

TECHNICAL NOTES

U. S. DEPARTMENT OF AGRICULTURE

NEVADA

SOIL CONSERVATION SERVICE

TN - BIOLOGY - NV-23 (Rev.)
TN - RANGE - NV-45

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ESTIMATING FORAGE REQUIREMENTS OF GAME SPECIES

The attached technical note is a revision of TN - Biology - NV-23 transmitted May 1990. Originally issued by Wyoming, the technical note is adapted to Nevada under dual subjects Biology and Range.

Please change the Biology Index to reflect the revised title and issue date and add to the Range Index as a new issue.


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ESTIMATING FORAGE REQUIREMENTS OF GAME SPECIES

This Technical Note is adapted from Wyoming Technical Note BIOLOGY NO. 37 (July 1988), compiled by R.C. Rintamaki, State Biologist, SCS, Wyoming.

ANIMAL-UNIT CONVERSION FACTORS:

An *Animal Unit Conversion Factor* is a numerical figure expressing the forage requirements of a particular kind or class of animal relative to the requirement for an animal-unit $\frac{2}{3}$. Animal-unit conversion factors will vary according to the kind and size of individual animals.

An *Animal-Unit* (AU) is generally considered to be one mature domestic cow of approximately 1,000 pounds, either dry or with calf up to six months of age, or their equivalent $\frac{3}{4}$. An *Animal-Unit-Day* (AUD) is the amount of air-dry forage required by one animal unit in one day based on a 26 pound forage allowance $\frac{2}{3}$. An *Animal Unit-Month* (AUM) is the amount of dry forage required by one animal unit for one month based on a forage allowance of 26 pounds per day (or about 800 pounds of dry forage per month) $\frac{2}{3}$.

ESTIMATING FORAGE REQUIREMENTS OF GAME ANIMALS:

Refer to TABLE II for consumption rates of different species of game birds.

To determine the approximate forage requirements of a given animal refer to TABLE I and find the animal-unit conversion factor for the kind and class of animal in question. Multiply this number by the standard animal-unit forage requirement of 26 pounds per day. The product is an estimate of the daily consumption rate for the animal selected.

EXAMPLE

Animal-unit conversion factor for a mature domestic sheep is 0.20 (from TABLE I).
 $0.20 \times 26 \text{ Lbs forage per day} = 5.2 \text{ Lbs per day forage allowance per mature domestic sheep}$

An approximation of the forage requirements for a group of animals can be calculated by combining animal census data and known daily forage intake values.

DETERMINING THE ANIMAL-UNIT CONVERSION FACTOR

The following procedures outline a method for estimating the average forage intake rate and related animal-unit conversion factor for various groupings of game animals.

Where average weights by class of animal are known, and with census data that accounts for the number and class of animals within a herd (herd composition), the average weight per animal of the population can be found. Once the average weight per animal within a population is determined, this value is multiplied by the appropriate forage intake rate for the kind of animal being addressed to find the average consumption rate for the herd. Forage intake rates that are adjusted to body size or weight offer a more realistic approximation of animal forage requirements. See EXAMPLES.

To find the animal-unit conversion factor for a given group of animals, divide the average herd consumption rate (amount of forage per unit of time) of the animal grouping by the standard animal-unit forage allowance of 26 pounds per day. The result is the animal-unit conversion factor for a specific kind of animal at a given herd composition. The inverse of the animal-unit conversion factor is the number of the specified group of animals per standard animal-unit (AU). See EXAMPLES.

NOTE: The animal-unit conversion factor is a useful tool for approximating the amount of forage required to maintain an animal (or a group of animals), but may not be applicable in determining stocking rates for particular kinds or classes of animals because of different grazing preferences 2/.

The following average weights per kind and class of animal and consumption figures by hundred-weight (cwt) for various kinds of game animals are based on data compiled by the Wyoming Game and Fish Lab in Laramie, WY.

