DEER HERD UNIT MANAGEMENT PLAN
Deer Herd Unit #25
Plateau, Fishlake #25A
Plateau, Thousand Lakes #25B
Plateau, Boulder #25C/Kaiparowits #26
2020

BOUNDARY DESCRIPTION

Sevier, Garfield, Piute, Kane and Wayne counties - Boundary begins at SR-24 and US-89 at Sigurd; south on SR-24 to SR-62; south on SR-62 to SR-22; south on SR-22 to the Widtsoe-Antimony road; south on the Widtsoe-Antimony road to SR-12; east on SR-12 to the Paria River; south on the Paria River to the Utah-Arizona state line; east along the state line to Lake Powell; along the shore of Lake Powell to the Burr trail road; north on the Burr Trail to the Notom Road; north on the Notom Road to SR-24; east on SR-24 to the Caineville Wash road; north on the Caineville Wash road to I-70; west on I-70 to US-89; south on US-89 to SR-24.

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 - Achieve a target population size of 16,900 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.

< Sub-unit #25A = 7,000

- Adjust the target population objective from 10,000 to 7,000. The previous objective was not reached in the past 10 years. The average population for the last 10 years is 6,700.

< Sub-unit #25B = 1,400

- Adjust the target population objective from 3,000 to 1,400. The previous objective was not reached in the last 10 years. The average population for the last 6 years is 1,200.

< Sub-unit #25C/26 = 8,500

- Adjust the target population objective from 13,000 (Boulder 12,000 and Kaiparowits 1,000) to 8,500. The previous objective was not reached in the last 10 years. The average population for the last 6 years is 7,800.

- Herd Composition – All units within this plan are General Season units and will be managed to maintain a three year average postseason buck to doe ratio of 18-20 according to the statewide plan.

- Harvest – General Buck Deer hunt regulations, using archery, early rifle, 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. Due to a history and concern of crowding, we may allocate some permits to an early any legal weapon in October as described in the statewide management plan.

- The Plateau, Thousand Lakes unit is geographically small, has a transient deer population, and a small deer herd, making it difficult to manage as an individual unit. We are considering combining this unit with the Plateau, Fishlake, within the life of this plan. Additional data collection efforts, analysis and outreach will be conducted prior to this recommendation.

Plateau Fishlake Harvest and Classification Data

Year	Buck Permits	Buck harvest	*Antlerless Harvest	Post-Season F/100 doe	Post-Season B/100 doe	**Post-Season Population Estimate	Objective
2010	2700	528	6	42	12	5900	10,000
2011	2100	368	5	53	19	6400	10,000
2012	1500	543	0	61	14	7000	10,000
2013	1300	554	3	71	19	7200	10,000
2014	1300	585	12	62	22	7900	10,000
2015	1300	654	12	71	24	8500	10,000
2016	1500	668	12	44	18	6800	10,000
2017	1400	517	37	57	15	6600	10,000
2018	1200	473	16	46	18	6300	10,000
2019	1100	375	16	45	17	5100	10,000
2020	950						
Avg.	1486	527	12	55	18	6770	

*Antlerless harvest targets deer living on agricultural ground.
**Population estimates are modeled population estimates.

Thousand Lakes Harvest and Classification Data

Year	Buck Permits	Buck harvest	*Antlerless Harvest	Post-Season F/100 doe	Post-Season B/100 doe	**Post-Season Population Estimate	Objective
2010	Limited Entry	35	8	58	20		3000
2011	Limited Entry	66	9	66	27		3000
2012	400	142	1	42	17		3000
2013	200	58	9	61	25	1300	3000
2014	200	76	8	58	28	1300	3000
2015	200	75	25	63	40	1400	3000
2016	300	107	29	50	21	1250	3000
2017	300	102	7	55	32	1150	3000
2018	300	87	10	63	26	1150	3000
2019	300	61	10	62	14	1000	3000
2020	250						
Avg.	272	89***	12	58	25***	1221	

*Antlerless harvest targets deer living on agricultural ground.
**Population estimates are modeled population estimates.
***Does not include years the unit was limited entry.

Boulder Harvest and Classification Data

Year	Buck Permits	Buck harvest	*Antlerless Harvest	Post-Season F/100 doe	Post-Season B/100 doe	**Post-Season Population Estimate	Objective
2010	2000	579	82	61	14		12000
2011	1700	407	51	64	16		12000
2012	1800	694	61	70	25		12000
2013	2000	694	60	57	16	7700	12000
2014	2100	824	113	57	20	8200	12000
2015	2200	995	183	65	21	8500	12000
2016	2200	1106	221	56	17	8500	12000
2017	2100	872	150	69	17	7900	12000
2018	2000	857	377	47	13	7200	12000
2019	1700	569	64	52	13	6600	12000
2020	1200						
Avg.	1909	760	136	60	17	7800	

*Antlerless harvest targets deer living on agricultural ground.
**Population estimates are modeled population estimates.

	Objective from past plan (2015)	2021-2025 Objective	Change
Plateau, Fishlake # 25A	10,000	7,000	-30%
Plateau, Fishlake Thousand Lakes #25B	3,000	1,400	-53%
Plateau, Boulder #25C/Kaiparowits #26	12,000	8,500	-29%
UNIT TOTAL	25,000	16,900	-32%

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 model estimates the population at 13,100 deer.

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

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

Limiting Factors (May prevent achieving management objectives)

- Crop Depredation - The Division of Wildlife Resources will maintain aggressive programs to eliminate or lessen the burden of deer depredation on private cultivated and stored agricultural crops. Crop depredation problems will be addressed as provided for in applicable laws, rules and policies, and procedures of Utah's Landowner Assistance Program for big game. When necessary, control hunts will be implemented through the RAC process. When a problem needs immediate attention, local biologists may call depredation hunts and issue mitigation permits to keep deer away from cultivated and stored agricultural crops. These control hunts will be specified in areas where only offending animals will be harvested. Applicable laws, policies, and procedures will also be followed to lessen the burden of big game on private rangelands.

- Habitat - The amount and condition of summer habitat on public lands and landowner acceptance and winter forage conditions on private lands will influence herd size. Excessive habitat utilization will be addressed through antlerless removal.

- Predation – DWR will follow the current DWR predator management policy.

- Highway Mortality – DWR will cooperate with the Utah Dept. of Transportation to construct highway fences, passage structures, 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 developed in cooperation with the Law Enforcement Section.
  .

PLATEAU UNIT HABITAT MANAGEMENT OBJECTIVES

Deer Herd Unit # 25A
(Plateau Fishlake)

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.

- Encourage vegetation manipulation projects and seeding to increase the availability, abundance and nutritional content of browse, grass, and forb species.

- Seek cooperative projects and programs to encourage and improve the quality and quantity of deer habitat, with public and private land managers to maintain a stable or upward trend in vegetative composition.

- Provide improved habitat security and escapement opportunities for mule deer keeping habitat restoration projects a priority for wildlife.

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, Improvement and Maintenance

- 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 the use of agreements with land management agencies and local governments, and through the use of conservation easements, etc. on private lands.

- Continue to cooperate with Utah Department of Transportation (UDOT) and or Sportsman's groups to identify areas to mitigate and prevent deer-vehicle collisions to the extent possible.

- 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.

- Reseed mechanical treatment areas with selected seed species that will out compete areas dominated by Cheatgrass with desirable perennial vegetation focusing on seeding native grass species.

- Reduce expansion of Pinyon-Juniper woodlands into sagebrush habitats and improve habitats dominated by Pinyon-Juniper woodlands by completing habitat restoration projects like lop & scatter, bullhog and chaining projects.

- 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.

- Continue to monitor and collect data from browse transects and permanent range trend studies located throughout the seasonal ranges within the unit.

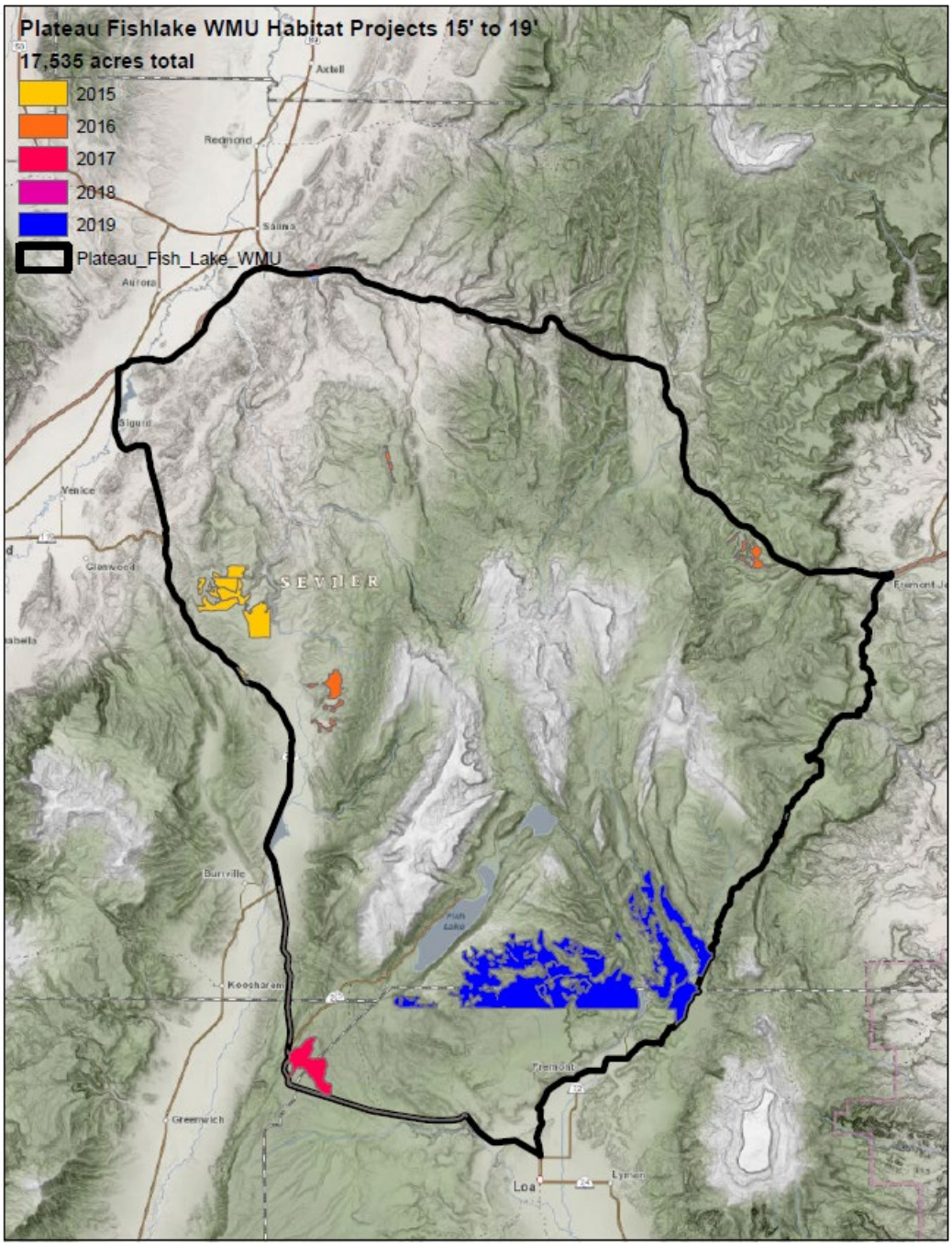
- Future habitat work should be concentrated on the following management priorities:

    - Increase browse species in critical winter range, and burned areas.
    - Improve the carrying capacity of mule deer within the unit.
    - Increase critical winter range opportunities for mule deer.
    - Maintain summer fawning areas by increasing beneficial habitat work in summer and transitional habitat areas.
    - Continue to reduce threats to catastrophic wildfires, by reducing fuel loads and creating firebreaks.
    - When selecting and implementing habitat restoration projects, design and develop with wildlife benefit, including grass, forbs and shrubs for mule deer within the seed mixes.
    - Support enhancement and restoration efforts in Quaking Aspen forests unit wide by reducing encroachment of Spruce-Fir forests.
    - Continue to use the Watershed Restoration Initiative (WRI) to identify, implement, and fund critical habitat projects throughout the unit, while partnering with federal, state, and private landowners to achieve these goals.

