

## MANAGEMENT SUBUNIT 16A - NEBO

### Subunit Boundary Description

**Utah, Juab, and Sanpete Counties** - Boundary begins at the junction of I-15 and US-6 in Spanish Fork; southeast on US-6 to US-89 at Thistle Junction; south on US-89 to Gunnison and SR-28; north along SR-28 to I-15 at Nephi; north along I-15 to US-6 in Spanish Fork.

### Range Trend Studies

Fifteen studies were originally established in the subunit in 1983. Six studies were added in 1989, and two were added in 2007. Three have been suspended over the years. A total of 21 sites were sampled in 2007.

### Management Unit Description

This management subunit incorporates most of the old North and South Nebo deer herd units. The old North Nebo deer herd unit included about 490,240 acres (198,400 ha). Physiographically, the unit was dominated by high mountains such as Santaquin Peak, Bald Mountain, and Mount Nebo. Mount Nebo represents the southernmost extension of the Wasatch Range. These mountains constitute the heart of a diverse and productive summer range, making up about 29% of the unit. Normal winter range constitutes approximately 32% of the area. The Mount Nebo summer range has a long history of high hunting success and depredation problems, a growing elk herd, and limited winter range.

The principal limiting factor and management concern in the old North Nebo unit is the lack of good-condition winter range, especially severe winter range on the west side of the unit. In this area, from Spanish Fork Canyon south to Nephi, the normal winter range averages 2 miles (3.2 km) or less in width. Severe winter range is even more narrow, ranging from as narrow as a few hundred yards, up to 1.5 miles (2.4 km). Total severe winter range accounts for only about 12% of the area. However, the winter range on the east and south sides of the unit is more expansive, and not nearly as critical. Some of the major problems related to the limited winter range on the unit, especially low elevation severe winter range, include: restricted access to traditional wintering areas west of I-15, predominately private ownership of critical ranges (63% of normal winter range), and agricultural depredation. To remedy the situation, the Utah Division of Wildlife Resources (UDWR) has acquired approximately 12,800 acres (5,180 ha) of winter range in the unit (7% of winter range) and has attempted treatments and rehabilitation in these critical areas. This unit remains one of the top deer herd units requiring winter habitat revegetation action. The available winter range, especially critical areas on the west side of the unit, remains threatened by development, mismanagement, and a high fire hazard from cheatgrass.

The key areas identified and sampled with 12 trend studies in 1983 are still priority areas. Three new studies were added in 1989. The majority of the studies are on UDWR land. However, much of the critical range is under private ownership and was not sampled due to restricted access and limited management opportunities. The 15 permanently-marked trend studies originally sampled in early August 1983 were resampled in mid-July of the drier year of 1989, and in late May of 1997, 2002, and 2007. All sample big game winter range areas, although many sites had some evidence of summer deer occupancy. The studies range in elevation from approximately 5,400 feet (1,646 m) to 6,500 feet (1,981 m). The prominent winter range vegetation types that were sampled include: mixed oak/big sagebrush, sagebrush/grass, mountain brush, bitterbrush, and cliffrose.

The San Pitch Mountains make up the majority of the old South Nebo herd unit. This low mountain range contains all of the summer range on the unit and 40% of the area. The surrounding foothills and western slopes provide winter range that makes up the remaining 60% of the range. The upper limit of the winter range is approximately 7,000 feet (2,134 m) in elevation, but extends to 8,000 feet (2,438 m) on the south exposures in canyons on the west side of the unit. Twenty-five percent of the winter range was classified as severe winter range in the 1976 range inventory. The upper limit of severe winter range is 6,000 feet (1,829 m), while the lower limit (5,200 feet or 1,585 m) of the winter range is restricted by highways, reservoirs,

agriculture, and small communities.

The Division has acquired several parcels of land totaling 7,200 acres (2,914 m), or 5% of the winter range. Further habitat acquisition and rehabilitation are necessary to adequately maintain the winter range. This unit has been one of the most important deer herd units for future winter range land purchases.

In 1983, four of the permanent range trend studies were established on severe winter range in the old South Nebo unit. Their elevation ranged from 5,520 feet (1,682 m) to 6,000 feet (1,829 m). Two chained areas were also sampled. One study is in a cliffrose type, the other in a mountain brush community. These studies were initially read in mid-August 1983. They were reread in mid-July 1989, then again in late May and early June of 1997, 2002, and 2007. Three studies were established in 1989 and reread in 1997, 2002, and 2007. Two new studies were established in June and July of 2007.

