Willow North Watershed
Ten Year Monitoring and Standards and Guidelines Report

Glasgow Field Office
2011

Executive Summary

This document is an assessment of the Standards for Rangeland Health in the Willow North Watershed in north Valley County, Montana. The document also addresses other resource values such as cultural resources, paleontological resources, water resources, wildlife, transportation, recreation, visual resource management (VRM), the Bitter Creek area, and weeds.

The Executive Summary Table below depicts whether the allotments in the Willow North Watershed are meeting the current Standards for Rangeland Health based upon determinations made in 2010.

Allotment # & Name	Are Healthy Rangelands Standards Being Met?				Is livestock grazing a significant factor in allotment not meeting standards?	Narrative Explanation and Recommended Actions
	Upland	Riparian/ Wetland	Water quality	Wildlife/ Bio-diversity		
#04024 Divide	Yes	Yes	Yes	Yes	NA	No Recommendations
#04041 Anderson-Ojuel	Yes	Yes	Yes	Yes	NA	No Recommendations
#04042	Yes	Yes	Yes	Yes	NA	No Recommendations
#04043 Shaw Coulee	Yes	Yes	Yes	Yes	NA	No Recommendations
#04053 East Willow Creek	Yes	Yes	Yes	Yes	NA	A short section of Willow Creek is not meeting the standard. It is not livestock caused. Trend is up-continue monitoring
#04054 Chisholm Creek	Yes	Yes	Yes	Yes	NA	No Recommendations
#04056	Yes	Yes	Yes	Yes	NA	No Recommendations
#04058	Yes	Yes	Yes	Yes	NA	No Recommendations
#04071 Upper Canyon Creek	Yes	Yes	Yes	Yes	NA	No Recommendations
#04711 North Deep Creek	Yes	Yes	Yes	Yes	NA	No Recommendations
#04717 Deep Creek	Yes	Yes	Yes	Yes	NA	No Recommendations
# 04718 Upper Willow Creek	Yes	Yes	Yes	Yes	NA	No Recommendations
#04722 Bitter Creek	Yes	Yes	Yes	Yes	NA	No Recommendations
#04725	Yes	Yes	Yes	Yes	NA	No Recommendations
#04726 Eagles Nest Coulee	Yes	Yes	Yes	Yes	NA	A section of Bitter Creek is not meeting standards because of weed spraying. Discontinue chemical application along creek

Water quality information is available in Montana's 2008 Integrated Water Quality Report. The Department of Environmental Quality (DEQ) is the lead agency for determining beneficial use support and achievement of water quality standards.

The concept of scale must be kept in mind while evaluating each standard. For example, isolated sites within a landscape may not be meeting the standards; while the vast majority of the larger landscape is in proper functioning condition. No single indicator provides sufficient information to determine rangeland health. The Standards for Rangeland Health must be used in combination to provide information necessary to determine rangeland health.

Before any changes or improvements are made in these allotments, further environmental analysis will be completed. Changes or improvements are contingent upon staffing to complete the analysis and adequate construction funding.

Based on my review of the Assessment Team's recommendation and other relevant data and information, I have determined that the allotments in the Willow North Watershed meet the Standards for Rangeland Health and Guidelines for Grazing Management for BLM lands in Montana.

Authorized Officer Determination:

Authorized Officer: _____
Casey R. Buechler

Date: _____

Title: Field Manager

Introduction

The Willow North Watershed includes 150,827 acres of BLM – administered public lands as well as 57,000 acres of private and state lands in north Valley County, Montana. Land ownership is approximately 72% public, administered by the BLM (see Figure 1). The watershed includes 15 livestock grazing allotments held by10 permittees. All of the grazing permits are renewed on 10-year intervals. There are currently seven implemented allotment management plans (AMP) in this watershed.

The watershed level management program being used in the Glasgow Field Office is the result of decisions made in the Judith-Valley-Phillips Resource Management Plan (JVP-RMP) dated September 1994. Initial assessments of the riparian and upland areas of the Willow North Watershed were conducted during the grazing seasons of 1997 and 1998. The Willow North Watershed Plan was completed in March of 1999 (see Table 1). The five (5) year Willow North Watershed Monitoring and Standards and Guidelines Report was completed in 2005 (see Table 2).

Temperature and Precipitation

The following charts show the average temperature and precipitation in this watershed during the growing season (April through September). This information was gathered from two weather stations and shows the deviations from the 10-year average between 1999 and 2010. All precipitation measurements are in inches and all temperature readings are in degrees Fahrenheit.

The Opheim 12N was 3.3 degrees cooler than the long-term average and was 3.3 inches of precipitation wetter. The Opheim 10N was .2 inches of precipitation wetter than the long- term average. No data was available for temperatures for 2010 at this station.

The NOAA weather sites provided the following data:

Opheim12N

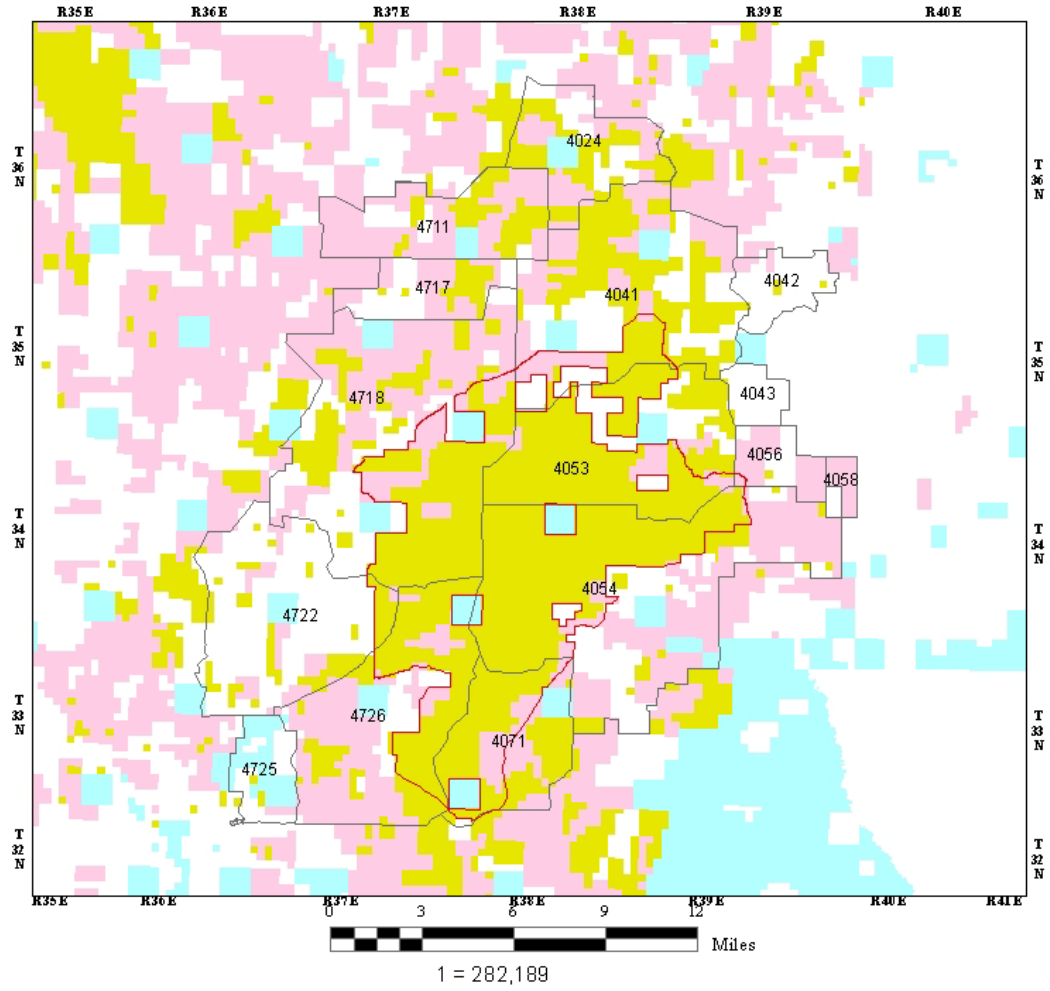
	Opheim 12N				
	1999-2010	Long Term	Deviation	2010	Deviation
Annual Precipitation	10.2	9.9	.3 3% above	13.2	+3.3 25% above
Avg. Temp.	55.3	56	.7 1% below	52.7	-3.3 6% below

Opheim 10N

	Opheim 10N				
	1999-2010	Long term	Deviation	2010	Deviation
Annual Precipitation	11.2	10.4	.8 8% above	10.6	+.2 2% above
Avg. Temp.	55.5	56.2	.7 1.2% below	**No data**	**No data**

Figure 1

Willow North Watershed Boundary



History

The Willow North Watershed Plan (1999) determined that the uplands were meeting the Upland Standard, even though the watershed did not reach the land use plan objective of 80% good(High Seral stage) and excellent (Potential Natural Community) ecological condition. Many of the lower rated sites are dominated by clubmoss and would not be expected to change without major monetary investments in the ecological system (i.e. mechanical treatment or fire).

The Willow North Watershed Plan (1999) identified some streams within the watershed that were not meeting the Riparian Standard due to livestock and weeds. Recommendations were developed and implemented to address these riparian concerns. In 2005, an interim report (Willow North Watershed Monitoring and Standard and Guidelines Report) identified what recommendations have been implemented and the results of those actions on the streams that were not meeting the standard. All streams not meeting standards in 1999, were on an upward trend and some were meeting the standard.

