DEER HERD UNIT MANAGEMENT PLAN
Deer Herd Unit # 29
(Zion)
February 2015

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

Ownership	Year-long range		Summer Range		Winter Range	
	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 15,500 wintering deer (modeled number) during the five-year planning period unless range conditions become unsuitable, as evaluated by DWR. 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
Change from last plan +6,500

- 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 typically exceeds the 20 bucks per 100 doe threshold post season. The unit is dominated by private lands and increases in permits have not significantly lowered the buck to doe ratio. The current hunting permits are similar to the current demand. Significant increases in buck permits will not result in more harvest if hunters can not gain access to hunt. It may only result in more trespass issues. Caution will be use when adjusting permits and trends will be considered.

- Harvest – General Buck Deer hunt regulations, using archery, Rifle, and Muzzleloader hunts. Antlerless removal will be implemented to achieve the target population size using a variety of harvest methods and seasons. It is recognized that buck harvest may fluctuate due to climatic and productivity variables. Buck harvest strategies will be developed through the RAC and Wildlife Board process to achieve management objectives.

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 2014 model estimates the population at 15,000 deer.

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

- Harvest - The primary means of monitoring harvest will be through the statewide harvest survey and the use of checking stations.

Year	Buck harvest	Post-Season F/100 doe	Post-Season B/100 doe	Post-Season Population	Objective	% of Objective
2012	1367	61.9	24.5	11,000	9,000	122.2%
2013	1326	58.6	23.8	13,000	9,000	144.4%
2014	1297	56.3	23.5	15,000	9,000	166.7%
3 Year Avg	1330	58.9	23.9			

Limiting Factors (May prevent achieving management objectives)

- Crop Depredation - Strategies will be implemented to mitigate crop 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 through antlerless removal.

- Predation - Follow DWR predator management policy:
  - If the population estimate is less than 90% of objective and fawn to doe ratio drops below 70 for 2 of the last 3 years or if the fawn survival rate drops below 50% for one year, then a Predator Management Plan targeting coyotes may be implemented on that subunit.
  - If the population estimate is less than 90% of objective and the doe survival rate drops below 85% for 2 of the last 3 years or below 80% for one year, then a Predator

Management Plan targeting cougar could be implemented on that subunit.
- This unit is currently under a Harvest Objective Cougar unit because of the significant amount of private land and the livestock grazing operations on them. Also this unit is a bighorn sheep unit although cougars are thought to have little impact on the bighorn sheep population at this time.

- Highway Mortality - DWR will Cooperate with the Utah Dept. Of Transportation to construct highway fences, passage structures and warning signs etc if needed. Currently, highway mortality is not a limiting factor on this unit.

- Illegal Harvest - If illegal harvest is identified as a limiting factor, a unit specific action plan will be develop in cooperation with the Law Enforcement Section.

