

WILDLIFE MANAGEMENT UNIT 1 - BOX ELDER

Boundary Description

Box Elder, Tooele, Salt Lake, Davis and Weber counties - Boundary begins at the Utah-Idaho state line and Interstate 15; then west along this state line to the Utah-Nevada state line, south along this state line to Interstate 80, east on I-80 to I-15, north on I-15 to the Utah-Idaho state line.

Herd Unit Description

Wildlife Management Unit 1 is one of the largest in the state. However, big game range accounts for less than one-third of the unit. The Box Elder subunit 1B (Promontory region) is located in the east side and consists primarily of private land and was considered unsuitable for permanent trend studies. The Pilot Mountain subunit 1C is made up of the most southern portion of the unit and Pilot Mountain. The Raft River subunit 1A (western portion of the unit), where studies have been established, is dominated by the Raft River, Grouse Creek, and Goose Creek Mountains. Here again, private land accounts for almost 70% of what is considered "normal" winter range (King and Muir 1971) and is arranged in a checkerboard pattern with public lands. Towns located within this area are Etna, Grouse Creek, Lynn, Yost, and Park Valley.

The Raft River Mountains run parallel to the Utah-Idaho border, are moderately steep on the south and east, and more gentle on the north and west. The highest point is 9,925 feet on an unnamed peak at the head of the Clear Creek drainage. The Grouse Creek Mountains are relatively narrow and steep and run north-south. At 9,000 feet, Red Butte is the highest point in the Grouse Creek Range. The topography of the Goose Creek Mountains is generally more nominal, the highest point being 8,584 feet on Twin Peaks. The Dove Creek Mountains are more rough, but the terrain becomes more gentle near the Three Corners area.

Normal winter range covers 588,898 acres in subunits 1A and 1B. The upper elevation limits range between 6,000 and 8,000 feet depending on aspect. Winter concentration areas include: the Raft River Narrows, Devils Playground, Bovine, Kimber Ranch, Red Butte Basin, Black Hills, Hardister Creek, and Mud Springs Basin. During severe winters, the normally available winter range can be reduced as much as 74% (King and Muir 1971).

Seasonal migration consists mainly of elevational and north to south migrations from summer range to winter range. A significant number of deer spend their summers in Idaho then migrate south onto unit 1 winter ranges.

King and Muir (1971) estimated that the summer range was restricted to 194,612 acres (only 17% of the range) located in the upper portions of the Raft River, Goose Creek and Grouse Creek Mountains. They considered this quality summer range to be critical to the unit's big-game herds, especially for deer. Areas specifically listed as summer concentration areas for deer are the uppermost elevations of the Raft River Mountains, Johnson Creek Drainage, the head of Lynn Valley, the crest of the Grouse Creek Mountains, and Hardister Creek Plateau. Fawn production estimates from 1975 through 1990 have averaged a little more than 74 fawns/100 does (Jense et al. 1985, Jense et al. 1991). Between 1990 and 1995 the average was nearly 60. This would indicate that the summer range appears to be of sufficient quantity and quality to maintain a healthy herd, at least at present levels. But, if one examines a regression of trend on the fawn/doe ratios, it shows a declining trend through this same 15 year period (1975-90) with the ratios going from almost 86 down to 46. This is reflective of periods of drought that are so detrimental to summer ranges, especially if they are already a limiting factor. Climate data from Grouse Creek and Rosette show precipitation below 90% of normal for eight out of the past 23 years (1983 to 2005). Drought conditions (less than 75% of normal precipitation) existed in five years during this period (additionally, data was insufficient in 1989 and 2002, but these were very dry years across Utah). See precipitation graphs in unit summary (Figure 1).

