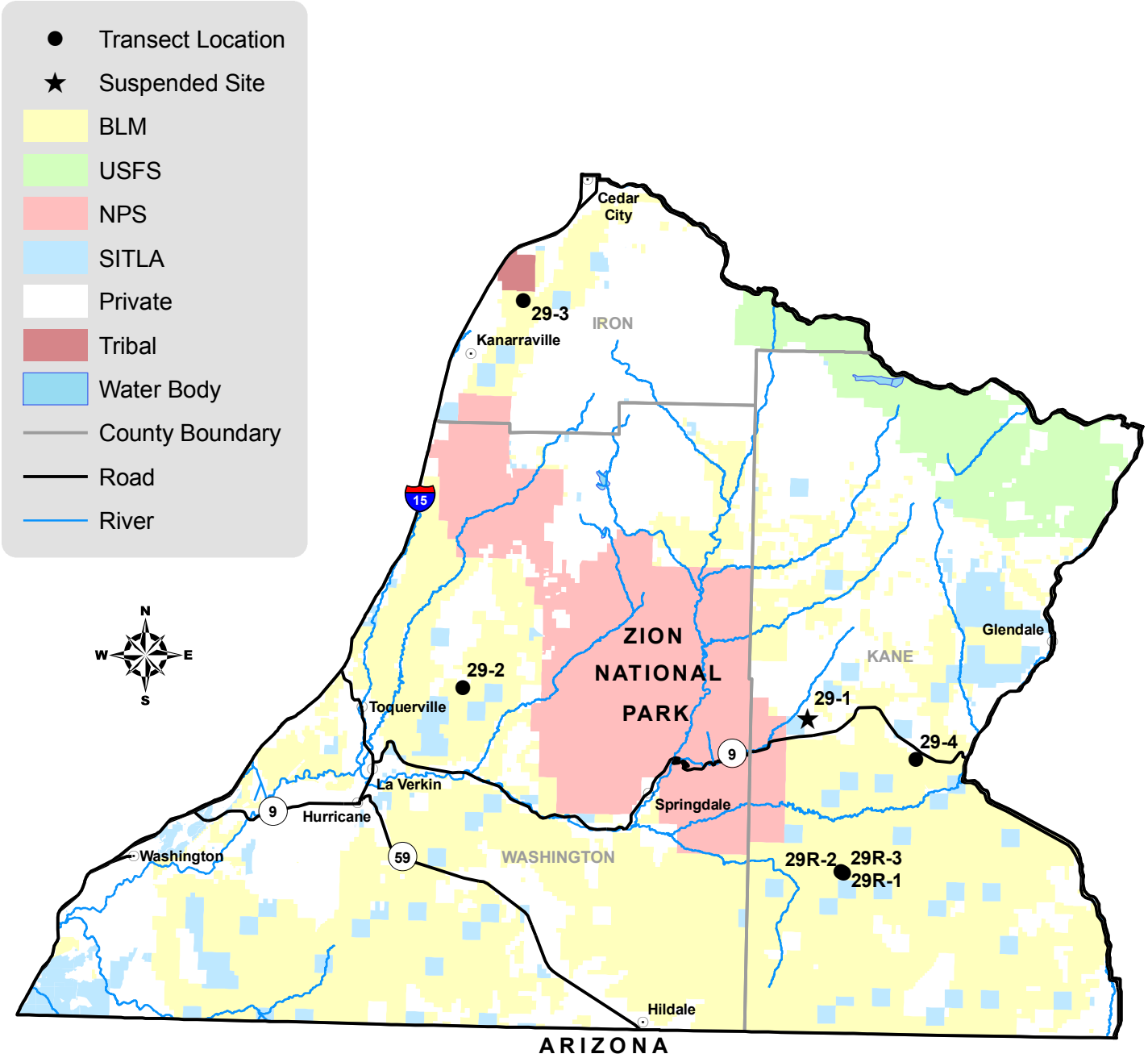
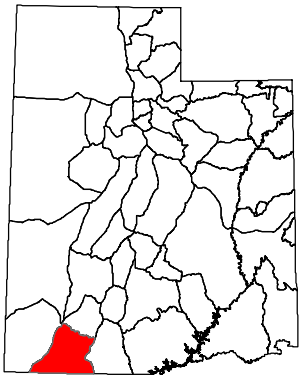
Management Unit 29