## SUMMARY

### WILDLIFE MANAGEMENT SUBUNIT 16A - NEBO

#### Community Types

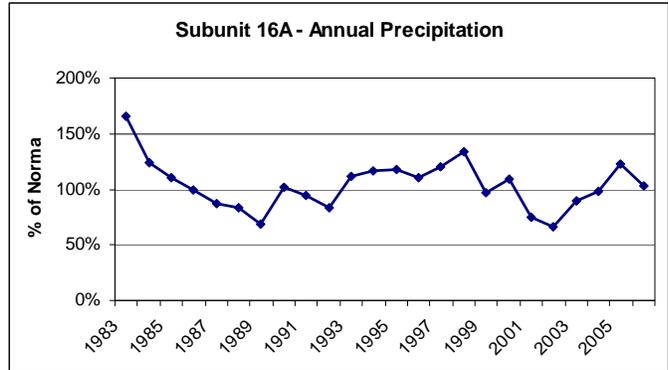
Nineteen studies were resampled and two studies were established in 2007. Five studies were dominated by mixed oak and sagebrush, three by Stansbury cliffrose, three by pinyon-juniper, two by mountain brush, two by mountain big sagebrush, two by basin big sagebrush, two by Wyoming big sagebrush, one by bitterbrush, and one by true mountain mahogany.

#### Precipitation

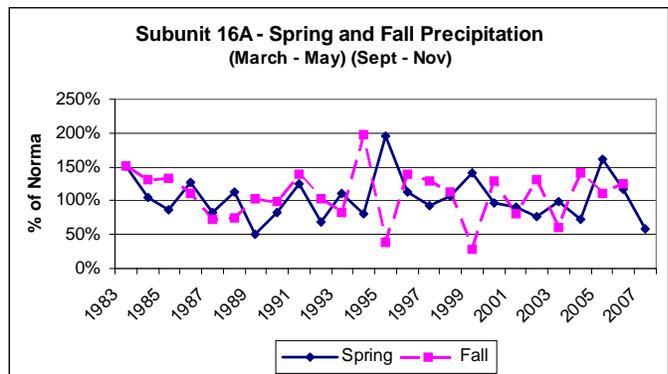
Vegetation trends are dependent upon annual and spring precipitation patterns. Precipitation data for this subunit were compiled from the Nephi, Levan, and Santaquin weather stations (Figures 1 and 2). The subunit annual precipitation average was below normal in 1987-1989, 1991, 1992, 1999, and 2001-2004, and was below 75% of normal (drought conditions) in 1989 and 2002 (Figure 1). Spring precipitation was below normal in 1985, 1987, 1989, 1990, 1992, 1994, 1997, 2000-2004, and 2007, and was near or below 75% of normal in 1989, 1992, 2002, 2004, and 2007 (Figure 2). Spring precipitation is essential for the recruitment of browse seedlings and the establishment of native perennial grasses and forbs. Fall precipitation was below 50% of normal in 1995 and 1999 (Figure 2).

#### Browse

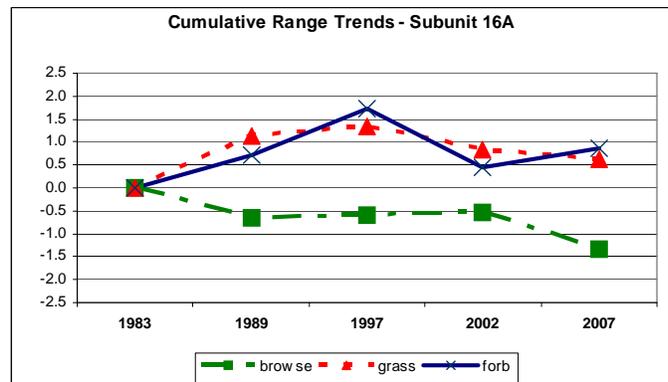
The average browse trend decreased from 1983 to 1989, remained relatively stable between 1989 and 2002, and decreased from 2002 to 2007 (Figure 3). Mountain big sagebrush was sampled on most studies, while basin big sagebrush was only sampled on Nebo Creek (16A-5), Big Hollow (16A-14), and Levan Farm Chaining (16A-16). The densities of both these species remained relatively stable from 1997 to 2002, then declined from 2002 to 2007 (Figure 4). Black sagebrush was only sampled on one study, Birch Creek (16A-9), and decreased from 1997 to 2002, then increased from 2002 to 2007. Wyoming big sagebrush was only sampled in 2007 on Levan North (16A-22) and Fountain Green Plateau (16A-23). Mountain big sagebrush cover remained relatively stable from 1997 to 2007, however, basin big sagebrush remained stable between 1997 and 2002, then declined from 2002 to 2007 (Figure 5). Black sagebrush was sampled only in density strips and not quadrats, and therefore cover could not be estimated. Decadence increased between 1997 and 2007 for



**Figure 1.** Annual Precipitation for subunit 16A. Precipitation data were collected at the Nephi, Levan, and Santaquin weather stations (Utah Climate Summaries 2007).