King and Muir (1971) also describe seven general vegetation types which appear to dominate this big-game range. Sagebrush makes up 55% of the winter range and 58% of the summer range. With an estimated

production of 2,010 lbs/acre and 3,033 lbs/acre on the winter and summer ranges respectively, the big sagebrush type produces the most forage of any type. Black sagebrush occupies ridge tops within the summer range and the upper reaches of the winter range. On the summer range, the black sagebrush type has the highest abundance of grasses and forbs. Within the summer range, the browse type is dominated by curlleaf mountain mahogany on the drier sites and by maple on the more mesic sites. This type provides a good variety of spring-fall forage, yet makes up less than 1% of the winter range. The sagebrush-juniper and juniper types together account for 31% of the winter range. Juniper are more important for the thermal cover they provide in this type. Although small amounts of the aspen-timber and forb-grass types are found along the upper edges of winter range, their primary value is as summer range. A more detailed description and vegetation maps of the different vegetation types for deer herd unit 1 can be found in the 1970 Range Inventory Report published in 1971 by King and Muir.

The Box Elder herd unit was divided into two areas in the 1970 inventory, the western segment, with 588,898 acres of useable big-game range and the eastern segment with 342,567 acres of useable big-game range. The average vegetation production for each vegetation type and their respective acreages for each range type were determined as follows:

Black sagebrush 1,940 lbs/acre on 26,188 acres; sagebrush 2,010 lbs/acre on 511,744 acres; mixed browse 1,842 lbs/acre on 5,767 acres; sagebrush-juniper 1,863 lbs/acre on 134,167 acres; juniper 1,556 lbs/acre on 154,912 acres; aspen-timber 384 lbs/acre on 5,056 acres; forb-grass 1,164 lbs/acre on 7,564 acres; and maple-sagebrush 1,086 lbs/acre on 21,203 acres (this last type is located only on the eastern segment of the unit). The remainder of the acreage was made up of non-range and agricultural land types.

These average production figures were determined by sampling a total of 404 one-hundred-foot transect lines during the range inventory in 1970.

Big Game Trends

Pratt (1983) gave a brief history of the recent management of this unit's deer populations. In 1950, the season was primarily buck only with a few special permits. Between 1951 and 1970, regulations allowed either sex hunting with some special permits and season extensions. During 1971 and 1972, the first three days were either sex, followed by eight days of buck only hunting. From 1973 to the present, hunts have been buck only with a few special antlerless permits to help lower the population because of depredation to agricultural lands. The 1990 management objectives were to maintain the population necessary to sustain a yearly harvest of 2,250 bucks from subunits A and B and 1,100 for subunit C. Current objectives are to manage for a modeled target winter population of 24,000 deer with an annual buck harvest of about 2,800 animals, achieve post season ratio of 15 bucks/100 does, and to maintain and protect 588,000 acres of winter range and 194,000 acres of summer range.

Between 1950 and 1981, the buck harvest for the western portion of the unit ranged between 508 and 3,022, with an average of 1,302 bucks per year (Pratt 1983). However, the harvest has been increasing in recent years. In 1982, there were 2,891 bucks taken and 3,364 and 2,233 were taken in 1983 and 1984, respectively (Jense et al. 1985). Harvests peaked in 1988 and 1991 when 4,454 and 4,323 bucks were harvested, respectively. Harvests dropped significantly after the severe winter of 1992-93. Only 503 bucks were taken in 1993 and 1,081 by 1994. Antlerless permits have been issued each year averaging 1,418 does per year between 1986 and 1992. Numbers dropped to only 583 in 1993, 39 in 1994 and 117 in 1995.

A regression trend line of buck harvest for the 40 year period of 1950-1990 shows an increasing trend from 838 in 1950 to 3,014 by 1990. While the regression of fawn-doe ratios have decreased from 86 to 46 from 1975-1990. This would suggest that the harsh winters of 1982-84 and a 3 year period of drought from 1988-89 have had a detrimental effect on the fawn population. Between 1991-92 and 1994-95 the fawn/doe ratio

has averaged 64 fawns/100 does. Since the severe winter of 1992-93, numbers have increased from 54 fawns/100 does in 1992-93 to 70 in 1994-95.