0 2.5 5 10 15 20 Miles

Unit Location



WILDLIFE MANAGEMENT UNIT 29 - ZION

Boundary Description

Iron, Kane and Washington counties - Boundary begins at Interstate 15 and the Utah-Arizona state line; then north on I-15 to Highway SR-14; then east on SR-14 to Highway US-89; then south on US-89 to Highway US-89A; then south on US-89A to the Utah-Arizona state line; then west on this state line to I-15 and beginning point.

Management Unit Description

The Zion unit is relatively large, yet there are few trend studies located within the unit. There is an estimated 301,431 acres of deer summer range and 333,914 acres of winter range within the unit (DWR 1998). Most of the summer range is found in the northern part of the unit, which includes the southern end of the Markagunt Plateau. Unlike the majority of the wildlife management units in the state, most of the summer range (59%) in the Zion unit occurs on private land with increased summer home development becoming more of a management problem. Of the remaining summer range, 21% is administered by the Forest Service and another 12% occurs within Zion National Park. Winter range occurs predominately on BLM land (54%), with an additional 20% in Zion National Park and 18% private (DeBloois 2001).

Study Site Description

Only one key area was selected for study in this unit in 1987. It was located at Wilson Ranch (now the Clear Creek Ranch). This study samples a Wyoming big sagebrush flat on private land located just east of the Zion National Park boundary, and north of Highway 9. This site was reread in 1992 and 1998. In 1998, two additional permanent trend study sites were established, one at Smith's Mesa and the other at North Hills. Both occur on the west side of the unit. In 1998, three special studies were established at the Elephant Gap exclosure to monitor the effects of differing grazing regimes. These studies were read as normal range trend studies in 2003 and 2008. In 2003, the Wilson Ranch study was suspended and a new study was established in the Barracks chaining located about three miles west of Carmel Junction and one-half mile south of Highway 9.

SUMMARY

WILDLIFE MANAGEMENT UNIT 29 - ZION

Community Types

Six trend studies were sampled in the Zion unit in 2008. All of the studies sample were winter range. Three of the studies were initially special project studies established at the Elephant Gap exclosure complex to evaluate different grazing effects that have since become regular range trend studies (29R-1, 29R-2, and 29R-3). These studies are in a pinyon pine (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), and Basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) community. One study is located in a Basin big sagebrush community (29-2). One study is located in a chained and seeded pinyon pine, Utah juniper, and mountain big sagebrush (*Artemisia tridentata* ssp *vaseyana*) community (29-3). One study is located in a mountain brush community (29-4).

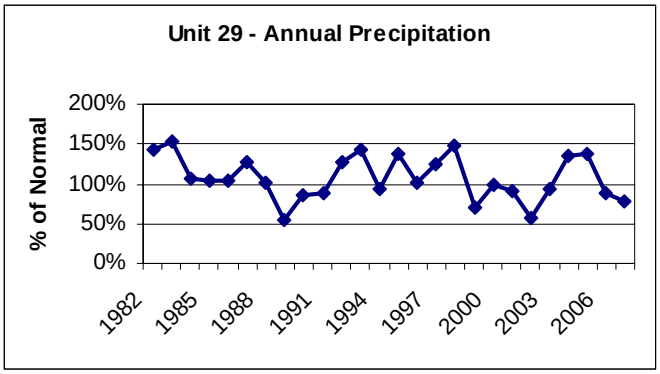


Figure 1. Average annual precipitation data for unit 29, Zion. Precipitation data were collected from the Cedar City FAA Airport, Orderville, Kanab, LaVerkin, and Zion National Park weather stations (Utah Climate Summaries 2008).