Treatment and Restoration Work

Treatment Action	Acres
Anchor Chain	1,421
Bullhog	574
Harrow	12,259
Herbicide Application	645
Mowing	2,522
Forestry Practices	52
Seeding (primary)	814
Hand Crew Vegetation Removal	7,478
***Total Acres Treated**	**25,765**
Total Treatment Acres	**17,874**

Table 1.1: WRI treatment size by treatment action (2000-2018).
*Does not include overlapping treatments

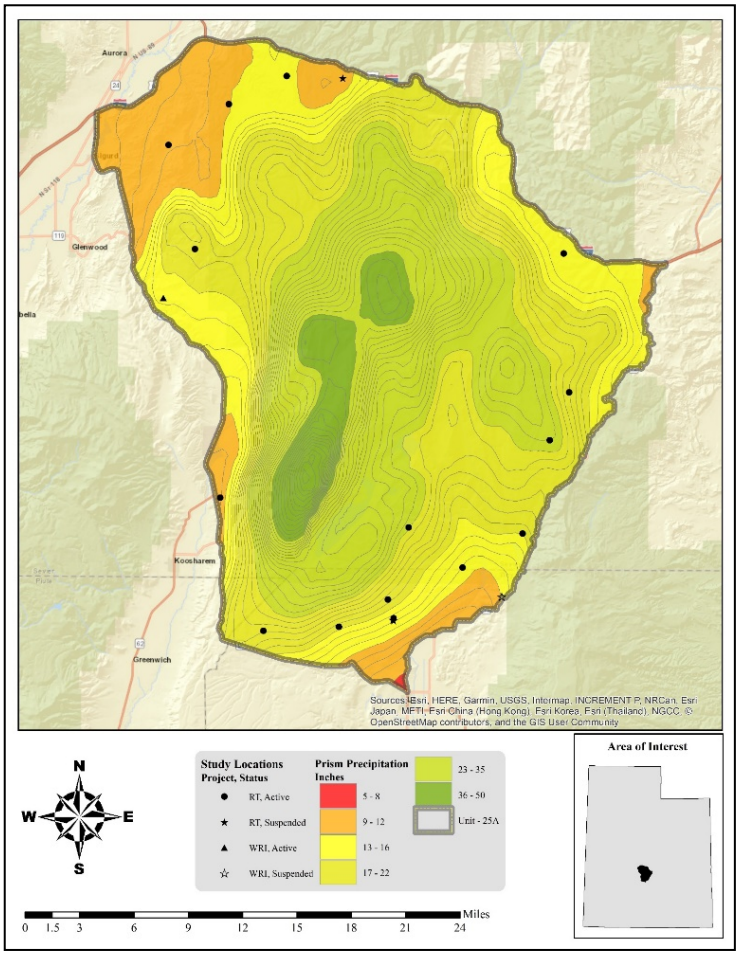


Map 1.1 WRI treatments by Fiscal Year (2015-2019)

Climate Data

The 30-year (1981-2010) annual precipitation PRISM model shows precipitation ranges on the unit from 8 inches on the south and northwest of the unit to 41 inches on the high elevation peak of the Fish Lake Hightop Plateau. All of the Range Trend and WRI monitoring studies on the unit occur within 11-23 inches of precipitation (**Map 1.2**).

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. 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.



Map 1.2: The 1981-2010 PRISM Precipitation Model for WMU 25A, Fishlake Plateau (PRISM Climate Group, Oregon State University, 2013).

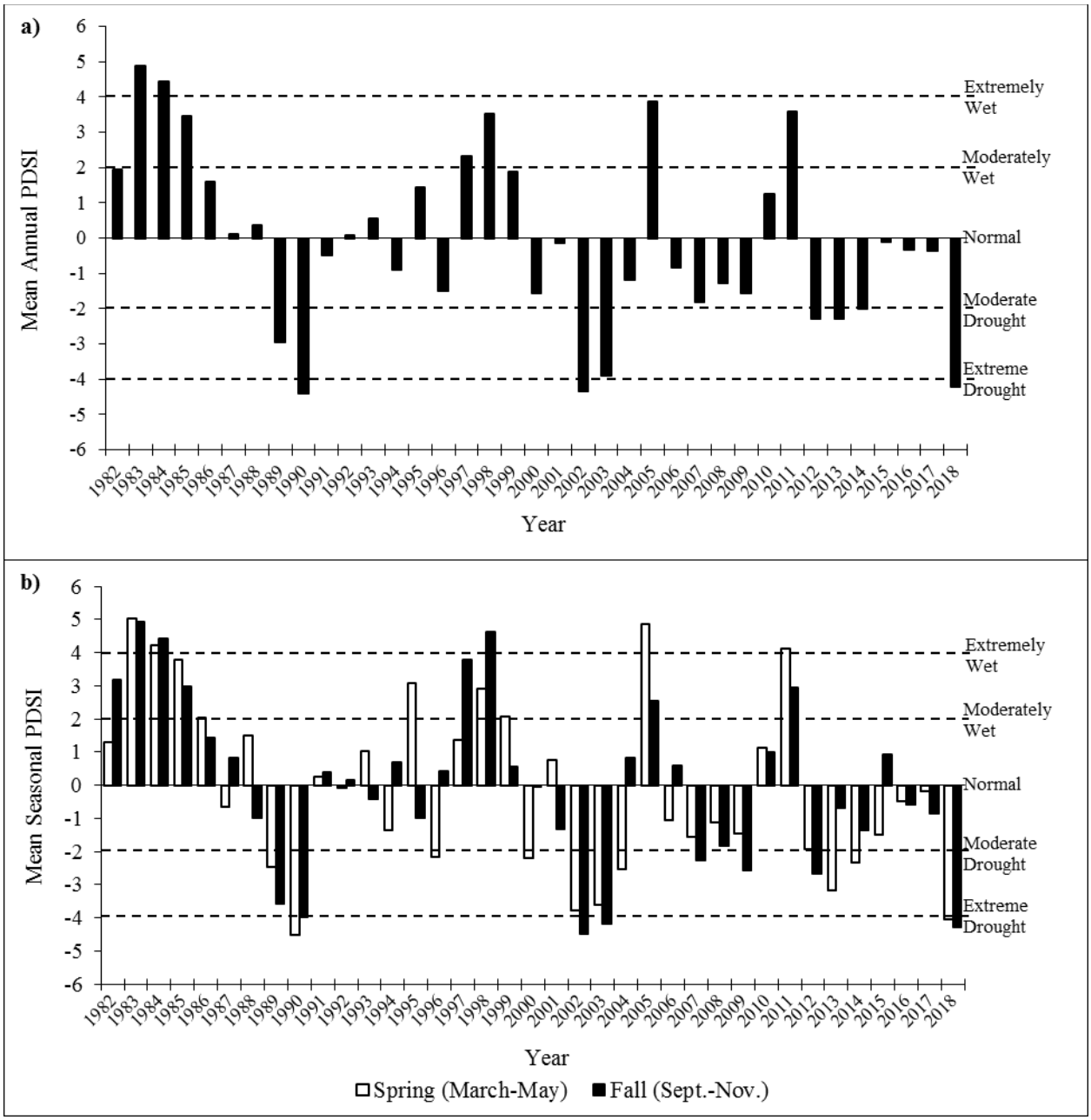


Figure 1.1: The 1982-2018 Palmer Drought Severity Index (PDSI) for the South Central division (Division 4). The PDSI is based on climate data gathered from 1895 to 2018. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification 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).

Big Game Habitat

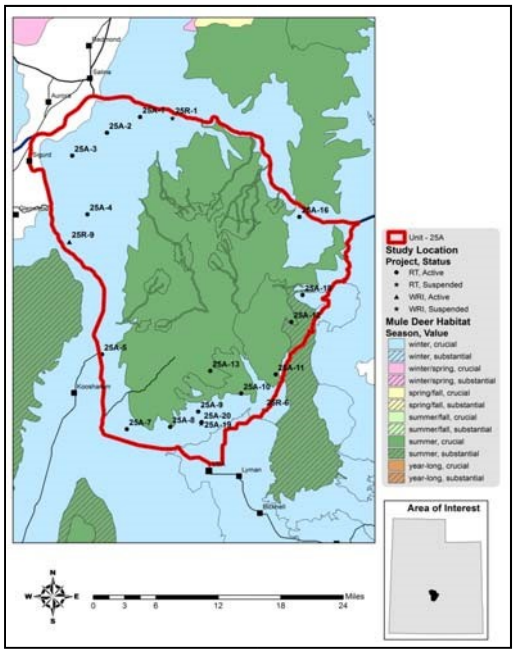
An estimated 428,775 acres are classified as deer range on 25A with 44% classified as winter range and 56% as summer range (**Table 1.2**, **Map 1.3**). The United States Forest Service administers 47% of the winter range, 28% is managed by the Bureau of Land Management (BLM), 16% is privately held, 8% is managed by the School and Institutional Trust Lands Administration (SITLA), and the Paiute Indian Tribe of Utah, Utah Department of Transportation (UDOT), and Utah Division of Wildlife Resources (UDWR) each manage less than 1%. (**Table 1.3**, **Map 1.4**).

The northern two-thirds of the unit include the high elevation Fish Lake Mountains which constitute summer range for deer and elk. Winter range is primarily confined to the lower elevations of the northern third of the unit and the sagebrush benches on the west side above Highway 24. Antelope are also present and are normally found in the more open areas of the deer and elk winter range. Excessive accumulations of snow during severe winters confine deer below the 8,600-foot contour. Pinyon-juniper on both normal and severe wintering areas provide extremely important protective cover for elk and deer, while the closely associated sagebrush type produces the bulk of the required forage.

Limiting Factors to Big Game Habitat

According to the current LANDFIRE Existing Vegetation Coverage model, just over 25% of the unit is comprised of pinyon-juniper woodlands. While these woodlands provide valuable escape and thermal cover for wildlife, encroachment and invasion into historic shrublands reduces available browse (Miller, Svejcar, & Rose, 2000) and may thereby decrease the carrying capacity of the unit.

In addition, annual grasslands primarily composed of cheatgrass (*Bromus tectorum*) comprise a small proportion of the deer winter range and pose a minimal threat to the resilience of the plant communities on this unit. Increased amounts of cheatgrass also increase fuel loads, potentially exacerbating the risk of catastrophic wildfire (Balch, D'Antonio, & Gómez-Dans, 2013).