Elk herd unit 1 boundary coincides with Deer herd unit 1. The Pilot Mountain elk unit population had been relatively stable from 1984 to 1990, with two aerial counts (1989 and 1990) showing totals of 302 and 327 animals. The calve-cow ratios have bounced around since 1984 and have gone from a low of 24 to a high of 51 in 1990. Between 1991-92 and 1995-96 the calves/100 cow ratio has averaged only 39. The regressed trend for calve-cow ratios has shown a slightly downward trend since 1984, following the downward trend of the fawn-doe ratios.

Pratt (1983) listed several concerns about the increasing pressure on the unit's range and deer herd. A livestock owners group called the "Park Valley Improvement Association" is attempting to rehabilitate the range (for livestock use) by burning or chaining sagebrush and juniper on private lands. Much of this range is then seeded to monotypic stands of crested wheatgrass. This results in reductions in important wintering areas, and thermal-hiding cover. It has changed migration routes and concentration areas and has resulted in increased agricultural depredation problems. Other problems mentioned were: access problems resulting in uneven harvests and increasing hunter pressure in more open vegetation types, which could result in over-harvests. More importantly, these monotypic grass stands are more susceptible to catastrophic events, such as drought, insect outbreaks, disease, and also limits the season of use for this type. The more diverse a plant community is, the more resilient it is, especially in its recovery from periods of drought. Community diversity also extends season of use for both wildlife and livestock. Several private land owners are investing money in restoration projects for this purpose.

When interpreting the data, it should be recalled that the 1984 studies were read in a period of above average precipitation. In fact both 1983 and 1984 were well above normal. The 1990 readings were conducted after several successive years of drought (1988-1990). The 1996 readings occurred in a year of above normal precipitation. These conditions must be considered when evaluating long-term trend data, especially pertaining to herbaceous vegetation. Since the studies sample mostly winter range where browse, most often sagebrush, is the key forage, the following study discussions focus more on trends related to browse condition, composition and availability.

Trend Study Summary

Twenty four studies have been established in this management unit. Fourteen of these studies were established in 1984. Twelve study sites sampled winter ranges on sagebrush-grass range types, two were placed in the pinyon-juniper type, and one in mixed mountain brush. The Cedar Hills (1-15) trend study was established in 1990. Nine new trend studies were established in 1996 to provide data in other areas of concern. These include mixed mountain brush sites at Nut Pine Hills (1-16), Clark's Basin (1-17), and Keg Spring (1-21). A high elevation black sagebrush site was added on Bally Mountain (1-19) and an aspen site was established at Cotton Thomas (1-20). Due to the increasing elk numbers on the Pilot Range, two studies, Patterson Pass (1-23) and Sheep Range Spring (1-24), were also established. An additional site was established at Dake Pass (1-22) to monitor a black sagebrush wintering area for elk north of the Pilot mountains.

In 2006, five studies were not monitored due to lack of use by wildlife. If the need arises in the future these studies can be sampled again. The suspended studies were: Kelton (1-1), Rosebud Hills (1-3), Southwest Rosette (1-9), Cotton Thomas (1-20), and Keg Spring (1-21). To access maps, discussions, and data tables for these studies see: <http://www.wildlife.utah.gov/range>.

SUMMARY

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Nineteen trend studies were sampled in 2006. Monitoring for this unit has occurred in 1984, 1990, 1996, 2001, and 2006. The original studies were established in 1984 and others were established in 1990 and 1996.

