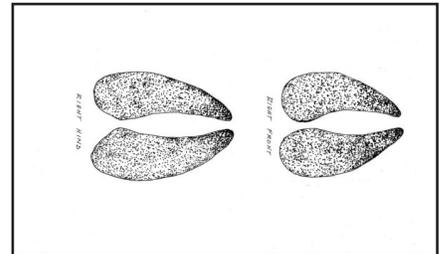
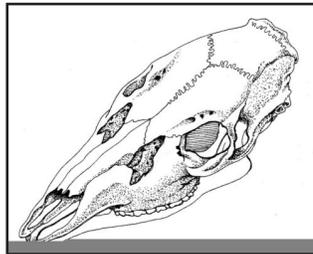
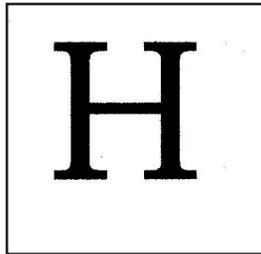
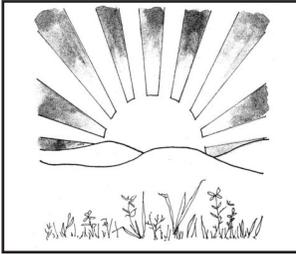




Ungulates

Order Artiodactyla
Family Cervidae



Take a close look at the pictures below. When's the last time you saw an elk, moose or bison grazing along a roadside meadow in Pennsylvania?

A long time ago the elk, the moose (*Alces alces*) and the buffalo (*Bison bison*) all lived in our state. But most were in serious decline by the early to mid-1700s, if not before. Unregulated hunting, logging and habitat destruction all took their toll. Only the elk has been reestablished in small numbers.

All three are **ungulates (hooved mammals)** and all share the same order, Artiodactyla, as the white-tailed deer. The deer, elk, moose and bison also all the same family - Cervidae.



Are those Antlers or Horns?

Some ungulates or hooved animals like deer, elk and moose show antler growth in males. Male & female caribou, who live in the arctic, *both* grow antlers. **Antlers are made of bone and a new rack is grown & shed each year.**

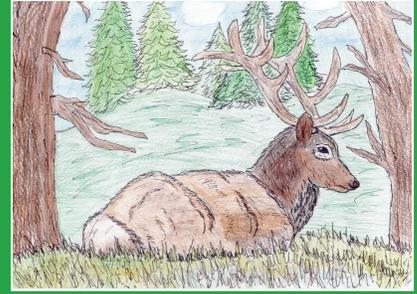
Other ungulates, like bison, cattle, sheep and antelope, grow horns. Horns are made of material similar to our fingernails. **Horns continue to grow throughout an animal's life and are rarely shed.**





Elk

Cervus elaphus



Elk are really big relatives of our white-tailed deer. Big, like up to 900 pounds for a bull elk! When settlers first came to Pennsylvania, the elk were probably bountiful. But we either changed their habitat so much they could no longer find enough food and shelter, or we hunted them to the brink of extinction. Remember, many years ago there were no hunting seasons. People could hunt whenever they felt like it and take whatever they wanted, without considering the consequences. Supposedly, the last native Pennsylvania elk was killed in 1867,

Then, in the early 1920s, **elk were shipped by train from Yellowstone National Park** and South Dakota and released in Pennsylvania in an effort to reestablish a herd. That worked for a while, but many of the elk died. Today the descendants of those elk still live in herds in Cameron county and - yes - Elk County.



Elk are active at dawn & dusk. The bulls usually keep to themselves when the cows browse and rest in herds. During the September and October rut the bulls began to bugle. It's a haunting, high-pitched trumpeting to attract a mate. A single bull will gather a number of cows into harems. During the entire breeding season they will travel together in larger groups while **the bulls stage spectacular battles butting their enormous antlers for their rights to the cows.**

Like most hooved mammals, elk are sociable animals spending much of their time in herds. In some regions out west where their populations are large and stable their herds may number up to 400 animals. Elk prefer a mixed habitat of woodland and open grassland, where they browse on trees and shrubs or graze on herbs and grasses. Even though elk are large, they can move quickly, and quietly, when they need to.