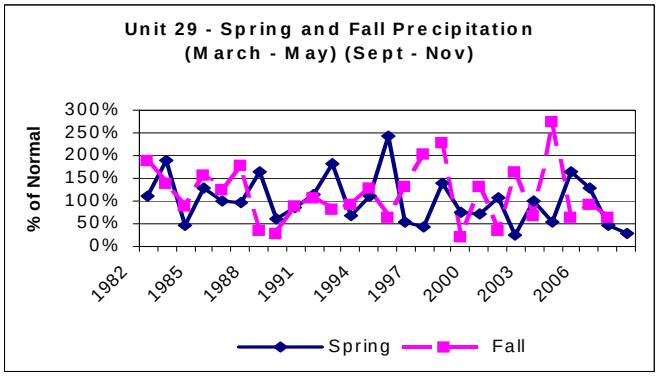


Figure 2. Average annual spring (March-May) and fall (Sept.-Nov.) precipitation data for unit 29, Zion. Precipitation data were collected from the Cedar City FAA Airport, Orderville, Kanab, LaVerkin, and Zion National Park weather stations (Utah Climate Summaries 2008).

Precipitation

Vegetation trends are dependent upon annual and seasonal precipitation patterns. Precipitation data from this herd unit were compiled from the Cedar City FAA Airport, Orderville, Kanab, LaVerkin, and Zion National Park weather stations (Figures 1 and 2). Precipitation data are averaged from the inception of the program in 1982 to present (Utah Climate Summaries 2008). The unit annual precipitation average was below or near 75% of normal (drought conditions) in 1999 and 2007, and near 55% in 1989 and 2002 (Figure 1). Spring precipitation (March-May) was below 75% of normal in 1989, 1993, 1999, and 2000, below 55% of normal in 1984, 1996, 1997, 2004, and 2007, and below 30% of normal in 2002 and 2008 (Figure 2).

Fall precipitation (Sept.-Nov.) was near or below 75% of normal in 1995, 2003, 2005, and 2007, and near or below 35% of normal in 1988, 1989, 1999, and 2001 (Figure 2). Spring precipitation is essential for the recruitment of browse seedlings and the establishment of native perennial grasses and forbs. Fall precipitation, however, benefits winter annual species, such as cheatgrass (*Bromus tectorum*) (Monsen 1994).

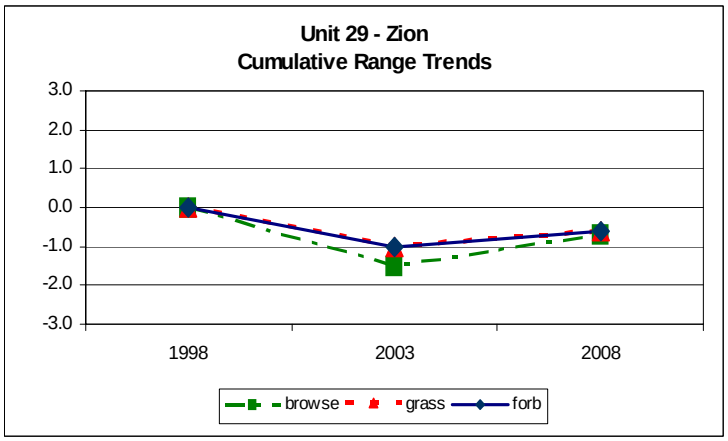


Figure 3. Cumulative range trends for unit 29, Zion.

