DEER HERD UNIT MANAGEMENT PLAN
Deer Herd Unit # 29
Zion
2020

BOUNDARY DESCRIPTION

Iron, Kane and Washington Counties - Boundary begins at I-15 and the Utah-Arizona state line; north on I-15 to SR-14; east on SR-14 to US-89; south on US-89 to US-89A; south on US-89A to the Utah-Arizona state line; west on the Utah-Arizona state line to I-15.

LAND OWNERSHIP

RANGE AREA AND APPROXIMATE OWNERSHIP

	Year-long range		Summer Range		Winter Range	
Ownership	Area (acres)	%	Area (acres)	%	Area (acres)	%
Forest Service	0	0%	60638	20%	1270	<1%
Bureau of Land Management	1270	8%	19123	6%	268291	58%
Utah State Institutional Trust Lands	52	<1%	9059	3%	37693	8%
Native American Trust Lands	0	0%	0	0%	2226	<1%
Private	14149	91%	177242	59%	87560	19%
Department of Defense	0	0%	0	0%	0	0%
USFWS Refuge	0	0%	0	0%	0	0%
National Parks	0	0%	35501	12%	67854	15%
Utah State Parks	0	0%	0	0%	0	0%
Utah Division of Wildlife Resources	0	0%	0	0%	0	0%
TOTAL	15471	100%	301563	100%	464894	100%

UNIT MANAGEMENT GOALS

- Manage for a population of healthy animals capable of providing a broad range of recreational opportunities, including hunting and viewing.
- Balance deer herd impacts on human needs, such as private property rights, agricultural crops and local economies.
- Maintain the population at a level that is within the long-term capability of the available habitat to support.

POPULATION MANAGEMENT OBJECTIVES

- Target Winter Herd Size - Manage for a 5-year target population of 19,000 wintering deer (modeled number) during the five-year planning period unless range conditions become unsuitable, as evaluated by DWR. This is an increase from the 2015 plan, which was 15,500. The 10-year average population estimate is 15,300. Range Trend data coupled with annual browse monitoring will be used to assess habitat condition. If habitat damage by deer is occurring due to inadequate habitat, measures will be taken to reduce the population to sustainable levels. Change to population objective is based primarily on new data and models available beginning in 2013. New estimates of actual population numbers have been taken into account and the new objective should reflect the numbers of deer that are currently on the unit.

Unit 29

1994-2001 Objective: 9,000
2002-2014 Objective: 9,000
2015-2020 Objective: 15,500
2021-2025 Objective: 19,000
Change from last plan +3,500

- Herd Composition – This is a General Season unit and will be managed to maintain a three-year average postseason buck to doe ratio of 18-20 according to the statewide plan. This unit recently has exceeded the 20 bucks per 100 doe threshold post season in the three-year average. The summer range on this unit is dominated by private lands and increases in permits under the current hunt structure may only result in more trespass issues. The Statewide Mule Deer Management plan allows for change in hunt structure to accommodate for migratory herds and that may be an option considered if the adding more permits under the current hunt structure becomes problematic.

- Harvest – General Buck Deer hunt regulations, using archery, rifle, and muzzleloader hunts apply. In an effort to reduce hunter crowding on the traditional any-weapon season, an early any-weapon hunt was initiated in 2018 with 20% of the total permits being offered during this season. Hunter success rates have been similar to the traditional any-weapon season.

POPULATION MANAGEMENT STRATEGIES

Monitoring

- Population Size - Utilizing harvest data, postseason and mortality estimates, a computer model has been developed to estimate winter population size. The 2019 post- season model estimates the population at 19,200 deer.

- Buck Age Structure - Monitor age class structure of the buck population through the use of checking stations, postseason classification, uniform harvest surveys and field bag checks.

- Migration – In the fall/winter of 2018/19 a migration study was started on this unit by GPS collaring 80 adults, does and bucks on multiple winter ranges around the unit. Some deer have been observed spending the summer on the Panguitch Lake unit to the north. This study has also allowed us to monitor adult survival and has improved our data used to model the post-season population.

- Harvest - The primary means of monitoring harvest will be through the statewide uniform harvest survey and the use of checking stations. Achieve the target population size by use of antlerless harvest using a variety of harvest methods and seasons. Recognize that buck harvest will be above or below what is expected due to climatic and productivity variables. Buck harvest strategies will be developed through the RAC and Wildlife Board process to achieve management objectives for buck: doe ratios

Year	Buck harvest	Post-Season F/100 doe	Post-Season B/100 doe	Post-Season Population	Objective	% of Objective
2017	1622	60.4	22.8	19,000	15,500	122.6%
2018	1518	57.4	22.6	19,900	15,500	128.4%
2019	1587	58.8	19.1	19,200	15,500	123.9%
3 Year Avg	1576	58.9	21.5			125%

Limiting Factors (May prevent achieving management objectives)

- Crop Depredation - Take all steps necessary to minimize depredation as prescribed by state law and DWR policy.