Calving season usually occurs in early June. One calf is born to each cow is normal. Like fawns, elk calves are spotted to help them camouflage on the ground. Cows and calves will stay together for up to nine months.

Elk migrate up and down mountainsides in search of food as the seasons change. In summer they will forage in mountain meadows and move down to wooded slopes and valleys in wintertime.





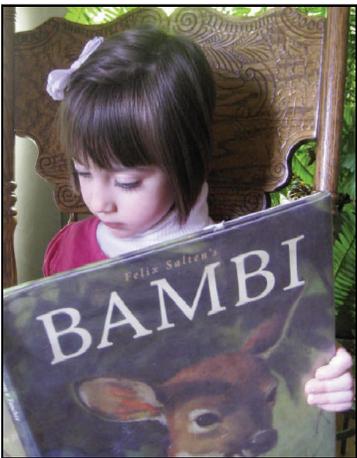
White-tailed Deer

Odocoileus virginianus



In Pennsylvania, we love our deer. We love them to death. Whether you drive down a country road at night to spotlight deer, toss corn cobs across your yard to entice deer or make the annual trek to your hunting cabin each fall to hunt deer, there is no question the white-tailed deer is the most recognized and best-loved animal in the state. Unfortunately, it is also one of the most misunderstood.

The deer is our poster child for wildlife management. But ask anyone who works in the field of wildlife management and they will tell you - it is not really a wildlife management issue, it is a people management issue. Or at least it should be.



Blame it on our childhood. Take an extremely appealing animal and create an impossibly endearing character. Then watch the world alter its outlook on the animal kingdom forever.

Anthropomorphism is when you attribute human characteristics to animals. We do it all the time. With wolves, we created monsters. With deer - we created helpless doe-eyed creatures peacefully communing with all the creatures of the forest. Unfortunately this sympathetic view created a monster too. A management monster.

Deer are beautiful animals that most of us appreciate living close to. But our association with deer is unbalanced. Historically, wolves and mountain lions were the natural predators of Pennsylvania's deer - helping to keep their populations in check. But people wiped out those predators long ago, leaving us with the challenge of maintaining both a healthy deer population and protecting our diverse native botany. It is a subject of ongoing debate: How to protect deer *and* protect the vegetation they eat!

Ideal deer habitat is brushy forests, forest edges and thickets mixed among open fields. But deer can tolerate a lot of human activity and are comfortable on farms with wooded patches, and even in busy suburbs. In both areas deer can wreak havoc on the farmer's crops or the homeowners carefully landscaped properties.



White-tails are named for the white hairs on the underside of their tail. When alarmed, the white “flag” flashes up as a warning for other members of the herd to follow. Biologists have identified nearly 30 subspecies of whitetails throughout North and Central America. Common throughout Pennsylvania, **our state is home to the largest** of the subspecies - the northern woodland whitetail.

Our bucks average about 140 pounds and stand about 34 inches at the shoulder. But adult weight varies depending on the time of year. **Bucks often weigh as much as 25 percent more in September, at the beginning of the breeding season.** Does are generally smaller overall.

Both bucks and does are colored alike. The fur on the belly, throat, around the eyes, inside the ears and the underside of the tail are white all year long. The summer coat is short, straight and reddish. Winter coats are growish-brown due to longer, thicker, crimped hairs. **Hollow winter hairs provide excellent insulation against the cold.**

Black (melanistic) and albino deer rarely occur. **Partial albinos, known as "piebalds" are more frequent,** but they are often a sign of inbreeding within a local population. They are interesting to see, but piebalds could mean an unhealthy population.



The PA Game Commission estimates that **our deer population is stable and sustainable.** Population numbers vary and some people find it hard to believe the state has a huge deer population. They think if they don't see a deer, the animals must be declining. That's why **it helps to be a botanist if you are going to study deer.**

Why? Because botanists study plants. Being able to correctly identify native plants allows us to see the impact our deer have on native forests. **Deer eat a variety of herbaceous and woody plants** between the ground and the deer's upper browse line. The browse line means the highest level into the forest canopy the deer can reach. Our deer are overbrowsing are forests. When deer over-browse a forest, not only are deer affected, but virtually all other species dependent upon that habitat.

