Montana Fish, Wildlife & Parks

1400 South 19th Avenue
Bozeman, MT 59718

August 21, 2009

To: Governor's Office, Mike Volesky, State Capitol, Room 204, P.O. Box 200801, Helena, MT 59620-0801
Environmental Quality Council, State Capitol, Room 106, P.O. Box 201704, Helena, MT 59620-1704
Dept. of Environmental Quality, Metcalf Building, P.O. Box 200901, Helena, MT 59620-0901
Dept. of Natural Resources & Conservation, P.O. Box 201601, Helena, MT 59620-1601
Montana Fish, Wildlife & Parks:

Director's Office	Parks Division	Lands Section	FWP Commissioners
Fisheries Division	Legal Unit	Wildlife Division	Design & Construction

MT Historical Society, State Historic Preservation Office, P.O. Box 201202, Helena, MT 59620-1202
MT State Parks Association, P.O. Box 699, Billings, MT 59103
MT State Library, 1515 E. Sixth Ave., P.O. Box 201800, Helena, MT 59620
James Jensen, Montana Environmental Information Center, P.O. Box 1184, Helena, MT 59624
Janet Ellis, Montana Audubon Council, P.O. Box 595, Helena, MT 59624
George Ochenski, P.O. Box 689, Helena, MT 59624
Jerry DiMarco, P.O. Box 1571, Bozeman, MT 59771
Montana Wildlife Federation, P.O. Box 1175, Helena, MT 59624
Wayne Hurst, P.O. Box 728, Libby, MT 59923
Jack Jones, 3014 Irene St., Butte, MT 59701
Snowcrest Ranch, PO Box135, Alder MT 59710
Ledford Creek Grazing Association, 585 Ruby River Drive, Sheridan MT 59749
Ruby Dell Ranch, PO Box 85, Alder MT 59710
Bradley Livestock, PO Box 89, Alder MT 59710
Vigilante Bison, PO Box 78, Alder MT 59710
US Forest Service, 420 Barrett Street, Dillon MT 59725-3572
Bureau of Land Management, 106 N Parkmont, Butte MT 59702

Ladies and Gentlemen:

The enclosed Environmental Assessment (EA) has been prepared for the proposal to establish a new grazing lease on the Robb/Ledford Wildlife Management Area (WMA) with the Ledford Creek Grazing Association (Association) for a 3-year term to begin January 2010 through October 2012 which would allow the modification and continuation of a rest-rotation grazing system on the WMA. The EA presents four grazing alternatives that have all been developed to address changes from the current lease needed to fully meet the objectives for the WMA

The proposed lease would encompass 17,302 FWP owned acres, 10,796 acres FWP leases from Montana Department of Natural Resources and Conservation (DNRC), 680 acres owned by the U.S. Bureau of Land Management, and 3,600 acres owned by DNRC known as the McGuire section that is sub-leased to the Association. Total acres involved in the R/L System are 32,378.

In conjunction with any lease agreement under 3 of the four grazing alternatives, FWP plans to install a 3.84-mile riparian fence along Robb Creek to establish 4 small water gap access points for cattle in order to protect the existing riparian areas from livestock grazing.

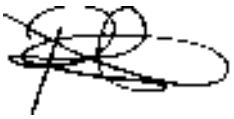
This Draft EA is available for review in Helena at FWP's Headquarters, the State Library, and the Environmental Quality Council. It also may be obtained from FWP at the address provided above, or viewed on FWP's Internet website: http://www.fwp.mt.gov .

Montana Fish, Wildlife & Parks invites you to comment on the attached proposal. The public comment period will be accepted until October 5, 2009 at 5:00 p.m. Comments should be sent to the following:

Montana Fish, Wildlife & Parks
c/o Robb Ledford WMA
1400 South 19th Avenue
Bozeman, MT 59718

Or e-mailed to: RLGrazing@mt.gov

Sincerely,



Patrick J. Flowers
Region Three Supervisor

Attachment

Draft
Environmental Assessment

Robb/Ledford Wildlife Management Area
Grazing Lease

August 2009

Montana Fish, Wildlife & Parks

Draft Environmental Assessment
MEPA, NEPA, MCA 23-1-110

I. PROPOSED ACTION DESCRIPTION

1. Type of proposed state action: Montana Fish, Wildlife & Parks (FWP) proposes to establish a new grazing lease on the Robb/Ledford Wildlife Management Area (WMA) with the Ledford Creek Gazing Association (Association) for a 3-year term to begin January 2010 through October 2012 which would allow the continuation of a rest-rotation grazing system on the WMA.

The proposed lease would encompass 17,302 FWP owned acres, 10,796 acres FWP leases from Montana Department of Natural Resources and Conservation (DNRC), 680 acres owned by the U.S. Bureau of Land Management, and 3,600 acres owned by DNRC known as the McGuire section that is leased by the Association and incorporated into the Robb/Ledford Coordinated Grazing System (R/L System) through an exchange of use agreement. Total acres involved in the R/L System are 32,378.

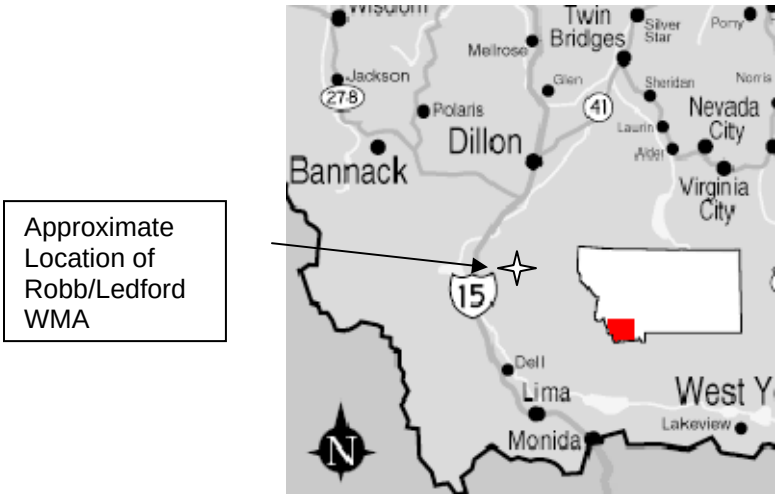
In conjunction with the lease agreement, FWP plans to install a 3.84-mile riparian fence along Robb Creek and establish three small water gap access points in order to protect the existing riparian areas from livestock grazing.

2. Agency authority for the proposed action:
FWP has the authority under Section 87-1-210, M.C.A. to protect, enhance, and regulate the use of Montana's fish and wildlife resources for public benefit now and in the future. Any consideration of continued livestock grazing would have to conform with objectives of maintaining or improving wildlife, wildlife habitat, and public access as outlined in the Robb/Ledford Management Plan (1999). Additionally, the Fish, Wildlife and Parks Commission must approve any grazing leases on Wildlife Management Areas owned by FWP.

3. Anticipated Schedule:
Public Comment Period: Thursday, August 20 – Friday, October 2, 2009
Presented to the FWP Commission for Approval: November 12
Proposed Lease in Effect: January 2009

4. Location:
The WMA is located in Madison and Beaverhead Counties in Southwestern Montana. It is situated on the western slopes of the Snowcrest Mountains approximately 20 miles south of Alder, Montana, along the Robb and Ledford Creek drainages of the Ruby River and a portion of the upper Blacktail Creek drainage. This WMA borders the Beaverhead National Forest (FS), Bureau of Land Management (BLM), Department of Natural Resources and Conservation (DNRC), FWP's Blacktail WMA, and private lands.

The WMA straddles Madison and Beaverhead Counties encompassing parts of T9S, R5W; T9S, R4W; T10S, R6W; T10S, R5W; T10S, R4W; T11S, R6W; and T11S, R5W. See *Appendix A* for a map of the WMA.