- Habitat - Public land winter range availability, landowner acceptance and winter range forage conditions will determine herd size. Excessive habitat utilization will be addressed with hunting.

- Predation - Follow DWR predator management policy.

  - This unit is currently under a Predator Management Plan for cougars. In the winter/spring of 2020, 9 of the 11 collared adult deer were taken by cougars. This PMP will take effect in November 2020. This unit is currently under a Predator Management Plan for bighorn sheep. Being under a PMP means that cougar can be taken without a quota.

- Highway Mortality - Cooperate with the Utah Dept. of Transportation in construction of highway fences, passage structures, warning signs, etc. Highway mortality is not a limiting factor on this unit.

- Illegal Harvest - If illegal harvest is identified as a significant source of mortality, an attempt to develop specific preventive measures within the context of an action plan will be developed in cooperation with the Law Enforcement Section.

HABITAT MANAGEMENT OBJECTIVES

- Maintain mule deer habitat throughout the unit by protecting and enhancing existing crucial habitats and mitigating for losses due to natural and human impacts.
- Reduce highway deer mortality along Interstate I-15 south of Cedar City and along Highway 14 east of Cedar City.
- A major proportion of both summer and winter habitat for deer on this unit is on private land. Therefore, it is paramount to work with private landowners to maintain both summer and winter habitat. Currently, there are two CWMU's. One is comprised of 15,000 acres (Mt. Carmel) in the Muddy Creek drainage on the east portion of this unit. Another is comprised of 5500 acres (East Zion) in the Clear Creek drainage. Other landowners have expressed interest in a CWMU and they may be organized in the future.
- Seek cooperative projects to improve the quality and quantity of deer habitat in order to support herd objectives.
- Provide improved habitat security and escapement opportunities for deer.

HABITAT MANAGEMENT STRATEGIES

Monitoring

- Determine trends in habitat condition through permanent range trend studies, spring range assessments, pellet transects, and field inspections. Land management agencies will similarly conduct range monitoring to determine vegetative trends, utilization and possible forage conflicts.
- Range trend studies will be conducted by DWR to evaluate deer habitat health, trend, and carrying capacity using the deer winter range Desirable Component Index (DCI) and other vegetation data. The DCI was created as an indicator of the general health of deer winter ranges. The index incorporates shrub cover, density and age composition as well as other key vegetation variables. Changes in DCI suggest changes in winter range capacity. The relationship between DCI and the changes in deer carrying capacity is difficult to quantify and is not known.

Habitat Protection and Maintenance

- Continue to work with UDOT to implement fencing and other strategies to reduce deer-vehicle collisions along I-15, SR-14, and US-89.
- Work with public land management agencies to develop specific vegetative objectives to maintain the quality of important deer use areas.
- Continue to coordinate with land management agencies in planning and evaluating resource uses and developments that could impact habitat quality.

- Work toward long-term habitat protection and preservation through the use of agreements with land management agencies and local governments, and through the use of conservation easements, etc. on private lands.

Habitat Improvement

- Cooperate with federal land management agencies and private landowners in carrying out habitat improvement projects. Protect deer winter ranges from wildfire by reseeding burned areas, creating fuel breaks and vegetated green strips, and reseed areas dominated by cheat grass with desirable perennial vegetation.
- Reduce expansion of Pinion-Juniper woodlands into sagebrush habitats and improve habitats dominated by Pinion-Juniper woodlands by completing habitat restoration projects like lop & scatter, bullhog, and chaining.
- Cooperate with federal land management agencies and local governments in developing and administering access management plans for the purposes of habitat protection and escape or security areas.
- Future habitat work should be concentrated on the following areas.

  -Seek opportunities to increase browse in burned areas of critical summer and winter range.

  -Continue to reduce Pinion and Juniper encroaching into shrubland in critical winter range. Specifically, on the west side of the Zion Unit from Cedar City south to Toquerville where it is adjacent to I-15 in critical winter range, and on the East Zion in the Yellow jacket and Pine Spring areas.

