APPENDIX A

WYOMING STATEWIDE WEATHER DATA
Biological Years 2008 - 2010

Rebecca Schilowsky
Biological Services
May 17, 2011

National Climate Data Center/National Oceanic and Atmospheric Administration (NCDC/NOAA) has divided Wyoming into 10 climatic divisions for the purpose of weather data recording (Figure 1). These divisions correspond to major watersheds within the state and include: Zone 1 – Yellowstone Drainage Basin; Zone 2 – Snake Drainage Basin; Zone 3 - Green and Bear Drainage Basin; Zone 4 - Big Horn; Zone 5 - Powder, Little Missouri, and Tongue Drainage Basin; Zone 6 - Belle Fourche Drainage Basin; Zone 7 - Cheyenne and Niobrara Drainage Basin; Zone 8 - Lower Platte; Zone 9 - Wind River; and Zone 10 - Upper Platte. Climatic data for these divisions can be found at the NCDC/NOAA web site: http://www.ncdc.noaa.gov/oa/ncdc.html.

Divisional monthly temperature, precipitation and Palmer drought severity data were obtained from: http://www1.ncdc.noaa.gov/pub/data/cirs/. Graphs portraying Palmer Drought Severity Index data over time were created for each climatic division (Figures 2, 9, 16, 23, 30, 37, 44, 51, 58, 65). Graphs were also generated comparing divisional monthly and 30-year normals temperature (Figures 3-5, 10-12, 17-19, 24-26, 31-33, 38-40, 45-47, 52-54, 59-61, and 66-68) and precipitation data (Figures 6-8, 13-15, 20-22, 27-29, 34-36, 41-43, 48-50, 55-57, 62-64, and 69-71) for bio-years 2008, 2009 and 2010. A bio-year (or biological year) is defined as June – May. A climatic normal is the arithmetic average of a meteorological element over a 30-year period (generally three consecutive decades). Monthly divisional temperature and precipitation normals are calculated by adding the yearly values for a given month and then dividing by the number of years in the period.

The Palmer Drought Severity Index was developed in the 1960s (http://www.drought.noaa.gov/palmer.html). The index uses temperature and precipitation data to determine dryness. It is most effective in determining long-term (several months) drought. Another index, the Crop Moisture Index (CMI) is more sensitive to short-term conditions. On the Palmer scale, zero is normal, -2 is moderate drought, -3 is severe drought, and -4 is extreme drought. Positive numbers indicate wetter than normal time periods. The Palmer Index is standardized to local conditions. Since this index does not reflect snow moisture, it typically works best for areas east of the Continental Divide.

Additional contact information for NCDC can be found at the following web address: http://lwf.ncdc.noaa.gov/oa/about/ncdccontacts.html.

Figure 1. NCDC/NOAA, State of Wyoming Climate Division Map.
http://www.wrds.uwyo.edu/wrds/wsc/normals/normalmap.html