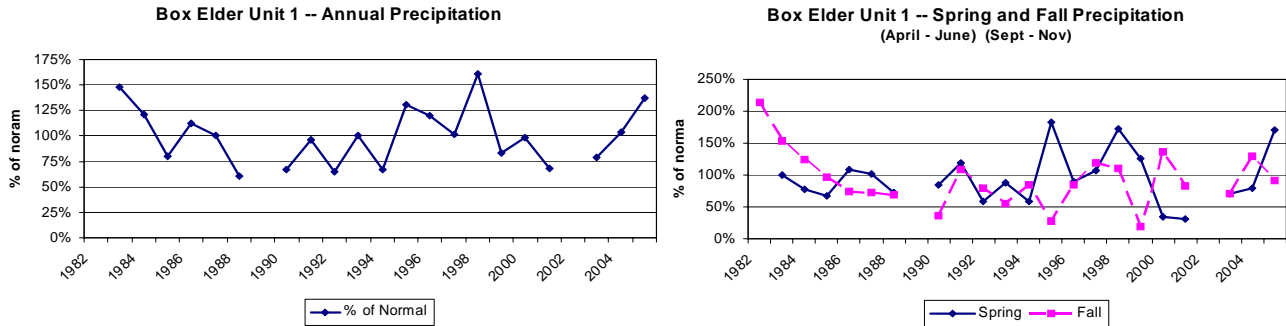


Figure 1. Percent of total annual precipitation (left) and percent of spring and fall precipitation (right) for Box Elder Unit 1, from weather stations at Grouse Creek and Rosette (Utah Climate Summaries 2006).

Precipitation data from Grouse Creek and Rosette from 1982 to 2006 show alternating periods of wet and dry cycles (Utah Climate Summaries 2006). Drought conditions (less than 75% of normal annual precipitation) were found in 1988, 1990, 1992, 1994 and 2001 (Figure 1). Data were incomplete for 1989 and 2002, but these years were considered drought years in other areas of the state. Spring precipitation (April-June) was less than 75% normal precipitation in seven years: 1985, 1988, 1992, 1994, 2000, 2001, and 2003 (Figure 1). Spring precipitation is critical for herbaceous plants and shrub recruitment. Drought conditions for multiple years plays a role in the decline of range conditions.

The cumulative browse trend (Figure 2) shows declining browse conditions since 1996. The average browse trend was -0.6 in 2001 and -0.9 in 2006. This decline is due to fire, drought, increased decadence, and lack of recruitment of key species.

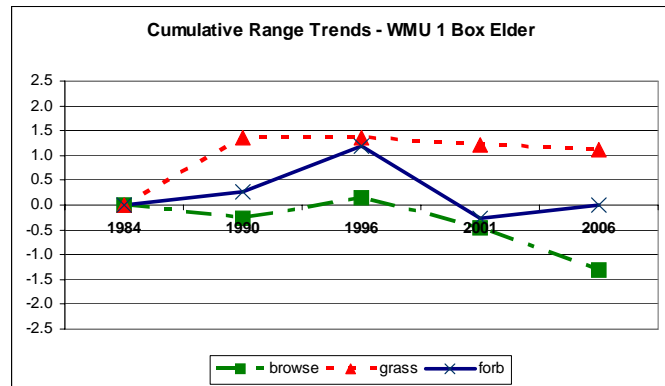
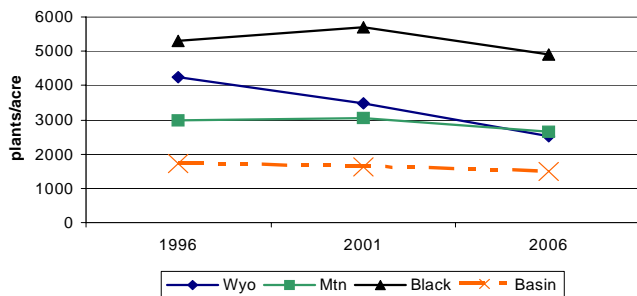


Figure 2

Average Sagebrush Density WMU 1 Box Elder (excluding burned studies)