The major influence on both uplands and riparian is the continued expansion and dominance of Leafy Spurge *(Euphorbia esula L.)* in the Willow North Watershed. The noxious and invasive weed section describes the continuing efforts to control leafy spurge.

Table 1 shows the initial standard determinations and recommendations for changes in management made in the Willow North Watershed Plan in 1999.

Table 1

Allotment # & Name	Are Healthy Rangelands Standards Being Met?				Is livestock grazing a significant factor in allotment not meeting standards?	Narrative Explanation and Recommended Actions
	Upland	Riparian/ Wetland	Water quality	Wildlife/ Bio-diversity		
#04024 Divide	Yes	Yes	Yes	Yes	NA	Continue deferred rotational grazing.
#04041 Anderson-Ojuel	Yes	Yes	Yes	Yes	NA	Continue rest rotational grazing, consider grassland birds in project plan.
#04042	Yes	Yes	Yes	Yes	NA	No change in grazing management
#04043 Shaw Coulee	Yes	Yes	Yes	Yes	NA	No change in grazing management
#04053 East Willow Creek	Yes	No	No	Yes	Yes	Change season of use or class of livestock. Continue rest rotation grazing.
#04054 Chisholm Creek	Yes	Yes	Yes	Yes	NA	Continue existing grazing system. Intensify leafy spurge control.
#04056	Yes	Yes	Yes	Yes	NA	No change in grazing management
#04057 *	Yes	Yes	Yes	Yes	NA	No change in grazing management

Allotment # & Name	Are Healthy Rangelands Standards Being Met?				Is livestock grazing a significant factor in allotment not meeting standards?	Narrative Explanation and Recommended Actions
	Upland	Riparian/ Wetland	Water quality	Wildlife/ Bio-diversity		
#04058	Yes	Yes	Yes	Yes	NA	No change in grazing management
#04071 Upper Canyon Creek	Yes	Yes	Yes	Yes	NA	Continue deferred rotational grazing Intensify leafy spurge control
#04711 North Deep Creek	Yes	No	Yes	Yes	Yes	Construct cross fence to control grazing on Deep Creek. Consider rock dams in channel.
#04717 Deep Creek	Yes	No	Yes	Yes	Yes	Implement AMP possible land treatment riparian pasture in system.
# 04718 Upper Willow Creek	Yes	Yes	Yes	Yes	NA	Continue rest rotational grazing. Monitor willow creek riparian closely. Intensify leafy spurge control
#04722 Bitter Creek	Yes	Yes	Yes	Yes	NA	No change in grazing management. Continue aggressive biological control of Leafy spurge.
#04726 Eagles Nest Coulee	Yes	No	Yes	Yes	No	Continue rest rotational grazing Continue aggressive biological control of Leafy spurge.

*Allotment is gone due to a Land Exchange.

In 2005, a five-year report was completed for the Willow North Watershed. The report, titled Willow North Watershed Monitoring and Standards and Guidelines Report, showed that all the riparian reaches that were not initially meeting the Riparian Standard in 1999, had made significant progress or had met the riparian Standard in 2005. The report also documented the successes of biological releases on the control of leafy spurge. Table 2 reflects the status of the uplands and riparian reaches in the Willow North Watershed in 2005.

Table 2

Allotment # & Name	Are Healthy Rangelands Standards Being Met?				Is livestock grazing a significant factor in allotment not meeting standards?	Narrative Explanation and Recommended Actions
	Upland	Riparian/ Wetland	Water quality	Wildlife/ Bio-diversity		
#04024 Divide	Yes	Yes	Yes	Yes	N/A	No Recommendations
#04041 Anderson-Ojuel	Yes	Yes	Yes	Yes	N/A	No Recommendations

Allotment # & Name	Are Healthy Rangelands Standards Being Met?				Is livestock grazing a significant factor in allotment not meeting standards?	Narrative Explanation and Recommended Actions
	Upland	Riparian/ Wetland	Water quality	Wildlife/ Bio-diversity		
#04042	Yes	Yes	Yes	Yes	N/A	No Recommendations
#04043 Shaw Coulee	Yes	Yes	Yes	Yes	N/A	No Recommendations
#04053 East Willow Creek	Yes	** No	Yes	Yes	No	No Recommendations
#04054 Chisholm Creek	Yes	Yes	Yes	Yes	N/A	No Recommendations
#04056	Yes	Yes	Yes	Yes	N/A	No Recommendations
#04058	Yes	Yes	Yes	Yes	N/A	No Recommendations
#04071 Upper Canyon Creek	Yes	Yes	Yes	Yes	N/A	No Recommendations
#04711 North Deep Creek	Yes	Yes	Yes	Yes	N/A	No Recommendations
#04717 Deep Creek	Yes	Yes	Yes	Yes	N/A	No Recommendations
# 04718 Upper Willow Creek	Yes	Yes	Yes	Yes	N/A	No Recommendations
#04722 Bitter Creek	Yes	Yes	Yes	Yes	N/A	No Recommendations
#04726 Eagles Nest Coulee	Yes	**No	Yes	Yes	No	No Recommendations

** Both streams in this allotment made significant progress toward meeting the riparian standard

Range Improvements

Most of the water developments recommended for the Willow North Watershed Report have been completed. The last new livestock waters were completed in 2005. Several reservoirs have been built to replace existing structures since 2005. The Deep Creek riparian fences in Allotments #4711 and #4717 were completed in 2000. No electric fencing was done in the Upper Willow Allotment #4718 as riparian monitoring was showing significant improvement in the riparian zone without the fence. Cattle guards were installed on the pipeline road to improve visitor access to the Hose fishing reservoir and eliminate the "left open gate" problem. The major expenditure of range improvement funds in this watershed has been on helicopter application of chemicals for weed control.

Current Status

The monitoring policy for all seven watersheds within the Glasgow Field Office's area of responsibility states that, at a minimum, all sites not meeting standards will be monitored yearly, while sites that are meeting standards will be monitored every five years. Both BLM personnel and permittees will adhere to this policy. All sites can be monitored more frequently if desired or needed by the BLM or the permittees.

Table 3 depicts the current standard determinations in the Willow North Watershed as of 2010. The DEQ is responsible for water quality monitoring, while it is up to the BLM to monitor water quality restoration actions to establish the effectiveness of water quality improvement and land health

restoration treatments. As the table illustrates, all of the allotments in this watershed are meeting the Standards for Rangeland Health.

Table 3

Allotment # & Name	Are Healthy Rangelands Standards Being Met?				Is livestock grazing a significant factor in allotment not meeting standards?	Narrative Explanation and Recommended Actions
	Upland	Riparian/ Wetland	Water quality	Wildlife/ Bio-diversity		
#04024 Divide	Yes	Yes	Yes	Yes	NA	No Recommendations
#04041 Anderson-Ojuel	Yes	Yes	Yes	Yes	NA	No Recommendations
#04042	Yes	Yes	Yes	Yes	NA	No Recommendations
#04043 Shaw Coulee	Yes	Yes	Yes	Yes	NA	No Recommendations
#04053 Eastfork Willow Creek	Yes	Yes	Yes	Yes	NA	A short section of Willow Creek is not meeting the standard. It is not livestock caused. Trend is up-continue monitoring
#04054 Chisholm Creek	Yes	Yes	Yes	Yes	NA	No Recommendations
#04056	Yes	Yes	Yes	Yes	NA	No Recommendations
#04058	Yes	Yes	Yes	Yes	NA	No Recommendations
#04071 Upper Canyon Creek	Yes	Yes	Yes	Yes	NA	No Recommendations
#04711 North Deep Creek	Yes	Yes	Yes	Yes	NA	No Recommendations
#04717 Deep Creek	Yes	Yes	Yes	Yes	NA	No Recommendations
# 04718 Upper Willow Creek	Yes	Yes	Yes	Yes	NA	No Recommendations
#04722 Bitter Creek	Yes	Yes	Yes	Yes	NA	No Recommendations
#04725*	Yes	Yes	Yes	Yes	NA	No Recommendations
#04726 Eagles Nest Coulee	Yes	Yes	Yes	Yes	NA	A section of Bitter Creek is not meeting standards because of weed spraying. Discontinue chemical application along creek

*Allotment #04725 was added to the watershed for evaluation in 2010.

Uplands

All of the allotments in the Willow North Watershed were assessed in 2010 to determine if they met the Upland Standard, by an interdisciplinary team using the BLM approved method: The 17 Indicators of Rangeland Health. All of the rangelands were determined to be healthy and meeting the Upland Standard as described in the Standards for Rangeland Health. Table 4 shows all of the assessments that were completed and the allotments where the assessments took place. Photographs numbered 1-8 in Appendix 1 are examples of the upland monitoring photographs taken during these assessments.

Table 4

Allotment a Number and Name	Site Number (3X3)	Standard Determination	Wildlife/Other Studies
#04024 Divide	STSP-1	PFC	WN-46,
#04041 Anderson-Ojuel	F-1	PFC	WN-27, 34, 35, BG-39, BG-40
#04042	P-1	PFC	
#04043 Shaw Coulee	P-1	PFC	
#04053 East Willow Creek	A-3, C-2,	PFC	WN-12, WN-6, WN-22, BG-66
#04054 Chisholm Creek	TP-2, TP-3	PFC	WN-18, WN-9, WN-2, WN-48, WN-33, WN-44, WN-36, Tank
#04056	P-1, P-2	PFC	
#04058	P-1	PFC	
#04071 Upper Canyon Creek	TP-1, TP-2	PFC	WN-17, WN-52
#04711 North Deep Creek	STSP-1	PFC	WN-49, WN-32, WN-04, WN-21
#04717 Deep Creek	East-1	PFC	WN-30
# 04718 Upper Willow Creek	Chisel 1-1, D-2, A-1, D-2	PFC	WN-23, WN-15, WN-45, WN-7, WN-13, WN-11, WN-3, WN-37, WN-47
#04722 Bitter Creek	P-1, P-2	PFC	
#04726 Eagles Nest Coulee	B3-2, 5-2	PFC	WN-41, WN-39, WN-50, WN-19, WN-43, WN-42, WN-24

PFC – Proper Functioning Condition
WN – Willow North

The assessment sites that were not representative of an ecological site, as determined by the soil scientist, were relocated. If a pasture or allotment had no previous representative site established, a new one was established.