  -Quaking Aspen forests on higher elevation private land, NPS land, & USFS land

RANGE TREND SUMMARY

Management Unit Description

Geography

The Zion wildlife management unit includes the southern portion of the Markagunt Plateau. The unit also contains Pine Spring Knoll, Kolob Peak, and Little Creek Mountain. Pine Knoll, located in the northeastern part of the unit, is the highest point with an elevation of 10,000 feet. In contrast, the lowest point in the unit has an elevation of about 2,500 feet and is located east of St. George. Zion National Park is also included in the unit; the highest point in the park is Horse Ranch Mountain with an elevation of 8,726 feet, and the lowest point is Coalpits Wash at 3,666 feet. The park occurs at the junction of the Mojave Desert, Colorado Plateau, and Great Basin, giving it a unique assembly of flora and fauna in addition to a variety of geographical configurations such as canyons, buttes, mesas, natural arches, and monoliths. Towns in this unit include Kanarraville, Hurricane, Springdale, Rockville, Mt. Carmel, and the cities of St. George and Cedar City on the unit boundaries.

A number of streams are located within this unit, including La Verkin Creek, Muddy Creek, Blue Creek, Crystal Creek, and Deep Creek: most of these are tributaries of the Virgin River. The Virgin River itself is formed by the confluence of the North Fork Virgin and East Fork Virgin just outside of Zion National Park near the town of Springdale. Navajo Lake and Kolob Reservoir are also found within the Zion management unit.

Climate Data

The 30-year (1981-2010) annual precipitation PRISM model shows precipitation ranges on the unit from 7 inches in the southwest portion of the unit near St. George to 36 inches near Midway Valley. All of the Range Trend and WRI monitoring studies on the unit occur within 12-18 inches of precipitation (PRISM Climate Group, Oregon State University, 2013).

Vegetation trends are dependent upon annual and seasonal precipitation patterns. Palmer Drought Severity Index (PDSI) data for the unit was compiled from the National Oceanic and Atmospheric Administration (NOAA) Physical Sciences Division (PSD) as part of the South-Central division (Division 4).

