

**Jarbidge Cooperative Elk Herd Carrying Capacity Study
Nevada Division of Wildlife, Hunt Unit 072, Elko County, Nevada**

1999 ANNUAL REPORT:

Preliminary Estimates of 1999 Elk Summer Range Carrying Capacity

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EXECUTIVE SUMMARY

This Annual Report provides data summaries and calculations relative to preliminary estimates of carrying capacity for elk (*Cervus elaphus*) on 1999 summer range within Nevada Division of Wildlife (NDOW) Hunt Unit 072. Unit 072 comprises 166,533.8 ha (411,499.2 ac) in Elko County. The Jarbidge Mountains form the core summer range area in the Unit, with most of the area being administered by the U.S. Forest Service and Bureau of Land Management.

Results from preliminary analyses indicate two key communities, aspen (*Populus tremuloides*) and curlleaf mountain mahogany (*Cercocarpus ledifolius*), could have supported about 1,700 (key available forage) to 2,300 (total available forage) elk in summer 1999. The purpose behind estimating carrying capacity on these key communities was to provide managers with potential results from future models incorporating forage availabilities from key foraging areas. These results are at use levels that elk in the study area do not now exhibit. Additional information on snowbrush communities, a third key community type, is needed prior to modeling carrying capacity for this type. It must also be added that 1999 was a near normal precipitation year and elk grazing capacities in drier summers would be expected to be lower than these value ranges. In addition, the key forage estimate probably reflects better the nature of elk selection for preferred forages. Fine-tuning these estimates as well as including results from the 2000 field season will likely result in significant changes. Therefore, a conservative approach to these data should be applied. Final estimates may be higher or lower than these preliminary ones.

Results from two field seasons (1998 and 1999) have demonstrated elk summer habitat selection in the Jarbidge Mountains is associated closely with woody communities. Aspen and curlleaf mountain mahogany are the primary communities used by elk with some selection also being shown for snowbrush ceanothus (*Ceanothus velutinus*) communities. Aspen and mahogany comprise about 9 and 7 percent respectively, of the vegetation cover in the area.

Dietary analyses indicate the major portion of the elk diet in summer has consisted of forbs (1998 = 62.2; 1999 = 49.5) and shrubs (1998 = 20.1; 1999 = 31.7). Livestock summer diets, on the other hand, have been predominated by a high proportion of graminoids (grasses and grass-like plants [cattle, 1998 = 82.6 and 1999 = 91.5; domestic sheep, 1998 = 70.5 and 1999 = 71.5]). Graminoids have been highest in elk spring diets (1998 = 54.3%; 1999 = 34.5%).

A subset of 11 forage species were selected as key forage species in an effort to (1) investigate elk nutritional relationships, (2) examine dietary overlap between elk, livestock, and mule deer, and (3) direct forage availability investigations. Dietary analyses reveal that requirements for crude protein (CP) and digestible energy (DE) by a representative 236 kg (520.3 lb) lactating cow elk are more attainable through consumption of forbs and shrubs; grasses typically provided lower levels. Dietary overlap based on key forage species between elk and other ungulates in summer has been highest ([% \pm 1 SE] 1998 = 48.4 \pm 10.4; 1999 = 43.6 \pm 13.2). between elk and mule deer. Lupines (*Lupinus* spp.) and snowbrush are the two species that occur in highest concentrations in elk and deer summer diets. Both of these plants are abundant in the Jarbidge

Mountains, and in all but one case, contain levels of protein and energy exceeding cow elk requirements throughout the summer.

Dry matter (DM) standing crop (kg/ha) of herbs and shrubs in aspen and mahogany communities was measured at transects for three time periods in three allotments during summer 1999. Elk carrying capacity was calculated for the amount of forage remaining (residual forage) in aspen and mahogany communities after seasonal livestock grazing was essentially completed. United States Forest Service allowable use levels (60% for herbs and 50% for current annual growth (CAG) of shrubs in deferred rotation allotments) were then applied to the remaining forage. However, it appears that a large portion of the standing crop is lost through the summer due to factors other than direct grazing such as trampling, fouling, and forage senescence.

Carrying capacity was calculated based on an estimated daily dry matter intake (DMI) of 2.5% for a 236 kg lactating cow elk. This type of carrying capacity, a form of grazing capacity, was based on elk use of residual herbaceous (graminoids and forbs) and shrubby (CAG) forage following the grazing season. This was considered to be the amount that could be used by elk after all other uses (livestock, mule deer, and current elk numbers) were considered.

