

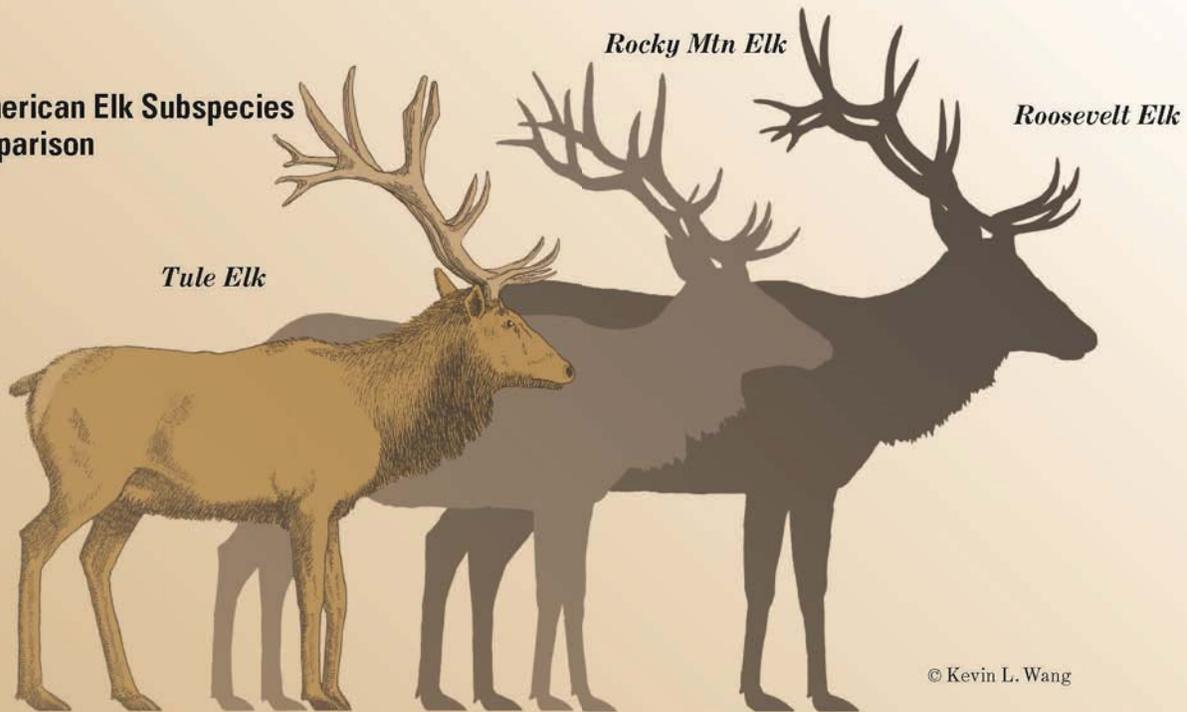
California's Tule Elk

A Species Almost Lost



San Luis National Wildlife Refuge

North American Elk Subspecies Size Comparison



North American Elk

North American Elk belong to the same family (Cervidae) as deer and moose. They are believed descended from the European Red Deer (*Cervus elaphus*) and arrived in North America about 120,000 years ago when the species travelled across a land bridge exposed by glaciers in what is now the Bering Sea.

Once here, elk became isolated from their European ancestors and began dispersing throughout North America, further isolating themselves and eventually evolving into six subspecies. Two of those subspecies are extinct: the Eastern Elk (*C. elaphus canadensis*) lived in what is now eastern Canada and eastern United States, and the Mexican or Merriam's Elk (*C. elaphus merriam*) lived in the Southwest and northern Mexico.

Four subspecies of North American Elk are extant, or alive, today. The most widespread, the Rocky Mountain Elk (*C. elaphus nelsoni*), lives in the Rocky Mountain West and has been transplanted to many other locations throughout the United States. Roosevelt Elk (*C. elaphus roosevelti*) live in the Pacific Northwest. The Manitoban Elk (*C. elaphus manitobensis*) live in the northern Great Plains and the Tule Elk (*C. elaphus nannodes*) is endemic to California, meaning it lives here and no place else.