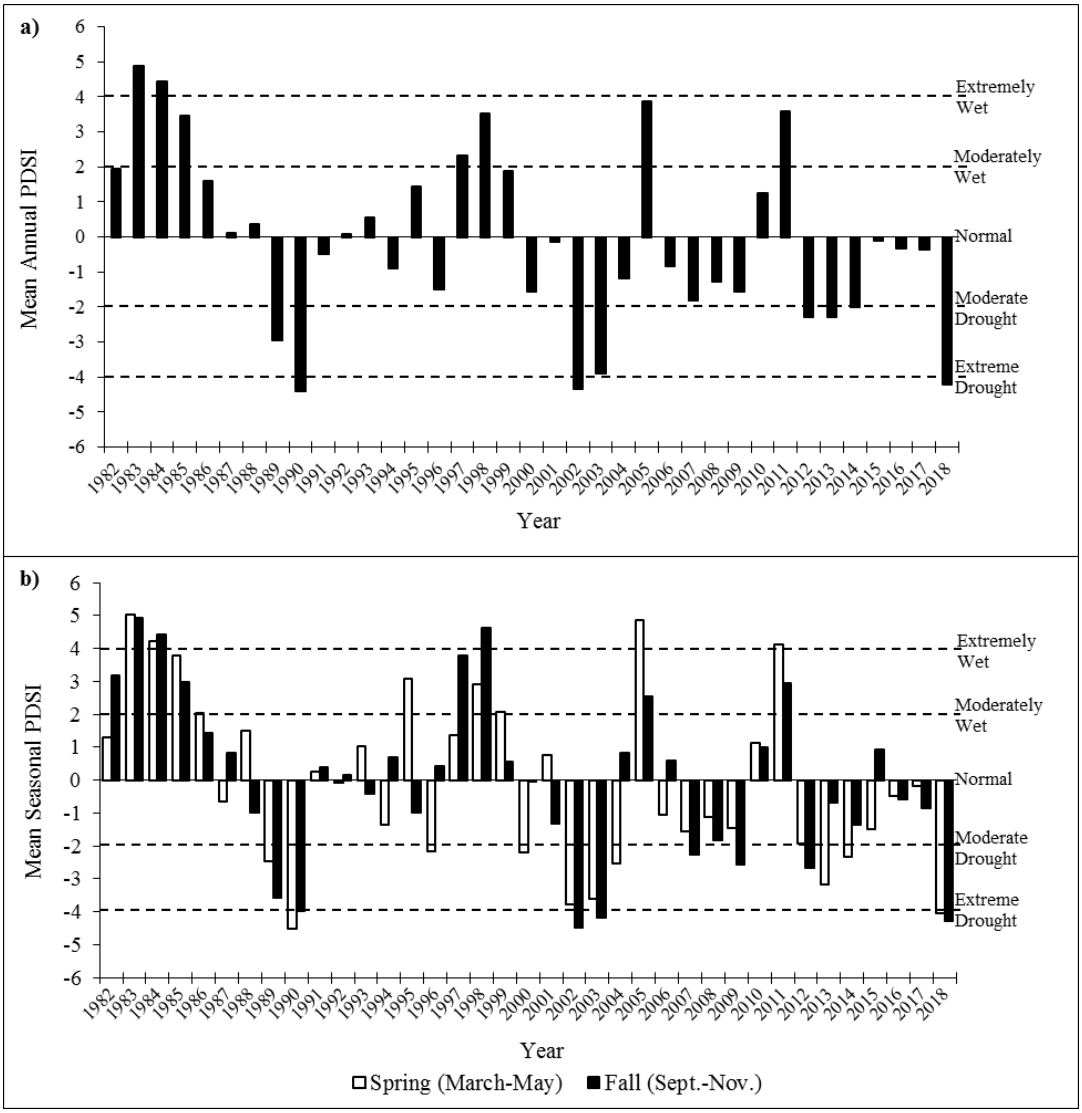


Figure 1.1: The 1982-2018 Palmer Drought Severity Index (PDSI) for the South Central division (Division 4). The PDSI is based on climate data gathered from 1895 to 2018. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification of the scale is ≥4.0 = Extremely Wet, 3.0 to 3.9 = Very Wet, 2.0 to 2.9 = Moderately Wet, 1.0 to 1.9 = Slightly Wet, 0.5 to 0.9 = Incipient Wet Spell, 0.4 to -0.4 = Normal, -0.5 to -.9 = Incipient Dry Spell, -1.0 to -1.9 = Mild Drought, -2.0 to -2.9 = Moderate Drought, -3.0 to -3.9 = Severe Drought and ≤-4.0 = Extreme Drought. a) Mean annual PDSI. b) Mean spring (March-May) and fall (Sept.-Nov.) (Time Series Data, 2019). .

Summer Range Habitat

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 in the Zion unit occurs on private land with increased summer home development becoming more of a management problem. The Forest Service and Zion National Park administrate the remaining summer range. Winter range predominately occurs on BLM land, but Zion National Park and private land make up a minor portion.

Winter Range Habitat

Winter range is a limiting factor on the west side of the Zion Unit from Cedar City south to Toquerville where it is adjacent to I-15. In addition, the majority of the summer range occurs on private land with increased summer home development becoming more of a management problem.

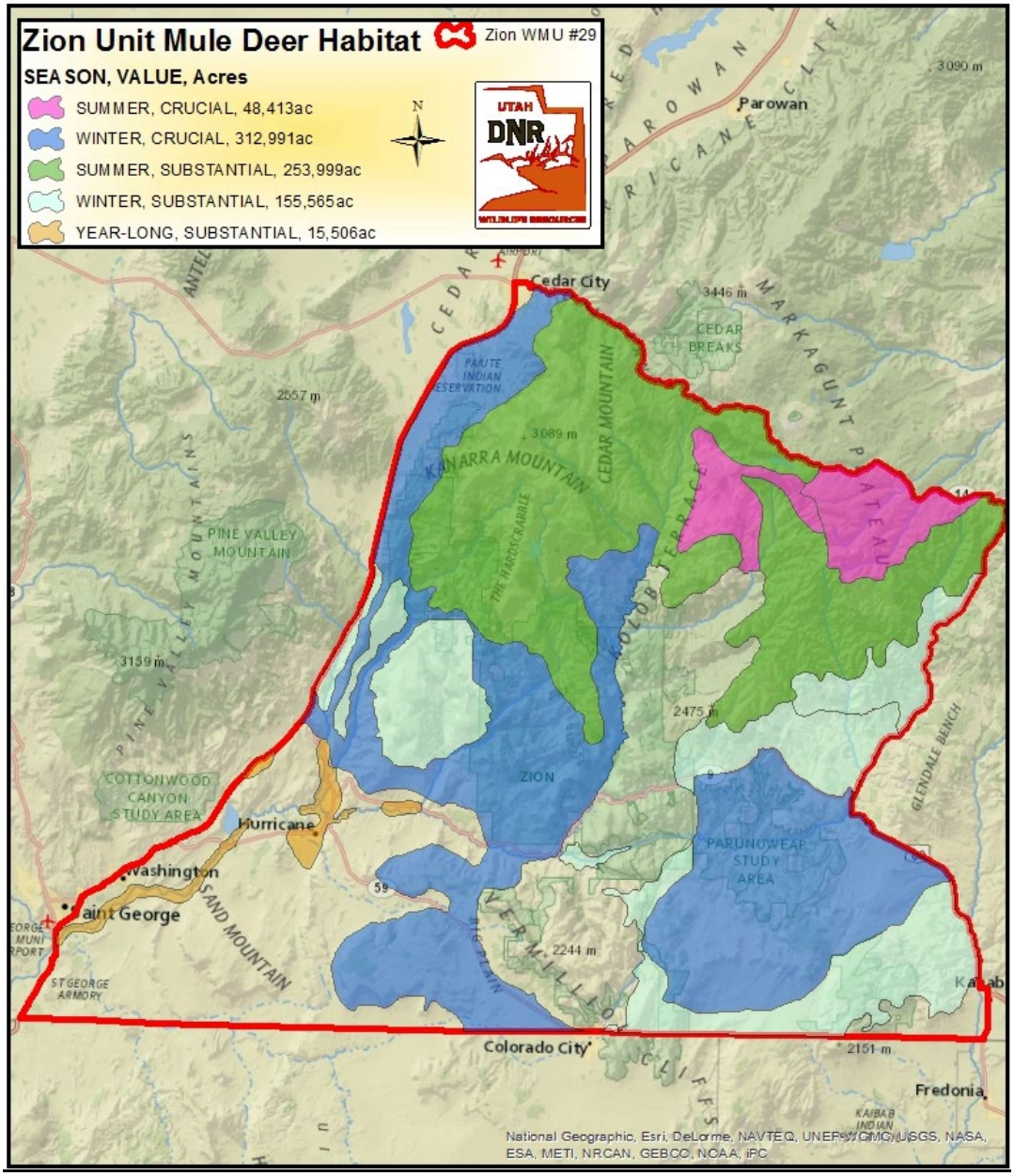
Wildfire has also had an impact on the deer winter range in this unit. The Kolob fire of 2006 was the largest wildfire in the unit at 17,631 acres, and burned almost entirely within the western boundary of Zion National Park. The Ranch fire of 2006 burned 6,108 acres of deer winter range on the western side of the unit near Pintura. The Shingle fire of 2012 and Big Wash fire of 2002 burned several thousand acres each of deer summer range in the