5. **Project size:**

	Acres		Acres
(a) Developed:		(d) Floodplain	0
Residential	0.5		
Industrial	0	(e) Productive:	
(existing shop area)		Irrigated cropland	0
(b) Open Space/		Dry cropland	0
Woodlands/Recreation		Forestry	0
(c) Wetlands/Riparian	~400	Rangeland	31,978
Areas		Other	0

6. **Costs and Jurisdictions:**

(a) **Permits:** None

(b) **Costs to FWP:** Water gap fence $ 43,271
Maintenance for riparian fence and existing pasture fences

(c) **Other Overlapping or Additional Jurisdictional Responsibilities:** None

7. **Need for Proposed Action:**

History of Grazing Leases on the WMA

In 1987, the Rocky Mountain Elk Foundation (RMEF), supported by a $500,000 donation from Anheuser-Busch Companies Inc., purchased the property from the Ledford Creek Grazing Association.

FWP acquired the Robb/Ledford Wildlife Management Area in 1988 from the RMEF. This was FWP's first acquisition using funds from a new lands program authorized from earmarked license revenue under House Bill 526. This acquisition was also RMEF's first habitat conservation project.

RMEF, FWP, and sportsmen touted the acquisition as an opportunity to provide a "showcase for cooperative management between ranching and wildlife interests." At the time of acquisition, the Ledford Creek Grazing Association (Association) retained the grazing rights until November 1, 1990. From 1991 through 1999, FWP leased the grazing to the Association under a rest rotation grazing formula with a stocking rate 3,495 Animal Unit Months (AUMs) and during a grazing season June 15 through October 15.

During the 1990s as FWP was preparing their grazing plans, controversy grew between landowners, FWP, and sportsmen. The controversy centered on whether FWP was managing the WMA more as a cattle ranch than a WMA. In a memo dated February 18, 1998, to the FWP Commission, Joel Peterson (former Region 3 Wildlife Manager) summarized the history as follows:

1) "WMA purchased 1988 – 9600 AUMs on WMA."
2) "Grazing reduced in 1991 from 6 to 4 months (June 15 to Oct. 15) and reduced AUMs to 5855 on WMA."
3) "Following the 1991 season FWP determined the need to further reduce Animal Units to 500 to reach an objective of having approximately 6 acres of primary range for each AUM of grazing. Keep in mind, not all of the WMA acreage would be available for grazing during any particular year. This is because some areas may not be in the system because they are critical winter range. Non-grazeable range would not be included and 1/3 of the grazeable acres would not be used each year under a rest rotation system. The intention to graze the game range under a rest rotation system is outlined in the enclosed EA. As you can see by the enclosed documentation, the Association opposed the proposed 1992 reduction. Subsequently, an agreement was made between the Association and FWP as negotiated by George Swann representing the Association and R-3 Game Manager John Cada. This agreement (1992 lease enclosed) noted that 3495 AUMs would be allowed for 1992 through 1995. After that, FWP would reduce grazing to around 500 Animal Units (which would reduce AUMs to approximately 2000 on the WMA). This agreement was made to give the Association time to prepare for the eventual cuts. The Association has been repeatedly reminded that these reductions are coming, even though we have continued to extend their lease with the same 1992 AUM figure through the 1997 grazing season. These recent extensions have been in large part due to our waiting for the successful completion of the Turner/DNRC land trade that would affect the amount of acreage we would ultimately have to base our grazing management on. This trade has been delayed by litigation and we feel we need to begin reducing AUM use on the WMA to a level more realistic to our final goals. Note we are only requesting a partial reduction for 1998."

During this time period, there was strong concern expressed over domestic sheep trailing across the WMA and that there should be no grazing on the WMA.

On May 12, 2000, the FWP Commission adopted a new 10-year lease. The lease involved a six pasture rest rotation system including FWP deeded lands, DNRC lands leased by FWP, and the

McGuire DNRC lands leased by the Association included under an exchange of use agreement. The lease for this system allows up to 3310 AUMs annually and a grazing season length of June 15 to October 15. The Robb/Ledford WMA Management Plan (See *Appendix A*) and the 2000 Robb/Ledford Coordinated Grazing System Plan (See *Appendix B*) outlined the direction with the adopted AUM grazing level. Under the existing Grazing Plan, "total annual grazing intensity ranges from 5.2 to 6.5 acres per AUM, and averages 6.0 acres per AUM over the three year grazing cycle." This is the same grazing intensity that FWP was striving for when the 500 Animal Units were contemplated in Joel Peterson's 1998 memo as outlined above.

The reason FWP could accommodate the higher Animal Unit levels (>500) under the 2000 grazing lease is because the Turner Land exchanges were completed placing the McGuire Place (3,600 acres) in DNRC ownership leased by the Ledford Creek Grazing Association. This lease was incorporated into the Robb/Ledford Coordinated Grazing System (R/L system), all of which was completed by 2000.

In order to accommodate the level of grazing as adopted by the FWP Commission, the Robb/Ledford Grazing Management Plan outlines improvements that needed to be put in place. In summary, improvements included:
1) removing old internal fences which would have been done regardless of whether cows were allowed to graze on the WMA,
2) construction of the Kelly Springs water line and the Hogback water line to address cattle distribution,
3) construction of new interior pasture fences, and
4) if needed, a one strand electric fence at lower elevations to keep cows off of tall larkspur until late July after which its toxicity to cattle drops significantly.
All but one of the improvements was completed as of 2008.

In 2008, it was decided that the Hogback water line would not be constructed based on the following reasons:
1) it would not fix the problems associated with Robb Creek riparian degradation,
2) it would not fix problems associated with tall larkspur poisoning which has created a bottleneck in not complying with movement dates in the existing grazing plan,
3) it would not quantifiably improve wildlife habitat, and
4) cost ($112,000 to 142,000) versus benefit does not justify the expense.

It has taken 8 years to remove old fences, construct new fences, finish the Kelly Springs Water line, and to get the system fully operational. The system has been fully operational since 2007, one full grazing rotation.
The latest and final improvement was the construction of a mid-elevation, 1-strand electric fence that would allow a separation of cattle from the main distribution of tall larkspur until larkspur had matured to a less toxic state for livestock. It is now obvious that even with the fence, capacity is too limited at the lower elevations to meet the standards outlined in the grazing plan of 6 acres per AUM during a two-week window. The plan prescribes a movement from the early use pasture to the next higher elevation pasture to occur in early July. During the last 10 years, that movement has not taken place until the end of the third week of July, and in one year not until mid-August driven by a concern over tall larkspur poisoning.

Investments Completed at the Robb/Ledford WMA	**Cost**
Interior fencing	$149.081.05
Solar/wind power system	$ 25,008.97
Kelly Springs Pipeline	$121,972.32
Fencing – McGuire/Ledford/ E Robb Creek/remove cattle guard at Ledford Creek	$ 69,884.42
Grazing fence –	$ 94,947.00
Dismantle 4 Bldg Robb/Blacktail; repair doors, window, remove cross fence	$ 2,197.50
Fence removal/cattle guard/demolish bldg	$ 8,000.00
South end fence removal	$ 4,999.00
Install cattle guard/gate/remove fence upstream on Ledford Ck/remove hay corrals	$ 4,999.00
Install entrance sign	$ 4,997.06
Survey costs	$ 850.00
Total Costs	$486,936.32

Some of the above costs cover expenses that would have been incurred had no cows been allowed to graze or under a much lower stocking rate than approved by the FWP Commission. The cost of improvements that were required based on the FWP Commission approval of the 2000 grazing plan is $460,893.76.

Need for Proposed Action

In the 1999 Management Plan developed for Robb/Ledford Wildlife Management Area, nine management objectives were identified in order to reach the goals of the WMA to maximize the productivity of the soil, vegetation, watershed, and game and nongame wildlife that are products of that environment. A summary of those objectives include:
(1) maintenance or improvement of the basic resource including vegetation, soil, and water, (2) expanding benefits of FWP management to adjacent DNRC lands,
(3) showcase the WMA as an area demonstrating where wildlife and livestock can co-exist while maintaining a healthy rangeland,
(4) provide winter forage for elk,
(5) provide habitat for all wildlife utilizing the WMA,
(6) incorporate adjacent public lands into management of the WMA,
(7) provide adequate public access,
(8) maintain the natural character of the land, and
(9) increase public awareness and appreciation for the diversity of wildlife on the WMA.