As the quality of the deer habitat declines, so does nutritional intake, which has an effect on the health of the entire population.



Ample, diverse supplies of natural foods throughout the year are essential to a healthy deer population. How do biologists make that happen? Education, and controlling our state's deer population through annual hunting seasons (harvests) are two ways research botanists and the Game Commission are working together to save our forests and help protect our most popular mammal.

I'm guessing you know the white-tailed deer is our state mammal.

Do you know our other state symbols?

State Bird: The ruffed grouse; State Insect: The firefly; State Fish: The brook trout;

State Tree: The eastern hemlock; State Flower: The mountain laurel;

State Fossil: The trilobite; State Beverage: Milk and believe it or not, we even have a

State Dog: The great dane!

The buck's first set of antlers begins to grow at about 10 months of age. **The buck should grow and shed a new set of antlers every year.** Beginning in March, a velvety-layer of soft hair, skin and blood vessels feeds the growing bone. This "velvet" supplies important nutrients to the antler. By August or early September the antlers stop growing and the **velvet is shed or rubbed off by the buck as he rubs his antlers against saplings** (below left) **during the rut.**

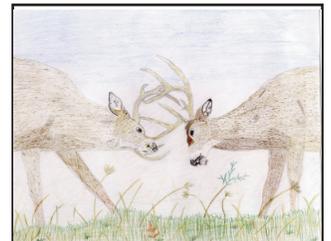


The polished-looking antlers (top right) are believed to be an important part of the breeding season and remain on the bucks sometimes into late February when they are shed. In spring a new set begins to grow again.

Antlers can easily be damaged in velvet. They are soft and still growing at that point and accidents can result in bent antlers or twisted antlers. And although they are hard and made of bone, finished antlers can also break during fighting with other males.

Both food quality & genetics play a role in the size of the antlers.

First -year bucks usually only produce "spikes" their first season since antler growth begins while the young buck is experiencing a growth spurt. Spikes are antlers with just a single main beam. But since antler growth is affected by nutrition, older bucks with a poor food supply may also carry spikes. With good food, the prime of a buck's lifespan, between the ages of five and 10, antlers should get large in each successive year. But most deer taken during hunting season are three to five years old and we may never know the true potential of their antlers. **You cannot age a buck by the size of its antlers.**



During rut season each fall, the buck's testosterone levels rise and he works off aggression by creating "buck rubs" to strengthen shoulder and neck muscles. **Bucks that tolerated one another during the summer quickly become rivals over territory or the opportunity to mate with a doe.**

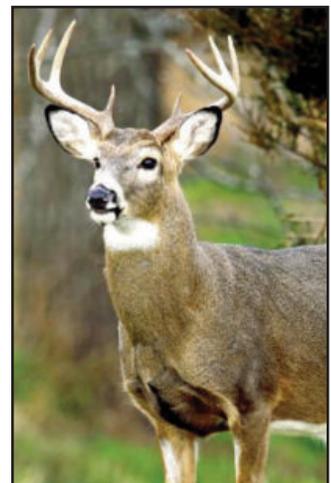
Bucks usually only approach a doe during breeding season.

When the season comes to an end in January, small groups of bucks may stay together throughout the winter and summer until the rut begins again in September.

The rut can really take a toll on bucks. Some will lose substantial body weight. Fighting between bucks can lead to injury and death. On rare occasions two sparring bucks may get their antlers hopelessly entangled causing one or both animals to die.

Bucks in rut sometimes pay less attention to their surroundings

Because its breeding season, bucks often charge across roadways in pursuit of a doe or to challenge another buck. In Pennsylvania, autumn is a time of increased dangerous collisions between deer and vehicles.



Can you hide behind polka-dots? The next time you are standing in the woods on a sunny day look at the sun shining through the leaves and branches from above. It creates dappled streaks and spots of light on the forest floor. **The white stripes and dots on a fawn's coat look the same - perfect camouflage.**

Soon after birth, **the doe directs the fawn to lie down while she wanders away to eat.** And this moves her body scent away from the fawn. Born almost scentless, the quiet fawn instinctively knows to stay still (remember, camouflage doesn't work if you move).