northern portion of the unit. Other large fires have occurred within the unit boundaries, but did not occur on deer habitat. Most recent fires burned less than 1,000 acres and have had negligible impact on deer winter range.

According to the LANDFIRE Existing Vegetation Coverage model, nearly 33% of the unit is comprised of pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) woodlands. While these woodlands provide valuable escape and thermal cover for wildlife, encroachment and invasion of pinyon-juniper woodlands into sagebrush communities has been shown to decrease sagebrush and herbaceous cover, therefore decreasing available wildlife forage (Miller, Svejcar, & Rose, 2000).

Annual grasslands, primarily cheatgrass (*Bromus tectorum*), comprise a small proportion of the unit and pose a minimal threat by increasing fuel loads and decreasing ecological resilience.

ZION MULE DEER HABITAT



Range Trend Studies

Range Trend studies have been sampled within WMU 29 on a regular basis since 1987, with studies being added or suspended as was deemed necessary. Due to changes in sampling methodologies, only data collected

following the 1992 sample year is included in this summary. Monitoring studies of WRI projects began in 2004; when possible WRI monitoring studies are established prior to treatment and sampled on a regular basis following treatment. Due to the long-term nature of the studies, many of the Range Trend and WRI studies have had some sort of disturbance or treatment prior to or since study establishment.