Livestock grazing was identified as a means to meet some objectives. Formal grazing leases have been used on the WMA since 2000 under the guidance of a rest-rotation grazing plan which has met some of the management plan's objectives.

With one exception, it has taken the last eight years to complete the scheduled improvements that would fulfill FWP's commitments under the current grazing system plan and enable FWP to fully implement the grazing plan. The exception was the decision in 2008 not to proceed with the construction of the Hogback Waterline. To reiterate that decision, 'not to construct' was based on the following:

1. it would not fully address riparian concerns along Robb Creek,
2. it would not fix problems associated with tall larkspur poisoning which has precluded compliance with movement dates in the existing grazing plan,
3. it would not quantifiably improve wildlife habitat, and

4. cost ($112,000 to 142,000) versus benefit does not justify the expense.

During the last 10 years under the 2000 lease, the lower elevation pastures had a two-week grazing prescription without hard movement dates. What has occurred during that year period is an actual use in the low elevation pastures of five to eight weeks resulting in a 2-3 acre per AUM grazing intensity, more then double what was prescribed. This high grazing intensity has resulted in a loss of cover and forage for wildlife that has far exceeded prescription and contributed to riparian resource concerns on lower Robb Creek. As a result, objectives 2, 3, 4, 5, 8, and 9 as described in the 1999 management plan have not been fully met in many years for the system as a whole.

In order to address the movement prescriptions in the grazing plan, hard dates would be implemented in any new lease that would only allow for no more then two weeks of grazing in the early use pasture. The livestock owners have committed to the use of "silent herder," a mineral supplement commonly used to minimize tall larkspur poisoning. The livestock owners have committed to accepting those losses without violating movement dates.

Livestock grazing was identified as a means to meet some objectives, and formal grazing leases have been used on the WMA since 2000 under the guidance of a rest-rotation grazing plan. This has met some, but not all, of the management plan's objectives. Riparian corridors are responding positively since the implementation of the R/L System with the exception of small areas along Robb Creek. Under any new lease, the installation of the riparian fence is expected to allow improvement in those areas.

8. Alternatives:

Alternatives A, B, C, and D were all developed to provide modification to further address habitat and wildlife concerns while demonstrating compatibility of potentially competing resource uses in ways that try to honor and respect the idea of conservation of natural resources on landscapes where people live, work, and recreate.

The following are general proposed lease terms common to all grazing Alternatives:

1) For partial payment ($25,000) of this lease under the exchange of use agreement, the Ledford Grazing Association (Association) will fully incorporate the management of the DNRC McGuire Section into the WMA,
2) The Association would agree to maintain the existing WMA fencing and FWP would reimburse the Association for the labor costs at a fixed negotiated rate,
3) Vaccination of the Association's livestock per Montana law,
4) The Association must follow the State of Montana's Brucellosis Action Plan,
5) The Association's livestock must reside in the state for 30 days prior to being placed on the WMA to prevent the invasion of noxious weeds,
6) The livestock permittees are responsible for moving their cattle at the prescribed times regardless of tall larkspur conditions, and they are entirely responsible for protecting their animals from larkspur poisoning,
7) This will be a three-year lease to allow time to evaluate the effectiveness of the new terms in addressing forage allocation, vegetative cover, nongame inventory information, and other

conditions throughout an entire 3-year rotation. FWP's intent is to allow for adjustments to lease terms if deemed necessary and to enter into a longer-term lease after that time,

8) The new lease will be with individual members as represented by the Association.

The success of any of the grazing alternatives hinges upon compliance by the Association with movement dates, regardless of the condition of tall larkspur toxicity. Table 1 summarizes the Alternatives with regard to grazing rotations, animal units, animal unit months, and grazing season length.

<u>Alternative A:</u> The grazing system would run from June 22 to October 22, with a maximum of 3235 AUMs.

This alternative will continue the consolidation of BLM and DNRC lands along with FWP deeded ground on the WMA into a coordinated grazing system called the Robb/Ledford Coordinated Grazing System (R/L System). Livestock utilizing this system would also make coordinated use of the adjacent FS Snowcrest Grazing Allotment (Forest Service Allotment) and Blacktail BLM Grazing Allotment (Bureau of Land Management Allotment). FWP presently leases over 10,000 acres of DNRC lands.

An additional 3,600 acres of DNRC would be included in the R/L System through an exchange of use agreement with the lessees, the Ledford Creek Grazing Association. This exchange of use allows DNRC lands (known as the McGuire section) leased by the Association to be included in the R/L system. In exchange, the Association receives grazing rights in the R/L System by the terms set by the lease agreement. (See *Appendix C* Draft Grazing Lease and Exchange of Use Agreement).

<u>Grazing System Methodology</u>

The R/L System will involve rest-rotation grazing principles described by Hormay (1970). Livestock grazing would occur during a 4-month period from June 22nd until October 22nd each year. Livestock would be rotated through the low elevation and high elevation pastures. On June 22nd cattle would be placed in a low elevation pasture until July 5th. Cattle will be moved off lower pastures on July 6th to high pastures regardless of the maturity of tall larkspur. On the 6th all the cattle will be moved to high pastures. On July 15, 352 animal units are moved to the Forest Service (FS) allotment, the remaining livestock (766 animal units) stay within the R/L System on the first high elevation pasture until vegetation matures and produces seed around August 15th. On August 15, a group of 400 cattle are moved off of the R/L System to the BLM Allotment and the remaining livestock (366 animal units) on the R/L system would be moved to a second high elevation pasture. On September 15 and October 1' cattle from the BLM and FS allotments, respectively, would return to the R/L system joining the cattle in the second high elevation pasture. All of the livestock that had entered the R/L System in June are now back in the R/L system on October 1. On October 8, livestock would be moved into the last (low elevation) pasture using it as a gathering/trailing pasture. It is preferred that cattle remain on the high pasture until their departure from the R/L System on October 22, but the low pasture will be utilized as necessary, particularly in the event of early snows which can push cattle down in elevation. See *Appendix B* pages 287-29 for diagrams showing the rest-rotation system by WMA pasture.

Table 1. Comparison of Grazing Alternatives, movement dates and Animal Units (AU), Animal Unit Months (AUM), and Length of Season (months).

ROTATION	ALTERNATIVES					Current 2000 Grazing Lease*
	A	B	C	D	E	
On Date to First Low Elevation Pasture	**June 22**	**July 1**	**June 22**	**July 15**	No Grazing	June 15
AU	**1118**	**1118**	**500**	**1118**		1118
Move Date to First High Elevation Pasture	**July 6**	**July 15**	**July 6**	**July 18**	No Grazing	****Early July real movement dates have ranged from July 15 to August 8 due to concerns over tall larkspur poisoning**
AU	**1118** to 7/15 **766** 7/15-8/15	**766**	**500**	**766**		1118 to 7/15 766 7/15-8/1
	352 go to FS allotment 7/15	352 go to FS allotment 7/15		352 go to FS allotment 7/18		352 go to FS allotment 7/15
Move Date to Second High Elevation Pasture	**August 15**	**August 15**	**August 15**	**August 15**	No Grazing	August 15
AU	**366** AU to 9/15 **766** 9/16 to 10/ 1 **1118** 10/1 to 10/8	**366** to 9/15 **766** 9/16 to 10/ 1 **1118** 10/1 to 10/8	**500**	**366** to 9/15 **766** 9/16 to 10/1 **1118** 10/1 to 10/8		366 to 9/15 766 9/16 to 10/1 1118 10/1 to Oct
	400 to BLM 8/15-9/15 400 return from BLM 9/15 352 return 10/1 from FS	400 to BLM 8/15-9/15 400 return from BLM 9/15 352 return 10/ 1 from FS		400 to BLM 8/15-9/15 400 return from BLM 9/15 352 return 10/1 from FS		400 to BLM 8/15-9/15 352 return 10/1 from FS
Move Date to Second Low Elevation Pasture	**October 8**	**October 8**	**October 8**	**October 12**	No Grazing	October 8
AU	**1118**	**1118**	**500**	**1118**		1118
Off Date	**October 22**	**October 15**	**October 22**	**October 15**	No Grazing	October 15
Maximum AUM	**3235**	**2676** (-559 AUMs from Alt A)	**2527** (-708 AUMs from Alt A)	**2117** (-1118 AUMs from Alt A)		3235
Months of Grazing	**4**	**3.5**	**4**	**3**	No Grazing	4

*Alternative not considered due to not meeting WMA objectives.

