ELK *in* MISSOURI

CONSERVATION DEPARTMENT
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History

Elk ranged historically from Southern California, east to New York and south to South Carolina. Lewis and Clark reported elk in Missouri on their trip west in 1804, and explorer Henry Schoolcraft referenced elk when writing of his journey through the Missouri Ozarks in 1818–1819. By the mid-1880s, however, market hunting had erased any trace of elk from the Missouri landscape.

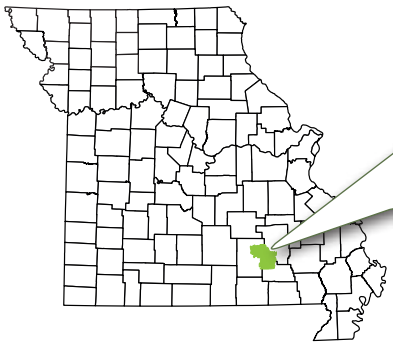
In 2011, the Missouri Department of Conservation (MDC) reintroduced the first group of elk onto Peck Ranch Conservation Area in south-central Missouri. These elk were captured in Kentucky and transported here after undergoing disease testing and a quarantine period. Additional elk were brought into Missouri in 2012 and 2013. These 108 elk formed the base for our Missouri elk herd in parts of Carter, Shannon, and Reynolds counties.

Biology

Elk (*Cervus elaphus*) are in the deer family (Cervidae), and they are the second-largest cervid in North America. Bull elk (males) in Missouri can weigh more than 700 pounds and cows (females) can weigh more than 550 pounds. Elk have a brown to sometimes reddish coloration with a light-colored rump patch. Males grow a set of antlers every year and will use those during the breeding season to defend groups of female elk. Elk can be found in herds year-round, but the size of the herd may change throughout the year. Adult males and females are often in separate groups for most of the year. Like other members of the deer family, elk are crepuscular, meaning they are most active during dawn and dusk.

Habitat

Elk are habitat generalists and use many different types of habitat in Missouri. Elk spend much of the day in forests and glades, venturing out into more open habitats at dawn and dusk.



Food

Like deer and cattle, elk have a four-chambered stomach, which allows them to eat a variety of foods. Elk can feed on anything from forbs, grasses, and leaves to nuts, twigs, and lichen. In Missouri, elk prefer foraging in open areas with lots of grasses, forbs, and legumes. Their diet will change with the seasons as different foods become available. For example, as fall approaches and acorns start to fall, elk will incorporate them into their diet.

ELK CANINE TEETH are remnants of **PREHISTORIC TUSKS** that changed *as the* animal evolved.

Reproduction

Elk, like deer, go through a period called rut. During the rut, males will gather groups of females, called harems, and defend those females from other males. In theory, this means the most dominant males are the ones who breed. Peak rut in Missouri typically occurs from late September to mid-October. Some breeding behavior can still be seen into late November.

Females can reach reproductive age within 18 months. A little before giving birth, they will leave the herd to find a calving area. Calves are born from late May to mid-August and weigh 30–45 pounds at birth. Calves are mobile within a few hours of birth and can get up and run quickly. Twins, unlike in deer, are a rare occurrence.

Antler Loss

Bull elk in Missouri will drop their antlers from late January through March. The timing of antler drop depends on several variables, including photoperiod (length of daylight), testosterone levels, body condition, and age. Older bulls typically shed their antlers earlier than younger bulls.

A set of **ELK ANTLERS** can weigh **40 POUNDS.**

Elk Management

Research projects help MDC determine survival and reproductive rates of the restored elk population, with a goal of growing the state's herd to 400–500 head. As the herd grows, MDC will recommend to the Missouri Conservation Commission a carefully monitored hunting season. If approved by the Commission, hunting would begin prior to the population reaching the goal, but not before the population reaches a number that can sustain annual harvest. Herd health and size will dictate how many elk can be sustainably harvested each year.

How do elk benefit Missouri?