Map 1.3: Estimated mule deer habitat by season and value for WMU 25A, Fishlake

M**ap 1.4:** Land ownership for WMU 25A, Fishlake

	Summer Range		Winter Range	
	Area (acres)	*%*	*Area (Acres)*	*%*
Mule Deer	241,169	56%	189,664	44%
Elk	187,480	44%	238,265	56%

Table 1.2: Estimated mule deer and elk habitat acreage by season for WMU 25A, Fishlake.

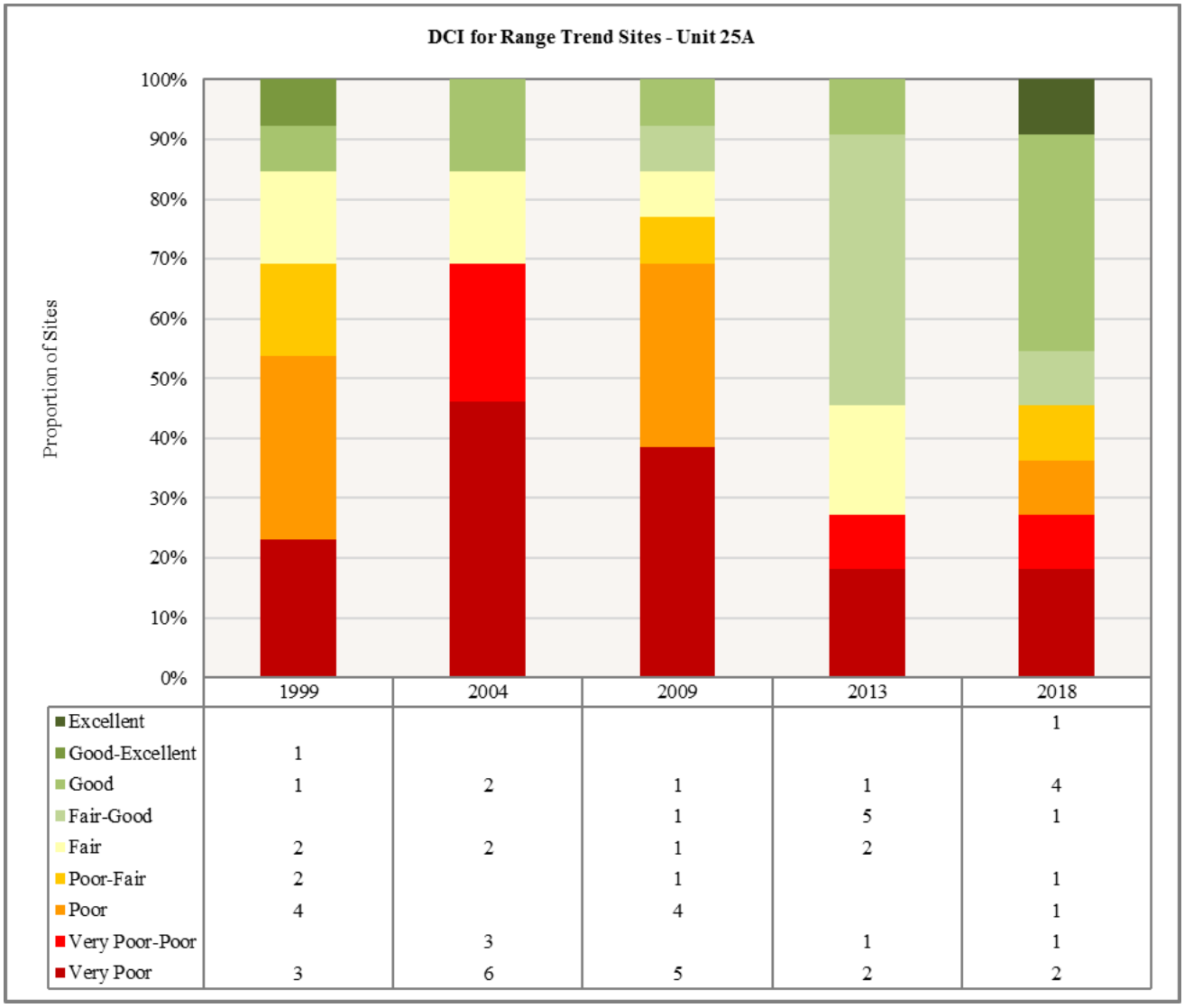
	Summer Range		Winter Range	
Ownership	*Area (acres)*	*%*	*Area (Acres)*	*%*
USFS	199,169	83%	88,754	47%
BLM	5,507	2%	53,156	28%
SITLA	279	<1%	14,950	8%
Tribal Land	0	0%	51	<1%
Private	36,297	15%	32,657	17%
UDOT	0	0%	43	<1%
UDWR	0	0%	52	<1%
Total	**241,169**	**100%**	**189,664**	**100%**

Table 1.3: Estimated mule deer habitat acreage by season and ownership for WMU 25A, Fishlake.

Deer Winter Range Condition Assessment

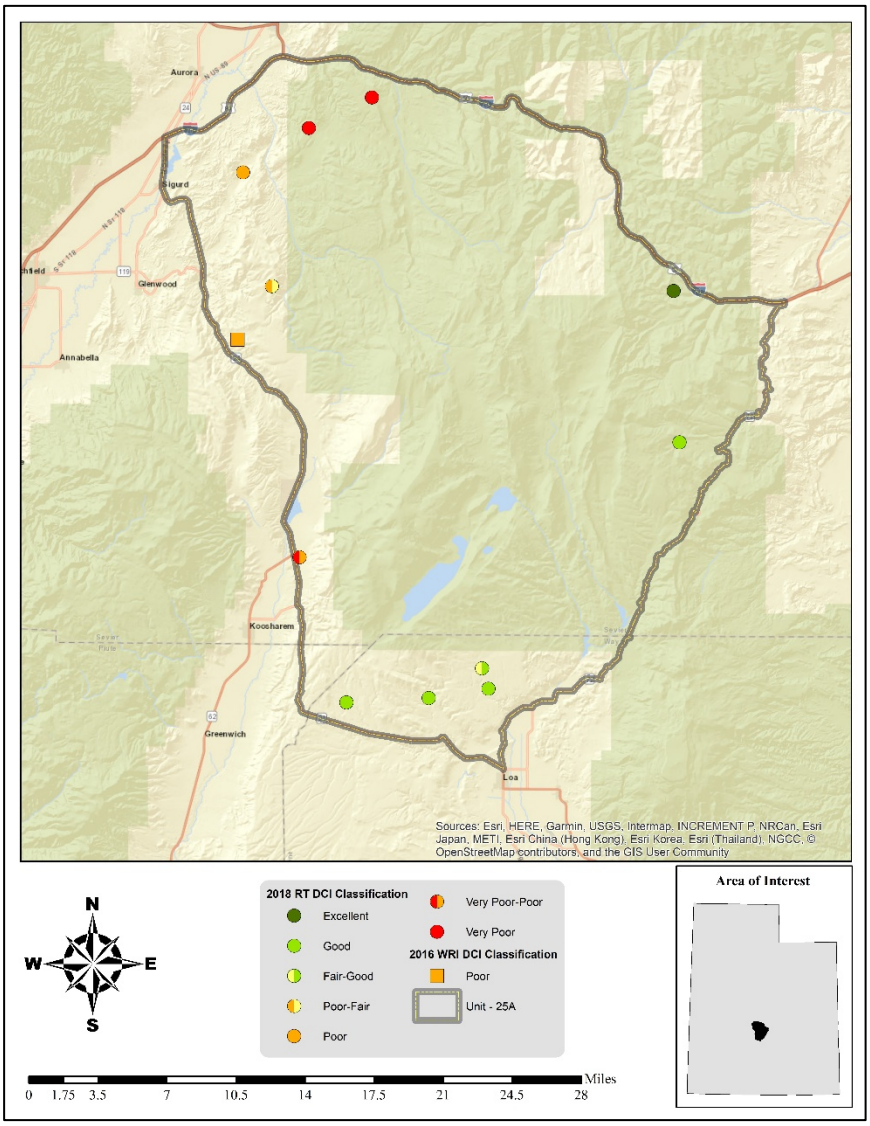
The condition of deer winter range within the Fishlake Plateau management unit has continually changed on the sites sampled since 1999. The active Range Trend sites sampled within the unit are considered to be in very poor to excellent condition as of the 2018 sample year (**Figure 1.2, Map 1.5**). The Tommy Hollow study is considered to be in excellent

condition, with high preferred browse cover and a robust understory contributing to this ranking. The four sites rated as being in good condition are Evans Reservoir, Lower Dog Flat, Row of Pines Exclosure, and Elk Camp. The one site in fair-good condition is the Row of Pines study. There is one study in poor-fair condition: the Durfee Homestead site. The Sage Flat study site is classified as being in poor condition. There is one study in very poor-poor condition: the Praetor Slope study. Finally, the two studies classified as being in very poor condition are Triangle Mountain and Black Mountain. Overall, the condition of the sites across the unit has slightly improved.



	1999	2004	2009	2013	2018
Excellent					1
Good-Excellent	1				
Good	1	2	1	1	4
Fair-Good			1	5	1
Fair	2	2	1	2	
Poor-Fair	2		1		1
Poor	4		4		1
Very Poor-Poor		3		1	1
Very Poor	3	6	5	2	2

Figure 1.2: Deer winter range Desirable Components Index (DCI) summary by year of Range Trend sites for WMU 25A, Fishlake Plateau.



Map 1.5: 2018 Desirable Components Index (DCI) ranking distribution by study site for WMU 25A, Fishlake Plateau.

Deer Herd Unit # 25B
(Plateau Thousand Lake)

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 such as oil, gas, and coal mining that occurs within the unit.

- Encourage vegetation manipulation projects in PJ communities, with reseeding opportunities to increase the availability, abundance and nutritional content of browse, grass, and forb species.

- Seek cooperative projects and programs to encourage and improve the quality and quantity of deer habitat, with public and private land managers to maintain a stable or upward trend in vegetative composition.

- Provide improved habitat security and escapement opportunities for mule deer keeping habitat restoration projects a priority for wildlife, improvement of sagebrush communities is important on this unit.

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, Improvement and Maintenance

- 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 along with private landowners 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 the use of agreements with land management agencies and local governments, and through the use of conservation easements, etc. on private lands.

- Manage vehicle access to limit human disturbance during times of high stress, such as winter and fawning, also work in conjunction with other land management agencies to help limit travel of off road vehicles during these critical times.

- Cooperate with federal land management agencies and private landowners in carrying out habitat improvement projects. Protect deer winter ranges from wildfire by reducing fuel loads, reseeding burned areas, creating fuel breaks and vegetated green strips.

- Reseed mechanical treatment areas with selected seed species with desirable perennial vegetation focusing on seeding native grass species. Unit is lacking in understory of herbaceous understory specifically forbs.

- Reduce expansion of Pinyon-Juniper woodlands into sagebrush habitats and improve habitats dominated by Pinyon-Juniper woodlands by completing habitat restoration projects like lop & scatter, bullhog treatments and chaining projects.

- Cooperate with federal land management agencies and local governments in developing and administering quality habitat restoration projects tied to management plans for the purposes of habitat protection, and livestock grazing.