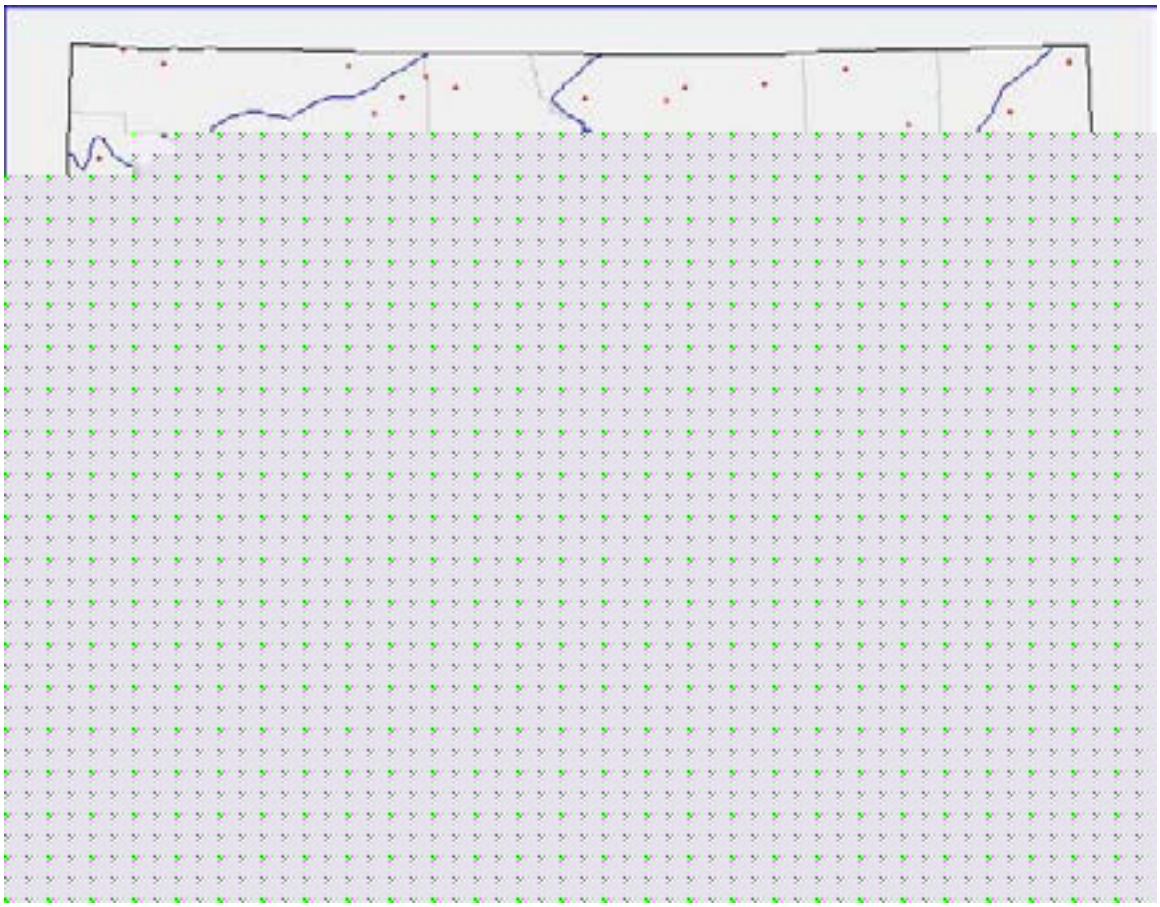


Figure 69. 2008 Bio-Year: Monthly precipitation data (in), Wyoming Climate Division 10.