****This has resulted in cattle remaining in the first lower elevation pasture to 1 to 1.5 months which has far exceeded a prescription of 2 weeks**

In this system, one-third of the pastures would be grazed from June 22 until seed ripe (August 15), another third would be grazed from seed ripe until October 22, and the other third would be rested. Annual livestock grazing on the WMA would be rotated so that over a three-year period each pasture receives all of the different treatments. Plants that are grazed by cattle during the growing season (June 22 through August 15) receive rest from livestock grazing during the next growing season followed by complete rest from livestock use the third year. The animal-stocking rate will be based on levels that will allow for the maintenance and enhancement of riparian and wildlife values within the system. Considering only the acreage grazed on a particular year and an approximate average of 6 acres/AUM (animal unit months), there would be a maximum of 1118 cow/calf pairs and steers allowed on the WMA. The R/L system would also employ riparian grazing strategies described by Ehrhart and Hansen (1997) and Ehrhart and Hansen (1998) that include salting, herding, and stock water development.

Additionally under this alternative, FWP would remove the previously installed electrical fencing in the higher pastures that was used to deter livestock grazing of the tall larkspur. Maintenance costs for the remaining pasture fencing is approximately $5,000 annually.

General Terms of the Lease

- For partial payment ($25,000) of this lease under the exchange of use agreement, the Ledford Grazing Association (Association) will fully incorporate the management of the DNRC McGuire Section into the WMA.
- The Association would be allowed to graze a maximum of 3,235 AUM or 1,118 cow/calf pairs and steers.
- Livestock grazing would occur during a 4-month period from June 22 until October 22 each year using the rest-rotation system described above.
- The Association would agree to maintain the existing WMA fencing, and FWP would reimburse the Association for the labor costs at a fixed negotiated rate.
- Vaccination of the Association's livestock per Montana law.
- The Association must follow the State of Montana's Brucellosis Action Plan.
- The Association's livestock must reside in the state for 30 days prior to being placed on the WMA to prevent the invasion of noxious weeds.
- The livestock permittees are responsible for moving their cattle at the prescribed times regardless of tall larkspur conditions, and they are entirely responsible for protecting their animals from larkspur poisoning.
- This will be a three-year lease to allow time to evaluate the effectiveness of the new terms in addressing forage allocation, vegetative cover, nongame inventory information, and other conditions throughout an entire three-year rotation. FWP's intent is to allow for adjustments to lease terms if deemed necessary and to enter into a longer-term lease after that time.
- The new lease will be with individual members as represented by the Association.

Riparian Fence

In conjunction with the new grazing lease, FWP proposes to install a 3.84-mile riparian fence ($43,271) along Robb Creek near the WMA's headquarter cabin in order to redirect cattle movements along the creek to designated access points for watering. This will protect the riparian vegetation from livestock trampling and browsing. See *Appendix D* for a map of the location of the water gap fence.

This alternative carries the least amount of negative impacts to livestock operations while at the same time satisfying resource/wildlife needs. This Alternative has been discussed with the Association and it is our understanding that it would be compatible with their interests. The lease length established for three years (one rotation) would allow FWP to evaluate against objectives and adapt language in any new lease beyond that time in a way that would address additional changes to the R/L System.

<u>Alternative B:</u> Similar to Alternative A, but the grazing system would run from July 1 to October 15, a shorter grazing period with a maximum of 2676 AUMs.
Under this alternative, livestock grazing would occur during a 3.5-month period from July 1 until October 15 each year. Cattle would move into the low elevation pasture on July 1 and remain there for two weeks. On July 15, cattle (766 animal units) would move into the first high elevation pasture, and 352 animal units would leave the R/L system and move to the FS allotment. On August 15, 400 animal units would leave the R/L system and move to the BLM allotment and the remaining 366 animal units would move to a second high elevation pasture within the R/L system. On September 15 and October 1, cattle from the BLM and FS allotments, respectively, would return to the R/L system joining the cattle in the second high elevation pasture. All of the livestock that first entered the R/L system in July are now back in the system. On October 8, livestock would be moved into the last (low elevation) pasture using it as a gathering/trailing pasture. It is preferred that cattle remain in the high pasture until their departure from the R/L system on October 15, but the low pasture will be utilized as necessary, particularly in the event of early snows which can push cattle down in elevation.

The late arrival of the cattle would allow for a longer period of growth for vegetation before being grazed on both the low and high elevation pastures allowing for a greater amount of residual forage for wildlife. It would also shorten the length of time cattle are exposed to tall larkspur when it is most toxic.

Other terms of a grazing lease agreement would be the same as under Alternative A.

Outside of Alternative A, this alternative would carry less negative impacts to livestock operations but also satisfy resource/wildlife needs. Although some aspects of this Alternative (shorter grazing season, reduced stocking rate, etc.) have been discussed over the years with the Association and the public, it is unknown if this Alternative would be compatible with the Association's interests.

<u>Alternative C:</u> Same as Alternative A but with a limitation of 500 animal units, with a maximum of 2527 AUMs.
Under this alternative, the maximum number of cattle allowed within the grazing system pastures would be 500 animals. This would be approximately half of the number of cattle allowed under Alternative A. A conservative number of cattle moving within the grazing system would translate into a greater amount of forage and cover available for game and nongame wildlife species.

Other terms of the grazing lease agreement would be the same as Alternative A.

This alternative would have more negative impacts to livestock operations but at the same time more fully address cover and forage availability for wildlife as compared to Alternatives A and B. Although the 500 animal unit stocking rate has been discussed and was presented to the FWP Commission, Association, and public during the developmental years of the R/L System, the higher stocking rate was adopted by the FWP Commission for the 2000 lease along with direction to construct the improvements. It is unknown if this Alternative would be compatible with the Association interests.

<u>Alternative D:</u> Shorter grazing season, with no riparian zone fencing, allowing a 3-day trailing activity through the low elevation pastures beginning July 15 with an arrival date on the upper elevation pasture of July 18, with a maximum of 2117 AUMs.
Under this alternative, livestock grazing would occur during a three-month period from July 15 until October 15 each year. Cattle would enter the R/L System in the first low elevation pasture on July 15 and return to private land on October 15. The full compliment of cattle (1118 Animal Units) would be allowed to trail though the first low elevation pasture for three days beginning July 15 arriving in the first high elevation pasture on July 18. July 15 is also when 352 animals (from the full compliment of cattle) are moved to the Forest Service (FS) allotment. Under this alternative, these cattle would be allowed to graze and travel through the lower pasture to arrive on or before the July 18 on the FS allotment. The remaining livestock, 766 Animal Units, would arrive on the higher elevation pasture on the R/L System on July 18 where they would remain until vegetation matures and produces seed around August 15. On August 15, 400 cattle would then be moved off of the R/L System to the BLM Allotment. The remaining livestock (366 Animal Units) on the R/L System would be moved to a second high elevation pasture. On September 15 and October 1, cattle from the BLM and FS allotments, respectively, would return to the R/L System joining the cattle in the second high elevation pasture. All of the livestock that had at first entered the R/L System in June are now back in the R/L System on October 1. On October 12, livestock would be moved into the last (low elevation) pasture, using it as a gathering/trailing pasture. It is preferred that cattle remain on the higher pastures until their departure from the R/L System October 15, but lower pastures will be utilized as necessary, particularly in the event of early snows which pushes cattle down in elevation.

