

and is mostly limited to populations south of 51°N. It appears that pneumonia is mostly a bacterial disease and that most sheep do not suffer any deleterious consequences from lungworm infection. In some bighorn populations, however, heavy prenatal infections have been linked with high mortality of young lambs. Lungworms probably co-evolved with bighorn sheep; the pathogens that cause pneumonia were likely introduced to North America by European domestic livestock. Bighorn sheep are very vulnerable to diseases transmitted by domestic livestock, and are incompatible with domestic sheep. Some desert populations also appear threatened by introduced exotic ungulates.

Size

Males are larger than females; body and horn size vary considerably among subspecies and populations. These measurements are for the largest subspecies, *O. c. canadensis*, for individuals seven years of age and older. Total length: 1.6–1.9 m (males); 1.55–1.7 m (females). Length of tail: 80–120 mm (males); 70–120 mm (females). Weight: 75–105 kg in May, 95–135 kg in October (males); 48–64 kg in May, 65–85 kg in October (females).

Identification

Bighorn sheep and Dall's sheep (*Ovis dalli*) do not overlap in range. Bighorns are brown with a white rump patch; Dall's sheep are either white or dark gray. Female bighorns are sometimes confused with mountain goats (*Oreamnos americanus*) during the spring molt,

but mountain goats are white with sharp black horns, and molting female bighorns are cream-colored with brown, blunt horns. Among yearlings the horns of males are almost twice as long as those of females; the horns of adult males are about four times longer than those of females.

Other Common Names

Mountain sheep (a term used for all wild sheep). Different subspecies are referred to as Rocky Mountain bighorn, California bighorn, and desert bighorn.

Status

Reintroduced and common in much of its former range in the United States. Locally rare and declining, especially some desert populations. Common in most of its historic range in Canada. Extirpated in most of its range in Mexico.

Many populations in the United States, particularly of the desert subspecies, were extirpated during the last century, but reintroduction efforts have repopulated many ranges where there is suitable habitat. However, several historic ranges are no longer suitable for reintroduction because of habitat degradation. Reintroduction might be possible in parts of Mexico. In general, reintroductions of the desert subspecies have been less successful than for northern subspecies. Bighorn sheep, possibly of a subspecies different from *Ovis canadensis canadensis*, were formerly found in steep river valleys as far east as the Dakotas. Bighorns of the *canadensis* subspecies have been introduced in some of the eastern ranges. *M. Festa-Bianchet*

Subspecies

Ovis canadensis californiana, scattered populations east of the Rocky Mountains from central California to central British Columbia
Ovis canadensis canadensis, Rocky Mountains from Colorado to about 55° N in eastern British Columbia
Ovis canadensis mexicana, western Sonora; extinct in much of its former range in Sonora and Chihuahua
Ovis canadensis nelsoni, desert habitat from central Baja California to southwestern Colorado; scattered populations to eastern Texas
Ovis canadensis weemsi, extreme southern Baja California

References

Mammalian Species 230; Geist, 1971; Wishart, 1978

Dall's sheep | *Ovis dalli*

Dall's sheep are gregarious ungulates (hoofed mammals). These large herbivores inhabit extremely rugged mountains with subalpine grasses and low shrubs, on which they feed. These sheep typically migrate between summer and windswept winter ranges. Adult males and females seldom occur together outside rut (the mating season).

Dall's sheep are polygynous. Large, dominant males fight for possession of estrous females and do most of the mating. Dall's sheep do not have territories or hold harems, but males court, defend, and copulate with individual females, and then

move on in search of additional mates. Fights between males are impressive encounters in which the edges of their massive horns are slammed together forcefully. The impact can be heard kilometers away. Rutting activities peak in November and December and then wane as the sheep become more solitary.

Lambs are born at secluded sites among precipitous cliffs in early to mid-May. Most females give birth to a single lamb; twinning is rare. The gestation period is 171 days, and births are highly synchronized. The lambs weigh 3–4 kg at birth, and



Ovis dalli



are able to follow their mothers over rough terrain within 24 hours. They are weaned by 3–5 months of age and may weigh 30 kg by 9 months. The horns continue to grow throughout life and sheep, especially males, can be aged from the annual rings of growth on these structures. Some older males may wear down (broom) the tips of their horns.

Dall's sheep are preyed upon by wolves (*Canus lupus*), coyotes (*C. latrans*), grizzly bears (*Ursus arctos*), black bears (*U. americanus*), wolverines (*Gulo gulo*), and lynx (*Lynx canadensis*); golden eagles (*Aquila chrysaetos*) prey on lambs. The steep, rugged terrain in which the sheep live reduces their vulnerability to predators, but some sheep die from accidental falls and avalanches. Deep snow, low quality of forage, and high population density all have been associated with mortality

in this species. The ability of lambs to gain sufficient body mass over the summer to overcome harsh winter conditions is a critical factor in their survival. Only mature males are hunted, and current levels of harvest have little effect on most sheep populations.

Dall's sheep harbor a number of disease-causing organisms, including lungworms (*Protostrongylus*), but these parasites have not been associated with the large-scale die-offs reported for *O. canadensis*.

Unlike other populations of wild sheep in North America, Dall's sheep still inhabit pristine, undisturbed environments. Human disturbance, development, and subsequent loss of habitat are not yet pressing problems for these unique mountain ungulates. *R. T. Bowyer and D. M. Leslie, Jr.*

Size

Males are much heavier than females.
 Total length: 1.3–1.78 m (males); 1.324–1.62 m (females)
 Length of tail: 70–115 mm (males); 70–90 mm (females)
 Weight: 73–110 kg (males); 46–50 kg (females)

Identification

Ovis dalli is distinguished from *O. canadensis*, its only North American congener, by smaller body size and smaller, more widely flaring horns. *O. dalli* occurs farther north than *O. canadensis*, although their distributions

converge in British Columbia. The subspecies of *O. dalli* differ in color: *O. d. dalli* and *O. d. kenainensis* have white pelage, and *O. d. stonei* has silver to grayish-black pelage with a white muzzle, leg trimmings, and rump patch.

Recent Synonyms

Ovis cowani
Ovis fannini
Ovis montana

Other Common Names

Stone's sheep, Fannin's sheep

Status

Locally abundant in dry, mountainous terrain at high latitudes

Subspecies

Ovis dalli dalli, most of Alaska and Yukon; extreme western Mackenzie; extreme northwestern British Columbia
Ovis dalli kenainensis, Kenai Peninsula of Alaska
Ovis dalli stonei, south-central Yukon and north-central British Columbia

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