San Luis National Wildlife Refuge Herd

The U.S. Fish and Wildlife Service's San Luis National Wildlife Refuge (NWR) in Los Banos, California, played an important role in California's Tule Elk recovery. In 1974, a 780-acre enclosure was established on the Refuge with an initial 18 animals transplanted from the Detroit and San Diego Zoos to create a "seed" herd from which to restore the Tule Elk population in California. As the San Luis herd grew in numbers, elk were periodically relocated throughout the state to create new herds or augment existing herds—a practice that continues today. A true wildlife recovery success story, the statewide Tule Elk population has recovered to more than 4,000 animals.

Elk are a popular visitor attraction on the San Luis NWR. Due to their large size and permanent residency, they offer easy and predictable viewing opportunities for the public. A 5-mile auto tour route allows visitors to drive the entire circumference of the elk enclosure.

Most elk management activities at the San Luis NWR involve managing the habitat to improve forage quality and quantity in grasslands and riparian corridors, reduce invasive weeds, and encourage the growth of beneficial native vegetation. The Refuge combats invasive weeds and improves forage through prescribed burning, mowing, and the selective use of herbicides.

Distribution of Elk in California Today



Distribution—Past and Present

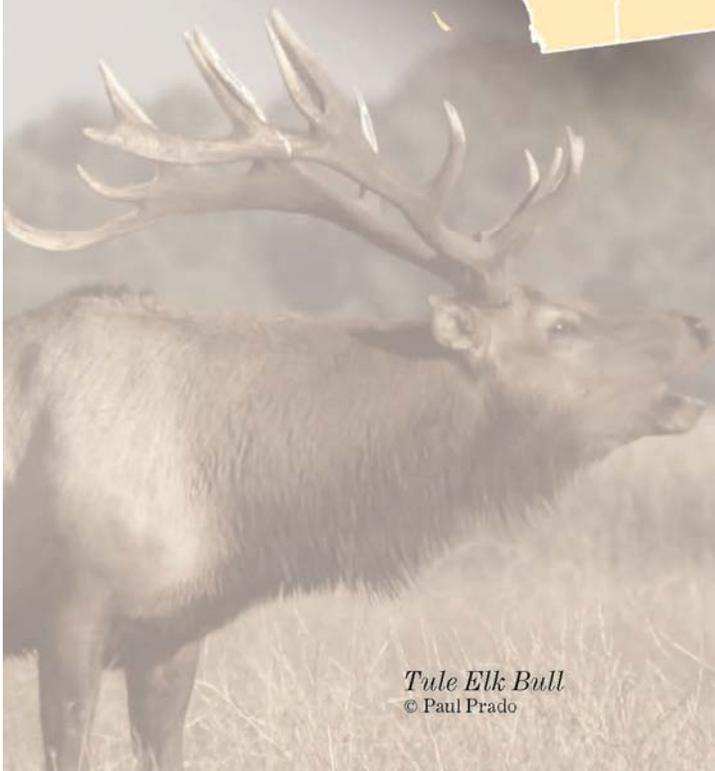
Prior to the mid-1800s, it is estimated there were as many as 500,000 Tule Elk in California. The animals ranged throughout the Great Central Valley from the northern end of the Sacramento Valley near present-day Redding to the southern end of the San Joaquin Valley near Bakersfield. They also traveled through the passes of the coastal mountain ranges to inhabit California's coastal valleys.

By the late 1800s, human settlement of California took its toll on the Tule Elk population. When the Spanish settled here, they brought untold numbers of cattle and sheep, turning them loose across California's rangelands. Those domestic ranch animals competed directly with the elk for food and also severely overgrazed the grassland.

The gold rush of 1849 brought hordes of hungry miners to the territory, and a high demand for commercial meat led to market hunting of the elk that further reduced the population...but that was not all. Gold mining gave way to farming as people realized the agricultural value of the deep sedimentary soils deposited by the territory's rivers for millions of years. Soon, the remaining grasslands went under the plow, vastly reducing habitat for Tule Elk.

