

National Elk Refuge

Elk Biology

Bulls expend a great amount of energy during the rut. It is not uncommon for a bull to lose 100-150 pounds causing bulls to come into winter in poor body condition, making them more susceptible to the scabies mite and other diseases.



Young calf on wobbly legs

- During a calf's first winter they weigh an average of 250 lbs.
- Elk can run at speed bursts up to 45 mph and can sustain 30 mph.
- Elk eat about 20 lbs. of grass per day. They eat about half this during the winter because the grass is cured, less digestible and less available.
- Calves have virtually no odor at birth and blend well with their surroundings.
- Elk are ruminants like cows and have four stomachs

Jackson Hole Elk Herd

The modeled population estimate for the Jackson elk herd was 13,356 for 2003-4. From 1989-90 through 2003-4, the herd has ranged from 13,200-18,825 animals. The Wyoming Game and Fish objective remains 11,029 and the department plans to continue to reduce herd size.

During the winter of 2004-5, the total number of elk wintering on and adjacent to the refuge ranged between 5,689 and 6,312. The remainder of the herd winters in Grand Teton National Park, on state feedgrounds, and on native winter range. Summer ranges include Grand Teton NP, Bridger Teton National Forest (including the Teton Wilderness), and southern Yellowstone National Park.

Influences on Elk Herd Size

Hunting accounts for nearly 90% of adult mortality in the Jackson elk herd. The harvest rate has averaged 20% of the herd during the last 20 years.

Grizzly and black bears, cougars, wolves, and coyotes prey on calves

and/or adult elk. The influence of predators may vary from one area to another, at different times, and for different reasons.

Amount and quality of habitat, including the availability of winter and transitional range, affect elk numbers, distributions and health.

Winter elk mortality averages 1-2% on the National Elk Refuge because supplemental feed is provided nearly every winter. If supplemental feeding were to be phased back to above average winters only, winter mortality would be expected to range from 1-5%.

Disease can kill elk directly or debilitate animals so that they are more susceptible to predation and severe winter conditions.

Other causes of mortality include natural events, such as drowning, particularly in the spring when water levels are high and elk often fall through ice. Vehicle collisions are also frequent causes of mortality.

These factors interact in complex ways, often making it difficult to determine the cause of population fluctuations.

For more information contact:

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Winter Adaptations

- Elk have a two layer coat: a wooly undercoat and longer hollow guard hairs with air-trapping qualities on top. The winter coat is shed in the spring and replaced by a thin, sleek summer coat.
- Elk will lie with their feet tucked under the body to reduce heat loss during cold winter days and nights.
- Elk have a reduced blood supply to their legs which keeps their core body temperature higher.
- Elk herd together during storms to prevent heat loss.
- Energy intensive activities, such as long movements, are reduced in the winter.

Elk rest more in the winter to conserve energy.



Photo by Mark Gocke

Fun Facts

- Wapiti is the Shawnee name for elk meaning "white rump".
- A bull averages 600 lbs. in winter and 700 lbs. in summer
- A cow averages 500 lbs. in winter and 450-500 lbs. in summer.
- Calves weigh 30-35 lbs. at birth



- Taxonomy**
- Elk are members of the deer family, Artiodactyla or Cervidae.
 - They are often lumped into a common group called ungulates which means hoofed mammal.

Antlers Antlers are the headgear male elk and other members of the deer family grow and shed annually. Peak antler growth usually occurs between the ages of 7-12. Summer nutrition is the major factor determining antler size, but mineral availability and genetics also play a role.



Group of shed

Growing antlers have a rich blood supply and network of nerves. Antlers grow by depositing cartilage tissue that mineralizes into hard dead bone once the blood supply pinches off. Then rich velvet blood supply dries and is shed.

Larger bulls grow their antlers for about 140 days, while spikes are complete in 90 days. Antler growth is generally complete by mid-August.

Age	Antlers	Description
1.5	First set	Spike bulls, may be forked with 2-4 points
2.5	Second set	“Raghorn” Bulls, smaller slender 3-5
3.5	Third set	Smaller with mature appearance, 5-6 points

The color of bare antlers comes from the reaction between oxygen in the air and the plant material the

animal rubs on. Different plants result in various antler color. Pines generally create a darker color compared to aspen or willows. Dried blood may appear on the antler as well.

Larger bulls shed their antlers first, generally in early March. Spikes lose theirs as late as May or June. Declining concentrations of testosterone, seasonal light duration, and an animal’s metabolism cause the erosion of the bone and the bond between the antler and the pedicle.

Once the antler drops, a wound will bleed but will become a new antler bud. New antler growth starts almost immediately, and velvet nubs can be seen within a few weeks. Antlers can grow up to an inch and a half per day.

Abnormal Antlers

Abnormalities are generally caused by genetics or injuries. Occasionally in the winter, elk are seen with velvet antlers. These may be females with severe hormone imbalances, causing sterility and growth of eo-antlers. These animals may also be a stag or castrated male. These animals either were born without testicles, or sustained an injury to their genitalia. Stags will sometimes have the coloration of a cow, and will be heavier than other bulls. Stags can also have eo-antlers that may be stunted or deformed. Generally, stags will keep their velvet antlers and not shed them.

Bull elk in velvet.



Social Behavior

Elk have a complicated social behavior that lends to exciting wildlife viewing and survival in harsh environments.



Large migrations are lead by lead cows.

Elk are organized around a matriarchal society. The herd leaders are older cows. These lead cows know the migration routes, calving areas, river crossings and other important information.

Migration is a learned behavior, not instinctive. Older cows will teach younger elk migration paths from summer to winter ranges.

Cow/calf herds and mature bulls tend to stay segregated except during the rut, although younger bulls can be seen with the cows. Bulls tend to stay in bachelor groups, except for the rut when they are competing with one another.

Elk Sounds

Elk exhibit a range of sounds to warn of predators and communicate with one another. Cows and calves “chirp” or “mew” back and forth when the herd is moving, feeding or regrouping. This allows the animals to keep in contact with each other. Bulls also bugle, bark and make other sounds.

Elk are gregarious animals, and displays of dominance are common within the herd. Cows may lower their head and flatten their ears or two cows may stand on their back legs and box. Bulls spar with their antlers, or box when the antlers have been shed.

Social behavior peaks during the rut. Bull displays of dominance can be very subtle, by the tilt of the antlers or in the bull’s walk. When bulls fight, it is usually between equally matched animals, and it is an effort to push the other back until he retreats. Fatalities from these fights are not common, but injuries occur frequently.

The Rut

The mating season or rut is from late August to October, peaking in September. During this time, bulls have a dramatic increase in testosterone causing their necks to swell, exhibit more aggressive behavior and advertise their fitness with dominance displays.



A bull elk and his harem

Bulls will display dominance by bugling, wallowing, urinating on themselves, rubbing/thrashing vegetation, and displaying antlers. These behaviors are not necessarily confined to mating season, but are most prevalent during this time.

Mature bulls breed more often than younger bulls. Although spikes (16 months old) are physiologically capable, they generally are not fully capable until later in the rut, and have lower sperm counts. Elk are polygamous and promiscuous. Bulls will assemble “harems” or groups of females they will breed with. Cows will cycle through 1-4 heats (estrus) 21 days in length. Cows can breed at 1.5 years, but older cows (2.5 years old) have the highest conception rates.