Under this alternative, no riparian zone (additional) fencing would be required along Robb Creek due to the short duration, three days in one low elevation pasture in July and three days in August in the late use low elevation pasture. Cattle would arrive in the upper pasture (containing tall larkspur) almost two weeks later then Alternative A, lessening the tall larkspur poisoning concern. A significantly larger amount of cover and forage would be left for wildlife in the lower pastures as compared to Alternatives A, B, and C.

This alternative carries more negative impacts to existing livestock operations while carrying the least amount of negative impacts to wildlife and their habitats as compared to Alternatives A, B, and C. Although some aspects of this Alternative (shorter grazing season, reduced stocking rate, etc.) have been discussed over the years with the Association, it is unknown if this Alternative would be compatible with the Association interests.

<u>Alternative E:</u> No Action, discontinue the grazing lease and halt all grazing on the WMA.

This alternative would involve terminating the livestock grazing on 32,378 acres participating in the R/L Grazing System. FWP would no longer provide grazing oversight and guidance on the 3,600 acre DNRC McGuire section. Furthermore, since the Ledford Creek Grazing Association would likely continue to graze their cattle within the McGuire section, FWP would need to fence the boundary between the McGuire section and WMA to restrict cattle movements. The estimated costs of that fence to FWP would be $120,000 based upon costs from recent fencing projects at other WMAs.

Under this alternative, the previously installed improvements (water system and fencing) within the WMA for the benefit of R/L grazing system would be abandoned, removed, or reconfigured. Since 2000, FWP has invested $460,893 into the livestock watering system from Kelly Springs and removed old fencing and installed new fencing to meet the pasture designations of the R/L System. The water system at Kelley Springs would continue to require some maintenance and be used by down-line users even thought the WMA specific portions might be turned off. In the future, internal fencing completed for the rest-rotation system would likely removed from within the WMA at an additional expense to FWP. Benefits from a coordinated and collaborative effort between sportsmen, ranchers, and FWP for the use of the WMA by wildlife and livestock would be lost.

This alternative would have the greatest negative impact to existing livestock operations but would also provide the maximum amount of cover and forage available to wildlife.

9. Other Livestock Activities within the WMA

Domestic sheep trailing has been allowed through the upper reach of the WMA prior to FWP purchasing the property from the Rocky Mountain Elk Foundation. Annual sheep trailing across the WMA has been allowed by FWP since the acquisition in 1988.

The FWP Commission approved the reintroduction of bighorn sheep in the Greenhorn Mountains with the addition of a Memorandum of Understanding (MOU) that was signed by FWP, the domestic sheep producers in the vicinity of the Greenhorns, the USDA Forest Service, and the Bureau of Land Management. That MOU allows for the continued grazing of domestic sheep on public lands, including trailing. It was signed after the Commission approved the reintroduction at their May 2002 meeting. The current sheep trailing is operating consistent with the commitment made in the MOU.

The administrative rules that guide commercial uses on WMAs became effective in January 2007. FWP intends to apply those rules to the Robb/Ledford sheep trailing activity beginning in 2010. FWP will start that effort in Fall 2009 in the form of an environmental review. At this point, we will continue to operate according to the commitments made in the Greenhorns MOU regarding sheep trailing. The following is an outline of the process and timelines FWP will use to evaluate the domestic sheep trailing and the Greenhorns Sheep transplant EA and MOU:

1) Scoping on both will occur formally from September 15 through October 15, 2009,

2) Preparation of a Draft environmental assessment (EA) for sheep trailing as a commercial use by January 15, 2010 with a public review period extending through February 15, 2010,
3) Prepare a final EA and Decision Notice for the sheep trailing as a commercial use and finalize a revised or affirm existing Greenhorns Sheep EA and MOU by March 15, 2010.

II. EVALUATION OF IMPACTS ON THE PHYSICAL ENVIRONMENT

1. Vegetation

The area ranges in elevation from approximately 6,000 feet along Ledford and Robb Creeks to 9,200 feet on the upper reaches of the WMA. The basic character of the land involves open rolling rangelands intersected with perennial streams and a small amount of timber in the upper reaches. Rangelands are grass and grass-shrub mixes with timber, primarily Douglas fir. Bluebunch wheatgrass and Idaho fescue grasslands are the predominant vegetation with some Douglas fir occurring at higher elevations. Sagebrush (both big sage and black sage), rabbitbrush, juniper, and mountain mahogany occur in association with these grass species. Willow stands are common along stream courses and in wet areas. Scattered patches of aspen and serviceberry can be found in areas where soils have a higher moisture level.

Average annual precipitation is 15-20 inches, much of which occurs in the form of snow. Some rock outcrops exist, but soil is generally free of gravel to depths of 6-12 inches.

From about 1958 to 1988, the previous owners of the acres associated with the WMA grazed about 2,200 cow/calf pairs on the range. This use occurred on an annual basis and followed a semi-regular schedule that involved using the same pastures at the same time each year. Grazing occurred generally from early May through November every year. In addition during the majority of the previous ownership, several hay meadows along Robb and Ledford Creeks were irrigated for cattle grazing. This continued until the latter 1980's when the irrigation ceased. Prior to the previous ownership, it is evident that these meadows were probably harvested for hay.

Under FWP's ownership of the property and the implementation of a rest-rotation grazing system, riparian areas along all the WMA's creeks have responded positively and are visibly improved. Challenges still linger for small portions of Robb Creek where repeated livestock movements and pressures have impacted the riparian vegetation.

There have been ongoing (1999 through 2008) riparian inventories conducted (by Bitterroot Restoration, Inc.) on the various streams that flow through the Robb/Ledford Wildlife Management Area. Most of the stream riparian areas were heavily and negatively impacted prior to FWP ownership. Most have at least stabilized, and many are showing improvement in physical site factors from 1999 to 2008. Based on a 2005 inventory, one stream has shown a decline in general riparian health since the 1999 inventory. " Over the six years there has been good improvement on overall vegetation cover of the riparian zone on Robb Creek, including improvements in preferred tree and shrub species regeneration and in browse utilization rates of these species. On the physical side of the assessment, Robb Creek has seen a decline since 1999. Channel incisement and human-caused alterations to both the banks and to the rest of the riparian

zone have more then offset the modest improvements in rootmass protection of the banks and in the amount of human-caused bare ground." (*Appendix E* - Riparian and Wetland Inventory and Health Assessment on Robb Creek and Ledford Creek in the Robb/Ledford Wildlife Management Area, W. Thompson & P. Hansen, February 2006). This decline is primarily attributed to lack of water in upland areas and a dependency on Robb Creek from two different pastures by livestock. There is high and concentrated pressure along about 2.5 miles of Robb Creek that is causing this decline in health. Under Alternatives A, B, and C, a riparian fence will need to be constructed to restrict livestock access to water. Paul Hansen (Bitteroot Restoration, Inc.) has consulted with FWP and provided site-specific recommendations for three water gaps along Robb Creek that would rectify the downward trend. Because of the short duration of use in the low pasture (only three days in July and three days in October), a riparian fence along Robb Creek as proposed in Alternatives A, B, and C will not be needed in Alternative D.

Long-term vegetation monitoring transects were established on the Robb Ledford Wildlife Management Area (WMA) in 2003 and 2004 at five locations. All five sites provide quantified Daubenmire canopy cover data. Sites 4 and 5 also quantify big sagebrush canopy cover using the line-intercept method. The vegetation monitoring project on the WMA includes 40 transects, 40 photo points, and 560 photo plots. The monitoring sites are measured approximately once every five years. Data collected to this point are not enough to suggest a long-term vegetation trend on the game range but do offer information describing the current vegetation composition at the five monitoring sites. Please refer to *Appendix F* -Vegetation Monitoring Transect Data for data details.