Elk use of vegetation at feeding sites in summer 1999 was light (herbs, 3.8 ± 0.8 ; shrubs, 1.3 ± 0.7 [$x\% \pm 1$ SE]). Results from summer 1998 demonstrated similar use levels by elk. Although use by elk should increase in important foraging areas with increased elk densities, it is also assumed that elk use will expand into areas that are not currently frequented.

Carrying capacity estimates were based on key communities as these areas form the major overlap areas between elk, livestock, and mule deer. Sagebrush-grass cover types encompass 70.5% of Unit 072. These areas provide the bulk of grassy forage to livestock. Elk and mule deer certainly forage in these areas, especially directly adjacent to woody communities. However, the long-term ability of the Jarbidge Mountains summer range to support viable elk and mule deer populations depends on healthy stands of trees and shrubs including aspen, mahogany, and snowbrush. These communities provide high yields of nutritious forbs, graminoids, and shrubs to browsing and grazing ungulates throughout the summer.

TABLE OF CONTENTS

	Page
EXECUTIVE SUMMARY	i
TABLE OF CONTENTS	iii
LIST OF TABLES	iv
LIST OF FIGURES	v
INTRODUCTION	1
STUDY AREA	1
METHODS	2
Vegetation Transects	2
Elk Feeding Sites	3
Dietary Analyses	4
Nutritional Analyses	4
Carrying Capacity Estimates	5
RESULTS AND DISCUSSION	6
Vegetation Transects	6
Elk Feeding Sites	6
Dietary Analyses	6
Nutritional Analyses	7
Carrying Capacity Estimates	8
ACKNOWLEDGMENTS	9
LITERATURE CITED	10

LIST OF TABLES

Table	Page
1. Community type coverages, Nevada Division of Wildlife, Hunt Unit 072. Data obtained from GAP vegetation cover	12
2. Preliminary elk carrying capacity estimates for 1999 summer range based on total allowable forage. Nevada Division of Wildlife, Hunt Unit 072, Elko County, Nevada	13
3. Preliminary elk carrying capacity estimates for 1999 summer range based on key available forage. Nevada Division of Wildlife, Hunt Unit 072, Elko County, Nevada	14
4. Rank and % composition of key forage species in ungulate diets, Jarbidge Mountains, Nevada, 1999	15
5. Mean % dietary overlap of ungulates based on key forage species, Jarbidge Mountains, Nevada, 1998	16
6. Mean % dietary overlap of ungulates based on key forage species, Jarbidge Mountains, Nevada, 1999	17
7. Mean % dietary overlap of ungulates based on total diets, Jarbidge Mountains, Nevada, 1998	18
8. Mean % dietary overlap of ungulates based on total diets, Jarbidge Mountains, Nevada, 1999	19
9. Mean seasonal crude protein (%) of key forage species, Jarbidge Mountains, Nevada, summer 1999. Daily requirements for an adult cow elk, gravid in spring and lactating through mid-autumn, with average consumption rates, daily activities, and metabolic demands (from Cook; In Press)	20
10. Mean seasonal in vitro dry matter digestibility (%) of key forage species, Jarbidge Mountains, Nevada, 1999	21
11. Digestible energy (Kcal/kg) of key forages and by key forage class across three time periods. Jarbidge Mountains, Nevada, 1999. Daily requirements for an adult cow elk, gravid in spring and lactating through mid-autumn, with average consumption rates, daily activities, and metabolic demands (from Cook; In Press)	22

LIST OF FIGURES

Figure	Page
1. Jarbidge elk study area "Nevada Hunt Unit 072"	23
2. Mean % use total aspen herbaceous crop, Jarbidge Mountains, Nevada, 1999	24
3. Mean % use total mahogany herbaceous crop, Jarbidge Mountains, Nevada, 1999	25
4. Mean % use key aspen herbaceous crop, Jarbidge Mountains, Nevada, 1999	26
5. Mean % use key mahogany herbaceous crop, Jarbidge Mountains, Nevada, 1999	27
6. Mean DM (kg/ha) herbaceous aspen standing crop, Jarbidge Mountains, Nevada, 1999	28
7. Mean DM (kg/ha) herbaceous mahogany standing crop, Jarbidge Mountains, Nevada, 1999	29
8. Mean DM (kg/ha) snowbrush standing crop, Jarbidge Mountains, Nevada, 1999	30
9. Mean % use by elk at summer feeding sites, Jarbidge Mountains, Nevada, 1999	31
10. Dietary proportions by forage class, Jarbidge Mountains, Nevada, 1999	32
11. Mean (%) crude protein of key species by forage class, Jarbidge Mountains, Nevada, 1999	33
12. Mean digestible energy (Kcal/kg) of key species by forage class, Jarbidge Mountains, Nevada, 1999	34