- Future habitat work should be concentrated on the following management priorities:

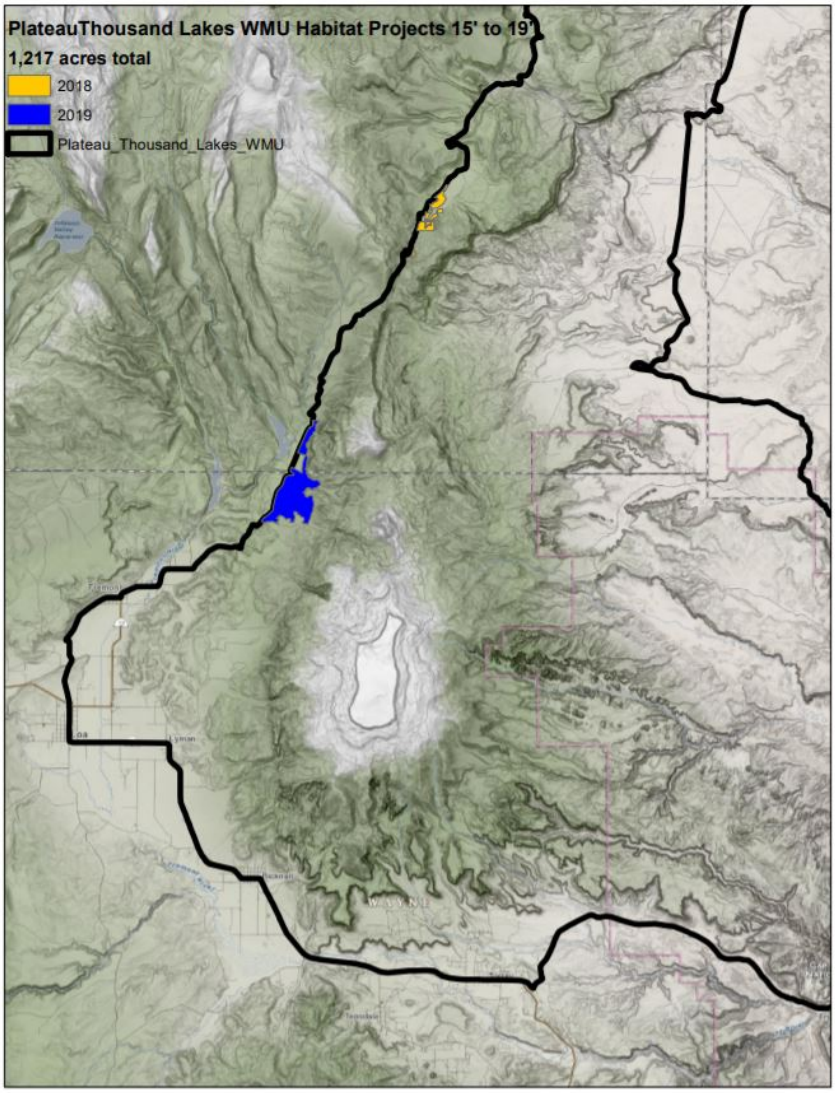
    - Increase browse species in critical winter range areas, continue to seed a quality of grasses, forbs and shrubs in critical burned areas.
    - Improve the need for future carrying capacity of mule deer within the unit.
    - Increase critical winter range opportunities for mule deer by reducing PJ encroachment in mountain and upland communities.
    - Maintain summer fawning areas by increasing beneficial habitat work in summer and transitional habitat areas.
    - Continue to monitor and collect data from browse transects and permanent range trend studies located throughout the seasonal ranges within the unit.
    - Continue to reduce threats to catastrophic wildfires, by reducing fuel loads and creating firebreaks.
    - When selecting and implementing habitat restoration projects, design and develop with wildlife benefit, including grass, forbs and shrubs for mule deer within the seed mixes.
    - Support enhancement and restoration efforts in Quaking Aspen forests within the unit by reducing encroachment of Spruce-Fir forests.
    - Continue to use the Watershed Restoration Initiative (WRI) to identify, implement, and fund critical habitat projects throughout the unit, while partnering with federal, state, and private landowners to achieve these goals.

Treatment 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 6,900 acres of land have been treated within the Thousand Lakes Plateau subunit since the WRI was implemented in 2004 (**Map 2.1**). An additional 1,905 acres are currently being treated and treatments have been proposed for 377 acres. Treatments frequently overlap one another bringing the total completed treatment acres to 9,182 acres for this unit (**Table 2.1**). 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.

Treatment Action	Acres
Anchor Chain	1,228
Bullhog	2,109
Harrow	6,652
Herbicide Application	390
Mowing	349
Prescribed Fire	1,900
Seeding (primary)	926
Hand Crew Vegetation Removal	5,192
Other	28
***Total Acres Treated**	**18,722**
Total Treatment Acres	**16,400**

Table 2.1: WRI treatment size (acres. 2004-2018). *Does not include overlapping treatments



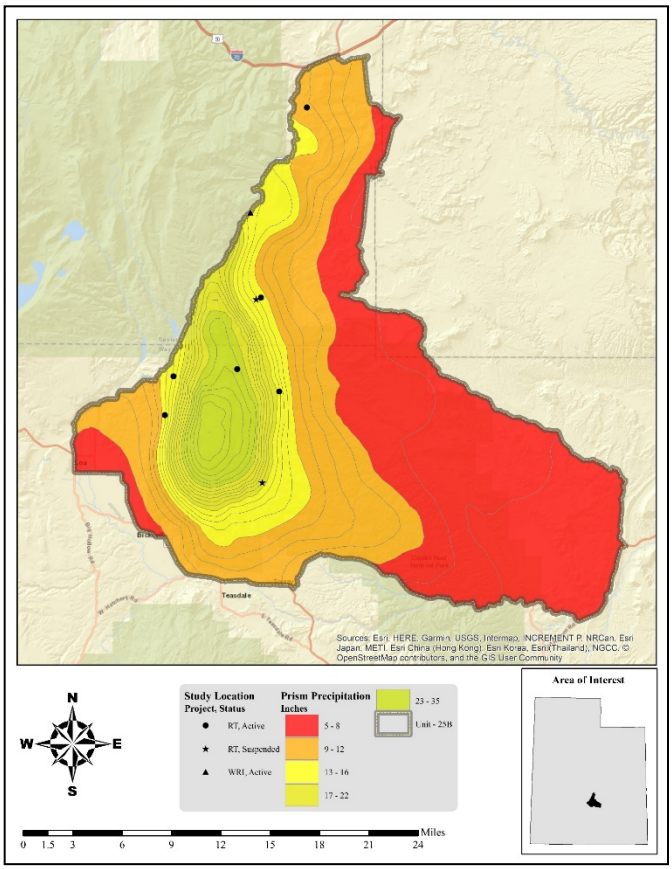
Map 2.1 WRI treatments by Fiscal Year (2015-2019)

Climate Data

The 30-year (1981-2010) annual precipitation PRISM model shows precipitation ranges on the unit from 6 inches on the lower east side of the unit to 29 inches on the peak of Thousand Lake Mountain. All of the Range Trend and WRI monitoring studies on the unit occur within 12-24 inches of precipitation (**Map2.2**) (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).

The mean annual PDSI of the South Central division displayed years of moderate to extreme drought from 1989-1990. 2002-2003, 2012-2014, and 2018. The mean annual PDSI displayed moderately to extremely wet years from 1983-1985, 1997-1998, 2005, and 2011 (**Figure 2.1a**). The mean spring (March-May) PDSI displayed years of moderate to extreme drought in 1989-1990, 1996, 2000, 2002-2004, 2013-2015, and 2018. Moderately to extremely wet years for this time period were displayed in 1983-1986, 1995, 1998-1999, 2005, and 2011. The mean fall (Sept.-Nov.) PDSI displayed years of moderate to extreme drought in 1989-1990, 2002-2003, 2007, 2009, 2012, and 2018; moderately to extremely wet years were displayed in 1982-1985, 1997-1998, 2005, and 2011 (**Figure 2.1b**) (Time Series Data, 2019).



Map 2.2: The 1981-2010 PRISM Precipitation Model for WMU 25B, Thousand Lake (PRISM Climate Group, Oregon State University, 2013)

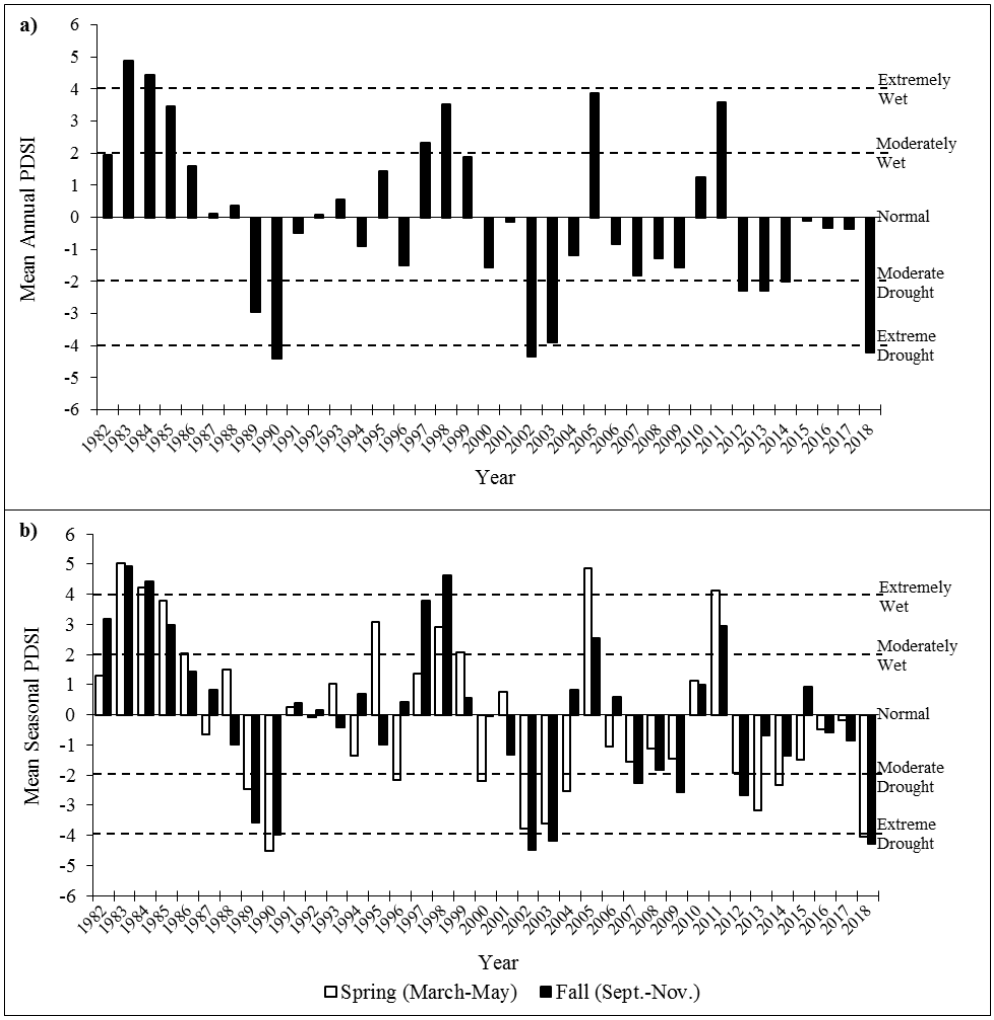


Figure 2.1: The 1982-2018 Palmer Drought Severity Index (PDSI) for the South Central division (Division 4). The PDSI is based on climate data gathered from 1895 to 2018. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification 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).