Few elk remained by the late 1860s. By 1873, Tule Elk were believed to be extinct. Henry Miller, a cattle rancher and resident of Los Banos at the time owned vast amounts of rangeland throughout the West. Some of Miller's land holdings were in the southern portion of the San Joaquin Valley near the now dry Buena Vista Lake. Miller's workers reported seeing a couple of Tule Elk in the marshlands of his property. Miller reported the information to a California Fish and Game Warden who set out to find the remaining elk, and located 28 surviving animals. Miller donated 600 acres of his rangeland as habitat for the elk. He also instructed his workers to be vigilant of anyone hunting or poaching the elk on his property. The actions taken by Henry Miller were the beginning of the conservation movement that saved the Tule Elk from extinction.

Tule Elk Bull
© Paul Prado





Tule Elk Bulls in Velvet
© Paul Prado

Get to Know the Tule Elk

Mature male Tule Elk are called bulls, females are called cows, and the young are called calves. Yearling bulls are called spikes, so named for their long unbranched antlers. Mature bulls weigh between 400 and 500 pounds. Mature cows weigh 300 to 400 pounds and calves weigh about 35 pounds at birth. Calves grow quite fast—2 to 2 1/2 pounds each day—so that, by the end of their first summer, a Tule Elk calf will weigh 150 to 250 pounds.

Tule Elk are the smallest of the North American Elk subspecies and they are the lightest in color. Their bodies are tan to light brown with darker heads, necks, and legs. Like all North American Elk, Tule Elk have light-colored rumps, which is why elk were known by Native Americans as *wapiti*. *Wapiti* is the Shoshone word meaning white rump.

The average lifespan of a wild Tule Elk is 12 to 15 years. In a relatively protected environment like the elk habitat at the San Luis NWR, Tule Elk can live as long as 25 years. Historically, in the San Joaquin Valley, Tule Elk would have been preyed upon by grizzly bears, gray wolves, and occasionally mountain lions. Today, grizzly bears are no longer found in California, gray wolves are rarely spotted near northern California borders far from the Central Valley, and mountain lions rarely venture into the Valley. A full-grown Tule Elk is too large for predators like coyotes and bobcats, though an injured, sick, or dying elk or unprotected calf could be predated.

Survival is About Adaptation

The Tule Elk's small size and light pelt color are adaptations in response to living in a milder climate than the other North American Elk subspecies. To live in areas with harsh winters, like the Rocky Mountains or Great Plains, Rocky Mountain Elk must be larger so they don't lose too much body heat; larger animals lose less body heat than smaller ones. Roosevelt Elk live in the dense shady forests of the Pacific Northwest where little sunlight penetrates through to the forest floor, or an elk's back. Roosevelt Elk are darker in color so they can absorb as much solar radiation as possible to help stay warm and blend in with their shadowy environment.

While other elk must stay warm and find food throughout harsh winters, Tule Elk face a different challenge. Tule Elk must endure summer temperatures regularly exceeding 100 degrees Fahrenheit and survive six months or more every year without rainfall. So, Tule Elk can go longer without water than other North American Elk. Their molars and premolars are very robust to help them chew up the dry coarse grasses and shrubs available to them through the long hot summer. Tule Elk also inhabit wetlands filled with tules, the tall emergent aquatic vegetation that gives these elk their name. Tule Elk have also adapted to eat a greater variety of plants than any other North American Elk, including aquatic vegetation pulled from the marshes.

A Society of Elk

Elk are gregarious animals that live in groups called herds. During most of the year, cows, their calves, and yearling bulls live in the cow herd. Mature bulls live in one or more bull, or bachelor herds dispersed throughout the habitat. In both the cow herds and bull herds, the oldest animals tend to be dominant. The dominant animals usually direct the herd's movements.

When the mating season, or rut, begins—around late July at the San Luis NWR—one or more mature bulls attempt to organize the cows into smaller groups, called harems. At the same time, yearling and two-year-old bulls still in the cow herd are driven out. Those young nonbreeding bulls may form smaller herds of their own.

A prime bull must compete with other mature bulls to maintain control of his harem and keep other bulls from getting to the cows to breed.