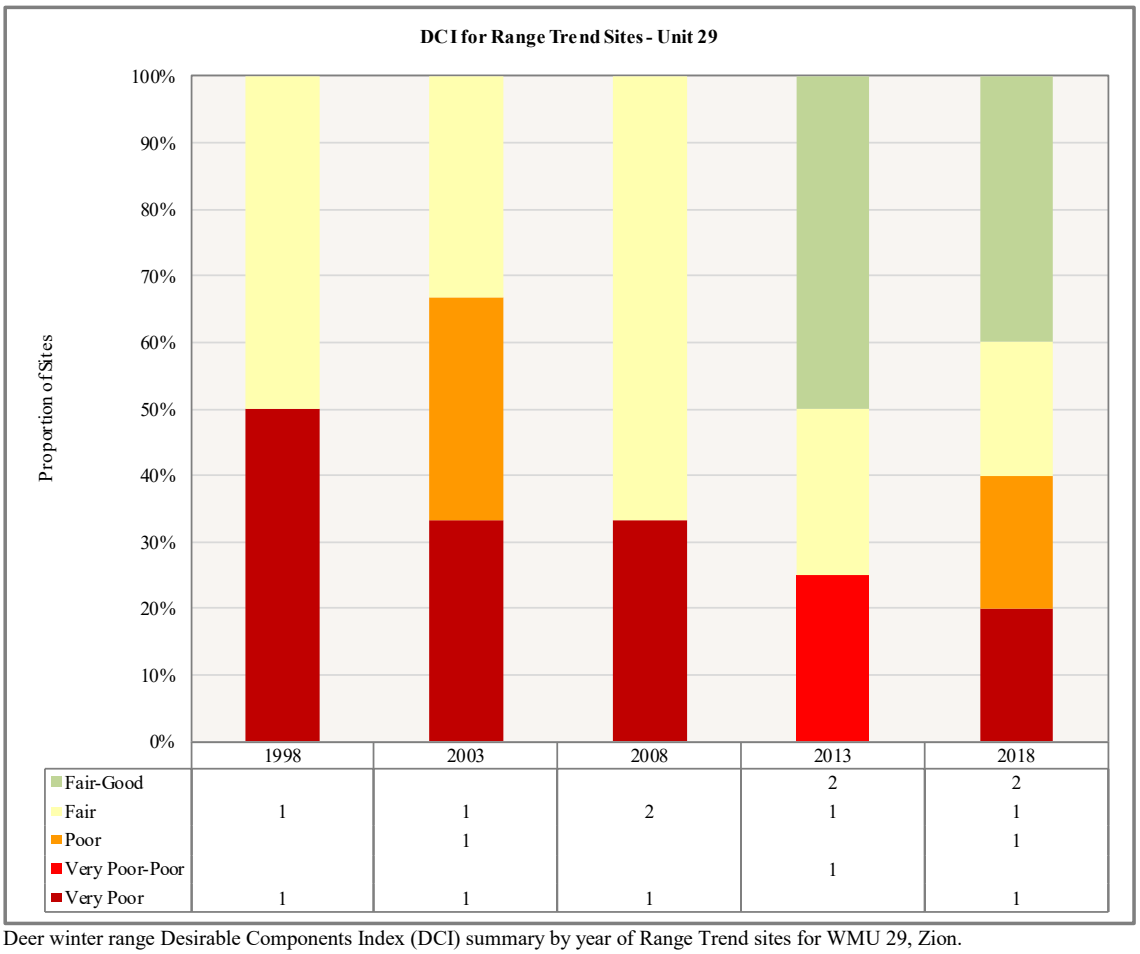
Range Trend studies that have not had recent disturbance or treatments are summarized in this report by ecological site or potential. Range Trend and WRI studies that have a disturbance or treatment during the reported sample period are summarized by the disturbance or treatment type. For a comprehensive report for each treatment type associated with the range trend site please refer to the full report. The full report can be viewed at the UDWR's regional office in Cedar City, Utah or at the UDWR Headquarters in Salt Lake City. An online version of the report will become available and currently you can access most of the results online at:

https://wildlife.utah.gov/.../**range**-**trend**s/.../2018_Southern_Region_Unit_Summary_Report.pdf

Study Trend Summary (Range Trend)