Average Sagebrush Density WMU 1 Box Elder

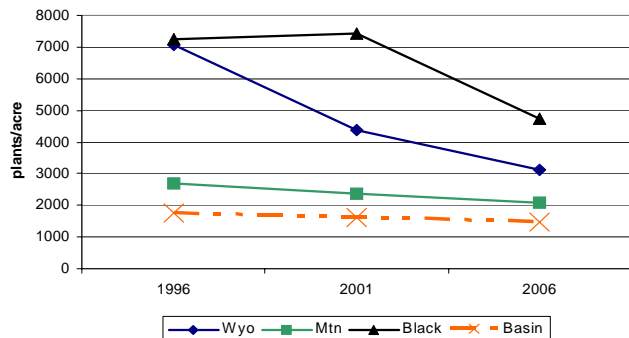


Figure 3. Average density of sagebrush species and subspecies from 1996 to 2006 across unit 1. Four burned studies not included (left) and all studies (right).

Excluding burned studies (Raft River Narrows, Broad Hollow, Cedar Hills, and Bally Mountain), each species or subspecies of sagebrush has showed a slightly declining density since 1996 (Figure 3). Fires have had major impact on sagebrush density (Figure 3), but have also been beneficial for the herbaceous understory at Cedar Hills and Bally Mountain.

Sagebrush decadence increased for Wyoming big sagebrush and mountain big sagebrush in 2006 (Figure 4). Drought conditions and increased competition of cheatgrass has likely led to this decrease in vigor of sagebrush. Average sagebrush cover (Figure 5) has remained stable from 1996 to 2006 for all species or subspecies except for Wyoming big sagebrush. The average cover for four Wyoming big sagebrush studies declined from 12.3% in 2001 to 9.3% in 2006.

Grass trends improved from 1984 to 1990. After 1990, the grass trends (Figure 2) have declined very slightly as cheatgrass nested frequency and abundance has increased (Figure 6). Cheatgrass nested frequency significantly increased on nine studies in 2001 and on seven studies in 2006. Four studies in 2001 and five studies in 2006 showed significant decreases of cheatgrass. Median cheatgrass cover increased in 2001 from less than 1% to nearly 4% (Figure 7).

Perennial grass nested frequency has remained stable from 1996 to 2006 (Figure 6), but median perennial grass cover increased in 2001 from 6% in 1996 to 8.5% and remained at 8.5% in 2006 (Figure 7).

The forb trends improved in 1990 and 1996, but declined sharply in 2001 with an average trend of -1.5. Forb trends improved in 2006 with an average trend of 0.3 (Figure 2). The median sum of nested frequency for perennial forbs decreased 47% in 2001, but increased slightly in 2006 (Figure 6).

The unit wide average Desirable Components Index rating (Figure 8) has declined from good in 1996 to fair in 2006 for both lower and mid-level ecological types. Increases in shrub decadence and decreases in shrub recruitment are the main factors for this decline.

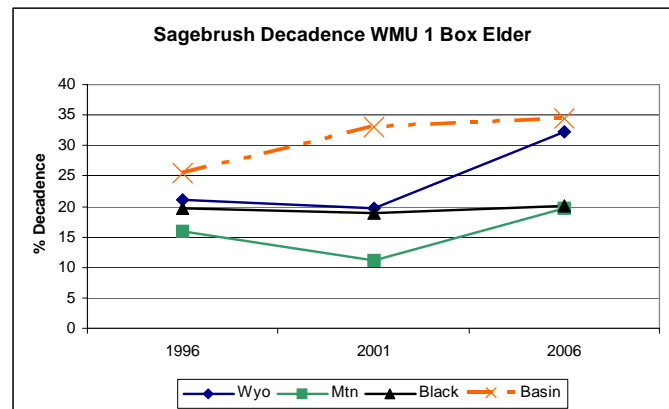


Figure 4. Average percent decadence for big sagebrush subspecies and black sagebrush across unit 1 from 1996 to 2006.