The Rut (Breeding Season)

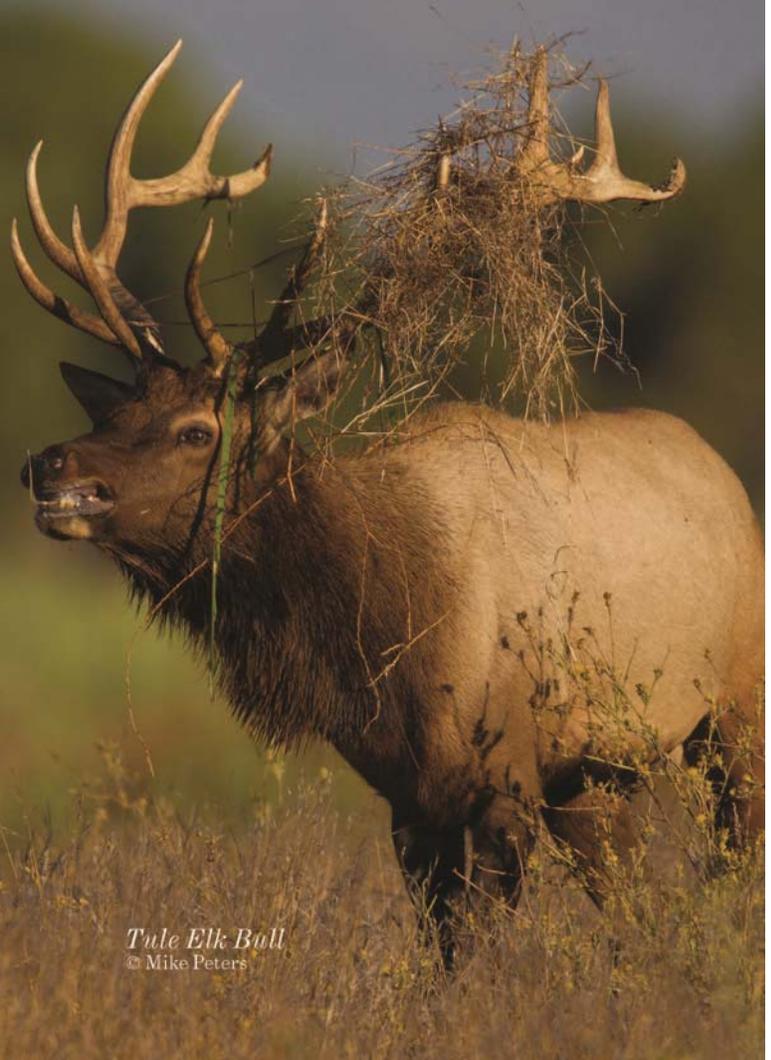
The rut for the Tule Elk at the San Luis NWR begins the end of July and lasts through November. By then the bulls' antlers are fully grown. The tattered velvet has been removed and the antlers polished by rubbing them on trees, bushes, and the ground. Vigorously rubbing antlers on anything he can is a physical display, and leaves behind the bull's scent so other elk know of his presence.

Prime bulls are usually six to eight years old and are the largest bulls, in best physical condition, with the most massive antlers. When the rut begins, bulls begin to bugle. Bulls bugle to announce their location and readiness to accept a challenge from another bull, as well as informing cows of their fitness. A bull's bugle lasts several seconds, occurs repeatedly, and sounds flute-like. It most commonly occurs in the early morning and evening. Older, larger, fit bulls tend to bugle more loudly than the younger, smaller ones.

A cow must gauge the quality of a bull to determine if he would make a good mate and sire for her calf. She will listen to his bugling and also observe the size of his antlers and his body. Antlers are a luxury. Only a healthy bull can grow an impressive set of antlers. If

a bull is ill or injured, or does not get enough nutrition during the antler-growing season, nutrients go first to repairing or growing his body. He may not have enough extra energy to be able to produce large antlers that season.