3X3 Trend Studies & Photo-Points:

Every allotment in the watershed had at least one 3x3 trend plot or photo-point completed in addition to an upland land health evaluation. Most of these studies had been established in the 1970s and have been read inconsistently since then. Many of the 3x3 studies were completed in 2004, and those that showed vegetative changes over time were reread in 2010. Collectively, the particular studies described in Table 4 showed an upward or static trend, depending on what year was used as the base year. Climatic conditions seemed to have the most effect on vigor and numbers of grass species. Clubmoss cover has neither increased nor decreased on most of the silty ecological sites (see photos #36 - #43).

Chisel plow studies:

The chisel plow study (chisel 1-1) on Allotment #04718 was reread in 2010. This study consists of a 3x3 trend plot, 100 point step-point transect, and weight estimate plots on the treated and untreated sites. Table 5 shows green weight production, vegetation hits, clubmoss cover, and the percent bare ground that was gathered from the step-point transect and weight estimate plots. Photographs of the 3X3 plots numbered 29 -32 are located in Appendix 1.

Table 5

Chisel Plow Study 1-1

	1983		1985		1986		1992		1994		2010	
	Untreated	Treated	Untreated	Treated	Untreated	Treated	Untreated	Treated	Untreated	Treated	Untreated	Treated
production LBS\acre	550	294	450	1280	1500	3940	580	1540	740	1046	830	1220
Vegetative Hits excluding clubmoss (%)	47	12	36	35	85	80			27	37	48	45
Bare ground %	3	52	3	59	0	15			2	29	0	17
Clubmoss (%)	47	0	52	0	14	0			52	0	42	16

The data indicates that after 27 years, the treated portion is still producing more vegetation than the untreated portion. Most chisel plow treatments have a life span of approximately 20 years, but this particular treatment has exceeded the normal lifespan of a land treatment project. The treated area is still producing approximately 30% more forage than the untreated, even as clubmoss is now invading the site (16% cover on treated area).

Habitat assessment sheets:

The wildlife program completed Vegetative Assessment worksheets and the 17 Indicators of Upland Health checklist on 40 random sites in the Willow North Watershed. The completed 17 Indicator checklists all showed that those particular sites were meeting the Upland Standard. The Habitat Assessment sheets for the Willow North Watershed are summarized in Table 6. Photographs and field forms are located in the Willow North 10 Year Binder, located in the Glasgow Field Office.

Table 6

Habitat Assessment Data North Willow Watershed 2010							
			Ecological Site				
		Avg WN	DC	OV	SWC	SI	TH
	# of Sites	40	10	4	7	15	4
Canopy Cover (%)	Total Sage	**1.77**	1.56	7.66	0.64	1.15	1.06
	Total Shrub	4.95	2.77	11.54	6.83	3.41	7.07
	Grass	27.28	30.60	27.08	18.48	28.14	30.95
	Forbs	**15.91**	15.40	28.23	13.13	13.90	18.31
	Cactus	0.24	0.28	0.21	0.41	0.20	0.04
	Total Veg	48.38	50.60	74.71	39.48	46.80	57.43
	Clubmoss	**20.27**	14.63	8.83	0.00	35.77	15.38
	Litter	9.68	11.95	7.96	6.76	9.16	13.05
	Bare/Lichen	**24.85**	29.89	27.94	56.30	10.30	15.99
Height	Sage	29.18	28.96	40.85	29.61	26.71	27.92
	Shrub	25.05	24.17	40.00	20.42	26.03	20.70
	Grass	31.64	34.04	31.46	34.93	28.73	32.39
	Forbs	18.37	18.61	20.97	18.46	16.93	21.12
Live Density (average contacts per decimeter)	Grass (0-10)	1.31	1.36	1.16	0.75	1.47	1.66
	Grass (10-20)	0.28	0.31	0.40	0.33	0.18	0.44
	Grass (20+)	0.13	0.08	0.38	0.26	0.05	0.05
	Forb (0-10)	0.33	0.32	0.75	0.41	0.20	0.30
	Forb (10-20)	0.06	0.05	0.09	0.13	0.04	0.09
	Forb (20+)	0.01	0.01	0.03	0.02	0.01	0.01
Dead Density (average contacts per decimeter)	Grass (0-10)	1.44	2.13	0.84	1.16	1.26	1.60
	Grass (10-20)	0.13	0.24	0.08	0.12	0.07	0.16
	Grass (20+)	0.02	0.06	0.00	0.03	0.01	0.03
	Forb (0-10)	0.07	0.05	0.16	0.09	0.05	0.10
	Forb (10-20)	0.01	0.01	0.03	0.01	0.01	0.03
	Forb (20+)	0.00	0.00	0.00	0.00	0.00	0.00
Species Richness	Total	35.05	33.90	28.00	37.14	33.24	49.00
	Shrubs	2.40	2.50	1.75	3.43	1.71	4.00
	Grass	6.52	6.40	6.00	7.14	6.35	7.00
	Forbs/Half-Shrubs	25.33	24.70	17.75	26.14	24.88	35.00

The data and photographs included in the Habitat Assessment methodology could be used to establish baseline cover information that would be used in the future to provide monitoring information on the vegetative components for both the Upland and Biological Standards. This data would be useful to establish vegetative trends in this watershed.

Upland Shrub Photo-points

Five upland shrub photo-points were retaken in 2010, to document any changes in the condition and to monitor the utilization levels on these shrub species. Photographs for BG-66 numbered 33- 35 are located in Appendix 1. Little or no change in shrub condition or utilization levels from previous years was apparent in the Silver Sagebrush vegetative types (see BG-66). Utilization of Rubber Rabbit Brush by wildlife species was readily apparent as shown in the photographs (BG-39; BG-40). These photographs can be found in the Willow North 10 Year Binder located in the Glasgow Field Office.

Riparian

Prior to 2008, streams on BLM managed lands in Valley County were assessed using the Montana Riparian\Wetland Association Method (MRWA) to rate functioning condition. In 2008, the Glasgow Field Office began using the approved BLM method of assessment called the Proper Functioning Condition(PFC) or PFC Method. The PFC Method was used by an interdisciplinary team of resource specialists (I.D. Team) during the 2010 field season to assess and record the riparian and wetland conditions in the Willow North Watershed.

Due to weather, road conditions, conflicting schedules, and other higher priorities, 100 percent of the riparian reaches in the Willow North Watershed were not assessed in 2010. The I.D. Team was able to conduct over 40 miles of stream assessments on 8 streams that consisted of 18 reaches flowing through 6 allotments. The streams that were not meeting standards in the previous watershed plan were all reassessed using the approved BLM method. The I.D. Team will continue assessing riparian areas during the 2011 field season and will include their findings in the 2015 Willow North Watershed Report.

The PFC method was implemented by the BLM in order to evaluate the condition of riparian vegetation and riparian function which indicate causes and sources of current and potential water quality issues. Riparian vegetation responds readily to changes in management and can be modified to produce conditions more favorable to stream stability and water quality. Achieving or maintaining PFC in riparian areas promotes the growth of deep-rooted riparian vegetation that dissipates streamflow energy, stabilizes streambanks from cutting action, and filters sediment. Proper functioning riparian areas have stable stream banks (low sediment input) that are well vegetated (low thermal loading). The functioning condition can indicate whether or not livestock are spending excessive time in or immediately adjacent to the waterway (low bacteria and nutrients). Riparian trends provide valuable information. Improving trends indicate that banks are becoming more stable (lower sediment load), shading is improving (less thermal loading), and livestock are spending less time in or immediately adjacent to the waterway (less bacteria or nutrients). Declining trends would likely denote the opposite.

Table 7 summarizes the riparian study sites that were initially assessed in 1997, 2004, or 2006, and sites that were reassessed during the 2010 field season. The table includes scores obtained through application of the MRWA method that rates the functioning condition displayed by the reaches. Trend calls are required for reaches that are FAR and, when evident, can be made for reaches that are at PFC. Photos numbered 23 - 28 in Appendix 1 display the riparian sites that were monitored in 2011 and include comparison photos of the sites that did not initially exhibit PFC.