MULE DEER HABITAT MAP
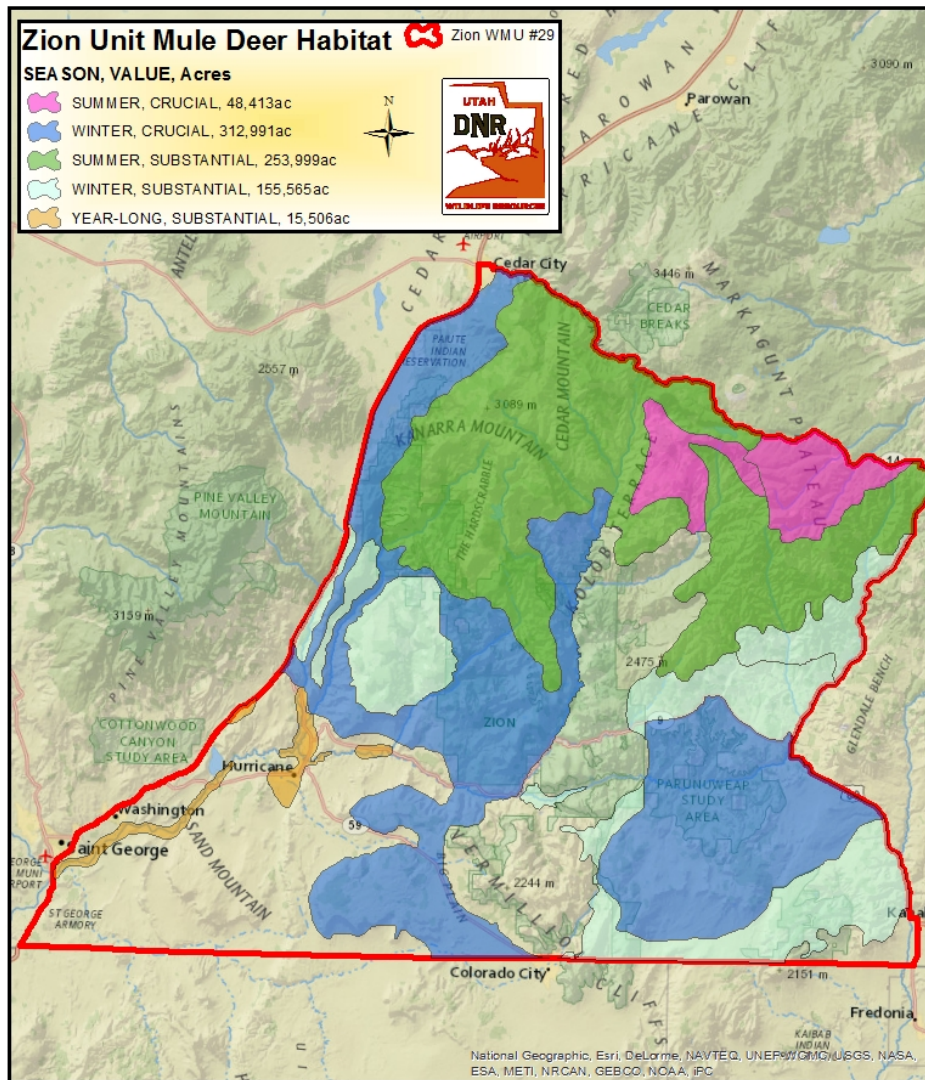
HABITAT MANAGEMENT OBJECTIVES
- Maintain mule deer habitat throughout the unit by protecting and enhancing existing crucial habitats and mitigating for losses due to natural and human impacts.

- 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 is one CWMU of 13,000 acres (Mt. Carmel - Zion) in the Muddy Creek drainage on the east portion of this unit. Other landowners have expressed interest in a CWMU and they may be organized in the future.

- Work with federal and state partners in fire rehabilitation and prevention on crucial deer habitat through the WRI process

- 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. However, the relationship between DCI and the changes in deer carrying capacity is difficult to quantify.

Habitat Protection, Improvement 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 including but not limited to: oil and gas development, wind energy, solar energy, and transmission line construction.

- Work toward long-term habitat protection and preservation through agreements with land management agencies and local governments, the use of conservation easements, etc. on private lands and working toward blocking up UDWR properties through land exchanges with willing partners.

- 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 Yellowjacket area.