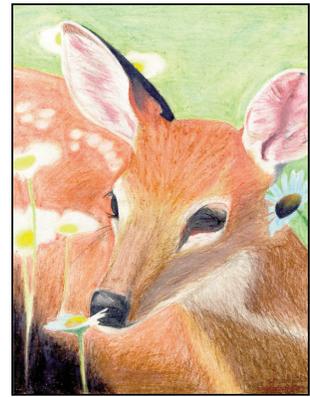
Always leave a fawn curled up on the ground. Do not assume it has been abandoned. It is doing exactly what it was designed to do and is perfectly safe. **Never touch a fawn.** If you do the fawn will have YOUR scent on it. That can lead a predator, including pet dogs, directly to the fawn. This can lead to the fawn's death.

Fawns bleat like a lamb when they need their mother. Does whine back to the fawn. Otherwise, deer are usually quiet. But when alarmed, all deer, including the buck, will stamp their feet and loudly blow air through their nostrils, making a surprisingly loud "whewooff" sound.

A healthy doe usually **gives birth to twin fawns.** Triplets are not uncommon. Young does seem to give birth to more males than females, though no one is quite sure why. **Because they produce twins almost every year, the deer population quickly rebounds despite our state's very popular hunting season.** We also lose many deer each year to car collisions, predation by pet dogs, diseases and numerous other causes. Yet Pennsylvania is still home to an enormous white-tailed deer population.

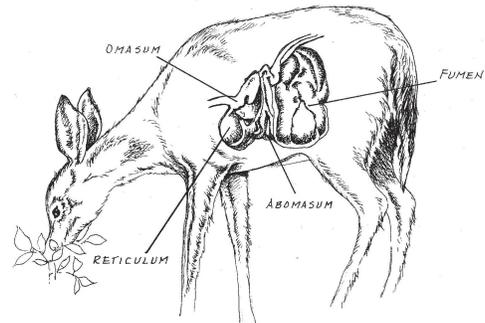
Deer herds are mostly **matriarchal.** That means several generations of related does and their fawns make up a herd. In late May does usually leave the herd to bear and rear their fawns. Yearling siblings are then on their own for the summer until the young bucks leave the group as the rut approaches. The yearling bucks permanently leave but yearling does rejoin their mother and her new fawns in the fall.

It's rare, but did you know that **a doe may grow small, irregular antlers.** This is probably the result of a hormone imbalance.



Have you ever found a shed antler? Even though antlers are made of a hard bone, it's really hard to find one. What happens to all those antlers each winter? Rodents. **Rodents love to gnaw on shed antlers.** It keeps their big incisors gnawed to a perfect length. The bone provides calcium and other important minerals to them at a time of year when other food may be scarce. The big antler pictured at left is an elk antler.

Deer are herbivores. They'll often feed on plants that other mammals cannot digest. They are called **ruminants** because they have a four-chambered stomach, similar to a cow. This allows them to get nutrients from "complex" foods like woody plants. Grazed food is swallowed into the rumen. Enzymes in the reticulum form a "Cud" of the partially digested plant materials. The cud is then regurgitated for the deer to chew on or ruminate. When swallowed for a second time the cud entered the omasum chamber followed by the abomasum - the true stomach - for final digestion. Ruminants can eat quickly in the open and then retreat to a sheltered area to chew their cud - **an adaptative strategy for avoiding predators.**



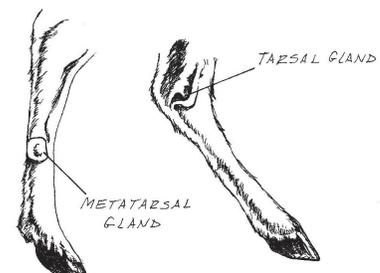
Deer eat a lot of mast and change their diet with the seasons. Spring & summer browse is green leaves and plants, and new growth on woody plants. By late summer they may turn to mast and fruits. Mid-winter foods are whatever mast is still available, evergreen leaves and dried leaves. Mast can be either soft or hard.