In general, the WMA hosts a variety of desired native plants in relatively desired amounts. Repeat vegetation measurements do not suggest a decline in health and vigor of the plant communities. Non-native plants are present on the WMA but in small amounts and are not causing a negative shift in plant composition. The soil surface data indicates stability of the soil surface with no signs of accelerated soils loss.

Noxious weeds that have been identified on the WMA include: spotted knapweed, Canadian thistle, field scabiosa, blackleaf henbane, hound's tongue, musk thistle, and mullen. The largest and most dispersed infestation of noxious weed is hound's tongue. The other varieties are found in smaller amounts, and no leafy spurge has been identified on the WMA.

Tall larkspur (*D. barbeyi, D. occidentale*) is widely distributed in the upper pastures of the R/L System. Larkspur is very palatable to cattle but is known to be toxic to them. The plants are most toxic during early growth, but toxicity gradually declines over the growing season. Silent Herder will be administered by the Association to their cattle in the future to protect them from the effects of the larkspur's toxins.

Alternative A: The grazing system would run from June 22 to October 22, with a maximum of 3235 AUMs. The degree and timing of grazing will determine the level of impacts on the land. Livestock grazing impacts soil and vegetation, and hoof action can remove vegetative cover. The impacts of these activities would not be detrimental to overall soil and vegetative health in a properly managed system. Livestock grazing can be managed in a manner that will allow for soil and vegetation maintenance and/or improvement (Anderson and Scherzinger 1997, Frisina and Morin 1991, Frisina 1991, Alt et al. 1992, Yeo et al. 1993, and

Werner and Urness 1996). Impacts of grazing livestock on the WMA will be mitigated through a properly managed grazing system. Plants need adequate rest in order to increase their root mass and carbohydrate storage. The rest-rotation grazing as developed by Hormay (1970) will allow plants two years of growing season rest out of every three. This allows plants adequate opportunity to increase and/or maintain their vigor. In addition, grazing strategies in riparian areas will include herding, salting, riparian fence and water gap locations, and water distribution systems to reduce the effects of livestock concentrations in these areas (Ehrhart and Hansen 1997, Ehrhart and Hansen 1998). The positive effects of this management system would be manifested on the associated DNRC lands as well as on FWP's deeded ground.

Since the implementation of the grazing management system within the Robb/Ledford Coordinated Grazing System (R/L System), the native compliment of vegetation has been assessed by FWP's Plant Ecologist. In general, the WMA hosts a variety of preferred native plants in relatively desired amounts. Repeat vegetation measurements do not suggest a decline in health and vigor of the plant communities. Non-native plants are present on the WMA but in small amounts and are not causing a negative shift in plant composition. The soil surface data indicates stability of the soil surface with no signs of accelerated soils loss.

The installation of the water gap fence along Robb Creek through Section 31 T9S, R4W and Section 6 T10S, R4W, and Sections 1, 12, 13 of T10S, R5W will assist in redirecting cattle from eroded streambanks and over grazed riparian vegetation. The establishment of the fence will protect riparian vegetation from further grazing from cattle which will allow willows and other vegetation to become more vigorous over time and stabilize streambanks.

The spread of noxious weeds within the WMA is controlled and managed primarily through the application of herbicides per the guidance of the 2008 Integrated Noxious Weed Management Plan and the regional weed management plan. Through annual inventories and strategic applications, spotted knapweed is contained and limited to specific areas. Other noxious weed infestations continue to challenge WMA staff, especially along riparian areas where the application of herbicides is difficult to use.

Under this Alternative, continuation of grazing livestock on the WMA is not expected to cause irreversible negative consequences to desired plant species because impacts to vegetation will be managed by the rest-rotation R/L System.

Alternative B (Shorter Grazing Period): The implementation of this alternative is anticipated to benefit both the lower and higher pasture vegetation by decreasing the grazing pressure in both areas, increasing the residual amounts of forage for wildlife. The delay by 1 week, as compared to Alternative A, in placing cattle onto the upper pastures will also allow additional time for vegetation in the upper elevation to mature before being grazed by cattle.

A later placement date would also mean that tall larkspur would have a longer period to mature, becoming less toxic before the presence of cattle on the landscape when cattle graze vegetation in the high pastures.

Under this Alternative, continuation of grazing livestock on the WMA is not expected to cause irreversible negative consequences to desired plant species because impacts to vegetation will be managed by the rest-rotation R/L System.

Alternative C (Decrease Number of Cattle): By limiting the number of cattle placed within the system, overall grazing pressure on riparian and non-riparian areas will be lessened and an increased amount of forage and cover will be available to wildlife. Some minor impacts to vegetation will still occur.

Under this Alternative, continuation of grazing livestock on the WMA is not expected to cause irreversible negative consequences to desired plant species because impacts to vegetation will be managed by the rest-rotation R/L System.

However, if this alternative is not compatible with the Association's interest, impacts would be similar to those described for the DNRC McGuire property under Alternative E. The Association would likely remove their McGuire DNRC lease from the R/L System and FWP would pursue other options.

Alternative D (Shortest Grazing Season, No Riparian Fence): The implementation of this alternative is anticipated to benefit residual cover and forage for wildlife by limiting use in the lower series of pastures to only three days in July and three days in October as compared with Alternatives A, B, and C. These low elevation pastures are also the most limiting in terms of acres as compared to the high elevation pastures. Impacts to riparian shrubs and forbs are expected to be minimal since the animals would be present for a very short period of time.

Under this Alternative, continuation of grazing livestock on the WMA is not expected to cause irreversible negative consequences to desired plant species because impacts to vegetation will be managed by the rest-rotation R/L System.

However, if this alternative is not compatible with the Association's interest, impacts would be similar to those described for the DNRC McGuire property under Alternative E. The Association would likely remove their McGuire DNRC lease from the R/L System and FWP would pursue other options.

Alternative E (No Action): Under this alternative, the coordinated grazing management plan for the 32,378 acres would cease to continue. The vegetation within the 28,098 acres owned or leased by FWP as the WMA would no longer be subjected to grazing pressures. Accordingly, forage and cover for wildlife would be expected to increase. As during the implementation of the R/L System, FWP will continue to monitor and manage noxious weeds on the WMA.

The Ledford Creek Grazing Association would likely continue to use the DNRC McGuire property for grazing pastures as they have done in the past. The benefits to vegetative health of the R/L System at that site could be lost because the removal of the rest-rotation grazing routine. In addition forage availability and cover would be severely reduced with an anticipated much higher stocking rate then the area would experience under the coordinated grazing system.

It is unknown what future grazing scenarios the BLM might adopt if the R/L System is eliminated.

2. *Fisheries and Water Resources*

The WMA contains portions or all of Crows Nest, Ledford, Robb, Rock, Swamp, and Taylor creeks. A viable fishery presently occurs on the WMA (for a full report of the fisheries values on the WMA, please consult the Management Plan). Species present include rainbow, rainbow-cutthroat hybrids, brown trout, brook trout, Westslope cutthroat trout (WCT), Mountain whitefish, and mottled sculpin. WCT populations in the Rock Creek drainage are nearly pure strains of the species. Historic livestock and farming uses have influenced stream and riparian conditions, but all the riparian corridors have responded positively since the implementation of the R/L System with the exception of small portions of Robb Creek.

FWP acquired 22 water rights consisting of one stock watering right and 21 irrigation rights when it purchased the property in the late 1980's. The sources for the irrigation rights are Ledford, Robb, and Warm Springs creeks and a tributary spring to the W. F. Ruby Creek.

Ledford Creek supports rainbow, rainbow-cutthroat hybrids, brown trout, and mottled sculpin. Based on an inventory in 1991, total densities of trout were estimated at approximately 240 per mile. Brown trout were the predominant species representing 74% of the catchable (6 inches or longer) fish.