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

Precipitation

Vegetation trends are dependent upon annual and seasonal precipitation patterns. Palmer Drought Severity Index (PDSI) data for the unit were compiled from the National Oceanic and Atmospheric Administration (NOAA) Physical Sciences Division (PSD) as part of the South Central division (Division 4). The mean annual PDSI of the South Central division displayed years of moderate to extreme drought from 1989-1990, 2002-2003, and 2012-2013. The mean annual PDSI displayed years of moderate to extreme wet years from 1982-1985, 1997-1998, 2005, and 2011 (Figure 1.1a). The mean spring (March-May) PDSI displayed years of moderate to extreme drought in 1989-1990, 1996, 2002-2004, and 2013; and displayed years of moderate to extreme wet years in 1982-1985, 1993, 1995, 1999, 2001, 2005, and 2011. The mean fall (Sept.-Nov.) PDSI displayed years of moderate to extreme drought in 1989-1990, 2002-2003, 2007, 2009 and 2012; and displayed years of moderate to extreme wet years in 1982-1985, 1997-1998, 2008 and 2011 (Figure 1.1b) (Time Series Data, 2014).
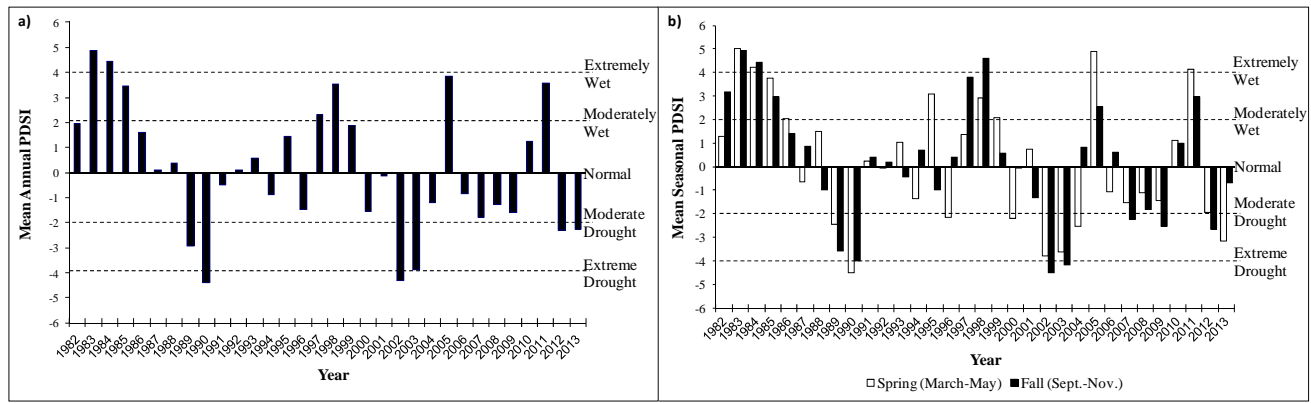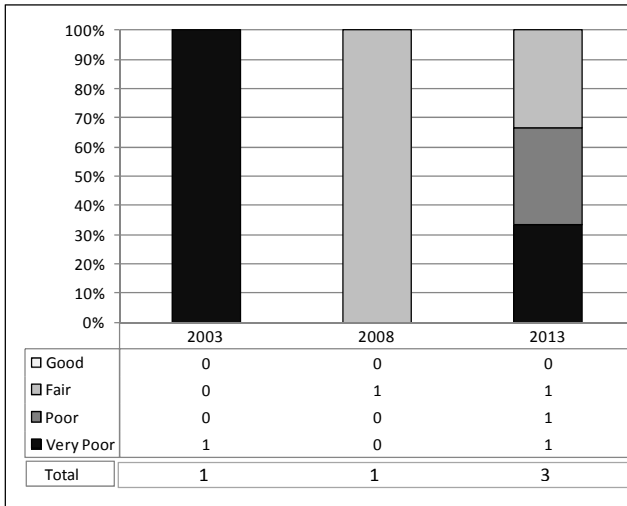

Figure Error! No text of specified style in document..1: The 1982-2014l Palmer Drought Severity Index (PDSI) for the South Central division (Division 4). The PDSI is based on climate data gathered from 1895 to 2013. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification of the scale is ≥4.0 = Extremely Wet, 3.0 to 3.9 = Very Wet, 2.0 to2.9 = 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 (Time Series Data 2014). a) Mean annual PDSI. b) Mean spring (March-May) and fall (Sept.-Nov.)(Time Series Data, 2014).
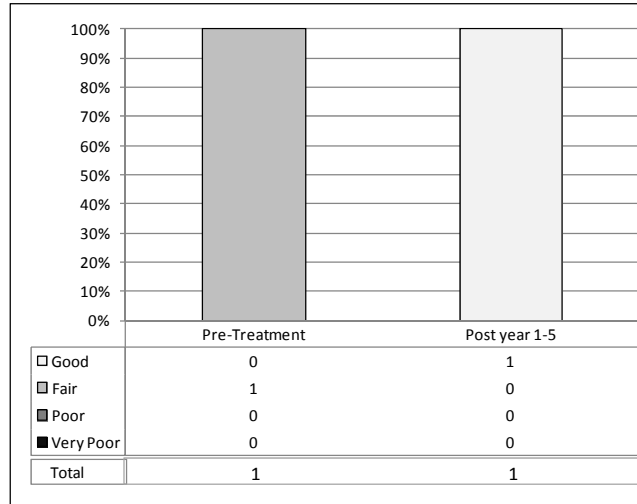
PERMANENT RANGE TREND SUMMARIES
Unit 29 Zion

The condition of deer winter range within the Zion management unit has varied on these studies sites since 2008. The Barracks Chaining has gone from very poor to fair to poor, mainly due to sagebrush density and demographics. Kolob Terrace and Elephant Butte were added in 2013 and were considered fair and very poor respectively. The disturbed site, North Hills, was considered fair prior to treatment and good after treatment. This improvement can be contributed to a diversification of the sagebrush

population demographics as well as an increase in perennial grasses. At the last reading most sites were considered poor to fair.