Table 7

Stream Name	Allotment	Site	Rating	Trend	Year
Willow Creek	#4041 Anderson-O'Juel	R-425 / R-426	PFC PFC (89)	Upward	2010 1998
Willow Creek	#4053 East Fork Willow Creek	R-409	PFC FAR (70)	Upward	2010 2004
Willow Creek	#4053 East Fork Willow Creek	R-410	PFC FAR (70)	Upward	2010 2004
Willow Creek	#4053 East Fork Willow Creek	R-411	FAR PFC (87)	Upward	2010 2006
Lone Tree Coulee	#4053 East Fork Willow Creek	R326	PFC FAR (76)	Upward	2010 2004
Rock Creek	#4711 North Willow Creek	R-123	PFC PFC (93)		2010 2004
Deep Creek	#4711 North Willow Creek	R-391	PFC PFC (87)	Upward	2010 2006
Deep Creek	#4717 Willow Creek	R392 / R-89	PFC PFC (80)		2010 2006
Deep Creek	#4718 Upper Willow Creek	R-393 / R-90	PFC PFC (96)		2010 2004
Willow Creek	#4718 Upper Willow Creek	R-505A	PFC FAR	Upward	2010 2007
Willow Creek	#4718 Upper Willow Creek	R-505B	PFC FAR	Upward	2010 2007
West Fork Willow Creek	#4718 Upper Willow Creek	R-406	PFC PFC (95)		2010 2004
Bitter Creek	#4726 Eagle's Nest Coulee	R-394	PFC PFC (84)		2010 2006
Bitter Creek	#4726 Eagle's Nest Coulee	R-404	FAR PFC (84)	Upward	2010 2006
Ash Coulee	#4726 Eagle's Nest Coulee	R-369	PFC PFC (91)		2010 2004
Horse Coulee	#4726 Eagle's Nest Coulee	R-400	PFC PFC (87)		2010 1997

A section of Willow Creek in Allotment #4053 was Functioning At Risk (FAR) when assessed in 2010. The FAR reach begins above the confluence of Lone Tree Coulee and ends as the water flows from Allotment #4053 into Allotment #4718. The reason behind the FAR condition is excess erosion and deposition of shale material. As the stream has attempted to meander, and as local weather events have contributed to flashy and moderately high flow events, the steep shale slopes that are the north bank of Willow Creek along this reach have fallen into the stream. The eroded material has been heavily deposited and has impacted the success of riparian vegetation for about 1.75 miles. The action and events that have contributed to the FAR condition of this reach are natural and can be expected as the creek attempts to configure a sinuosity that will eventually tolerate the energy carried during high flow events in this rugged landscape.

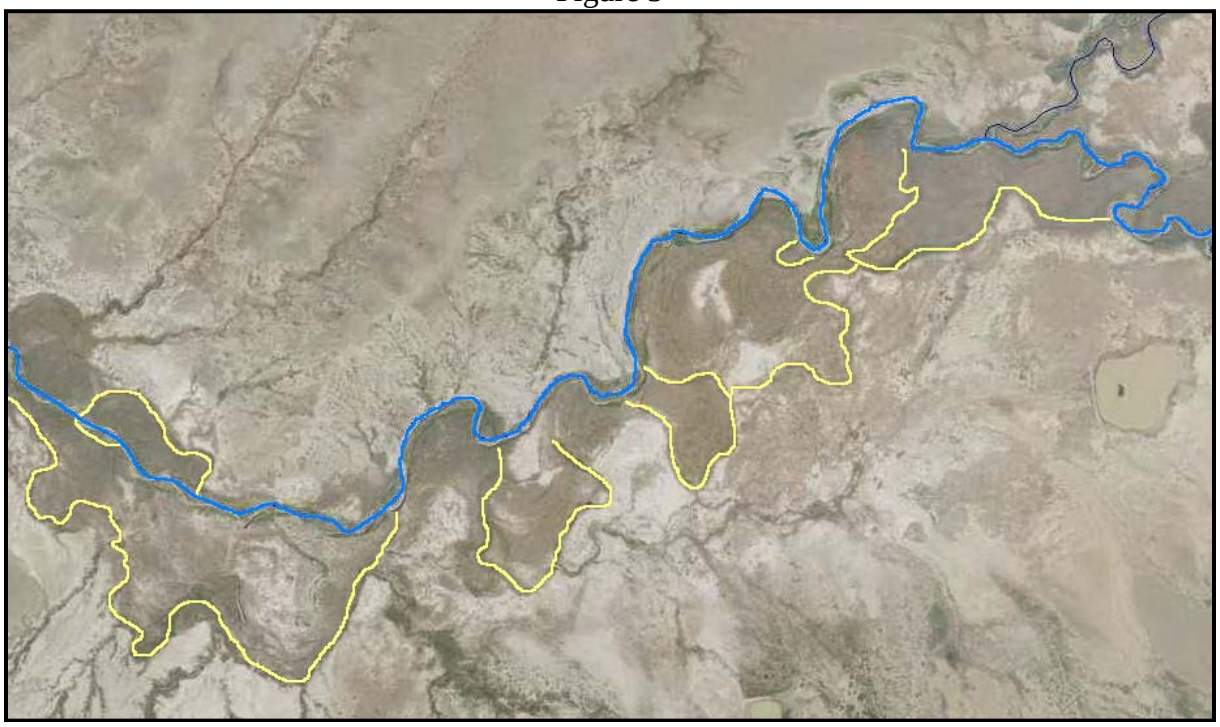
Figure 2 shows the topographic present where Willow Creek is butting up against the steep shale slopes. Encircled in red is the location where the shale is eroding. The elevation atop the slopes is approximately 5,641 feet above sea level, while the stream resides directly at the base of the slopes at an

elevation of about 5,548 feet above sea level. In a matter of about 200 horizontal feet the elevation drops nearly 100 vertical feet.

Figure 2

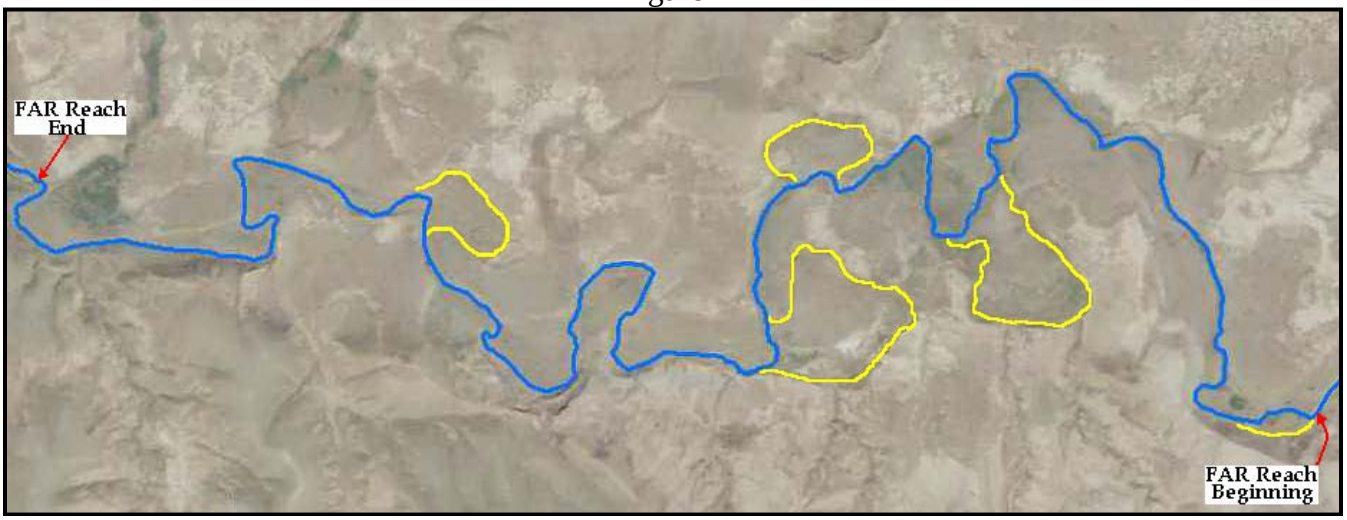
Figure 3 (an aerial photo) shows the ability of Willow Creek to meander about the valley floor. The current flow path of Willow Creek is along the blue line. The yellow lines indicate locations where the stream used to flow before meandering to its current path. The channels that were created in the past still serve to flow water when water levels are high and hold water when the high flows dissipate. The channel of Willow Creek will continue to change and the inclusion of sediment that hinders riparian vegetation growth in the present will provide nutrients and a growth medium to augment riparian vegetation density in the future.

Figure 3



A section of Bitter Creek in Allotment #4726 also exhibited FAR conditions in 2010. In order to control leafy spurge, the reach has been sprayed with Picloram (Tordon and 2 4 D) which has negatively impacted the prevalence of forbs and shrubs. The main characteristic of the reach that has lead to the FAR condition is the stream channel dynamics. As can be seen in the aerial photo (Figure 4) below (the current channel is colored blue while the old channel path is colored yellow), the stream channel path has been relocated due to natural flows and the composition of material in the area. Silt, sand, gravel, and cobbles are moving and re-depositing as Bitter Creek attempts to find the path of least resistance along this reach.

Figure 4



Water Resources

The Willow North Watershed has a perimeter of roughly 108 miles that encompasses 207,827 acres, of which approximately 150,828 acres are BLM managed lands. The Willow North Watershed contains parts of three different watershed basins (Rock Creek, Lower Milk River, and Porcupine Creek) identified by the U.S. Geological Survey.

The Rock Creek Watershed Basin makes up 86.7 percent of the Willow North Watershed and includes portions of Eagle Creek, Willow Creek, Rock Creek, Collins Creek, Chisholm Creek, Burnett Creek, East Fork Willow Creek, Deep Creek, South Creek, and Dashers Spring. Coulees that intermittently flow water in the Rock Creek watershed basin include Long Coulee, Short Coulee, Big Coulee, Spring Coulee, Ash Coulee, Coyote Coulee, Horse Coulee, Cow Coulee, Papoose Coulee, Parson Coulee, Starbuck Coulee, Lone Tree Coulee, Shaw Coulee, and Badland Coulee.

The Lower Milk River Watershed Basin makes up 8.1 percent of the Willow North Watershed and contains the West Fork of Canyon Creek and Buggy Creek.