	<u>FORAGE INTAKE RATE</u> <u>LBS/CWT/DAY</u>	<u>CLASS OF</u> <u>ANIMAL</u>	<u>AVERAGE BODY</u> <u>WEIGHT</u>
PRONGHORN ANTELOPE:	3.00	KIDS	49 LBS
		DOES	97 LBS
		BUCKS	106 LBS
BIGHORN SHEEP:	3.17	LAMBS	60 LBS
		EWES	121 LBS
		RAMS	149 LBS
MULE DEER:	3.10	FAWNS	70 LBS
		DOES	121 LBS
		BUCKS	160 LBS
ROCKY MOUNTAIN ELK:	3.10	CALVES	241 LBS
		COWS	467 LBS
		BULLS	461 LBS
MOOSE:	3.00	CALVES	413 LBS
		COWS	831 LBS
		BULLS	970 LBS

DETERMINING THE ANIMAL-UNIT CONVERSION FACTOR: (continued)

EXAMPLES-

BIGHORN SHEEP: @ 3.17 LBS FORAGE/CWT/DAY $\frac{1}{4}$

<u>NO. and CLASS</u>		<u>INDIVIDUAL AVERAGE WEIGHT(Lbs)</u>		<u>HERD COMPOSITION</u>		<u>ADJUSTED HERD WEIGHT(Lbs)</u>
15	Lambs	x	60	15%	=	900
50	Ewes	x	121	50%	=	6,050
<u>35</u>	Rams	x	149	35%	=	<u>5,215</u>
100						12,165 Lbs

Average weight = 12,165 Lbs / 100 Bighorn sheep = 122 Lbs per animal

122 Lbs / 100 Lbs = 1.22 cwt

Average Animal Consumption = 1.22 cwt x 3.17 Lbs forage/cwt/day = 3.87 Lbs/day

3.87 Lbs per day animal consumption = 0.149 animal-unit conversion factor
26 Lbs per day per standard AU

1 / 0.149 = 6.7 Bighorn Sheep per standard animal-unit
(given the listed herd composition).

MULE DEER: @ 3.10 LBS FORAGE/CWT/DAY $\frac{1}{4}$

<u>CLASS OF ANIMAL</u>	<u>INDIVIDUAL AVERAGE WEIGHT(Lbs)</u>		<u>HERD COMPOSITION</u>		<u>ADJUSTED HERD WEIGHT(Lbs)</u>
Fawns	70	x	35%	=	25
Does	121	x	45%	=	55
Bucks	160	x	20%	=	<u>32</u>
					112

Average Herd Weight = 112 Lbs per animal

112 Lbs / 100 Lbs = 1.12 cwt

Average Animal Consumption = 1.12 cwt x 3.10 Lbs forage/cwt/day = 3.47 Lbs/day

3.44 Lbs per day animal consumption = 0.133 animal-unit conversion factor
26 Lbs per day per standard AU

1 / 0.133 = 7.5 Mule deer per standard animal-unit
(given the listed herd composition).

DETERMINING THE ANIMAL-UNIT CONVERSION FACTOR: (continued)

EXAMPLES-

PRONGHORN ANTELOPE: @ 3.00 LBS FORAGE/CWT/DAY $\frac{1}{2}$

<u>CLASS OF ANIMAL</u>	<u>INDIVIDUAL AVERAGE WEIGHT(Lbs)</u>		<u>HERD COMPOSITION</u>		<u>ADJUSTED HERD WEIGHT(Lbs)</u>
Kids	49	x	35%	=	17
Does	97	x	43%	=	42
Bucks	106	x	22%	=	<u>23</u>
					82 Lbs

Average Herd Weight = 82 Lbs per animal

82 Lbs / 100 Lbs = 0.82 cwt

Average Animal Consumption = 0.82 cwt x 3.00 Lbs forage/cwt/day = 2.46 Lbs/day

2.46 Lbs per day animal consumption = 0.095 animal-unit conversion factor
26 Lbs per day per standard AU

1 / 0.095 = 10.5 Pronghorn antelope per standard animal-unit
(given the listed herd composition).

ROCKY MOUNTAIN ELK: @ 3.10 LBS FORAGE/CWT/DAY $\frac{1}{2}$

<u>CLASS OF ANIMAL</u>	<u>INDIVIDUAL AVERAGE WEIGHT(Lbs)</u>		<u>HERD COMPOSITION</u>		<u>ADJUSTED HERD WEIGHT(Lbs)</u>
Calves	241	x	28%	=	68
Cows	467	x	50%	=	234
Bulls	461	x	22%	=	<u>101</u>
					403 Lbs

Average Herd Weight = 403 Lbs per animal

403 Lbs / 100 Lbs = 4.03 cwt

Average Animal Consumption = 4.03 cwt x 3.1 Lbs forage/cwt/day = 12.49 Lbs/day

12.46 Lbs per day animal consumption = 0.480 animal-unit conversion factor
26 Lbs per day per standard AU

1 / 0.480 = 2.1 Rocky Mountain Elk per standard animal-unit
(given the listed herd composition).