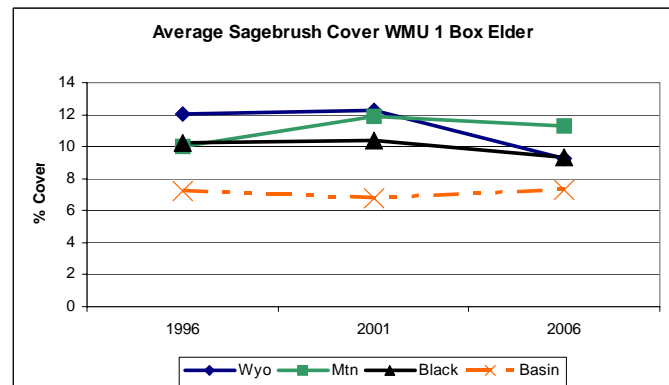


Figure 5. Average sagebrush cover for big sagebrush subspecies and black sagebrush across unit 1 from 1996 to 2006.

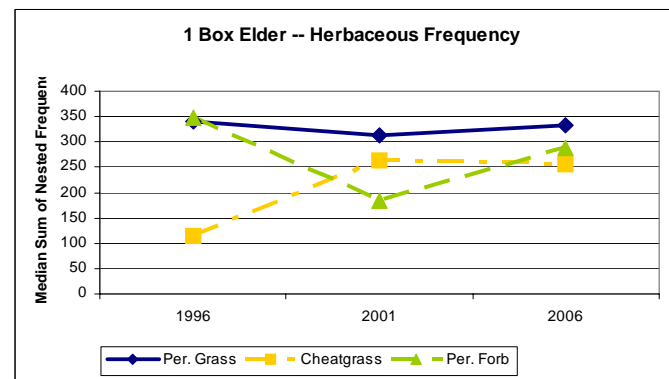


Figure 6. Median nested frequency for perennial grasses, cheatgrass, and perennial forbs for unit 1 from 1996 to 2006.

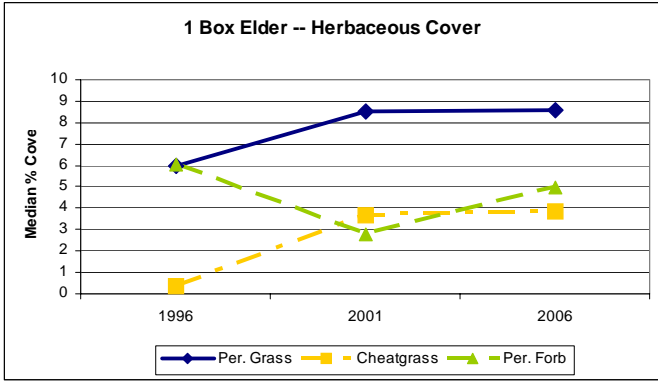


Figure 7. Median percent cover of perennial grasses, cheatgrass, and perennial forbs for unit 1 from 1996 to 2006.

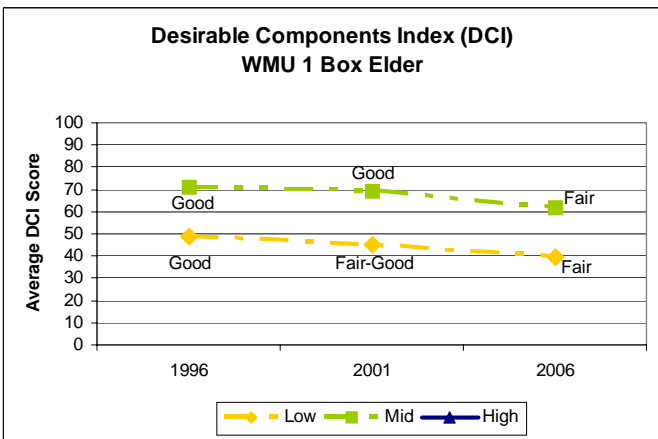


Figure 8. Average Desirable Components Index (DCI) ratings for Unit 1 from 1996 to 2006.