Hard mast like acorns, hickory nuts and beechnuts are long-lasting, hard-shelled seeds. They are high in fat, carbohydrates and protein. This provides high energy food in winter when other high energy foods are scarce. **Soft mast** is fleshy fruit high in sugar, vitamins, and carbohydrates. The fruits do not last long and are not available in great quantities in winter months. But during drought, soft mast is an important source of moisture for deer. Soft mast could include black cherries, persimmons, apples, pears, pawpaws, and blackberries.

Deer have flat molars for grinding tough, chewy plant materials, but only have incisors on the bottom jaw. Because there are no incisors on their top jaw, **deer pull or tear off parts of the plant rather than cleanly snipping off a leaf or stem like a rabbit might.** Maybe you have seen this in your backyard garden. A plant stem that has been sharply bitten off was probably snacked on by a rabbit or groundhog - a mammal with sharp upper incisors. But a plant stem that looks like it was torn off was probably nibbled by a deer.



Deer have scent glands to help establish territory, allow a deer to retrace its steps, help a buck find a doe or reunite a doe and fawn. The glands are found near their eyes (left), on the inside and outside of each hind leg (below), and between the toes on all four feet. The glands produce an oily, musky secretion that is spread on plant foliage.



Deer are ungulates and ungulates are mammals that walk on hooves. The sole and heel of the foot are actually raised off the ground. This even-toed stance is designed for running speed.



A Simple Review of White-tailed Deer



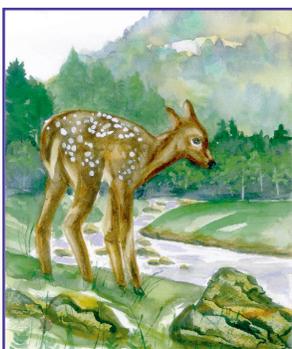
The white-tailed deer is our state mammal and our largest and most popular game animal. Found almost anywhere, they prefer woodlands and farms because of the food and shelter these areas provide. Deer are called ungulates. That means they have split-hooved feet. They have brownish-red coats, slender bodies and long, thin legs. They may look fragile, but they aren't. Deer can run up to 40 miles per hour and jump over nine-foot fences. They can even swim.

Male deer are called bucks. They are easy to identify in the summer and fall because they grow a set of antlers called a rack. Each spring they grow antlers and each winter they shed antlers. The rack is made of bone and each point on the rack is called a tine. A buck with a lot of tines on its antlers is probably very healthy and lives in a good habitat. But you cannot tell how old a buck is by counting the tines on the antlers.



Female deer are called does. Does gives birth to fawns, in May or June. A doe may give birth to one, two, or three fawns, usually twins. A fawn's white-spotted, reddish coat helps it camouflage on the forest floor. The spots will disappear when the fawn molts into its winter coat at about five months old.

Deer are herbivores. They graze or browse on tree leaves, ground vegetation, acorns, evergreen twigs, nuts, fruits and farm crops. They love corn, wheat and alfalfa. They can eat quickly and then move to a safe, quiet place to rest and **ruminates their food.** That's because they have a four-chambered stomach that allows them to digest these plants later by coughing up and re-chewing their food. Just like a cow.



How old is that deer? Biologists can age a deer by looking at its teeth! Deer are born with a set of baby teeth just like you. They are born with four teeth but in a few months grow baby incisors and premolars. By about 18 months old, permanent teeth replace the baby teeth.

Biologists can look at the teeth to tell whether the deer is a fawn, youth or an adult. They look for signs of wear on the molars (the flat, hind teeth). Because of all that plant grinding, the molars lose a bit of height each year. Age is decided by the height of the molar tooth above the gum line.

Deer tracks are heart-shaped. The pointed end of the track points in the direction the deer moves. When deer travel they create narrow paths called trails. **Deer trails** usually connect where the deer eats and rests. Deer regularly rest in the same area. These are called **deer beds.** Beds are often surrounded by thick plant cover for protection from weather and predators.

Bucks mark their territory in the fall by tearing bark from trees with their antlers. This is called a "**buck rub.**" Buck rubs are usually one to two feet above the ground. Because deer do not have upper teeth in the front of its mouth they can't snip off a piece of plant. **They twist the plant off, leaving a ragged stem.**