**Figure 2.** Spring and fall precipitation for subunit 16A. Precipitation data were collected at the Nephi, Levan, and Santaquin weather stations (Utah Climate Summaries 2007).



**Figure 3.** Cumulative range trends for subunit 16A.

mountain big and basin big sagebrush (Figure 6). Black sagebrush decadence was relatively low in 1997, was not sampled in 2002, and was high in 2007. Wyoming big sagebrush decadence was high in 2007 on both studies where it was sampled.

### Grass

The grass trend increased from 1983 to 1989, remained relatively stable in 1997, decreased from 1997 to 2002, and remained stable in 2007 (Figure 3). Average perennial grass cover slightly decreased from 1997 to 2002, then increased from 2002 to 2007 (Figure 7). However, average cheatgrass cover increased from 5% to 11% between 2002 and 2007. Bulbous bluegrass has been sampled at 12 sites, and its average cover has steadily increased from 2% to 5% since 1997. The average nested frequency of perennial grasses decreased from 1997 to 2002, then slightly increased from 2002 to 2007 (Figure 8). Cheatgrass nested frequency decreased slightly from 1997 to 2002, then increased substantially between 2002 and 2007. The average nested frequency of bulbous bluegrass has steadily increased from 1997 to 2007. Additionally, jointed goatgrass (*Aegilops cylindrica*), a noxious weed, was sampled on three sites.

### Forb

The forb trend steadily increased from 1983 to 1997, declined in 2002, and slightly increased in 2007 (Figure 3). The decline of the trend in 2002 may be attributed to drought conditions (Figures 1 and 2). The forb trend was slightly down or down on approximately 90% of the studies in 2002. Average perennial forb cover decreased between 1997 and 2002, then remained relatively stable in 2007 (Figure 7). The average nested frequency of perennial forbs followed the same pattern (Figure 8). Bur buttercup (*Ranunculus testiculatus*) and storksbill (*Erodium cicutarium*), two species that prevent the growth of other species (Buchanan et al. 1978, Kimball and Schiffman 2003), were sampled on 18 and 13 sites, respectively. Additionally, noxious weeds, including field bindweed (*Convolvulus arvensis*), houndstongue (*Cynoglossum officinale*), whitetop (*Cardaria draba*), and blue lettuce (*Lactuca pulchella*), were sampled on seven sites.

### Desirable Components Index

The subunit Desirable Components Index (DCI) average for mid-level potential studies declined from fair in 1997 to poor in 2002 and 2007 (Figure 9). The decline of the DCI ratings was mainly due to decreases in preferred browse and perennial forb cover, increases in browse decadence and cheatgrass cover, and the

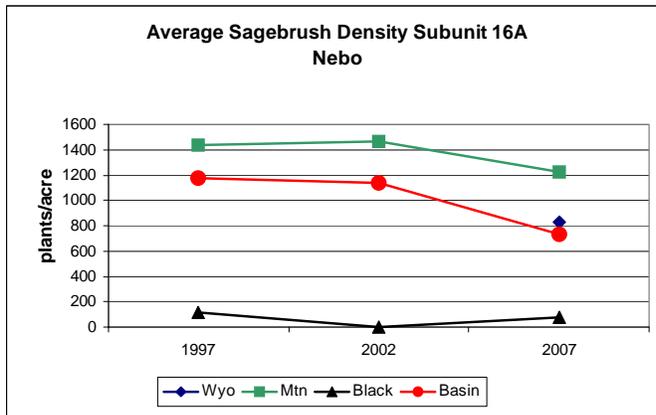


Figure 4. Average Wyoming big, mountain big, basin big, and black sagebrush density for subunit 16A.

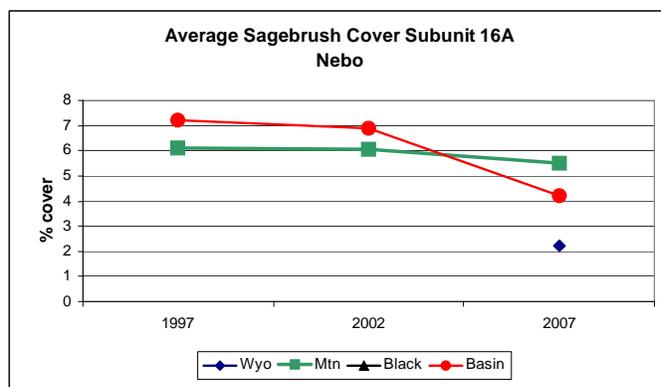


Figure 5. Average Wyoming big, mountain big, and basin big sagebrush cover for subunit 16A.