The Porcupine Creek Watershed Basin makes up 5.2 percent of the Willow North Watershed and contains the West Fork of Porcupine Creek.

The mean annual precipitation in the Willow North Watershed is 11 (eleven) inches; 40 percent falls in May, June, and August while 25 percent falls as snow. Approximately 80 to 90 percent of the moisture that falls in the watershed is lost to evaporation and transpiration. The runoff in the watershed is composed of about 9 to 19 percent of the water that falls, while less than 1 percent of precipitation goes to recharge ground water aquifers.

The Willow North Watershed encompasses 5.62 miles of the headwaters of Buggy Creek, of which 2.88 miles flow across BLM lands. The State's 303(d)/305(b) Integrated Report from 2010 indicated that 46.5 miles of Buggy Creek (from the headwaters to the mouth of the Milk River) has iron concentrations that exceed the numeric water quality standard for the aquatic life beneficial use. However, the only identified source or sources are natural. Thus, it is considered partially impaired. The types of assessments implemented in order to determine water quality along Buggy Creek include biological, habitat, physical, and chemical. The assessment methods integrated into water quality assessments include benthic macroinvertebrate surveys; fish surveys; information gathering from local residents; non-fixed station physical and chemical monitoring for conventional pollutants only; primary producer surveys for phytoplankton, periphyton, and macrophyton; and visual observations completed by State appointed professionals during a single season.

Wildlife

Key Questions from the initial Willow North Watershed Report (1999) were:

1). Grassland bird management; How do we find a balance to meet habitat requirements for species (especially those listed as sensitive) that need a variety of habitats from very short vegetation to dense, tall cover?

The Montana Natural Heritage Program has conducted bird surveys on grasslands throughout north Valley County since 2001. A number of the study sites are located in the Willow North Watershed. Results from the surveys suggest that the expected grassland bird assemblage is present in north Valley County and the North Willow Watershed. This watershed has many allotments; the larger ones have had grazing management plans developed for them, while the smaller ones are in custodial management with much variably in the grazing intensity. Differing annual moisture levels, and grazing intensity and timing result in a variety of habitat conditions throughout the area. The diversity and number of grassland bird species found throughout the watershed, as well as the surrounding landscape, reflects the variability in these factors, with an abundance of species associated with tall, mid, and short grass habitats. The abundance of such a wide variety of grassland birds in the area has led to the designation of much of the grassland habitats in north Valley County as a Globally Important Bird Area. Monitoring of grassland bird species continues and additional research has been initiated to examine how birds respond to management in large landscapes at multiple scales.

2). Swift Fox habitat; What is good swift fox habitat and how can we manage for it?

Since the original Willow North Watershed Report was finished in 1999, swift fox have been observed in the watershed. Joint Canadian and U.S. mid-winter surveys were conducted in 2001, and again in the winter of 2005. Other work by Canadian researchers modeling swift fox habitat needs suggest that the Willow North Watershed contains large tracts of potential swift fox habitat. Subsequent surveys have found numerous swift fox in the watershed area and swift fox populations are apparently continuing to increase and expand throughout northern parts of Valley County. Swift fox habitat is generally rather flat, intact native prairie. No additional management actions on BLM lands in this watershed are required to maintain or improve swift fox habitat.

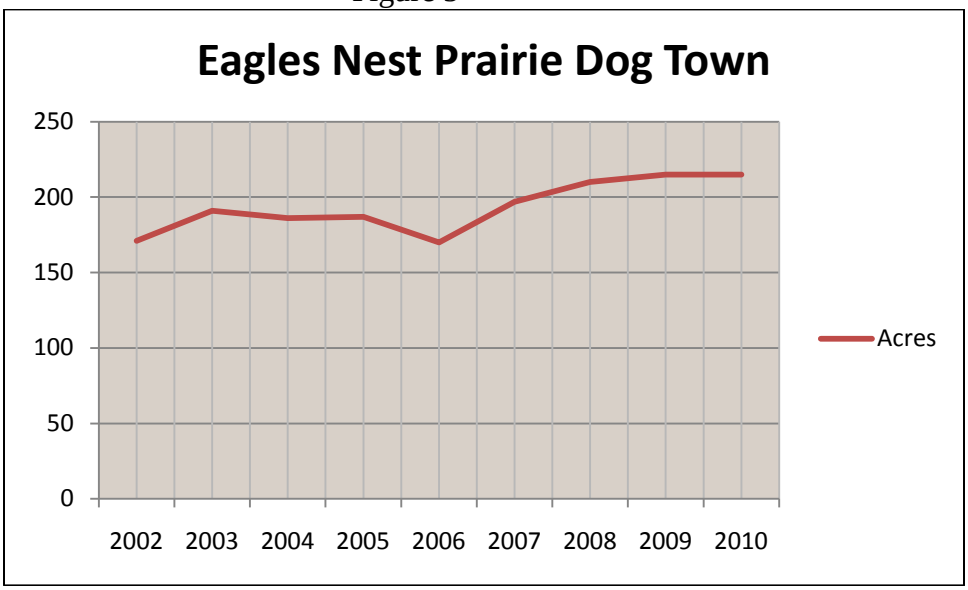
3). Waterfowl Production; How can waterfowl habitat be developed in cooperation with downstream water users? What management techniques and land treatments should be employed to enhance or maintain current habitat?

We continue to maintain the current waterfowl production reservoirs and monitor the use of these areas annually. The use of these reservoirs appears to be quite high and grassland conditions probably are adequate to provide excellent nesting cover for most waterfowl species. Emergent vegetation may be limited for those species needing this type of habitat, but it is unknown if these reservoirs are capable of producing this habitat type. Waterfowl production within this watershed continues to be mediated by water levels in the reservoirs. As noted in the original watershed report, waterfowl production is not enhanced by dense nesting cover, but by the vastness of the cover surrounding breeding reservoirs. Recommendations in the original assessment suggest creating more waterfowl reservoirs; however increased concern with Greater Sage-grouse habitat and a greater emphasis on maintaining natural habitats in the watershed have overshadowed the need for increasing the number of waterfowl production reservoirs.

4). Prairie dog management; What do we need to do to carry out the RMP decision concerning prairie dogs?

The only black-tailed prairie dog town in the watershed is approximately the same size as it was in 1999 (Figure 5). This black-tailed prairie dog town is the furthest northeast town in Montana and provides habitat for about five pairs of burrowing owls and as well as a greater sage-grouse lek. McCown's Longspurs are also abundant on and near the prairie dog town. All of these species are BLM species of concern. No additional management actions are proposed for this prairie dog town.

Figure 5



5) How should crucial winter ranges for mule deer and antelope be managed?

This watershed contains an important mule deer wintering area in Bitter Creek. This area should receive greater management attention to ensure habitat extent and conditions are adequate to continue to provide quality habitat for these animals. Some concern is warranted regarding the condition of the browse available within this watershed. As noted in the vegetation section, some browse appears to be heavily utilized during the winter. Browse condition should be a priority for vegetation monitoring. Browse conditions may improve after the anticipated heavy winter mortality of mule deer in this watershed due to extreme snow depths in the winter of 2010/2011.
Pronghorn may also use this area heavily is some winters or may use the watershed as a migration route. Ongoing research exploring habitat use and movement patterns of pronghorn should help define the importance of this watershed.

6) Recent updates and concern; greater sage-grouse

Since this watershed plan was published in March 1999, greater sage-grouse have become a priority species for both the State of Montana and the BLM. As a result of this emphasis, we have increased efforts to monitor known leks and search for previously undiscovered leks. This work is ongoing and to date we have discovered two new leks in the watershed. There are currently three known greater sage-grouse leks in the watershed.
A graduate study was initiated in 2007, through Dave Naugle at the University of Montana, to examine population vital rates, habitat relationships, and migration. Jason Tack completed his research in 2009, and found reproductive vital rates were comparable with stable or growing populations. However, larger scale landscape changes may have reduced a once larger population to current levels. This population is now subject to random mortality events that leave it vulnerable to extirpation. Perhaps the most interesting result of this work was the discovery that greater sage-grouse that breed in northern Valley County and southern Saskatchewan migrate south across the Milk River to winter in south Valley and Phillips counties. Additional greater sage-grouse research was initiated in 2010, with Dr. Dave Naugle at the University of Montana. Graduate student Rebecca Smith will investigate the nature of this migration to determine the timing and pattern of movement as well as migration habitat and habitat use.

During the summer of 2010, 43 habitat plots in the watershed were measured by BLM. Plots were randomly located in the watershed and a suite of habitat parameters were measured.

Habitat measures were compared to greater sage-grouse habitat standards established by the Montana Sage Grouse Working Group (Tables 8 and 9).

Table 8. Greater Sage-Grouse Habitat Standards

Habitat Feature	**Indicator**	**Suitable Habitat**	**Marginal Habitat**	**Unsuitable Habitat**
Nesting Cover	Big Sagebrush Canopy Cover	15-25%	10-14% or 26-35%	<10% or >35%
Nesting Cover	Big Sagebrush Height	30-80 cm	20-30cm or 80-100cm	<20cm or >100cm
Nesting Cover	Herbaceous perennial grass & forb height	≥18cm	12-18cm	<12cm
Nesting Cover & Food	Perennial grass canopy cover	≥15%	5-14%	<5%
Nesting Cover & Food	Forb canopy cover	≥10%	5-10%	<5%
Food	Forb Richness[1]	High	Low	Very Low

Table 9. Greater Sage-Grouse habitat measures in North Willow Watershed 2010.