The East Fork of Blacktail Creek fishery is primarily comprised of brook and rainbow trout. Mountain whitefish and mottled sculpin are also present. In 1995, a short section of stream was inventoried downstream of the mouth of Rough Creek. Brook trout were the only trout species captured. Sizes ranged from 4 to 9 inches, and densities were very low, estimated at 66 per mile. Westslope cutthroat trout (WCT) are present in the headwaters at similar densities. Analysis of several fish indicated they were 88% genetically pure. Instream flow reservation was requested and granted at 18 cubic feet per second.

Robb Creek is dominated by brook trout but maintains a small population of WCT. Mottled sculpin are also present. A survey in 1991 estimated catchable size fish at 496 per mile. Brook trout averaged nearly eight inches in length with the largest exceeding 12 inches. Westslope cutthroat trout averaged only 6% of the game fish population. Sizes ranged to 9 inches in length. Habitat in the surveyed area consisted primarily of a network of beaver ponds connected by short reaches of stream. The majority of habitat was provided by the ponds or woody debris associated with the dams.

Rock Creek contains exclusively WCT. Population densities range from 160 to 300 catchable size fish per mile with the largest fish exceeding 12 inches in length. Fish habitat is limited throughout most of the stream. Two reservoirs appear to provide over-winter habitat to a significant portion of the population. Primary factors influencing the habitat include the outlet of the upper reservoir which has eroded a 15-foot gully for approximately 200 yards. This has largely obliterated habitat features for a significant distance downstream. In addition, a natural

slump has confined the channel resulting in steep, eroding banks which continue to introduce high levels of sediment.

The genetic status of this population has not been adequately determined. Preliminary analysis of cutthroat collected in 1995 indicated this population was genetically pure. Subsequent fish collected in 1997 and analyzed in 1998 suggest that the population is either slightly hybridized or carries a rare WCT allele that is electrophoretically indistinguishable from that characteristic in Yellowstone cutthroats or rainbow trout.

Fisheries inventories have not been conducted on Crows Nest, Taylor, Swamp, or Indian creeks, thus their status as fisheries is not known. No new surveys have been completed within Blacktail, Ledford, Robb, and Rock creeks since 1990's. The diversity of the species at hand does not appear to be effected by the presence of livestock within the WMA.

Alternative A: The grazing system would run from June 22 to October 22, with a maximum of 3235 AUMs. Healthy riparian vegetation and stable stream banks are critical to maintaining a properly functioning stream, clean water, and quality fish habitat. The components of the R/L System established a rest-rotation system, livestock herding, pasture layout, and the establishment of upland water sources (i.e. water tanks) to ensure impacts to riparian areas decrease and their overall health is improved. These methods have proven effective in riparian management systems (Ehrhart and Hansen 1997, and Ehrhart and Hansen 1998).

Livestock will remove certain amounts of vegetation and walk on stream banks in grazed pastures. This situation has the potential to create anywhere from a serious and extensive degradation problem down to a few isolated "sore" areas that might be found in stream crossings, etc. Although intensive livestock grazing prior to FWP's purchase of the WMA led to a reduction in riparian health on portions of the WMA (Riparian Health Assessment, 1999), the conditions in most of these areas has improved under the 2000 grazing agreement and the R/L coordinated grazing system (Mike Frisina, FWP Range Coordinator, and Paul Hansen, Riparian and Wetland Ecologist, pers. communications). The only exception is along Robb Creek which is within one of the designated lower pasture areas and near the WMA's headquarters. Because the health of the riparian vegetation continues to struggle within this 2.5 mile stretch of Robb Creek and as part of the proposed lease agreement, FWP will install a water gap fence to redirect cattle movements along the creek to designated spots.

The new water gap fence will follow other wildlife-friendly fencing designs that FWP has used at other WMAs. The design of the fence will be a 4-strand barbed wire with the highest strand between 38"-40" to allow for wildlife to move across it and the lowest wire at a height of 16"-18" above the ground to accommodate smaller wildlife. There will be two or three water gaps along its length to accommodate the cattle's need to access water while placed there. The design of the water gap fence is not expected to be a barrier to wildlife movements.

As during the previous grazing agreement, protocols for vegetation monitoring were established to ascertain if the grazing system is working to meet the WMA's Management Plan's objectives and identify if management adjustments are necessary. Any significant degradation attributable

to livestock will be handled through adaptive management of AUM's, grazing patterns, or whatever means FWP feels necessary to correct the situation.

Under this Alternative, the overall diversity and population of fish species in the WMA's creeks are not expected to be negatively impacted by the presence and movements of cattle through the R/L System pastures.

Alternative B (Shorter Grazing Period) and Alternative C (Decrease Number of Cattle): Under both of these alternatives, fisheries and water resources within the grazing system would still be subjected to some pressure from cattle on the landscape. In areas where streambanks are not protected by water gap fences, cattle will continue to influence erosion patterns and riparian vegetation. Due to the length of time cattle will be in the low Robb Creek pasture, FWP will still need to construct the water gap fence as in Alternative A.

The regiment of the existing coordinated grazing system would not be altered if Alternatives B or C were implemented, only the duration (shorter in B) and intensity (B and lightest in C) of use would be altered.

Under these Alternatives, the overall diversity and population of fish species in the WMA's creeks are not expected to be negatively impacted by the presence and movements of cattle through the R/L System pastures.

However, if Alternative C is not compatible with the Association's interests, impacts to Robb Creek would be similar to those described under Alternative E for the DNRC McGuire property. The Association would likely remove their McGuire DNRC lease from the R/L System and FWP would pursue other options.

Alternative D (Shortest Grazing Season, No Riparian Fence): Similar to Alternatives A, B, and C, but there will be no need to construct the water gap fence. There will be very limited use of the low pastures riparian areas due to the very short duration of use.

Under this Alternative, the overall diversity and population of fish species in the WMA's creeks are not expected to be negatively impacted by the presence and movements of cattle through the R/L System pastures.

However, if this Alternative is not compatible with the Association's interests, impacts to Robb Creek would be similar to those described under Alternative E for the DNRC McGuire property. The Association would likely remove their McGuire DNRC lease from the R/L System and FWP would pursue other options.

Alternative E (No Action): The proposed water gap fence on Robb Creek would be unnecessary since cattle would no longer be able to graze within the WMA thus saving FWP the costs of the improvements. The riparian habitat health within WMA deeded lands would either maintain at current conditions or improve with the latter more likely to occur because the vegetation would not be subjected to cattle grazing pressures which includes trampling.

Fisheries within the WMA would be unaffected, both in diversity and population levels, if this alternative was chosen.

Continuous grazing would likely occur on the DNRC lands (i.e. McGuire property) without the availability of a rest-rotation system within its boundaries which could lead to a further decline in riparian health in those areas and possibly negatively affect fisheries in the headwaters of Robb Creek.

3. Wildlife

The WMA was acquired primarily as an elk winter range. At the time of FWP's acquisition, there was a wintering population of 500-800 elk found on and adjacent to the WMA. Depending on winter conditions and elk distribution, a larger number of elk can be found on and adjacent to the WMA as a part of the approximately 2000-3000 elk that winter in the larger area (Hunting District 324) including the Robb/Ledford and Blacktail WMA's. In recent winters, elk have discovered that there are more prevalent south-facing slopes, available forage, and less snow at the lower elevations in the Spring Brook Creek drainage adjacent to Robb/Ledford WMA. During the most recent winters excluding the winter of 2008-9, many elk spent the majority of the winter in this area. *Appendix G* Wildlife Survey and Inventory shows that in 2009 most elk surveyed were on the WMA (12883 elk out of 2060 total). In 2008, most elk were in Spring Brook. The winters of 2006 and 2007 elk were divided between the WMA and Spring Brook, and prior to 2006 (2000-2005) elk were divided between this WMA and Blacktail WMA.

This elk population principally summers in the Gravelly and Snowcrest Mountains on the Beaverhead National Forest. However, the bulk of the elk winter range occurs on and adjacent to the Robb/Ledford and Blacktail WMA's.