Browse

The cumulative browse trend decreased from in 2003, likely due to drought conditions, then increased again in 2008 (Figure 3). Basin big sagebrush was sampled in four of the studies, Smith's Mesa (29-2), Elephant Gap Total Exclosure (29R-1), Elephant Gap Livestock Exclosure (29R-2), and Elephant Gap Exclosure Outside (29R-3). Density and cover of basin big sagebrush declined and decadence increased in 2003, likely due to drought conditions. There was a large increase in density of Basin big sagebrush and a decrease in decadence in 2008, but cover continued to decrease. This increase in density is primarily due to the large density of young Basin big sagebrush plants sampled at the Smith's Mesa study. Black sagebrush (*Artemisia nova*) was only sampled on one site, North Hills (29-3). Mountain big sagebrush was sampled on two sites, North Hills and Barracks Chaining (29-4), but was only sampled on the Barracks Chaining study in 2003 and 2008. Because of the limited data, a summary was not done for these species. For more information on these species refer to the discussion section.

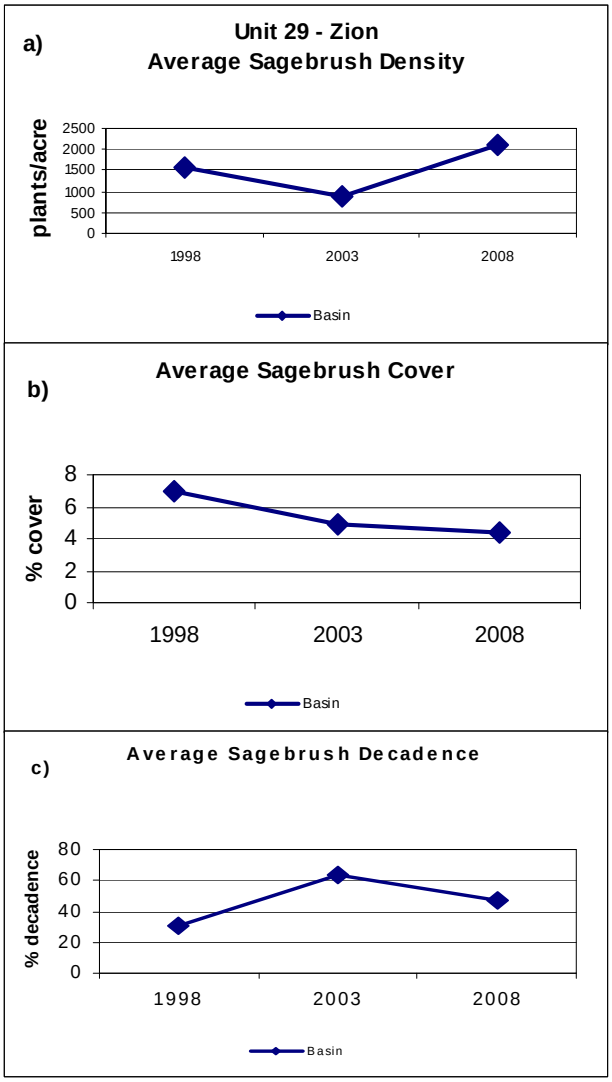


Figure 4. a) Average density of Basin big sagebrush unit 29, Zion. b) Average cover of Basin big sagebrush for unit 29. c) Average decadence of Basin big sagebrush for unit 29.