<table>
<thead>
<tr><th></th><th>2003</th><th>2008</th><th>2013</th></tr>
</thead>
<tbody>
<tr><td>☐ Good</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>☐ Fair</td><td>0</td><td>1</td><td>1</td></tr>
<tr><td>☐ Poor</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>☐ Very Poor</td><td>1</td><td>0</td><td>1</td></tr>
<tr><td>Total</td><td>1</td><td>1</td><td>3</td></tr>
</tbody>
</table>

Figure Error! No text of specified style in document..2: Deer winter range Desirable Components Index (DCI) summary by year of undisturbed sites for WMU 29 Zion.

<table>
<thead>
<tr><th></th><th>Pre-Treatment</th><th>Post year 1-5</th></tr>
</thead>
<tbody>
<tr><td>☐ Good</td><td>0</td><td>1</td></tr>
<tr><td>☐ Fair</td><td>1</td><td>0</td></tr>
<tr><td>☐ Poor</td><td>0</td><td>0</td></tr>
<tr><td>■ Very Poor</td><td>0</td><td>0</td></tr>
<tr><td>Total</td><td>1</td><td>1</td></tr>
</tbody>
</table>

Figure Error! No text of specified style in document..3: Deer winter range Desirable Components Index (DCI) summary by year of treated/disturbed sites for WMU 29, Zion.

There are currently 4 active range trend sites varying in conditions from good to very poor. The Elephant Butte site is the only site on the unit that is considered to be in very poor condition. The conditions on this site are due to either lack of diversity of demographics in the sagebrush community, or heavy pinion pine and Utah juniper encroachment causing shrub cover and herbaceous understories to decline or even be non-existent.

The condition of disturbed and treated sites typically improves with increased time on this unit. There is evidence of this on the Barracks Chaining, as well as the North Hills sites. The sagebrush densities have improved in these areas as well as the presence of distinct age classes has been observed. It is also notable that on these sites the herbaceous understory has improved but is still needing better annual and perennial forb cover.

The Higher elevation upland and mountain sites, which support mountain big sagebrush communities, are generally considered to be in good condition for deer summer habitat on the Zion management unit.

The mid elevation upland mountain big sagebrush communities are generally considered to be in fair condition for deer winter range habitat on the unit. These communities are prone to encroachment from pinion-juniper trees, which can reduce understory shrub and herbaceous health if not addressed.

The lower elevation semidesert Wyoming big sagebrush communities that have been disturbed/treated are generally considered to be in fair to good condition

The semidesert and upland communities that are undisturbed are typically in poor or very poor condition, and are heavily invaded with pinion pine and Utah juniper and are lacking in shrub and herbaceous cover. These areas are also prone to catastrophic wildfire, and show little value as deer winter range.

Treatments and 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 5,509 acres of land have been treated within the Zion unit since the WRI was implemented in 2004. As seen on the map, treatments frequently overlap one another bringing the total treatment acres to 8,329 acres for this unit. Other treatments have occurred outside of the WRI through independent agencies and landowners, but the WRI comprises the majority of work done on deer winter ranges throughout the state of Utah. Treatments to reduce pinion-juniper woodlands such as bullhog, PJ push, and lop-and-scatter are among the most common management practices. The use of seeding to supplement the herbaceous understory is also very common. Other common management practices are those to rejuvenate sagebrush stands such as disking, and harrow treatments. Work in the Yellowjacket area on the Southeast side of the unit has begun since the writing of the most recent Range