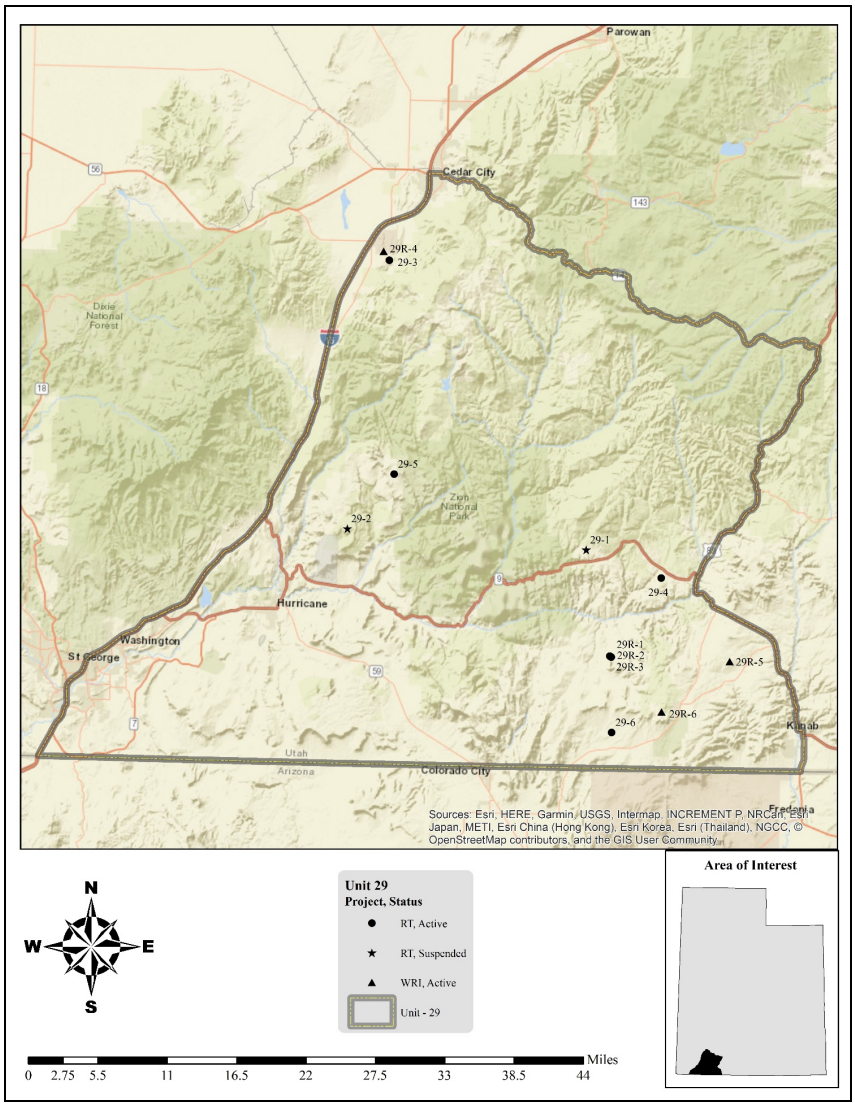
Deer Winter Range Condition Assessment

The condition of deer winter range within the Zion management unit has shown changes on the sites sampled since 1998. The active Range Trend sites sampled within the unit are considered to be in very poor to fair-good condition as of the 2018 sample year. The North Hills and Barracks Chaining studies have remained in fair-good condition. The Kolob Terrace study has stayed in fair condition. The Elephant Gap Exclosure Outside and Elephant Butte studies have remained in poor to very poor condition.



Deer winter range Desirable Components Index (DCI) summary by year of Range Trend sites for WMU 29, Zion.

Range Trend Study Locations – Long Term and WRI



Conditions and Recommendations

Mountain (Browse)

The studies that are within the Mountain (Browse) ecological type are considered to be in deer winter range and conditions on both sites are found to be fair to good. These sites are upper-elevation winter range sites and support mixed browse communities that provide browse for wintering animals. Annual grasses are a threat on these sites because they increase fuel loads which in turn can lead to habitat-destroying wildfires. Aggressive introduced perennial species are present and may present a significant threat to these sites, as they can reduce understory diversity by outcompeting more desirable native species. Conifer encroachment has been observed on both sites and these tree communities are likely to continue moving through the phases of woodland succession in future years.

When introduced perennial grasses become dominant in a system, they can reduce the biodiversity of the understory. Management of these rhizomatous introduced grasses can be difficult on these high-elevation sites. While they provide abundant forage, they can be detrimental to the overall biodiversity. Management options for introduced perennial grasses can include grazing management changes, prescribed burns, and if needed, herbicide treatments. Management of conifer trees is recommended in areas where it would be beneficial and feasible; possible tree-removing methods include bullhog, chaining, and lop and scatter. Areas with significant annual grass invasion should be monitored and treated if these high cover values persist. If reseeding is necessary to restore herbaceous communities, care should be taken in seed selection and preference should be given to native species.

Upland (Big Sagebrush)

The studies that are considered to be of the Upland (Big Sagebrush) ecological type are within deer winter range and are considered to be in condition varying from very poor to fair. Annual grass cover has been observed on the Kolob Terrace site: these grasses pose a threat because they increase fuel loads which can lead to an increased wildfire regime. Conifer encroachment was also observed on both study sites and this will likely increase in future years.

Although pinyon and juniper presence is currently limited on these study sites, further tree encroachment could lead to reduced herbaceous and shrub productivity. It is recommended that when necessary, work to reduce these tree species (e.g. bullhog, chaining, lop and scatter, etc.) should begin in areas where it would be beneficial to wildlife habitat. On sites with significant cover from annual grasses, treatments that could be helpful to restoring proper ecological function include changes to grazing, herbicide treatment, and other cultural control methods. If reseeding is necessary to restore herbaceous species, care should be taken in species selection and preference should be given to native grass species when possible.