Habitat Indicator	Mean	Suitability
Sagebrush Canopy Cover (%)	1.77	U
Sagebrush Height (cm)	29.18	M
Grass Canopy Cover (%)	27.28	S
Grass Height (cm)	31.64	S
Forb Canopy Cover (%)	15.91	S
Forb Height (cm)	18.37	-
S = Suitable Habitat, M = Marginal Habitat, U = Unsuitable Habitat		

Habitat for sage-grouse in the Willow North Watershed is considered unsuitable according to the standards, primarily because of low sage brush cover. However, the standards do not relate well to sage-grouse habitat in this area. We feel the established standards are not applicable for the type and scale of monitoring needed for management purposes and also may not reflect the conditions in this region given the silver sage habitats these birds utilize, and variance in soil type and climate. Also, sagebrush in this area may not be ecologically capable of meeting "suitable" habitat standards except in small patches. As Tack (2009) noted, the birds associated with this area often utilize shrubs other than sage brush for nesting cover. Current management appears to be providing conditions adequate to maintain sage-grouse vital rates such as nest success and chick survival (Tack 2009). Management should focus on maintaining current habitat size and connectivity with habitats surrounding the watershed as well as minimizing additional habitat stressors such as extensive oil and gas development and wind development (Tack 2009).

Overall, wildlife habitat/biodiversity standards continue to be met in this watershed.

Transportation, Recreation and VRM

Transportation and Signage

Off Highway Vehicle (OHV) travel on BLM public lands is regulated by the June 2003 Record of Decision (ROD) Off Highway Vehicle Environmental Impact Statement and Proposed Plan Amendment for Montana, North Dakota and South Dakota. This Record of Decision designated BLM lands as a limited area for OHV use. A limited area is restricted at certain times, in certain areas, and/or to certain vehicular use.

The approved preferred alternative in the 2003 ROD states that BLM will restrict motorized wheeled cross-country travel yearlong, which effectively limits motorized wheeled travel to existing roads and trails until site specific travel management plans are developed for high, medium, and low priority geographical areas.

BLM public lands within the Willow North Watershed area are in a low priority travel management planning area. Site specific travel management planning will be initiated within five years of the date of the ROD for moderate priority areas and there are no specific time requirements for initiation of site specific planning for low priority areas. Therefore, until that travel management planning occurs, all motorized wheeled travel on BLM public lands will be restricted to existing roads and trails within the Willow North Watershed area. This decision applies to the general public's use on BLM land, but allows BLM employees, other government entities, and grazing lessees and permittees motorized wheeled cross-country travel when performing administrative functions in managing the BLM public lands. Examples of grazing permittees administrative functions include, but are not limited to: checking vegetative conditions, building or maintaining fences, delivering salt and supplements, moving livestock, checking wells or pipelines as part of the implementation of a grazing permit or lease. Except for the Bitter Creek WSA, recreationists are permitted motorized travel to a campsite within 300 feet of a road or trail by the most direct route possible.

The BLM will ensure that appropriate signs and posters are used to promote safety and convenience for visitors and users, define boundaries, identify management practices, provide information about geographic and historic features and protect vulnerable land areas and resources from misuse. As per the HiLine District Office Sign Plan approved on 10/30/2003, off highway vehicle signing associated with implementing the June 2003 ROD for managing off highway vehicle travel within the HiLine District Office will continue along with informational signing of any recreational sites present or proposed for development within the Willow North Watershed area.

Recreation and Public Use

The BLM will maintain and/or enhance the recreational quality of BLM land and resources to ensure enjoyable recreational experiences. The recreation emphasis will be to develop and maintain opportunities for dispersed recreational activities such as hunting, fishing, scenic and wildlife viewing and driving for pleasure.

The grazing allotments within the Willow North Watershed area are within the Valley Extensive Recreation Management Area (ERMA) which provides dispersed and unstructured recreational activities. There are no structured recreational facilities within the watershed and visitation to the area is considered low and primarily occurs during the fall hunting season. Public motorized vehicle use is restricted to existing roads and trails.

Approximately eight commercial outfitters hold special recreation permits (SRPs) within the North Valley ERMA to guide their clients to hunt for big game, waterfowl, upland birds, and varmints during the fall and winter hunting seasons. In addition, this area is also popular for non-commercial hunters from throughout Montana and the surrounding states. The BLM does not allocate specific use areas for outfitters and guides within the ERMA. All BLM lands within the watershed are available at the discretion of the Field Manager as long as permittees maintain a special recreation permit and meet the BLM Handbook 2930 regulation requirements. Outfitters and other recreation users are required to use weed-free feed on BLM land for their livestock as a part of the field office's integrated weed management program.

Hose Reservoir, in Allotment #4726, provides fishing opportunities to the public and is periodically stocked with rainbow trout by Montana Fish, Wildlife & Parks.

Visual Resource Management

The BLM will manage activities (oil and gas production, range improvements, wind energy farms, etc) to comply with the visual resource management (VRM) policy. The BLM land within the Field Office has been assigned a VRM class based on a process that considers scenic quality, sensitivity to changes in the landscape and distance zone. The grazing allotments within the Willow North Watershed area fall within visual resource Classes II and IV areas. The objectives for these two visual resource classes and the allotments they affect are:

VRM Class II - The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low.

Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color and texture found in the predominant natural features of the characteristic landscape. Allotments 4717, 4718, 4041, 4053, 4054, 4071, 4726, 4722 and 4725 are VRM Class II areas.

VRM Class IV - The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance and repeating the basic elements. Allotments 4717, 4718, 4041, 4053, 4054, 4071, 4726, 4711, 4024, 4042, 4043, 4056, 4058 and 4725 are VRM Class IV areas.

Bitter Creek WSA and ACEC

The 59,660-acre Bitter Creek Wilderness Study Areas (WSA), includes portions of allotments 4041, 4056, 4053, 4054, 4071, 4726, 4722 and 4718 (see Figure 1). This WSA will continue to be managed under the BLM Interim Management Policy (IMP) and Guidelines for Lands under Wilderness Review (BLM Handbook 8550-1) until it is acted upon by Congress. The general standard for interim management is that lands under wilderness review must be managed so as not to impair their suitability for preservation as wilderness. This is referred to as the "nonimpairment" standard and applies to all uses and activities, except those specifically exempted from this standard by FLPMA (such as grandfathered uses, grazing and mining).

The Bitter Creek WSA is closed to public off-road travel. Transportation within the WSA, including all motorized and mechanical (bicycles and game carts) vehicles, is only allowed on existing roads or ways (routes). No new, permanent recreational ways or structures are permitted, except those that are the minimum necessary for public health and safety in the use and enjoyment of the public lands' wilderness values. Minimal signage and cattle guards have been installed to improve recreational access and conformation to WSA regulations, but additional boundary markers are needed and roads remain primitive and, at times, impassable. Gay Reservoir, which is located in the southwest portion of the WSA is no longer maintained as a recreational fishing site due to the lack of road access.

In 2003, the Bitter Creek WSA area was also designated as an area of critical environmental concern (ACEC) for its scenic diversity and variety of vegetation types and wildlife habitats. If Congress does not designate this area as wilderness, an ACEC management plan will be developed through a public process and initiated within two years of being released from wilderness consideration. Until completion of the ACEC management plan, the area will continue to be managed under the IMP as an extensive recreation management area where a limited commitment of resources will provide dispersed and unstructured recreational activities.

The Bitter Creek WSA is also listed as a Watchable Wildlife Area, a Globally Important Bird Area and is a destination on the Northeastern Plains Birding and Nature Trail.

Cultural Resources

Cultural resources in this area are a part of the Great Plains geographical culture, both in terms of prehistoric and historic period peoples. Both historic and prehistoric resources are present here. Historic resources consist of sites associated with European farming expansion such as homesteads, cabins, railroads, and trails. Prehistoric resources consist of those sites associated with indigenous cultures, such as stone circles, lithic scatters, bison kills, and those areas used for religious and/or spiritual purposes.

The literature search results show that several sites have been recorded within this area; and several Class III Inventories have been conducted to date. Conscientious grazing practices ensure a finding of "No Historic Properties Affected" (36 CFR §800: No Historic Properties Affected; sites, etc. would not be affected directly or indirectly.) is appropriate.

During previous tribal consultation for this area, no traditional cultural properties were identified.

Paleontological Resources

The Willow North Watershed area encompasses a large portion of northern Valley County. This area includes both high and low probability areas for paleontological resources.

Noxious and Invasive Weeds

Leafy spurge is the primary weed species problem on public lands in the Willow North Watershed. The Rock Creek Weed Management Area, north of Hinsdale, which includes a portion of the Willow North Watershed, is heavily infested with an estimated 150,000 acres involving BLM, state and private lands. Within this 150,000 acre area, leafy spurge infestations occur in Willow Creek, Collins Creek, Burnett Creek, Bitter Creek, Spring Coulee, Chisholm Creek, Ash Coulee and the Eagles Nest Coulee drainages. Of these 150,000 acres, 34,500 acres are located within the North Willow Watershed.

In 1984, BLM started an aerial and ground spray program to contain the rapid spread of leafy spurge by treating the outer perimeter of the 150,000 acre area (a perimeter that measures nearly 100 miles). ATVs, UTVs and pick-up sprayers are used for ground applications of pesticides to treat small and confined patches. Chemical treatment is not feasible inside the weed area perimeter as numerous creeks, drainages and coulees provide valuable wildlife habitat; therefore biological control is used inside the weed area boundary. Beginning in 1987, the Apthona nigriscutis (aka Brown Beetles) specie was released. At that time it was the only available flea beetle specie. Since the early 1990s an additional flea beetle specie, Apthona lacertosa (aka Black Beetle) has been released. The black flea beetle has proven to be the most effective biological control in this area.