A species native to Missouri, elk provide a sense of natural history, unique wildlife viewing, and potential hunting opportunities. Grazing elk help maintain open spaces on the landscape. They are a large, highly visible, popular species that wildlife viewers are willing to travel to see. From the rut during late September and October to calving during late spring and summer, elk viewing opportunities abound. Local communities benefit from the ecotourism surrounding elk watching. Future hunting seasons could provide another economic boost to local economies.

Research in Missouri

MDC, working with partners including the University of Missouri and University of Montana, has studied elk in Missouri since reintroduction. Researchers use Global Positioning System (GPS) technology, capture, aerial observation, and other methods to monitor elk movements, herd size, and herd health.

Researchers fitted the original elk herd with GPS collars, which helped them monitor elk locations and movements. Older GPS collars are replaced occasionally, and newborn calves are fitted with collars designed to expand as they grow. Researchers have also used GPS technology to determine how elk respond to human disturbance associated with deer hunting. Hunters participating in managed deer hunts on Peck Ranch CA between 2011–2013 were asked to carry GPS units. Comparing the GPS data from the hunters with data collected from the elk during the same time, researchers found that elk adapted to the hunters' presence. The study confirmed MDC's ability to continue pre-elk reintroduction activities, including hunting, on local conservation areas with minimal disturbance to the elk population.

GPS collars also help MDC determine how elk use the landscape. Prior to the reintroduction of elk into Missouri, researchers were uncertain of how the elk would use the habitat within the Elk Restoration Zone counties. In preparation for the first group of elk, MDC, working with cooperating public and nongovernmental organizations, improved more than 1,000 acres of existing open public lands. Land managers planted elk-friendly grasses, forbs, legumes, and annual cereal grains; added new open land acres; and continued quality forest management practices. Many neighboring private landowners also worked with MDC, using federal and state habitat improvement programs, to make similar improvements to their property. These efforts proved successful, as most elk have remained in the reintroduction area, primarily within Peck Ranch CA and neighboring public lands. As the population grows, elk will continue to expand and use new areas within the Elk Restoration Zone counties. Continued habitat work, public support, and hunting will help us manage elk in Missouri into the future.

Researchers gauge herd health through a regular schedule of elk capturing, observation, and sampling. Captured adult elk are examined to determine their age and tooth wear. Researchers sample their blood and feces, collect ticks, and replace their GPS collars. They also measure the antlers of bull elk.