TABLE I

GUIDE TO ANIMAL-UNIT CONVERSION FACTORS

KINDS and CLASSES of ANIMALS	ANIMAL-UNIT CONVERSION FACTOR	NUMBER PER ANIMAL-UNIT

CATTLE:		
Domestic cow, mature, dry	1.00 $\frac{3}{4}$	1.0
Domestic cow, with calf	1.00 $\frac{3}{4}$	1.0
Domestic bull, mature	1.25 $\frac{3}{4}$	0.8
Domestic calf, weaned	0.60 $\frac{4}{5}$	1.7
Cattle, 1 year of age	0.60 $\frac{3}{4}$	1.7
Cattle, 2 years of age	0.80 $\frac{3}{4}$	1.3
Yearling, 12 to 17 months	0.70 $\frac{4}{5}$	1.4
Long yearling, 17 to 22 months	0.75 $\frac{4}{5}$	1.3
Two year-old, 22 to 32 months	0.90 $\frac{4}{5}$	1.1
SHEEP:		
Mature domestic sheep	0.20 $\frac{3}{4}$	5.0
Mature domestic ewe w/lamb	0.20 $\frac{4}{5}$	5.0
Lamb, 1 year of age	0.15 $\frac{3}{4}$	6.7
Mature domestic ram	0.20 $\frac{4}{5}$	5.0
OTHER:		
Horse, mature	1.25 $\frac{3}{4}$	0.8
Domestic goat, mature	0.15 $\frac{3}{4}$	6.7
Domestic goat kid, 1 year of age	0.10 $\frac{3}{4}$	10.0
GAME SPECIES:		
*Bighorn sheep, mature	0.20 $\frac{3}{4}$	5.0
*Bighorn sheep	0.14 $\frac{4}{5}$	6.9
*Bison, mature	1.00 $\frac{3}{4}$	1.0
*Moose	0.83 $\frac{4}{5}$	1.2
*Mule deer, mature	0.20 $\frac{3}{4}$	5.0
*Mule deer	0.13 $\frac{4}{5}$	7.8
*Pronghorn antelope, mature	0.20 $\frac{3}{4}$	10.8
*Pronghorn antelope	0.09 $\frac{4}{5}$	10.8
*Rocky Mountain elk	0.48 $\frac{4}{5}$	2.1
*Whitetail deer, mature	0.15 $\frac{3}{4}$	6.7
*Whitetail deer	0.14 $\frac{4}{5}$	7.1
EXOTIC SPECIES:	(To be determined locally)	

*Closer estimates of animal-unit conversion factors require herd composition data

TABLE II

GAME BIRD CONSUMPTION RATES 1/

The following table lists the consumption rates of different species of game birds. As most damage occurs during the fall and winter seasons, only consumption rates for these periods are listed.

	<u>GRAIN CONSUMED</u>
Canadian Goose	0.38 lbs/day
Mallard	0.20 lbs/day
Blue Winged Teal	0.06 lbs/day
Canvasback	0.07 lbs/day
Lesser Scaup	0.05 lbs/day
Pheasant	0.23 lbs/day
Turkey	0.03 lb/lb body wt.
Sandhill Crane	1.5-1.75 lbs/day
Sage Grouse	0.24 lbs/day

REFERENCES

1/ Demaree J. and Fagan T. 1982. Evaluation of Damage Caused By Wildlife. Wyoming Dept. of Game and Fish.

2/ Society for Range Management. 1989. A Glossary of Terms Used in Range Management. Denver, CO.

3/ Soil Conservation Service. 1976. National Range Handbook, Section 800. USDA. Washington, D.C.

4/ Information provided by Bill Hepworth from the Game and Fish Lab at Laramie, WY, and Fee Busby and Jim Waggoner from the University of Wyoming. in: Wyoming SCS Technical Note BIOLOGY NO. 37. (1988)