The aerial spray boundary was modified in 2005, to include a section of Bitter Creek for aerial spraying (see Figure 6). A minimum of 45-50 hours of flight time is required to treat the entire perimeter, which now measures approximately 65 miles around the Rock Creek Weed Management Area.

A total of 43.4 hours was spent in the air monitoring and treating 400 acres throughout Valley County in 2010. Since 2001, approximately 85% of the total aerial spraying efforts on noxious weeds in Valley County occurred in the North Willow Watershed (see Figure 7). The only spraying done inside the Willow North Watershed boundary is aerial spraying.

Acres of aerial spraying were used to determine cost/acre in this watershed. Table 10 shows the amount of funding (federal and non-federal) and acres treated (Willow North Watershed boundary and Valley County).

Table 11 shows a breakdown of the cost per acre for BLM funding versus total funding (BLM and other cooperators). Table 11 also shows comparison of cost per acre in the Willow North Watershed versus the entire efforts of noxious weed control in Valley County for the last 10 years. Biological control costs were not figured in either Table 10 or 11.

The Eagles Nest Coulee has been used as a bug collection site since 2006. In 2009 and 2010, we distributed beetles to 19 leafy spurge infested areas totaling 92 acres. In Eagles Nest Coulee we were able to collect over a million flea beetles in 2009, and over half a million A. lacertosa beetles in 2010. Some of the major drainages where biological control was distributed within in the Willow North Watershed include; Willow Creek, Ash Coulee, Horse Coulee, and Eagle Creek (See Figure 8).

The pictures numbered 15 – 20 found in Appendix 1 were taken at an NRCS grant location along Eagle Creek and near Hose Reservoir. The NRCS grant pictures were taken in 2008 and 2010 showing the extreme contrast of before biological control and the effects after biological control methods were used. The photos numbered 11 – 14 and #21 -#22 taken near Hose reservoir were originally taken in 1996, after the initial release of the A. Lacertosa flea beetles. The 2002 and 2010 photographs show that the flea beetles are controlling the leafy spurge, allowing the native grass species to compete, thus returning the site to a native plant community.

In conclusion, treating noxious weeds hasn't varied much in cost per acre or number of acres treated from 2001 to 2010. Over the past 10 years, we have treated an average of 280 acres per year with an average treatment cost of $240 per acre in the North Willow Watershed boundary. This cost figure also includes inventory that is associated with the aerial spraying (helicopter hours). Inventory is essential for controlling weeds, and using the helicopter is a time effective method to find new infestations outside the Rock Creek Weed Management Area. However, aerial spraying is a very costly method of treating weeds, and without a significant decrease in the number of acres treated, it will be difficult to determine if the benefits of treating weeds with the helicopter justify the costs.

For the 2011 field season, we plan to use aerial spraying as a method to control weeds, but as funding continues to decrease we will have to determine how much helicopter use is practical on a year to year basis. In the past our aerial spraying efforts have mostly been located on the east side of the Rock Creek Weed Management Area, and mostly focusing on spraying in the bottom of the drainages. For the 2011 field season, we hope to move the aerial spraying toward the west side of the Rock Creek Weed Management Area and focus on the ridges and the tops of the ridges instead of in the bottoms of the

drainages and other areas where woody vegetation is prevalent. We are especially concerned with the die off of buffalo berry shrubs in the uplands and willows along the stream banks of the riparian zones. During our 2010 field assessments, we determined that spraying in woody drainages has taken a large toll on the woody vegetation and has decreased riparian value and wildlife habitat. Instead of spraying in these drainages with the helicopter we are going to emphasize biological control and if time and people allow, we hope to use backpack sprayers. Using backpack sprayers will allow for spot spraying areas not located near the woody vegetation.

The drainage we have been using for the last five years as an insectary is almost completely clear of leafy spurge. We expect there to be some flea beetles left in the insectary, but not in the numbers we have seen the past two years. In 2010, we distributed 150,000 bugs into a tributary off Ash Coulee, hoping to establish an insectary where, in the future, we will be able to collect a majority of our flea beetles. If this location doesn't produce the numbers of flea beetles needed to distribute within the Rock Creek Weed Management Area we will have to look at other counties/states to collect flea beetles.

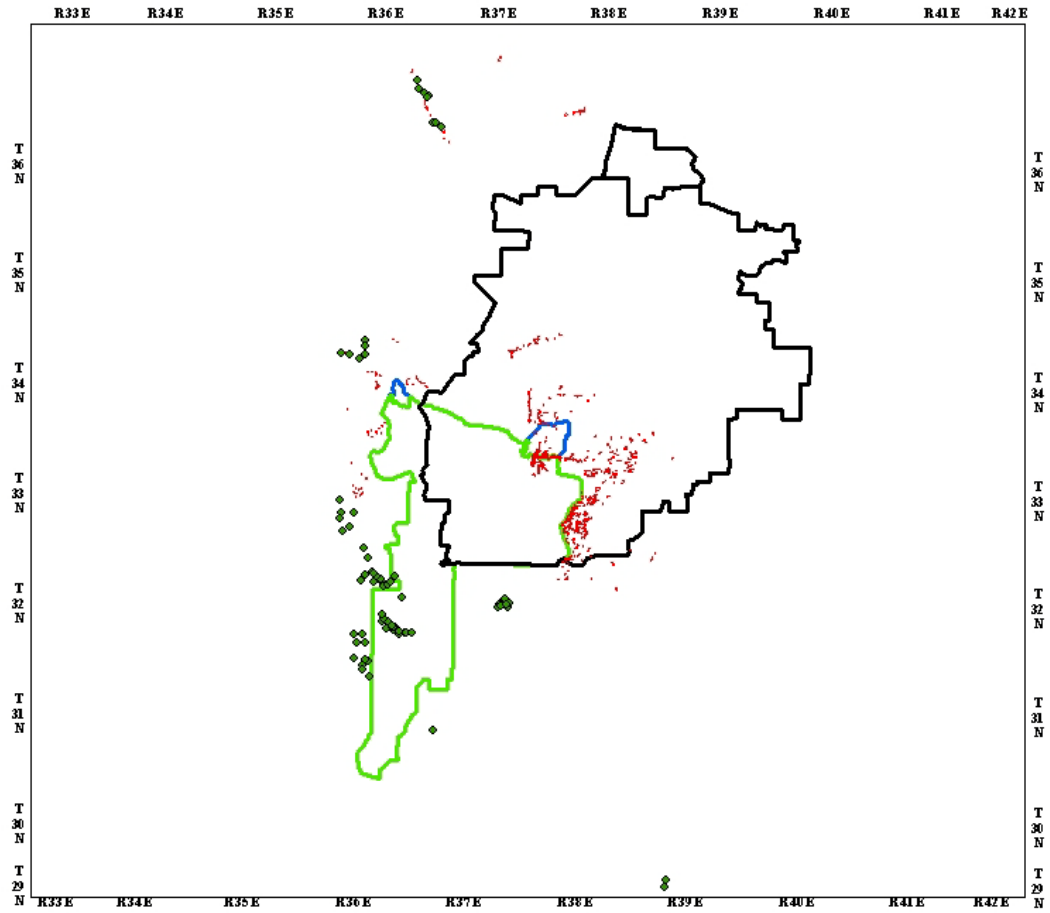
Table 10

Year	BLM Funding	Non-Federal Funding	Total Funding	NW Boundary Acres Treated (aerial spray)	Total Acres Treated in Valley County (aerial spray)	Total Acres Treated in Valley County (aerial and ground)
2001	$45,000	$34,000	$79,000	153	180	350
2002	$45,700	$30,000	$75,700	314.5	370	535
2003	$48,000	$16,000	$64,000	306	360	460.5
2004	$27,000	$16,000	$43,000	204	240	395
2005	$12,000	$14,000	$26,000	263.5	310	445
2006	$22,000	$12,100	$34,100	238	280	405
2007	$36,000	$36,100	$72,100	255	300	470
2008	$77,000	$31,100	$108,100	340	400	600
2009	$35,000	$31,100	$66,100	340	400	496
2010	$35,000	$27,959	$62,959	340	400	536
Total	$382,700	$248,359	$631,059	2,754	3,240	4,692.5

Table 11

Year	NW Boundary Cost/Acre (BLM Funding)	NW Boundary Cost/Acre (Total Funding)	Valley County Cost/Acre (aerial and ground (BLM Funding)	Valley County Cost/Acre (aerial and ground) (Total Funding)
2001	$294	$516	$129	$226
2002	$145	$241	$85	$141
2003	$157	$209	$104	$139
2004	$132	$211	$68	$109
2005	$46	$99	$27	$58
2006	$92	$143	$54	$84
2007	$141	$283	$77	$153
2008	$226	$318	$128	$180
2009	$103	$194	$71	$133
2010	$103	$185	$65	$117
Average	$144	$240	$81	$134

Figure 6



Legend

- 2010 Biological Control
- 2010 Ground Spray
- 2010 Aerial Spray
- Willow North Watershed
- Current Weed Boundary
- Previous Weed Boundary

1 = 478,797

0 5 10 15 20 Miles

0 7 14 21 28 KM

United States Department of the Interior
Bureau of Land Management
Montana/Dakotas State Office

Map created on Dec 02, 2010

N W E S

CAUTION:
Land ownership data is derived from less accurate data than the 1:24000 scale base map. Therefore, land ownership may not be shown for parcels smaller than 40 acres, and land ownership lines may have plotting errors due to source data.

