pp. 57-186 In: W.P. Taylor, (ed.). *The Deer of North America*. Stackpole Books, Harrisburg, PA.

Smith, T.R., C.G. Hunter, J.F. Eisenberg, and M.E. Sunquist. 1996. Ecology of white-tailed deer in eastern Everglades National Park--An overview. *Fl. Mus. Nat. Hist.* 39:141-172.