Bulls attempting to establish dominance fight to win the right to mate with the cows, but fighting amongst elk is a show of strength, not a battle to the death. Before a fight ensues, two bulls may display their dominance to each other by bugling and thrashing the ground with their antlers. They strut around while sizing up their opponent. When the fight begins, the bulls lock antlers and shove each other with all their strength. The bull that stumbles or gives up first, loses and usually retreats.



Tule Elk Bull
© Mike Peters

Reproduction

When a cow elk gives birth it is called calving. Most calving in the San Luis NWR population takes place during April and May. A cow elk calves 250 days (about 8 months) after breeding in the fall. She will leave her herd and seek seclusion several days before giving birth. She finds a place with optimal cover such as trees, shrubs, and fallen logs to hide her calf. This behavior not only protects the cow and her newborn calf, but the cow herd as well. The conditions surrounding the birth can attract predators. If the cow remained with her herd while calving, she might attract predators that could endanger all the cows and their calves too.

Newborn elk calves weigh 25 to 35 pounds and cannot run fast or far. For this reason, they hide for several weeks after birth until they are strong enough to keep up and move around with the herd.

Elk calves are born with spots, just like deer fawns. Camouflage is an important protective feature. Their spots help the calf blend in with the dappled shade of its hiding place beneath trees and shrubs. Also, the calf has almost no scent to attract a predator. While its mother is away feeding, the calf lies quiet and still to keep from attracting predators.

The cow helps her calf stay hidden by visiting it as little as possible. She may nurse it only four to six times a day, staying for only a few minutes each time. The cow cleans up all the birth materials and the calf's waste—anything that gives off scent that might attract a predator to her defenseless youngster. At the San Luis NWR, the largest predator that might threaten a calf is a coyote. Weighing about 400 pounds, a Tule Elk cow can defend her calf against something so small.

Joining the Herd

After a few weeks, calves have a chance of outrunning a predator and keeping up with the cows. The cows and their calves begin to come together in summer to form the cow herd. Living in a herd is a good strategy for protecting growing calves from predators. More elk mean more eyes on the lookout for danger. That allows calves to focus on nursing and learning to find the most nutritious forage to eat.

Sometimes a bunch of calves will form a nursery herd that follows a single cow—a babysitter. That cow stays alert, listening and looking for danger. If a predator threatens, she leads all the calves away in a group. After the danger passes, each mother sniffs out her own calf.



Tule Cow and Calf
© Paul Prado

An Antler or a Horn?

Antlers and horns are conspicuous bony projections from the skulls of many terrestrial mega-herbivores. Antlers and horns might seem similar, but there are major differences. Antlers are shed every year and the animal grows a new set. Animals with horns never shed them. Horns gradually get bigger as the animal ages, but they never come off. Generally, an animal's antlers grow back larger each year, provided adequate nutrition is obtained. In species with antlers, generally only the males grow them. Caribou are an exception in which both male and female Caribou have antlers. In species with horns, both males and females grow them.