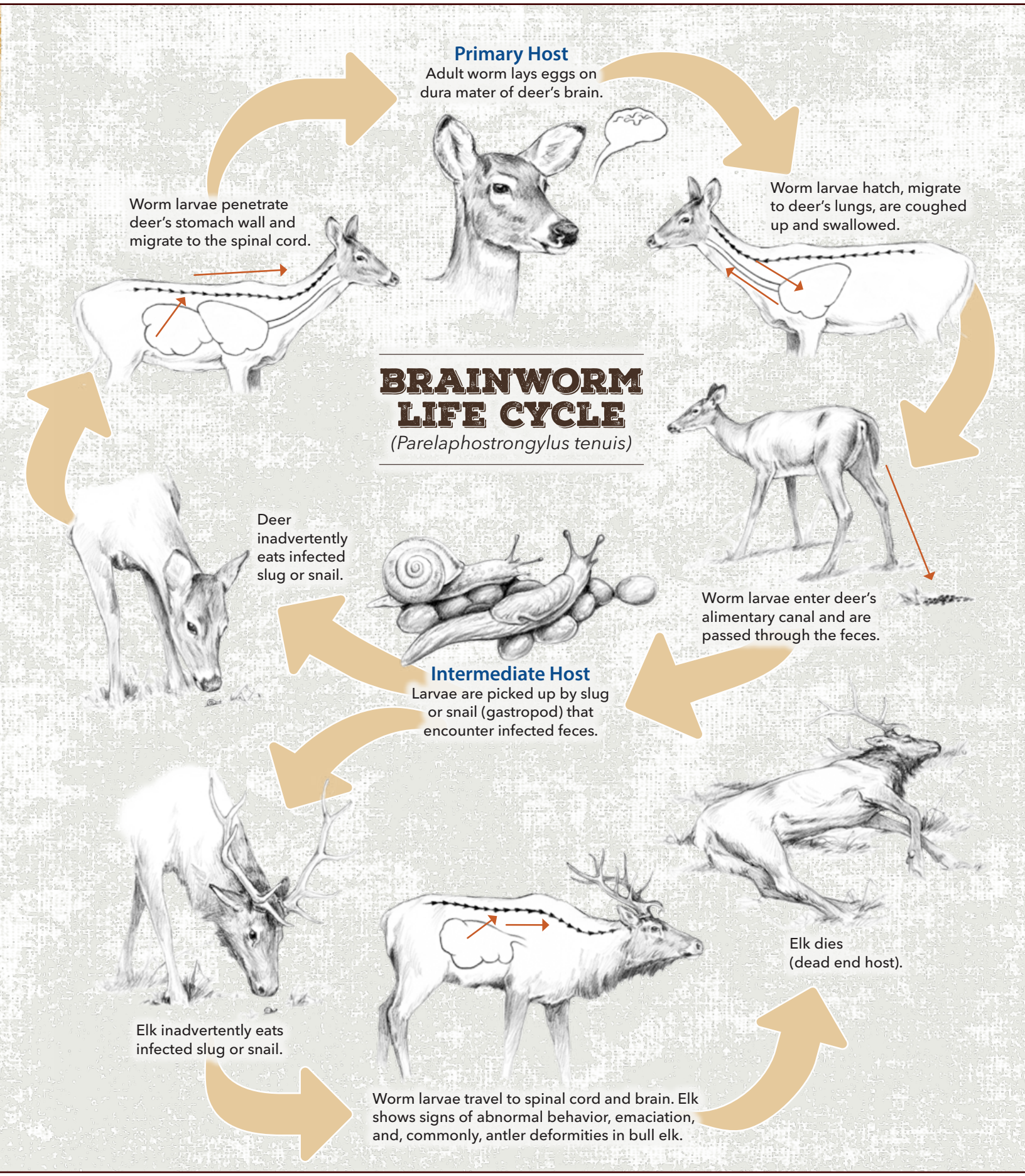
At the time of capture, cow elk are checked with an ultrasound to determine whether they are pregnant. If they are pregnant, researchers insert a vaginal implant transmitter (VIT). When a calf is born, the VIT comes out and sends a signal that helps researchers locate the calf. Once located, calves are weighed, and genetic samples are taken. They are also collared and tagged with a passive integrated transponder to aid future identification. MDC uses the information from this research to determine survival rates and estimate future population changes.

MDC also uses aerial surveys to help researchers track herd size and movement patterns, which will play an important role in setting harvest limits for future elk hunts.

BRAINWORM

Brainworm (*P. tenuis*), also known as meningeal worm, is a parasitic worm that naturally occurs in Missouri and needs a living host to survive. The usual host for brainworm is white-tailed deer. In deer, the worms are found between the brain and the meninges (thin membrane between the skull and brain surface). In previous work in the Missouri Ozarks, more than 40 percent of deer skulls that were examined had brainworm. Deer are the primary host for the adult stage of the parasite, but show very few negative effects from it, as deer and brainworms have evolved together. Cattle and humans aren't at risk from brainworm, but elk aren't as lucky. Parasitism by brainworm is the leading cause of death in Missouri elk where the cause of death is known. Despite this, the elk population continues to increase.

Signs of brainworm in elk include isolation from other elk, weakness, unsteady gait, fearlessness, unusual head tilt, and emaciation. In bull elk, brainworm commonly causes antler deformities. The only way to definitively diagnose brainworm is to detect worms in the brain or spinal cord of an elk during a necropsy (wildlife autopsy). A presumptive diagnosis can be made if, during the necropsy, signs of the worm, including tunnels, eggs, and swelling in the brain or spinal cord, are found.



LIFE CYCLE ILLUSTRATION: MARK RAITHEL,
ADAPTED FROM NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL SCIENCE

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