Big Game Habitat

There are an estimated 507,865 acres classified as deer range within Unit 25B with 88% classified as winter range, 12% as summer range, and less than 1% as year-long range (**Table 2.2**, **Map 2.3**). The National Park Service (NPS) administers 37% of the deer winter range, 30% is managed by the Bureau of Land Management (BLM), 24% is administered by the United States Forest Service (USFS), 6% is privately held, the School and Institutional Trust Lands Administration (SITLA) manages 3%, and the Utah Department of Transportation (UDOT) and Utah Division of Wildlife Resources (UDWR) each administer less than 1% (**Table 2.3**, **Map 2.4**)

The winter range on this unit provides ample protective cover, large basins, draws, and open ridges. The upper limits of the normal winter range vary from 8,400 feet at the northern boundary to 9,000 feet on the south end of Thousand Lake Mountain. The lower normal winter range limit is between 6,000 and 7,400 feet in elevation. At present, the winter range appears ample to support the deer and elk from the Thousand Lakes unit and many wintering deer from the adjacent Fish Lake unit. Solomon Basin, Sage Flat, Horse Valley, Sand Flat, Paradise Flat, and Lyman Slopes are all winter concentration areas.

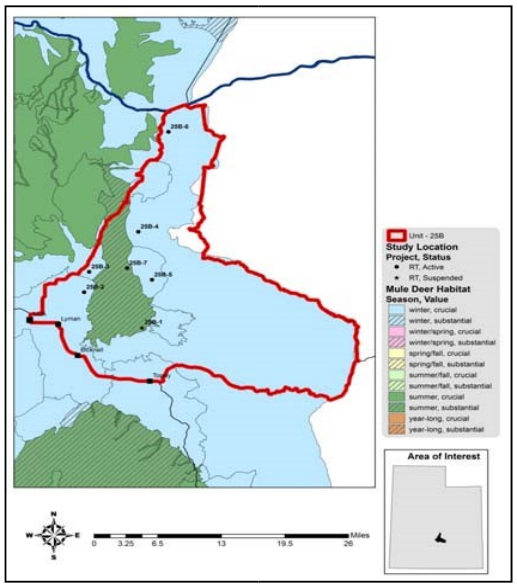
The unit has good winter range with ample protective cover, large basins, draws, and open ridges. The upper limits of the normal winter range vary from 8,400 feet at the northern boundary to 9,000 feet on the south end of the Thousand Lake Mountain. The lower normal winter range limit is between 6,000 and 7,400 feet in elevation. At present, the winter range appears ample to support the deer and elk from the Thousand Lakes unit and many wintering deer from the adjacent Fish Lake unit. Solomon Basin, Sage Flat, Horse Valley, Sand Flat, Paradise Flat, and Lyman Slopes are all winter concentration areas.

The condition of the spring and summer range is a current management concern. As the snow begins to recede in the spring, deer seek green grasses and forbs, which are very scarce on the overgrazed spring ranges. At this time, the early green-up in the alfalfa and grain fields on private land near Loa, Fremont, Lyman and Torrey are very attractive to wildlife and depredation becomes a problem.

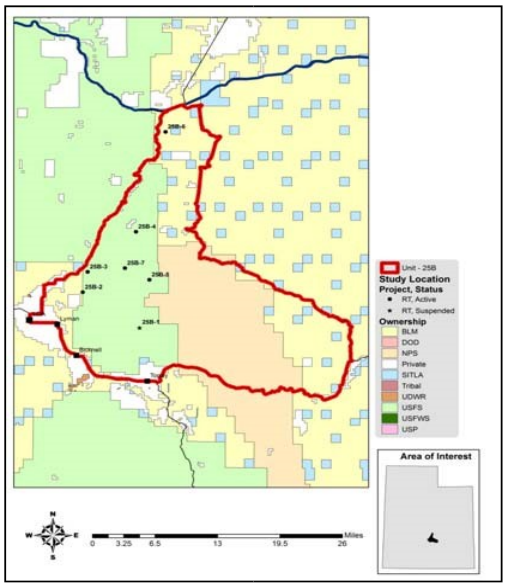
Limiting Factors to Big Game Habitat

One major management concern in this unit is the condition of the summer range. As the snow begins to recede in the spring, deer seek green grasses and forbs, which are very scarce on the overgrazed spring ranges. At this time, the early green-up in the alfalfa and grain fields on private land near Loa, Fremont, Lyman and Torrey are very attractive to wildlife and depredation becomes problematic.

Other limiting factors to big game include the encroachment of pinyon and juniper trees. According to the current LANDFIRE Existing Vegetation Coverage model, pinyon-juniper woodlands comprise nearly 22% of the unit. While these woodlands provide valuable escape and thermal cover for wildlife, encroachment and invasion into historic shrublands reduces available browse (Miller, Svejcar, & Rose, 2000), and may therefore influence the carrying capacity of the unit.



Map 2.3: Estimated mule deer habitat by season and value for WMU 25B.



Map 2.4: Land ownership for WMU 25B, Thousand Lake.

	Summer Range		Winter Range	
	Area (acres)	*%*	*Area (Acres)*	*%*
Mule Deer	39,301	12%	275,351	88%
Elk	28,629	17%	144,217	83%

Table 2.2: Estimated mule deer and elk habitat acreage by season for WMU 25B, Thousand Lake.

	Summer Range		Winter Range	
Ownership	*Area (acres)*	*%*	*Area (Acres)*	*%*
USFS	38,955	99%	65,673	24%
BLM	0	0%	82,550	30%
SITLA	0	0%	9,557	4%
Private	45	<1%	14,963	5%
NPS	301	<1%	102,609	37%
Total	**39,301**	**100%**	**275,351**	**100%**

Table 2.3: Estimated mule deer habitat acreage by season and ownership for WMU 25B, Thousand Lake.

Deer Winter Range Condition Assessment

The condition of deer winter range within the Thousand Lakes Plateau management unit has fluctuated on the sites sampled since 1994. The active Range Trend sites sampled within the unit are considered to be in poor to fair condition as of the 2018 sample year (**Figure 2.2**, **Map 2.5**). The four studies considered to be in fair condition are Sage Flat, Polk Creek, Little Deer Peak, and Morrell Pond. The one site classified as being in poor condition is the Horse Valley study: a degenerate understory and lack of preferred browse young are the reasons that this site is considered to be in this condition.

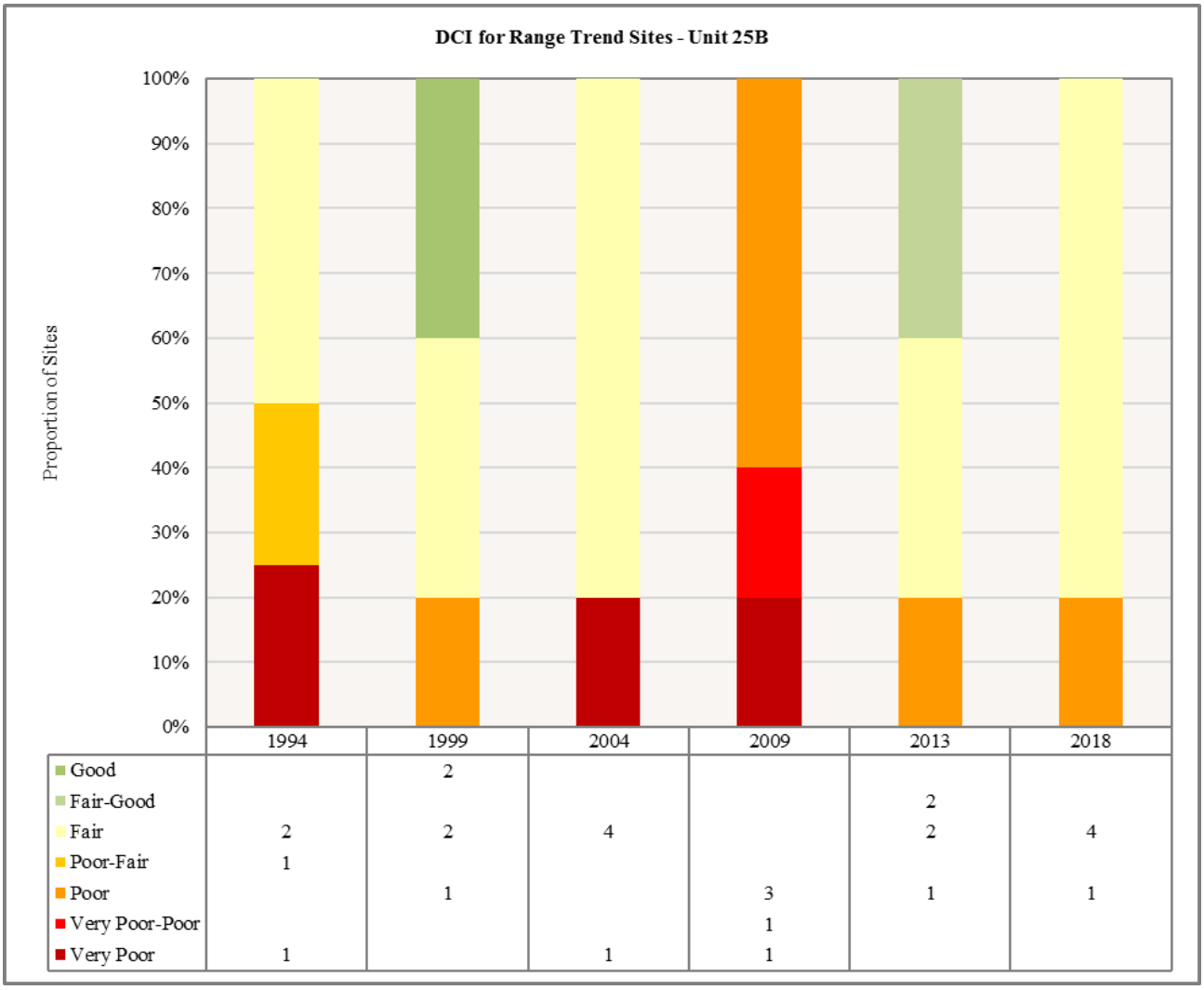
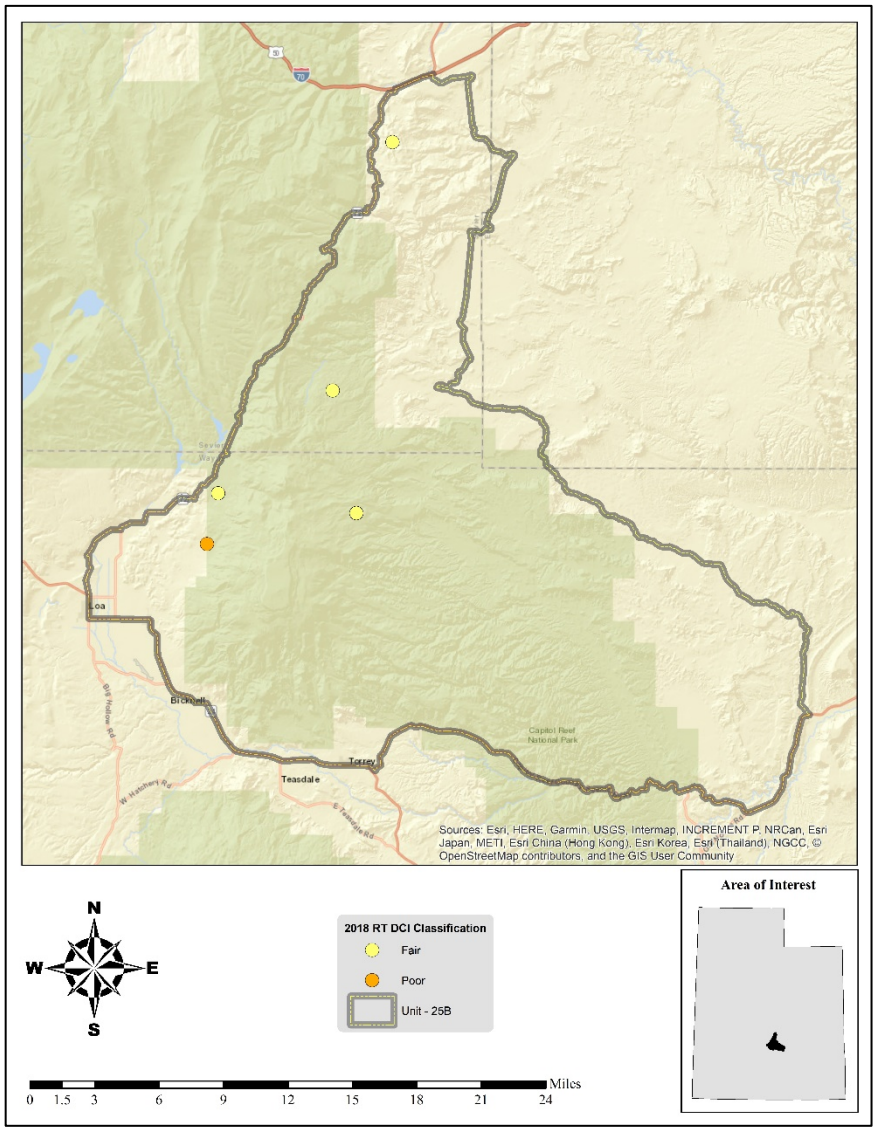