No warranty is made by the Bureau of Land Management for the use of the data for purposes not intended by the BLM.

Figure 7

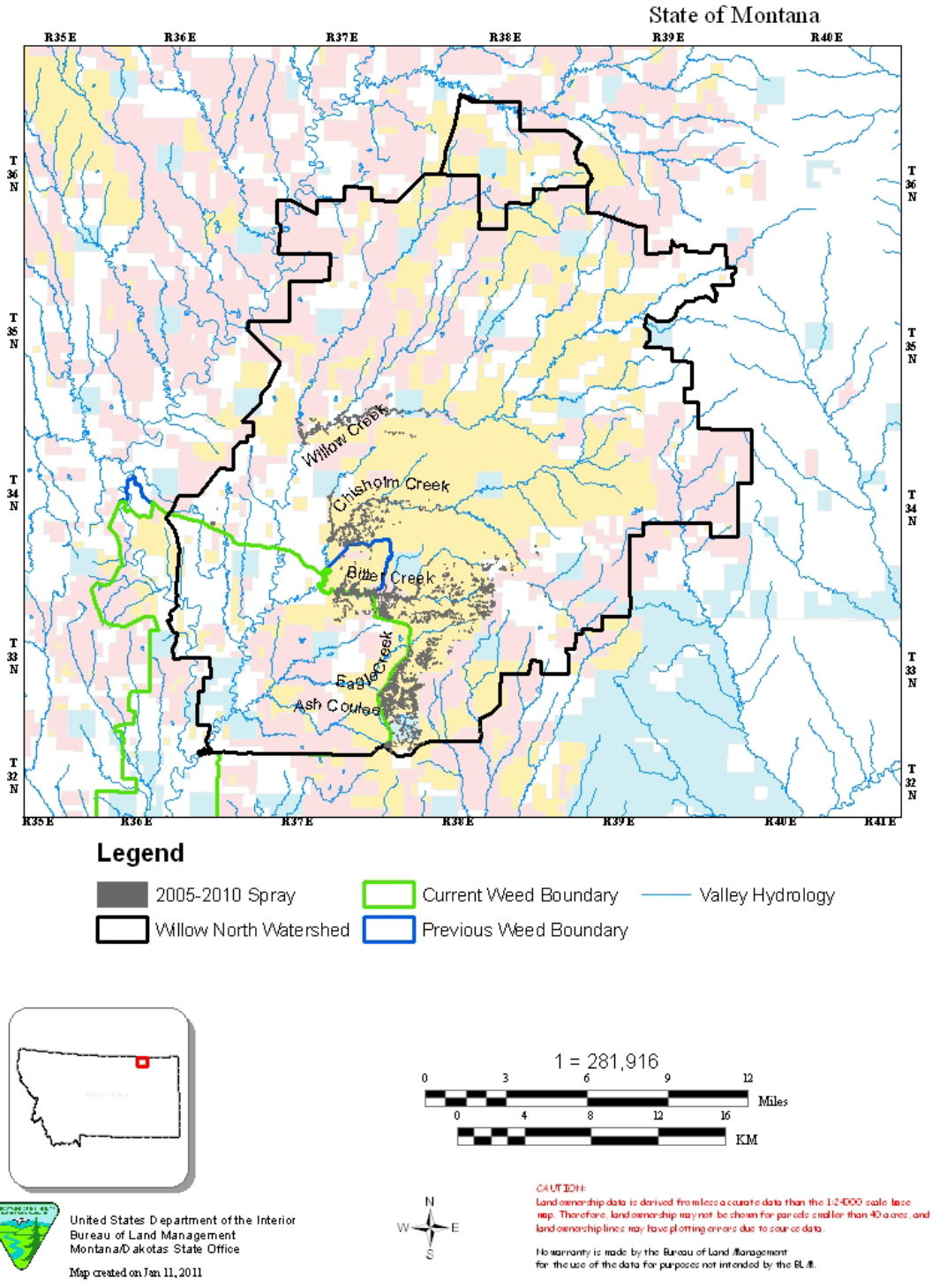

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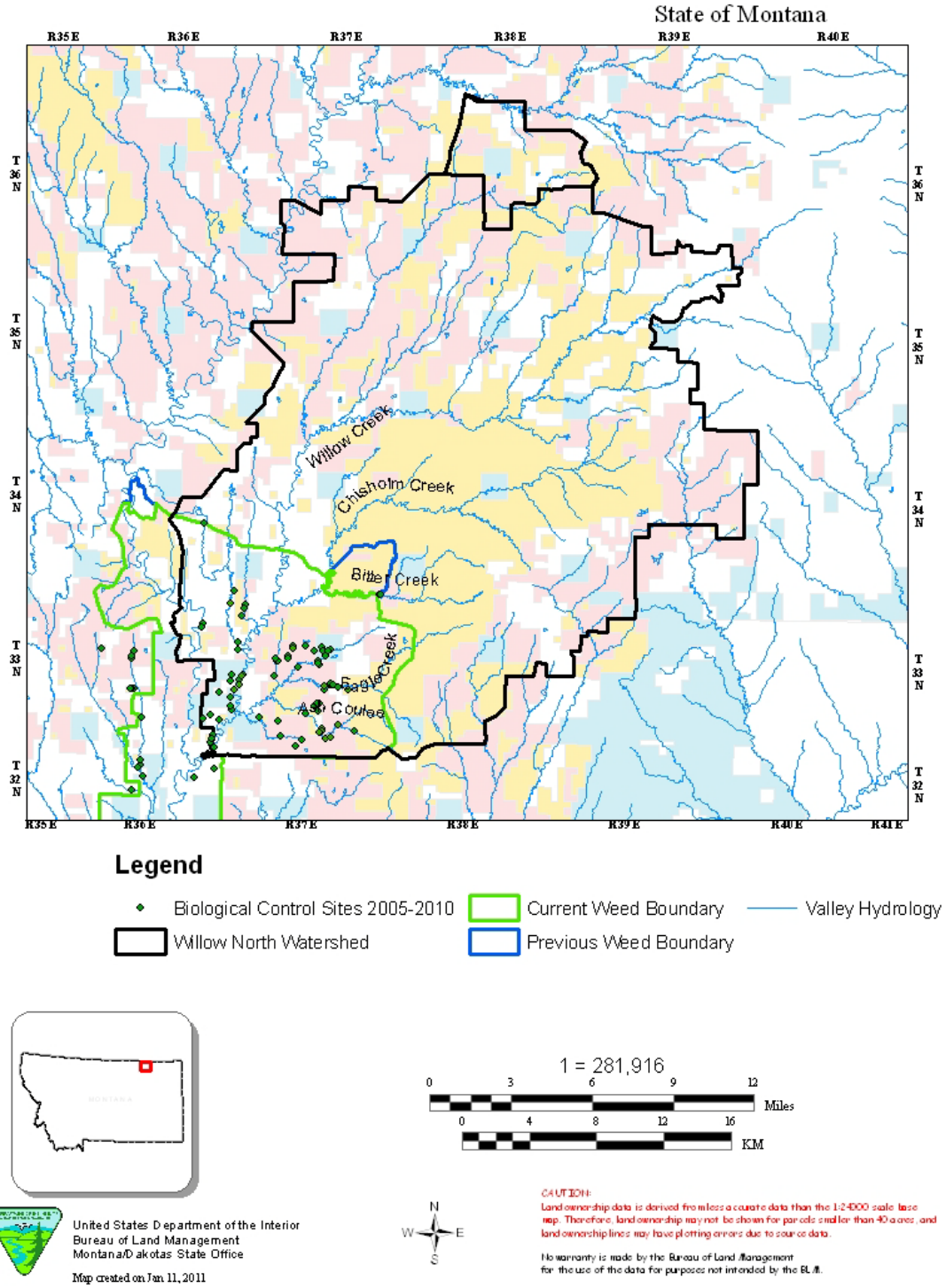
Figure 8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Biological Control Sites 2005-2010
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Map created on Jan 11, 2011
CAUTION:
Land ownership data is derived from less accurate data than the 1:24000 scale base map. Therefore, land ownership may not be shown for parcels smaller than 40 acres, and land ownership lines may have plotting errors due to source data.
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Recommendations &Conclusion

The I.D. Team will:

1. Continue assessing riparian areas during the 2011 field season and will include their findings in the 2015 Willow North Watershed Report;
2. Emphasize biological control and back pack spraying on the interior of the weed boundary, while using the helicopter for additional weed inventory work and spraying designated bench tops instead of weed patches associated with buffalo berry bushes and woody riparian vegetation;
3. Maintain existing grazing systems which will entail the maintenance and reconstruction of range improvements (stock water, interior pasture fences) that support these rotational grazing systems. Alternative funding mechanisms must be found to continue with the systems now in place;
4. Continue monitoring and habitat studies that support the Biological Standard especially as it relates to grassland birds and sage grouse habitat; and
5. Continue the signing effort along the Bitter Creek WSA boundary.

The Willow North Watershed is meeting all of the Standards for Rangeland Health on an allotment level and watershed basis. Some limited riparian areas are not meeting standards but are improving and they are not livestock caused. A great deal of the credit for the conditions in this watershed should go to the permittees who graze in this watershed. Grazing systems emphasizing riparian values and enhanced weed control efforts (with both chemical and biological control) have been implemented and allowed areas that were not meeting standards to progress to meeting the riparian standard. The livestock permittees have been very cooperative and proactive in their management and stewardship.

List of Preparers

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