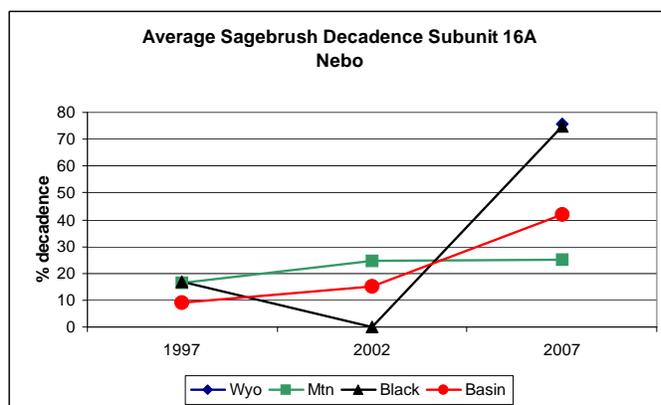


Figure 6. Average Wyoming big, mountain big, basin big, and black sagebrush decadence for subunit 16A.

presence of noxious weeds. Low potential studies were only sampled in 2007, but the average DCI rating for these two sites was very poor due to low sagebrush cover with high decadence, high annual grass cover, and the presence of a noxious weed on the Levan North site (16A-22).

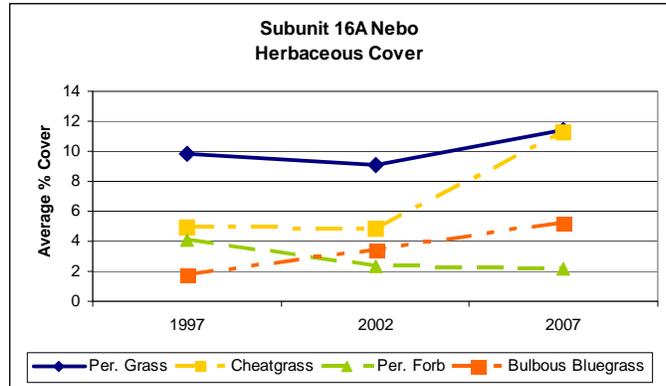


Figure 7. Average herbaceous cover for subunit 16A.

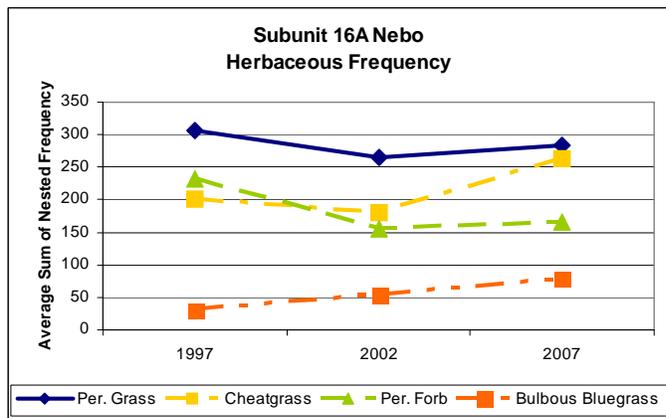


Figure 8. Average herbaceous nested frequency for subunit 16A.

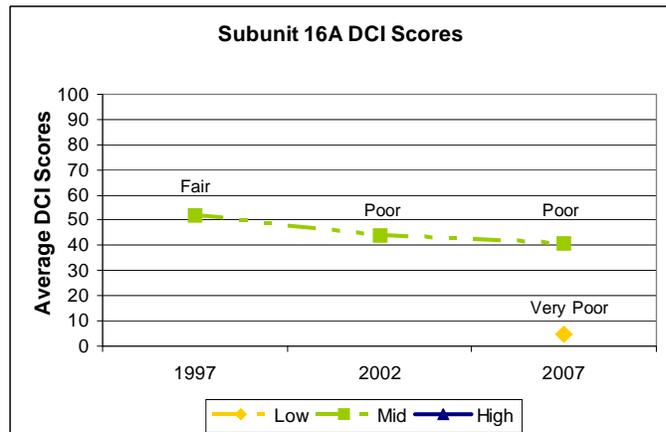


Figure 9. Subunit 16A average Desirable Components Index (DCI) scores by year. The DCI scores are divided into three categories based on ecological potentials, which include low, mid-level, and high.