Figure 2.2: Deer winter range Desirable Components Index (DCI) summary by year of Range Trend sites for WMU 25B, Thousand Lakes Plateau.



Map 2.5: 2018 Desirable Components Index (DCI) ranking distribution by study site for WMU 25B, Thousand Lakes Plateau.

Deer Herd Unit # 25C/26
(Plateau Boulder/Kaiparowits)

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.

- Encourage vegetation manipulation projects and seeding to increase the availability, abundance and nutritional content of browse, grass, and forb species.

- Seek cooperative projects and programs to encourage and improve the quality and quantity of deer habitat, with public and private land managers to maintain a stable or upward trend in vegetative composition.

- Provide improved habitat security and escapement opportunities for mule deer keeping habitat restoration projects a priority for wildlife.

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, Improvement and Maintenance

- 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 the use of agreements with land management agencies and local governments, and through the use of conservation easements, etc. on private lands.

- Continue to cooperate with Utah Department of Transportation (UDOT) and or Sportsman's groups to identify areas to mitigate and prevent deer-vehicle collisions to the extent possible.

- 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.

- Reseed mechanical treatment areas with selected seed species that will out compete areas dominated by cheatgrass with desirable perennial vegetation focusing on seeding native grass species.

- Reduce expansion of Pinyon-Juniper woodlands into sagebrush habitats and improve habitats dominated by Pinyon-Juniper woodlands by completing habitat restoration projects like lop & scatter, bullhog and chaining projects.

- 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.

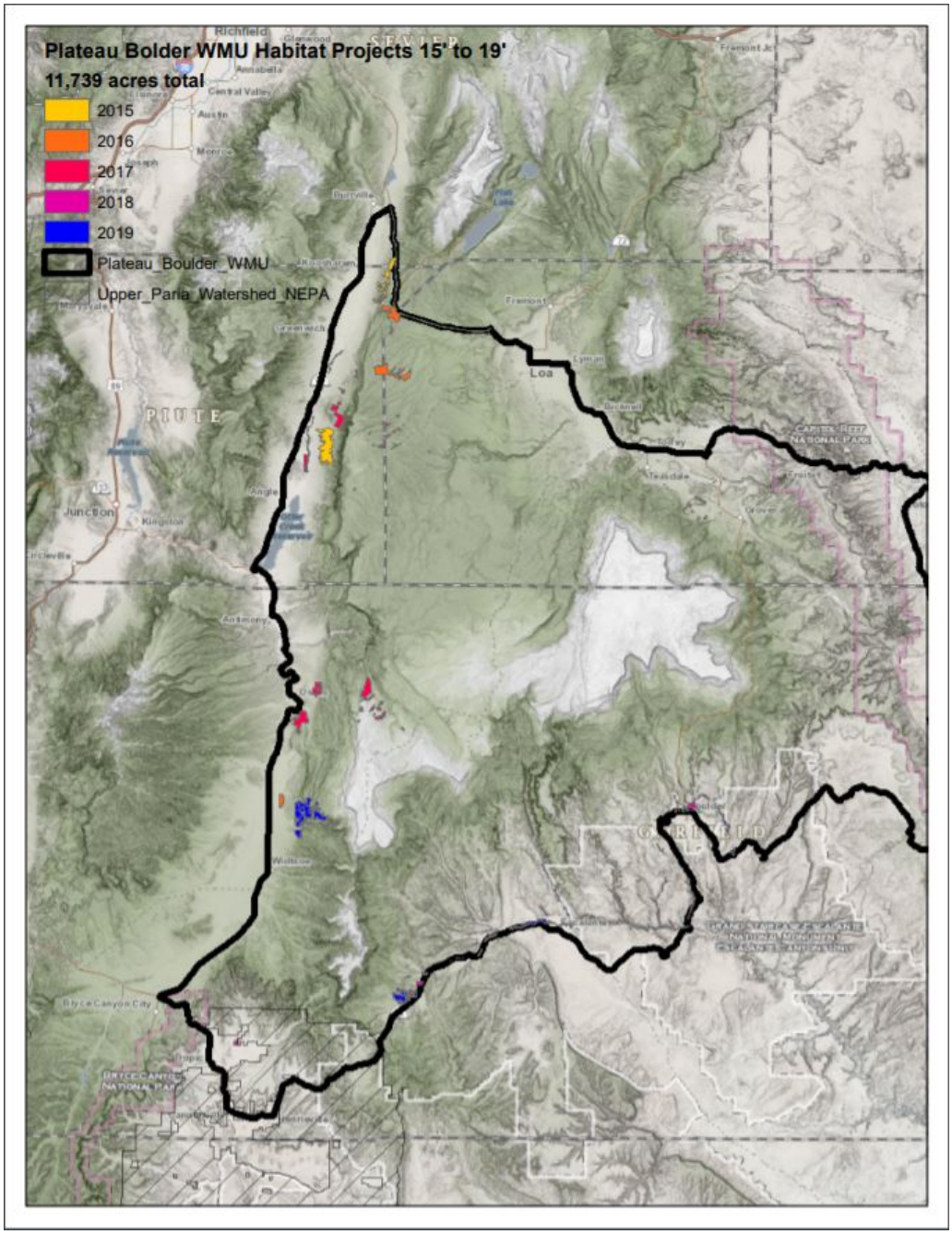
- Future habitat work should be concentrated on the following management priorities:

    - Increase browse species in critical winter range, and burned areas.
    - Increase critical winter range opportunities for mule deer.
    - Maintain summer fawning areas by increasing beneficial habitat work in summer and transitional habitat areas.
    - Continue to monitor and collect data from browse transects and permanent range trend studies located throughout the seasonal ranges within the unit.
    - Continue to reduce threats to catastrophic wildfires, by reducing fuel loads and creating firebreaks.
    - When selecting and implementing habitat restoration projects, design and develop with wildlife benefit, including grass, forbs and shrubs for mule deer within the seed mixes.
    - Support enhancement and restoration efforts in Quaking Aspen forests unit wide by reducing encroachment of Spruce-Fir forests.
    - Continue to use the Watershed Restoration Initiative (WRI) to identify, implement, and fund critical habitat projects throughout the unit, while partnering with federal, state, and private landowners to achieve these goals.

Treatments/Restoration Work There has been an active effort to address the limitations on this unit through the Watershed Restoration Initiative (WRI). A total of 16,400 acres of land have been treated within the Boulder Plateau subunit since the WRI was implemented in 2004 (**Map 3.1**). In addition, 564 acres are pending completion, 4,831 acres are currently being treated, and treatments are proposed for 1,020 acres. Treatments frequently overlap one another; bringing the total completed acres to 22,815 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.

Treatment Action	Acres
Anchor Chain	1,228
Bullhog	2,109
Harrow	6,652
Herbicide Application	390
Mowing	349
Prescribed Fire	1,900
Seeding (primary)	926
Hand Crew Vegetation Removal	5,192
Other	28
***Total Acres Treated**	**18,722**
Total Treatment Acres	**16,400**

Table 3.1: WRI treatment size (acres. 2000-2018). *Majority of seeding was done in conjunction with wildfire restoration efforts. **Does not include overlapping treatments



Map 3.1: WRI treatments by Fiscal Year (2015-2019)

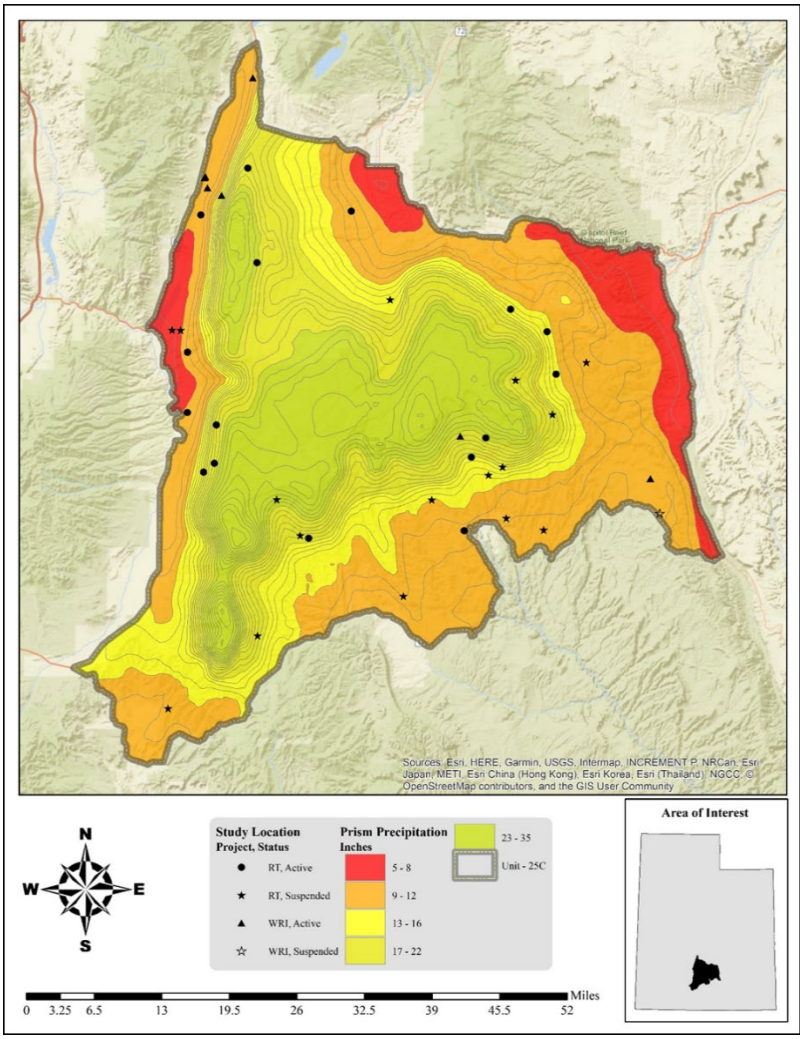
Climate Data

The 30-year (1981-2010) annual precipitation PRISM model shows precipitation ranges on the unit from 7 inches along the eastern portions the unit and in Rabbit Valley to 32 inches on Barney Top in the Escalante Mountains. All of the

Range Trend and WRI monitoring studies on the unit occur within 9-23 inches of precipitation (**Map 3.2**) (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).