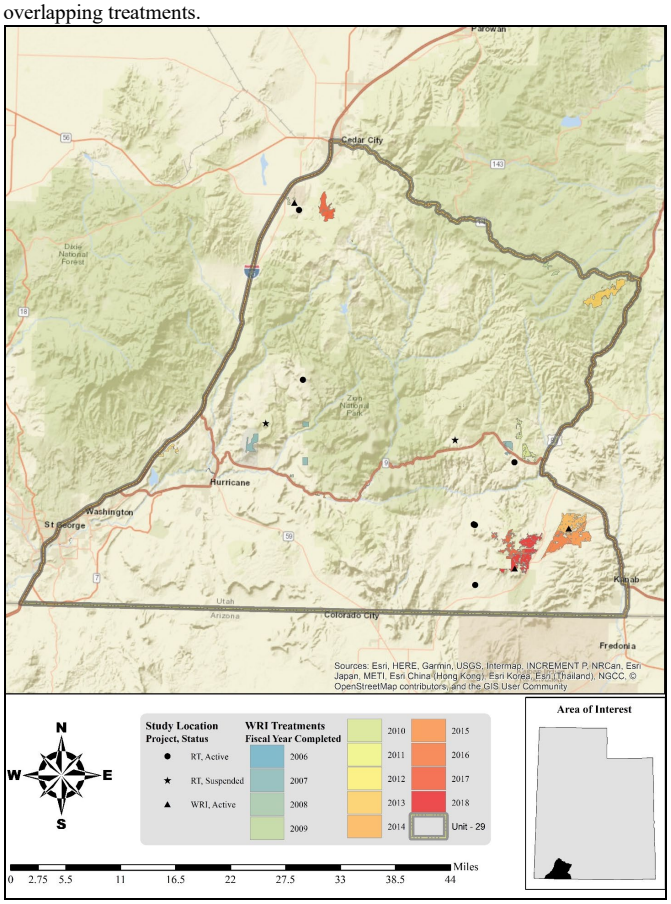
Treatments/Restoration Work

There has been an active effort to address many of the limitations on this unit through the Watershed Restoration Initiative (WRI). A total of 17,538 acres of land have been treated within the Zion unit since the WRI was implemented in 2004. In addition, 2,078 acres are currently being treated and treatments have been proposed for 6,770 acres. Treatments frequently overlap one another bringing the total treatment acres to 26,386 acres for this unit. Other treatments have occurred outside of the WRI through independent agencies and landowners, but WRI projects comprise the majority of work done on deer winter ranges throughout the state of Utah.

The most common management practice in this unit is the use of bullhog treatments to remove pinyon and juniper trees. Seeding plants to augment the herbaceous understory is also very common and frequently occurs together with other treatments. Other management practices include (but are not limited to): anchor chaining and manual vegetation removal techniques to remove trees, forestry practices such as thinning, discing, and prescribed fire.

Type	Completed Acreage	Current Acreage	Pending Completed Acreage	Proposed Acreage	Total Acreage
Anchor Chain	**1,341**	**0**	**0**	**1,075**	**2,416**
Ely (Two-Way)	1,341	0	0	1,075	2,416
Bulldozing	**53**	**0**	**0**	**0**	**53**
Tree Push	53	0	0	0	53
Bullhog	**10,042**	**2,262**	**0**	**2,496**	**14,800**
Full Size	9,892	2,262	0	2,496	14,650
Skid Steer	150	0	0	0	150
Disc	**349**	**0**	**0**	**0**	**349**
Plow (One-Way)	341	0	0	0	341
Off-Set (Two-Way)	8	0	0	0	8
Forestry Practices	**0**	**0**	**0**	**664**	**664**
Thinning (Commercial)	0	0	0	664	664
Harrow	**45**	**0**	**0**	**0**	**45**
≤15 ft. (One-Way)	45	0	0	0	45
Herbicide Application	**37**	**0**	**0**	**0**	**37**
Spot Treatment	37	0	0	0	37
Planting/Transplanting	**449**	**0**	**0**	**0**	**449**
Prescribed Fire	**298**	**0**	**0**	**0**	**298**
Seeding (Primary)	**5,310**	**21**	**0**	**2,077**	**7,408**
Broadcast (Aerial-Fixed Wing)	4,248	0	0	2,077	6,325
Broadcast (Aerial-Helicopter)	1,046	0	0	0	1,046
Hand Seeding	16	0	0	0	16
Ground (Mechanical Application)	0	21	0	0	21
Seeding (Secondary/Shrub)	**14**	**0**	**0**	**0**	**14**
Hand Seeding	14	0	0	0	14
Vegetation Removal/Hand Crew	**2,803**	**0**	**0**	**2,618**	**5,421**
Lop & Scatter	2,803	0	0	1,764	4,567
Lop-Pile-Burn	0	0	0	854	854
Grand Total	**20,741**	**2,283**	**0**	**8,930**	**31,954**
*** Total Land Area Treated**	**17,538**	**2,078**	**0**	**6,770**	**26,386**

WRI treatment action size (acres) for completed, current, and proposed projects for WMU 29, Zion. Data accessed on 02/18/2019. *Does not include overlapping treatments.



2015 – 2019 Habitat Project Areas