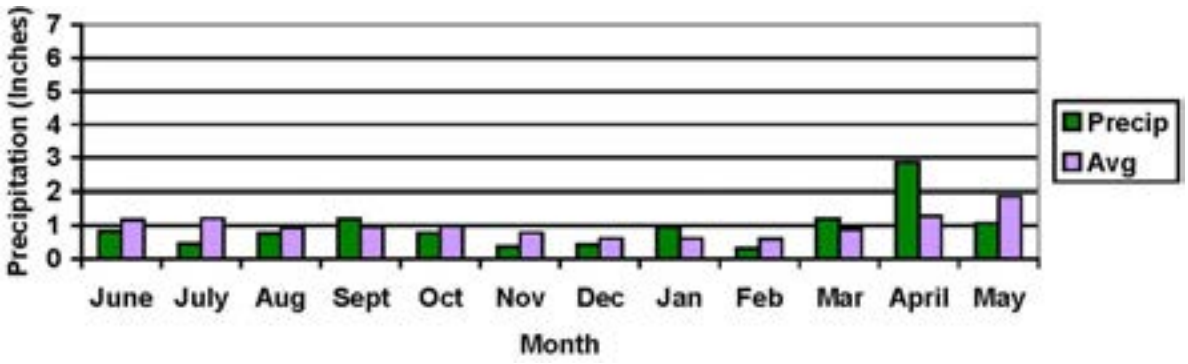
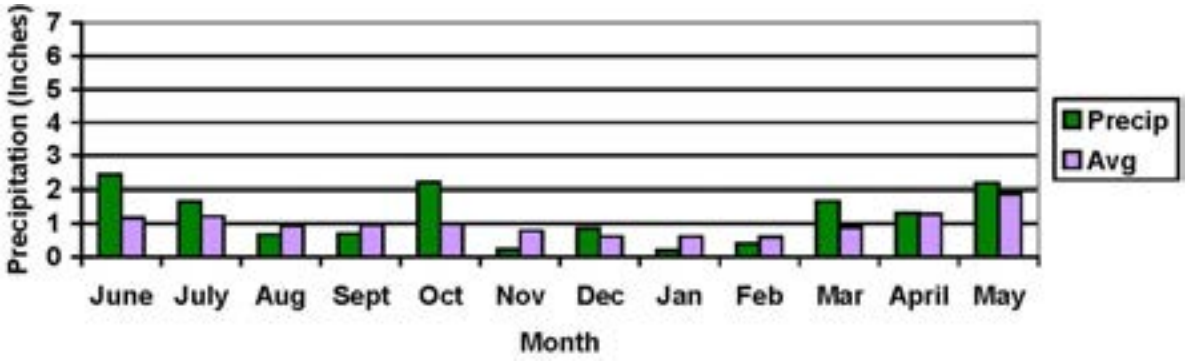
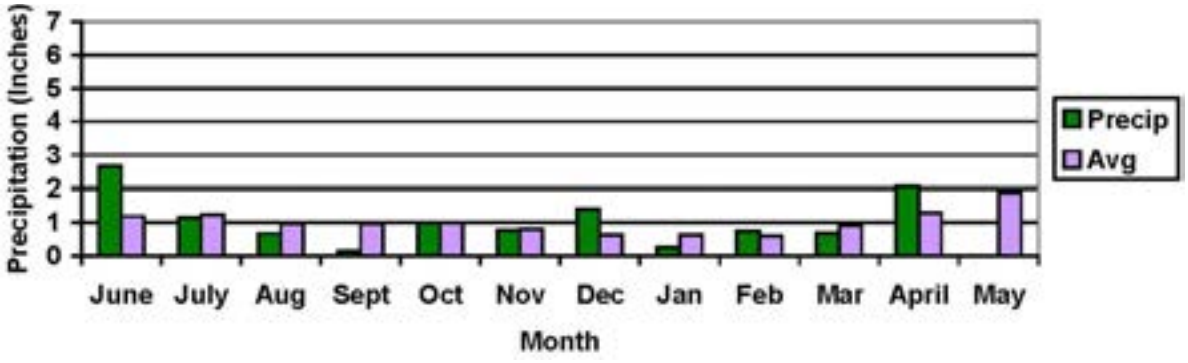


Figure 70. 2009 Bio-Year: Monthly precipitation data (in), Wyoming Climate Division 10.

Figure 71. 2010 Bio-Year: Monthly precipitation data (in), Wyoming Climate Division 10.





CITATIONS

Palmer Drought Severity Index data and monthly temperature and precipitation data were obtained from: http://www1.ncdc.noaa.gov/pub/data/cirs/.

Average monthly temperature and precipitation data obtained from:
NOAA. 2002. Climatography of the United States No. 85. Divisional normals and standard deviations of temperature, precipitation, and heating and cooling degree days 1971 – 2000 (and previous normals periods). Section 1: Temperature and Section 2: Precipitation.

To obtain the Temperature and Precipitation publications go to:
http://www.ncdc.noaa.gov/oa/ncdc.html
Click on Free Data, **Click** on Publications, **Under** Publications B: 1971 – 2000 US Climate Normals Products, **Click** on #6 CLIM 85 Divisional Normals, **Under** Monthly Divisional Normals & Standard Deviations - CLIM85, **Click** on Temperature Values - PDF, **Click** on Precipitation Values - PDF.