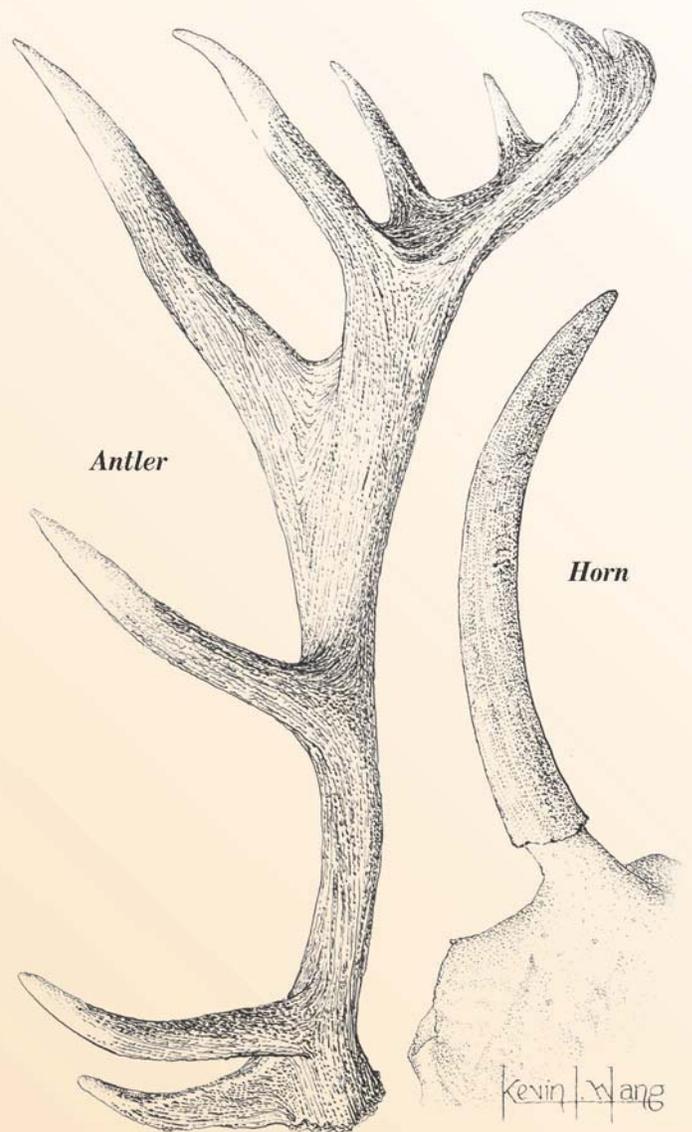
To the animals that grow them, antlers and horns are tools that serve a variety of purposes. Significant roles of antlers and horns include defense against predators, signals of reproductive maturity and virility, indicators of health and overall condition, and weapons used to establish mating rights.

Antlers are composed of calcified bone. When antlers first start growing, the bone is relatively soft and is covered with skin rich with blood vessels. This skin is called velvet. If you examine an antler and see many grooves, ruts, and bumps, you are seeing the marks left by the blood vessels that ran along the surface of the soft bone. The blood provides nutrients to the growing bone. Antlers harden when they are mature. The nutrient-rich blood is no longer needed, so the blood vessels and velvet dry up. The velvet starts to die, then shrinks and splits, and becomes itchy. The bull elk will rub its antlers on trees, posts, or along the ground to remove the dried strips of velvet.

Horns are composed of two parts: an inner core made of bone plus an outer sheath composed of keratin, the same material that makes up your hair and fingernails.

Finally, antlers are branched like a tree. As an animal ages, its antlers generally form more and more branches or points. Horns are not branched, though they can be curved like the horns of a Bighorn Sheep. The American Pronghorn Antelope is an exception. The pronghorn gets its name from its forked horns. Pronghorns do not have true horns—the outer sheath is shed each year and regrows.

A Tule Elk bull's large antlers identify him to a cow as a strong healthy individual that has access to plenty of food—signs that the bull would be a good choice as a sire for her calf. A large impressive set of antlers also announces to other bulls that, "*I am strong and able to defend my harem of cows. Don't mess with me!*" A healthy mature Tule Elk bull may have a set of antlers weighing 40 pounds or more.



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Tule Elk Herd on the Move
© Al Golub

Life-sized Tule Elk Hoofprint



© Kevin L. Wang

Conservation

This brochure was developed by the U.S. Fish and Wildlife Service's San Luis National Wildlife Refuge Complex with funding and support provided by the Rocky Mountain Elk Foundation (RMEF).

The RMEF permanently protects crucial elk winter and summer ranges, migration corridors, calving grounds and other vital areas, while focusing on securing and improving hunter access throughout elk country. RMEF's land conservation tools include: acquisitions, access agreements and easements, conservation easements, land and real estate donations, land exchanges and associated acres.

Healthy habitat is essential for healthy elk and other wildlife. The RMEF helps fund and conduct a variety of projects to improve essential forage, water, cover, and space components of wildlife habitat, and supports research and management efforts to help maintain productive elk herds and habitat.

The RMEF works to reestablish elk herds in historic ranges where the habitat and human cultural tolerance create a high potential for self-sustaining herds.



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Visitor Center Hours:
Daily 8:00 am–4:30 pm (closed holidays)

www.fws.gov/refuge/san_luis

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Tule Elk Bulls
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