Trend Report from which the summary below was taken. To date that work has included approximately 3,000 acres of Pinion-Juniper removal through bullhogging with plans to continue at a rate of 1000-2000 acres per year for the next several years.
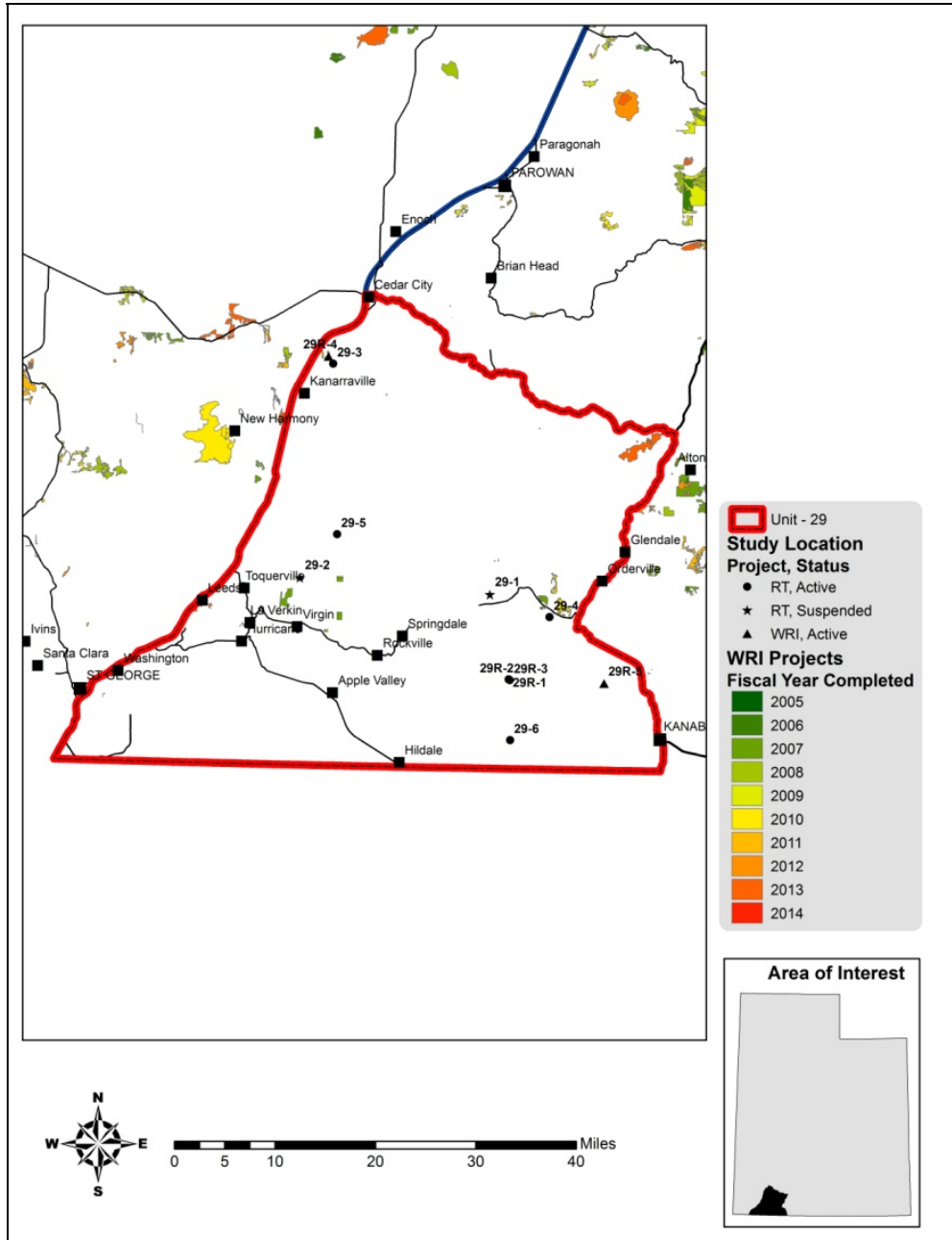
Treatment Action	Acres
Bullhog	1,150
Disc	349
Harrow	45
Herbicide	37
PJ push	394
Seeding (primary)	5,451
Seeding (secondary/shrub)	866
Lop and Scatter	37
*Total Land Area Treated	**5,509**

| Total Treatment Acres | 8,329 |