APPENDIX B

LARAMIE REGION HABITAT DATA
Biological Year 2010

Grant Frost
Laramie Region Habitat Biologist

PRONGHORN

Medicine Bow Pronghorn HU – Average Production and % Change From Previous Year by Species (Centimeters)									
Transect Name	**Species**	**2003 Prod.**	**2004 Prod.**	**2005 Prod.**	**2006 Prod.**	**2007 Prod.**	**2008 Prod.**	**2009 Prod.**	**2010 Prod.**
Marshall Road	Wy. Big Sagebrush	3.40	1.17	2.11	1.37	1.88	No Data	3.76	2.59
Shirley Basin	Wy. Big Sagebrush	3.94	2.14	2.00	1.53	2.58	No Data	No Data	4.09
Shirley Basin 1 Reservoir	Wy. Big Sagebrush	3.34	2.75	2.10	1.32	3.01	2.74	3.08	2.25
Shirley Basin 2 Bench	Wy. Big Sagebrush	0.48	0.74	0.81	0.52	0.94	No Data	1.71	1.57
County Road 3	Wy. Big Sagebrush	2.57	0.63	1.37	1.0	1.70	0.79	1.29	3.15
County Road 294	Wy. Big Sagebrush	No Data	0.93	0.13	0.83	1.64	1.55	1.90	1.72
Average Production		**2.75**	**1.67**	**1.42**	**1.10**	**1.96**	**1.69**	**2.35**	**2.26**
% Change From Previous Year		**+231%**	**-39%**	**-15%**	**-23%**	**+78%**	**-20%7**	**+49%**	**-4%**
Como Bluff	Gardner's Saltbush	*	*	2.48	*	*	*	*	*
Average Production		*****	*****	**2.48**	*****	*****	*****	*****	*****
% Change From Previous Year		**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

*Annual growth was difficult to impossible to identify in this species, creating unacceptable inaccuracy. In the future, photographs will be used to estimate changes in production (see monitoring station files).

7 Comparison made to transects with data in 2007 and 2008. Actual value used for 2007 Average Production is 2.12 cm.

GROWING SEASON MOISTURE CONDITIONS COMPARED TO AVERAGE FROM 2003-2009:

Average Current Years Growing Season Precipitation and Long Term Mean Precipitation Estimates at the Marshall Road, County Road 3, County Road 294 and Como Bluff Monitoring Stations. *

	April	May	June	July	August	TOTAL
Year 2010	0.91	2.47	3.05	0.82	0.31	7.56
Mean	1.46	1.45	1.15	0.73	1.2	5.99

*Data was obtained from the Western Region Climate Center, Medicine Bow weather station, which most closely reflects precipitation accumulations at the above transects.

Average Current Years Growing Season Precipitation and Long Term Mean Precipitation Estimates at the Shirley Basin, Shirley Basin 1 and Shirley Basin 2 Monitoring Stations. *

	April	May	June	July	August	TOTAL
Year 2010	0.88	2.07	2.27	1.33	0.36	6.91
Mean	1.43	1.55	2.87	1.73	1.22	8.8

*Data was obtained from the Western Region Climate Center, Shirley Basin weather station, which most closely reflects precipitation accumulations at the above transects.

Elk Mountain Pronghorn HU – Average Production and % Change From Previous Year by Species (Centimeters)									
Transect Name	**Species**	**2003 Prod.**	**2004 Prod.**	**2005 Prod.**	**2006 Prod.**	**2007 Prod.**	**2008 Prod.**	**2009 Prod.**	**2010 Prod.**
Pass Creek	Wy. Big Sagebrush	2.00	0.92	1.29	0.74	1.57	2.30	2.64	1.30
Pass Creek One	Wy. Big Sagebrush	2.23	1.45	1.06	0.83	1.67	2.47	1.41	1.83
Average Production		**2.12**	**1.19**	**1.18**	**0.79**	**1.62**	**2.39**	**2.03**	**1.57**
% Change From Previous Year		**+149%**	**-44%**	**-.8%**	**-33%**	**+105%**	**+48%**	**-15%**	**-23%**

GROWING SEASON MOISTURE CONDITIONS COMPARED TO AVERAGE FROM 2003-2009:

Average Current Years Growing Season Precipitation and Long Term Mean Precipitation Estimates at the Pass Creek and Pass Creek 1 Monitoring Stations.*

	April	**May**	**June**	**July**	**August**	**TOTAL**
Year 2010			2.29	0.72	1.79	4.8
Mean	1.21	1.58	1.01	0.72	1.23	2.96

*Data was obtained from the Western Region Climate Center, Saratoga NFH weather station, which most closely reflects precipitation accumulations at the above transects.