The mean annual PDSI of the South Central division displayed years of moderate to extreme drought from 1989-1990. 2002-2003, 2012-2014, and 2018. The mean annual PDSI displayed moderately to extremely wet years from 1983-1985, 1997-1998, 2005, and 2011 (**Figure 3.1a**). The mean spring (March-May) PDSI displayed years of moderate to extreme drought in 1989-1990, 1996, 2000, 2002-2004, 2013-2015, and 2018. Moderately to extremely wet years for this time period were displayed in 1983-1986, 1995, 1998-1999, 2005, and 2011. The mean fall (Sept.-Nov.) PDSI displayed years of moderate to extreme drought in 1989-1990, 2002-2003, 2007, 2009, 2012, and 2018; moderately to extremely wet years were displayed in 1982-1985, 1997-1998, 2005, and 2011 (**Figure 3.1b**) (Time Series Data, 2019).



Map 3.2: The 1981-2010 PRISM Precipitation Model for WMU 25C, Boulder (PRISM Climate Group, Oregon State University, 2013)

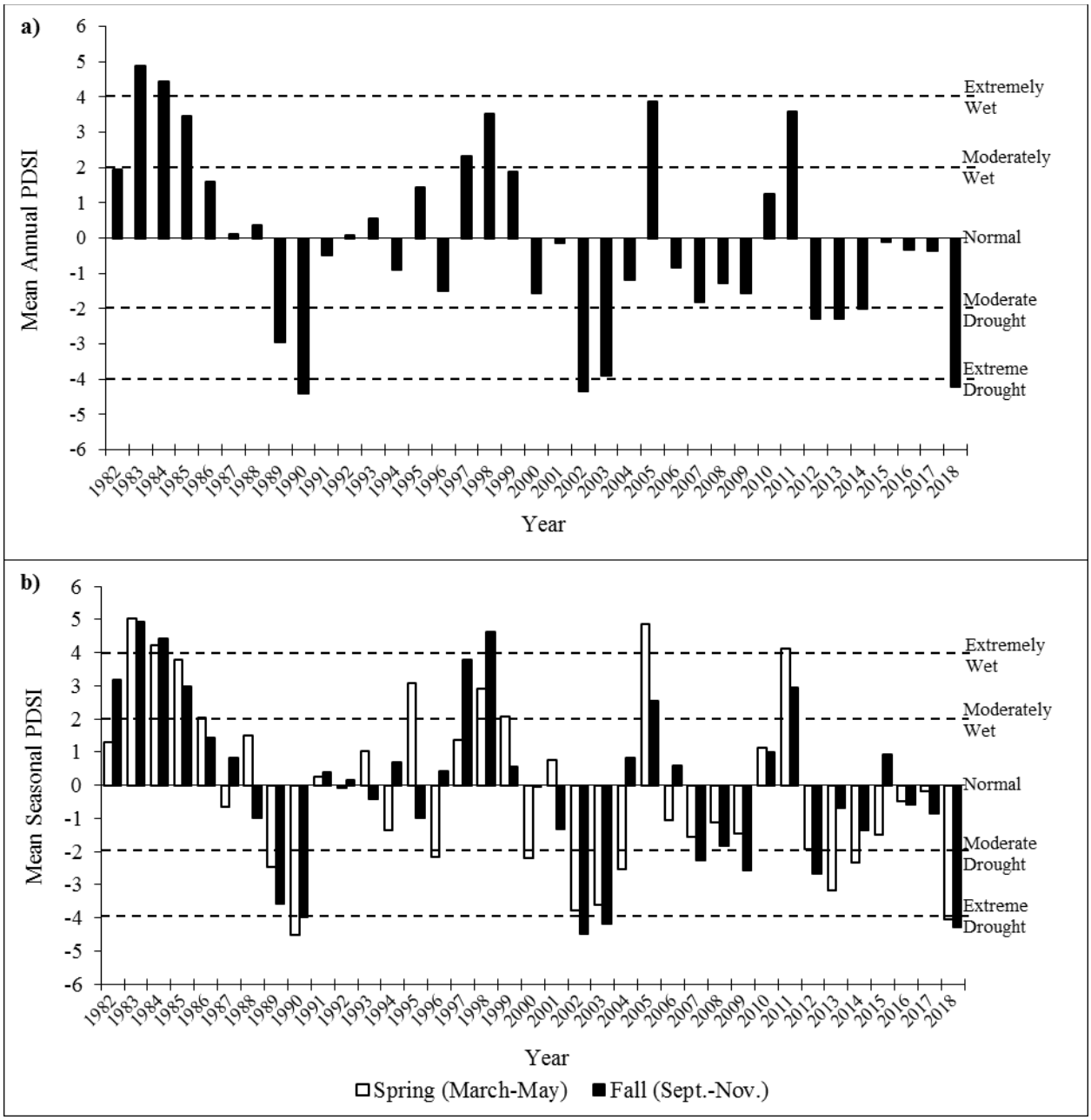


Figure 3.1: The 1982-2018 Palmer Drought Severity Index (PDSI) for the South Central division (Division 4). The PDSI is based on climate data gathered from 1895 to 2018. The PDSI uses a scale where 0 indicates normal, positive deviations indicate wet and negative deviations indicate drought. Classification 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).

Big Game Habitat

An estimated 1,337,035 acres are classified as deer range within Unit 25C with 62% classified as winter range, 38% as summer range, and less than 1% as year-long range (**Table 3.2**, **Map 3.3**). 42% of mule deer winter range is managed by the Bureau of Land Management (BLM), 28% is administered by the United States Forest Service (USFS), 11% is managed by the National Park Service (NPS), 10% is managed by the Utah School and Institutional Trust Lands

Administration (SITLA), 9% is privately held, and the Utah Department of Transportation (UDOT), Utah Division of Wildlife Resources (UDWR), and Utah State Parks (USP) each manage less than 1% (**Table 3.3**, **Map 3.3, Map 3.4**).

The winter range is large enough to support all of the deer summering on the unit. With a few localized exceptions, it is in mostly good condition. Huff & Coles (1966) drew the upper limits of the winter range between 8,000 and 8,400 feet and the lower limits between 6,500 and 7,000 feet. The pinyon-juniper and sagebrush types with various combinations of the two dominate the winter range. South of Boulder Mountain, there is abundant winter range. However, much of the country is slickrock canyons and mesas that support few deer. Most wintering takes place on the lower slopes and at the base of the mountain. The upper limits of the normal winter range are uniform at 8,000 feet across the south slopes of the Boulder Mountain. Seven thousand feet is the usual upper limit during severe winter conditions. The lower limit for most wintering deer on the south side of the unit is Highway 12. On the west side of the Aquarius Plateau between Antimony and Widtsoe, winter range is more restricted. The mountain drops off steeply from Griffin Top to the river valley. Deer can typically utilize vegetation up to 9,000 feet during normal winters, but are limited to an upper limit of around 8,000 feet during severe winters. The lower boundary for severe winters is the bottom of the valley on the Sevier River, which is approximately 6,500 feet in elevation.

Summer range is limited to specific areas on Parker Mountain and Boulder Mountain. Boulder Mountain contains approximately 50,000 acres above 10,500 feet (Christensen & Bogedahl, 1983). This high summer range is unsuitable for fawning and receives only light deer use in late summer. Most fawning and summer use is concentrated underneath the lava rock rim where stands of aspen, fir, and spruce are interspersed with sage flats and meadows. Because of fire suppression, the trend is toward a denser spruce climax community. Logging and/or prescribed burns may help maintain this important habitat in a seral stage, which is more productive and more favorable to big game. Lower down the slopes, ponderosa pine (*Pinus ponderosa*) with its associated mountain brush understory receives limited summer use. Summer range on Parker Mountain is more limited to the higher southern end, where aspen stands in association with big sagebrush and antelope bitterbrush provide excellent fawning areas.

Limiting Factors to Big Game Habitat

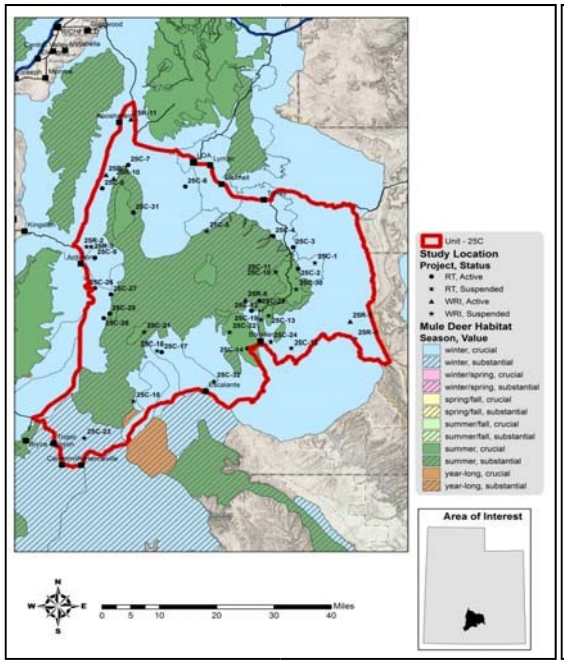
The Boulder Plateau and the surrounding winter range have a wide variety of multiple uses that stem from a diverse range of landownership and land management principles. Private land practices mainly include ranching and alfalfa production, while state and federal land uses include livestock grazing, mineral and resource exploration and extraction, road building, OHV riding, camping, and wilderness designations. Many of the land uses within the unit can be harmonious with the management of big game habitat, but other land practices may negatively affect its management within the unit. There is ample range for deer in normal winters, and it is only in severe winters that the usable range may become limited. In addition, the potential to increase forage for wintering deer and elk is substantial and can be gained by the removal of encroached pinyon and juniper trees that are very pronounced along benches and flats of the Boulder Plateau.

The current LANDFIRE Existing Vegetation Coverage model shows that nearly 27% of this unit is comprised of pinyon and juniper stands. While pinyon-juniper woodlands may provide valuable thermal cover, encroachment and invasion of these woodlands into sagebrush communities has been shown to decrease the sagebrush and herbaceous components, therefore decreasing the available forage for wildlife (Miller, Svejcar, & Rose, 2000).