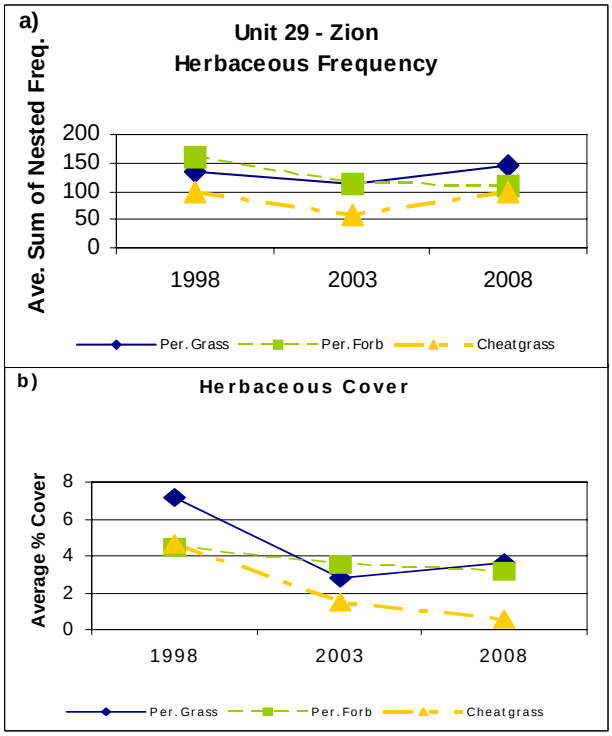


Figure 5. a) Average sum of nested frequency of perennial grasses, perennial forbs, and cheatgrass for unit 29, Zion. b) Average cover of perennial grasses, perennial forbs, and cheatgrass for unit 29.

Grass

The cumulative grass trend was similar to the cumulative browse trend decreasing in 2003, likely due to drought condition, and increasing to some extent in 2008 (Figure 3). Average perennial grass nested frequency decreased by 16% from 1998 to 2003, and increased by 29% in 2008 (Figure 7). Average perennial grass cover decreased markedly from 1998 to 2003, and increased slightly in 2008 (Figure 8). Cheatgrass was sampled on all of the studies in this herd unit. Cheatgrass average nested frequency decreased 40% from 1998 to 2003, but increased to near 1998 levels again in 2008 (Figure 7). Average cheatgrass

cover steadily decreased from near 5% in 1998 to less than 1% in 2008 (Figure 8).

Forbs

The cumulative forb trend was almost identical to the cumulative grass trend (Figure 3). Average perennial forb nested frequency decreased 30% from 1998 to 2003, but remained similar between 2003 and 2008 (Figure 7). The decrease in forb frequency in 2003 may be attributed to low annual and spring precipitation from 2002 (Figures 1 and 2). Average perennial forb cover decreased slightly, but steadily, from over 4% in 1998 to 3% in 2008 (Figure 8).

Desirable Components Index

All six studies in unit 29 were considered to be in the mid-level potential scale for the Desirable Components Index (DCI). The average DCI rating declined for the unit in 2003, but increased again in 2008 (Figure 9). The likely reason for the decline in habitat quality in 2003 was drought. There were general decreases in density of browse and cover of all species for that year.

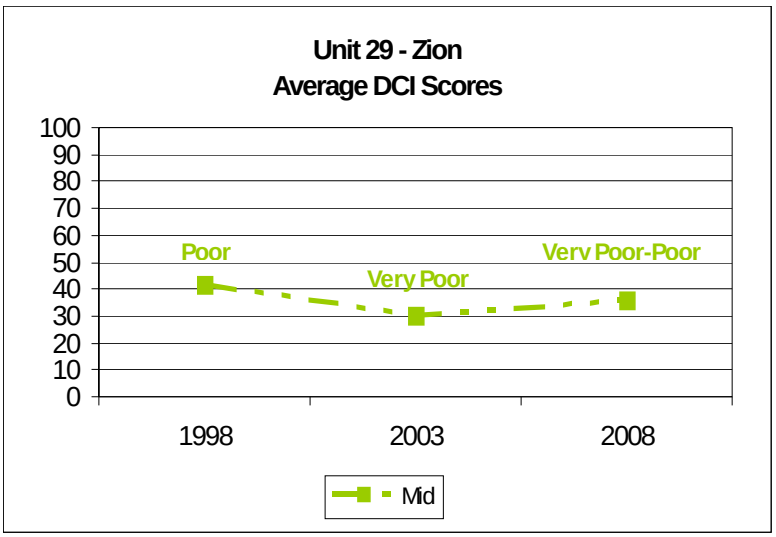


Figure 6. Unit 29 Desirable Components Index (DCI) scores by year. The DCI scores are divided into three categories based on ecological potentials, which include, low, mid-level, and high. Only mid-level sites are sampled on this unit.