Centennial Pronghorn HU – Average Production and % Change From Previous Year by Species (Centimeters)									
Transect Name	**Species**	**2003 Prod.**	**2004 Prod.**	**2005 Prod.**	**2006 Prod.**	**2007 Prod.**	**2008 Prod.**	**2009 Prod.**	**2010 Prod.**
Herrick Lane	Winterfat	*	*	*	*	*	*	*	*
Quealy Dome	Rabbitbrush ChrVis&Nau	**	**	**	**	**	**	**	**
Average Production									
% Change from Previous Year		**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

* Cattle and/or pronghorn consumed all annual growth. Photographs were taken to document use (see monitoring station file).
**Intense browsing of stunted ChrVis and ChrNau made accurate measurements impossible. Photographs of unprotected plants (ChrNau & ChrVis) taken at 6’9” from 20’ pin (see monitoring station file).

GROWING SEASON MOISTURE CONDITIONS COMPARED TO AVERAGE FROM 2003-2009:

Average Current Years Growing Season Precipitation and Long Term Mean Precipitation Estimates at the Herrick Lane and Quealy Dome Monitoring Stations.*

	April	May	June	July	August	TOTAL
Year 2010	2.14	1.24	2.29	0.77	1.16	7.6
Mean	1.06	1.60	2.03	1.31	1.29	7.29

*Data was obtained from the Western Region Climate Center, Laramie AP weather station, which most closely reflects precipitation accumulations at the above transects.

Iron Mountain Pronghorn HU – Average Production and % Change From Previous Year by Species (Centimeters)									
Transect Name	**Species**	**2003 Prod.**	**2004 Prod.**	**2005 Prod.**	**2006 Prod.**	**2007 Prod.**	**2008 Prod.**	**2009 Prod.**	**2010 Prod.**
Highway 34	Wy. Big Sagebrush	No Data	1.47	1.10	0.75	1.73	No Data	1.14	1.42
Average Production			**1.47**	**1.10**	**0.75**	**1.73**	**--**	**1.14**	**1.42**
% Change from Previous Year			**NA**	**-25%**	**-32%**	**+131%**	**NA**	**-34%**	**+25%**

GROWING SEASON MOISTURE CONDITIONS COMPARED TO AVERAGE FROM 2003-2009:

Average Current Years Growing Season Precipitation and Long Term Mean Precipitation estimates at the Highway 34 monitoring station. *

	April	May	June	July	August	TOTAL
Year 2010	2.14	1.24	2.29	0.77	1.16	7.6
Mean	1.06	1.60	2.03	1.31	1.29	7.29

*Data was obtained from the Western Region Climate Center, Laramie AP, weather station, which most closely reflects precipitation accumulations at the above transect.

INTRODUCTION

FUNDING

Platte Valley Mule Deer Habitat Enhancement

WWNRT $13,100
Encumbered FY09 6H10 funds $4,600
Encumbered FY10 6H10 funds $1,520
M&O 6H10 funds $1,672
Total = $20,892
Total funds expended in 2010 = $13,019.72

Thorne/Williams Fence Conversion

RMEF $10,000
MDF $5,400
WGBGLC $12,500
Trust Fund $15,000
WWNRT $10,000
Total = $52,900
Funding for this project has been gathered over the course of the last 18 months. The site is scheduled to be inspected by potential contractors in late spring, 2011, and the work done in late summer or early fall of 2011.

LANDOWNER CONTACTS
5 contacts, 2 have projects in development with funding being applied for, or partially obtained already.