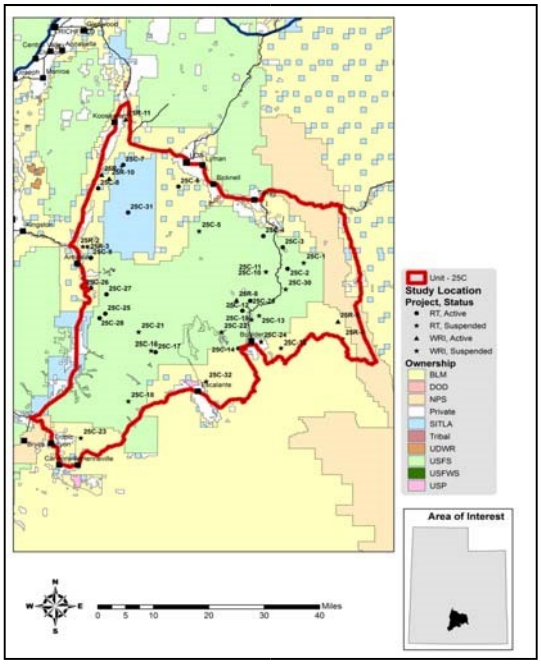
Wildfire has not substantially impacted the deer winter range within this unit. In addition, few of the range trend studies have captured wildfire events: as such, any responses to rehabilitation efforts or recovery of sagebrush communities within the fire perimeters since the year 2000 have not been evaluated.

Encroachment by pinyon-juniper woodland communities also poses a substantial threat to important sagebrush rangelands. Pinyon-juniper woodlands dominate the vegetation coverage within the deer winter range on WMU 25C. Encroachment and invasion of these woodlands into sagebrush communities

has been shown to decrease the sagebrush and herbaceous components, and therefore decreases available forage for wildlife (Miller, Svejcar, & Rose, 2000).



Map 3.3: Estimated mule deer habitat by season and value



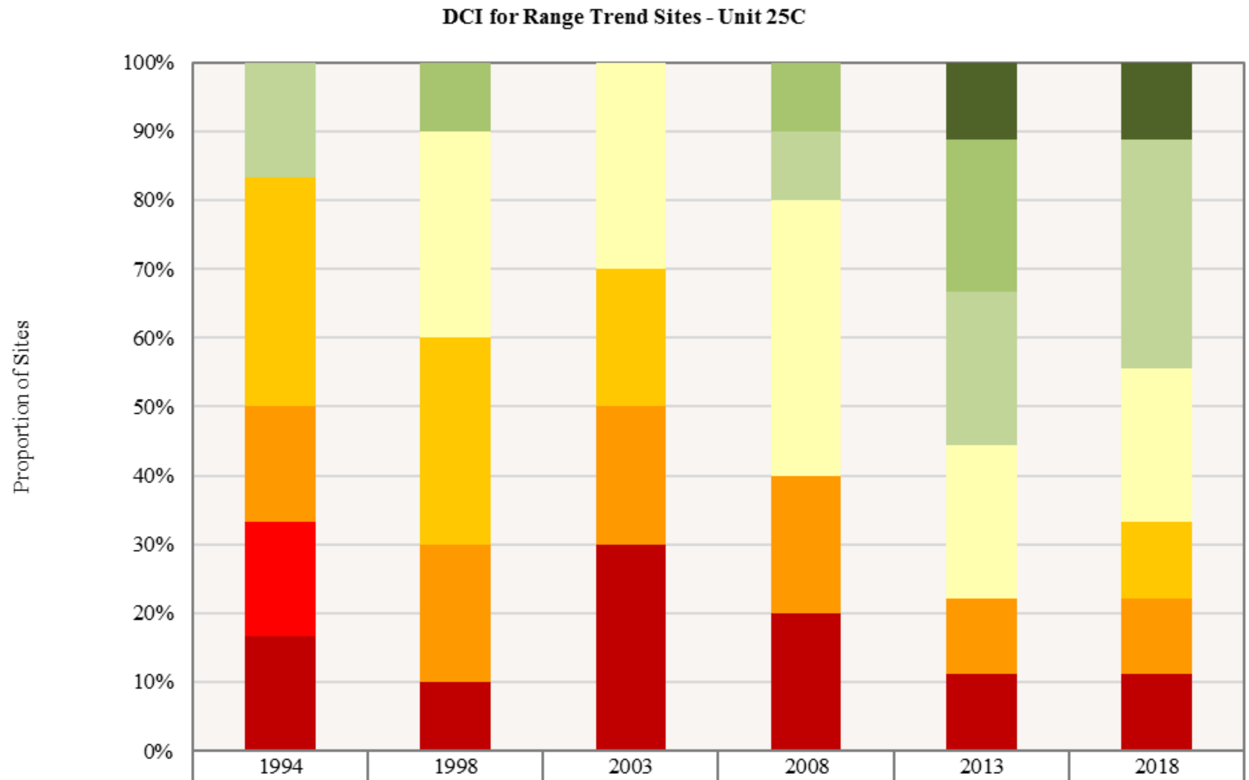
Map 3.4: Land ownership for WMU 25C.

Summer Range		Winter Range		Year Long Range	
Area (acres)	*%*	*Area (acres)*	*%*	*Area (acres)*	*%*
505,941	38%	828,523	62%	2,571	<1%

Table 3.2: Estimated mule deer habitat acreage by season for WMU 25C, Boulder Plateau.

	Summer Range		Winter Range		Year Long Range	
Ownership	*Area (acres)*	*%*	*Area (acres)*	*%*	*Area (acres)*	*%*
BLM	21,870	4%	347,683	42%	0	0%
Private	2,634	1%	75,859	9%	10	<1%
SITLA	52,594	10%	84,317	10%	0	0%
USFS	428,843	85%	227,979	28%	2,561	100%
UDOT	0	0%	151	<1%	0	0%
USP	0	0%	1,391	<1%	0	0%
UDWR	0	0%	1,110	<1%	0	0%
NPS	0	0%	90,034	11%	0	0%
Total	505,941	**100%**	828,523	**100%**	2,571	**100%**

Table 3.3: Estimated mule deer habitat acreage by season and ownership for WMU 25C, Boulder Plateau.

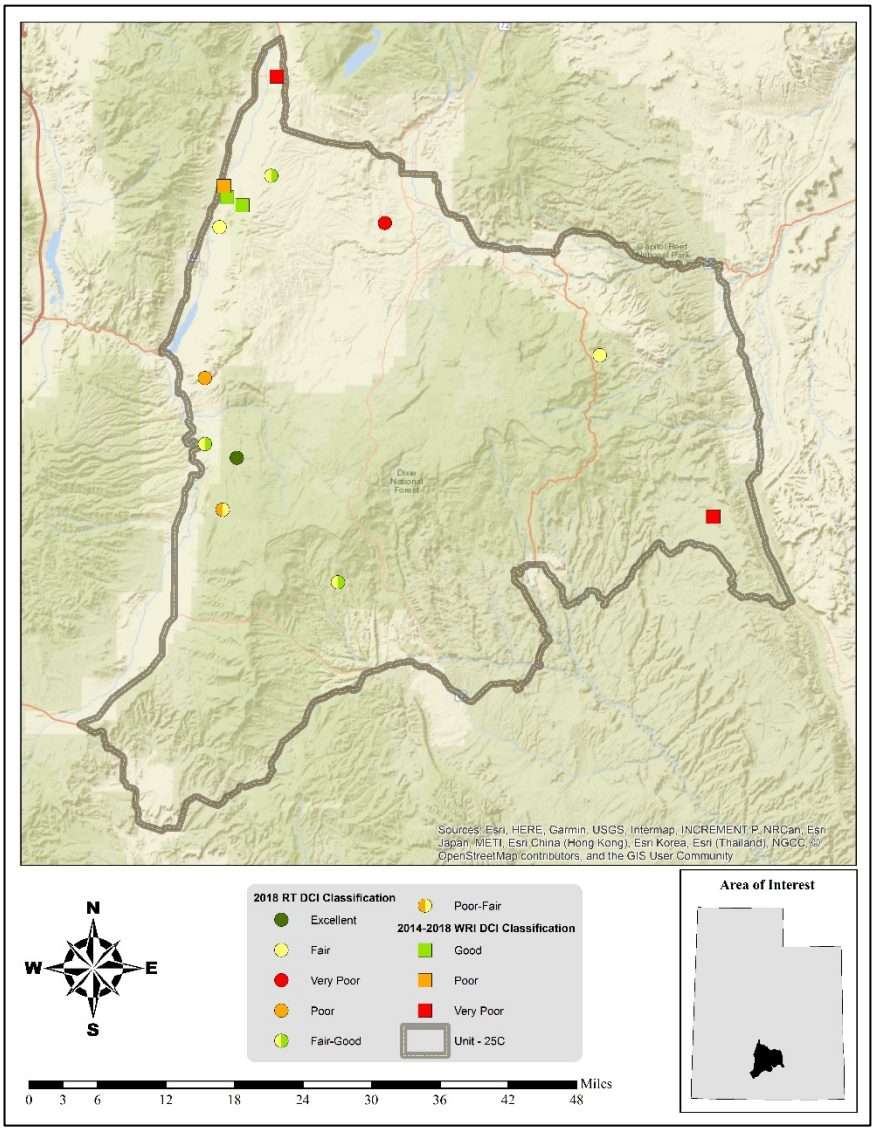


	1994	1998	2003	2008	2013	2018
Excellent					1	1
Good		1		1	2	
Fair-Good	1			1	2	3
Fair		3	3	4	2	2
Poor-Fair	2	3	2			1
Poor	1	2	2	2	1	1
Very Poor-Poor	1					
Very Poor	1	1	3	2	1	1

Figure 3.2: Deer winter range Desirable Components Index (DCI) summary by year of Range Trend sites for WMU 25C, Boulder Plateau.

Deer Winter Range Condition Assessment

The condition of deer winter range within the Boulder Plateau management unit has shown variation on the sites sampled since 1994. The active Range Trend sites sampled within the unit are considered to be in very poor to excellent condition as of the 2018 sample year (**Figure 3.2**). The Poison Creek Bench study is the only site that is considered to be in excellent condition: high amounts of preferred browse as well as perennial grasses and forbs contribute to this ranking. There are three studies considered to be in fair-good condition, and these sites are Cedar Grove, Varney-Griffin Chaining, and Black Canyon. There are two studies classified as being in fair condition: Happy Valley and South Narrows. The site ranked as being in poor-fair condition is the North Creek study. There is one study in poor condition, and this study is the Dry Wash site. Finally, there is one study considered to be in very poor condition which is the Terza Flat study. This study is considered to be in this condition because of a lack of preferred browse as well as a lack of understory plants.



Map 3.5: 2018 Desirable Components Index (DCI) ranking distribution by study site for WMU 25C, Boulder Plateau.

Duration of Plan

This unit management plan was approved by the Wildlife Board on _____ and will be in effect for five years from that date, or until amended.

APPENDIX

Unit 25a Plateau, Fishlake Subunit

Sevier, Piute, and Wayne counties - Boundary begins at SR-24 and US-89 at Sigurd; south on SR-24 to SR-72 at Loa; north on SR-72 to I-70; west on I-70 to US-89; south on US-89 to SR-24.

Unit 25b Plateau, Thousand Lake Subunit

Sevier, and Wayne counties - Boundary begins at the junction of SR-24 and SR-72 at Loa; southeast on SR-24 to the Cainville Wash road; north on the Caineville Wash road to the junction of I-70 and SR-72; south on SR-72 to SR-24 at Loa.

Unit 25c Plateau, Boulder Subunit

Garfield, Piute, and Wayne counties - Boundary begins at SR-24 and SR-62; south on SR-62 to SR-22; south on SR-22 to the Antimony-Widtsoe road; south on the Antimony-Widtsoe road to SR-12; east on SR-12 to the Burr Trail at Boulder; east on the Burr Trail road to the Notom Road; north on the Notom Road to SR-24; west on SR-24 to SR-62.