TRUST FUND PROJECTS ADMINISTERED
0

OTHER PROJECTS ADMINISTERED
0

I&E PROJECTS

PRESENTATIONS
Hunting and Fishing Heritage Expo.
Wyoming Game and Fish Commission tour of Platte Valley near Saratoga.

PEOPLE AT I&E and PRESENTATION
Approximately 40 people were present at different times during the commission tour.

Goal 2

Platte Valley Mule Deer Habitat Enhancement

The right-of-way fence along Highway 130 was converted to pole-top along the first ½ mile on both sides from County Road 209 to the east. Small portions of the fence had

been constructed originally that way in high wildlife crossing spots, but there were continued problems with young animals not being able to cross, or getting trapped in the ROW, or individuals getting caught in the fence. LETerrHabFigure1 The Pennock Mountain Wildlife Habitat Management Area has seen an increase of cheatgrass presence and dominance through the recent drought. A contract sprayer was hired to spray Plateau herbicide with ATV and backpack equipment on 38 acres of heavily infested sites along the main road along South Lake Creek. Plateau herbicide and 120 treated poles were purchased for future use. LETerrHabFigure1. Completed sections of pole-top fence along Hwy 130.

Red Mountain Project
Department involvement in this project began in 2004. A project update has been included in the previous five annual reports.

In 2010, a legal challenge was raised to the planned sagebrush mowing, and the project was put on hold.

Goal 4

Goal 5

The Southeast Wyoming Cheatgrass Partnership brings together representatives from WGFD, BLM, USFS, county weed and pest districts, NRCS, Conservation Districts, researchers and university faculty, and private citizens to communicate, collaborate on projects, and learn. CSU credits the partnership with helping get funding for their current research and the newly initiated Rocky Mountain Cheatgrass Management Project. In 2010, the group met twice, the first in September for a tour of the CSU study locations and presentation on their cheatgrass management program. LETerrHabFigure2**.** The second meeting occurred in November in Laramie, and had a presentation by Ed Vasquez on Ecologically Based Invasive Plant Management. LETerrHabFigure2**.** CSU presentation at study site - Thorne/Williams WHMA.

Goal 6

Pennock Mountain Beaver Transplant
Heavy runoff with a large component of rocks and gravel filled in much of the dam complex previously built on South Lake Creek, and beaver were displaced to unknown parts. Future transplants will have to be coordinated with upland stabilization work upstream.

HABITAT PROJECTS

Southeast Wyoming Cheatgrass Partnership
The Partnership continues to meet and share project planning and information.

Comprehensive Management Plan for the Platte Valley Mule Deer Herd
Department personnel continue to use the Platte Valley Mule Deer Habitat Assessment to try to plan projects, and look for opportunities to meet with landowners to get projects going. Coordination meetings are held with personnel from the BLM, NRCS, and local conservation districts. Project planning and funding applications have begun for work on the Mark Condict Ranch.

Mule deer will be collared in the 2010-11 winter for a new study on habitat use, migration, sightability and mortality. Information from this study will help in population estimation and in planning more effective habitat projects.

2010 Production and Utilization Surveys

Game wardens and population biologists assisted with collecting utilization and production information in the spring and fall. Utilization was measured for the winter of 2009-10 at 53 of the pronghorn and mule deer shrub winter range monitoring stations. Average utilization was down for bitterbrush and sagebrush, and up for mahogany. Utilization levels exceeded the recommended level of 35% at 17 transects.

Table 1. Laramie Region Average Shrub Utilization

	Big Sagebrush	Antelope Bitterbrush	Mountain Mahogany
2009 Measurement	32%	36%	5%
2010 Measurement	30%	29%	14%
Change	-2%	-7%	+9%

Production for the growing season of 2010 was generally similar to 2009, with slight drops for bitterbrush and mountain mahogany, but an increase for big sagebrush. Measurements were taken at 37 transects.

Table 2. Laramie Region Average Shrub Production (in)

	Big Sagebrush	Antelope Bitterbrush	Mountain Mahogany
2009 Measurement	0.94	3.56	3.99
2010 Measurement	1.13	3.39	3.71
Change	+20%	-4%	-7%