Mule and white-tailed deer spend spring, summer, and fall on the WMA. In addition, the WMA serves as part of a major winter range for a wintering mule deer population from the Snowcrest Mountains. Recent trend surveys for this area (HD 324) put the population at approximately 300-400 animals ranging in the last ten years from approximately 200 to 800. Of the 358 mule deer in this HD during the 2008 trend survey (the most recent), approximately 54 of those were on the WMA. Most of the mule deer winter range and spring green-up use occurs east and north of the WMA. Whitetail numbers are relatively low on the WMA, probably around 50 or less during the fall and winter.

Moose on the WMA are part of the population in HD's 331 and 332. Surveys have resulted in 1 to 135 moose observed in HD 331 and 2 to 92 in HD 332 since 1983, though many years with low counts are not valid data for trend because of poor survey conditions. In 2009, there were six moose on the WMA out of a total of 35 moose in HD 331. Environmental conditions for the survey preclude that data from being used as valid trend data.

There is a population of antelope in HD 321 that encompasses the WMA, the largest district in the region. A segment of this population uses the WMA yearlong but most significantly as winter range. The population in HD 321 has ranged from 702-7428 between 1972 and 2008 based on total counts or estimates. In the last ten years, it has ranged from about 1300-3000, also

based on total counts or estimates with the highest estimate being in 2008. The latest survey, which included the WMA (2007), resulted in approximately 150 pronghorn observed on the WMA out of 1596 total. There may have been more or less on the WMA given a different day for the survey. The estimated number of pronghorn in this HD for 2009 is 3213 animals. Of this number, a few hundred were probably on the WMA.

Bighorn sheep were reintroduced to the Greenhorn Mountains north of the WMA in 2003 and 2004. Prior to last winter, sheep were only observed on or near the WMA two times by FWP personnel. During aerial elk surveys this past winter, there were 10 sheep in the Snowslide Creek area in the Ledford Creek drainage. This spring there were again eight sheep in the same area at a lower elevation. Since that time, FWP personnel in the area have observed no sheep. Beginning this fall, an evaluation of the status of this sheep transplanting effort and subsequent direction will be formally initiated. Please refer to Section I, item 9. Other Livestock Activities within the WMA (pp 10-11), for a complete process and time frame for evaluating the Greenhorn's bighorn sheep reintroduction, MOU, and domestic sheep trailing issue.

Blue grouse, sage grouse, occasional ruffed grouse, and Hungarian partridge occur on the WMA as well as a variety of small mammals, but no population estimates have been made for those species. Sage grouse winter on the WMA, and it is likely there are leks in the area though they have yet to be identified. Some waterfowl nesting occurs along the numerous beaver dams located along Robb and Ledford Creeks. The principal waterfowl use is by mallards and teal. Nesting success and brood rearing sites for waterfowl appear to have been improved by the rest rotation grazing system that has been implemented on the WMA.

To address some of the uncertainties of nongame use of Montana Fish, Wildlife and Parks' (FWP) Wildlife Management Areas (WMA) and in an effort to be more comprehensive in our management of wildlife species including nongame as well as game species, FWP intends to conduct rigorous monitoring and develop a statistically sound sampling plan for Robb-Ledford and Blacktail WMA's. The evaluation of the area, commencing summer 2009 with a pilot study and continuing through 2012, will focus on small mammals, songbirds, raptors, and amphibian and aquatic reptile surveys. The sampling design for the surveys has been developed through collaboration between the native species biologist for Region 3, the statewide biometrician, and the nongame data manager and involves stratifying the WMA's by habitat (primary strata) which will be further embedded within the grazing treatment (secondary strata; early season grazed, late season grazed, and rested). This will be conducted to reach two main objectives: (1) to more comprehensively document species occupancy of these WMA's at the landscape level, and (2) evaluate species occupancy and diversity between habitats and between grazing treatments throughout a grazing cycle (3 years). All surveys and monitoring will follow the same sampling protocol that has been developed and intensively employed by Montana Natural Heritage Biodiversity Monitoring Program. After a pilot year during summer 2009, additional efforts will be made to conduct surveys for long-billed curlew, sage grouse, waterfowl, and furbearers (beavers). More intensive sampling is also intended for Robb Creek and Ledford Creek to assess the value of these riparian areas for wildlife. This work will help the agency determine if and how the landscape level grazing practice influences nongame wildlife. All information on species distribution and occurrence will be sent to the Montana Natural Heritage Program to be

integrated into their statewide biodiversity-monitoring database.

Alternative A: The grazing system would run from June 22 to October 22, with a maximum of 3235 AUMs. Livestock grazing will impact vegetation across the WMA relative to food and cover for a variety of game and nongame species. The impact will result in the reduction of vegetative cover in portions of the WMA, particularly in the lower elevations along riparian areas of grazed pastures. Under the existing grazing system and livestock stocking level, significant residual forage in rest pastures and on secondary range (i.e. steeper terrain) in grazed pastures has provided standing crops of lightly or unutilized grass providing good cover and wildlife forage throughout much of the WMA.

Impacts to available forage will be reduced in the proposed grazing agreement and the continuation of the R/L System by: 1) one-third of the WMA being totally rested the entire grazing season; 2) one-third of the WMA will not be grazed until after seed ripe in mid-August at a time when most bird nesting (including sage grouse) would be completed; and 3) the cattle stocking density will average no greater than 6 acres/AUM compared to around 3.5 acres per AUM allowed on many public land leases. In addition, substantially more vegetation will be left in the low elevation, early use pastures (which are also the most size limited) because grazing will be limited to no more then 2 weeks as compared to the 5 to 8 weeks of use under the current grazing practice.

Livestock grazing has had some positive benefits for elk in other areas. In the Elkhorn Mountains (Hunting District 380), Grover and Thompson (1986) found that elk selected feeding sites that were grazed by cattle the previous growing season. The removal of older forage by livestock may help establish a higher quality of feed for elk the following spring (Frisina 1992). Grazing by domestic livestock has been shown to improve accessibility, palatability, and nutritive quality of forage plants preferred by wild herbivores (Jourdonnais and Bedunah 1990). It should be noted that any increased elk use on the WMA grazed lands may be more tied to the reduction in older standing residual forage than to increased nutritive value since the nutritive value of grass is greatly diminished during the winter months when elk are normally on the WMA.

The distribution of grazed and ungrazed pastures has created a mosaic of habitats that have accommodated a wider variety of species with different habitat requirements. Resident wildlife species as well as transient animals have benefited from the increased food and cover that has occurred from the efforts of the 2000 grazing agreement and the implementation of the coordinated grazing management system as compared to the health of the habitat under previous ownership. It is expected that these benefits will be enhanced if the proposed grazing lease were approved because grazing intensity in low elevation pastures will be significantly reduced from 2-3 acres/AUM to 6 acres/AUM.

As a component of the proposed grazing lease, FWP would install a water gap fence along a 2.5-mile portion of Robb Creek near the WMA's headquarters. As with other fences along riparian areas within the WMA, this fence's design will be a 4-strand barbed wire with the highest strand between 38"- 40" to allow for wildlife to move across it and the lowest wire at a height of 16"-18" above the ground to accommodate smaller wildlife moving underneath it. There will be

three water gaps along the fence's length to provide easy access water for all wildlife as well as cattle.

Under this Alternative, the presence of cattle on the WMA's landscape will likely not impair or disturb general wildlife movements. The continuation of the R/L System will limit impacts to forage and cover for wildlife and continue to maintain and enhance quality/palatability for ungulates and nongame species. In addition, the three-year term of the lease will allow FWP adaptability, if needed, after evaluation of how well it met WMA objectives following a full three-year rotation.

Alternative B (Shorter Grazing Period): A later placement of cattle onto the lower grazing pasture would likely benefit ground nesting birds because they would not be disturbed by cattle movements. A July 1 start day would mean that most ground nesting birds would be almost through with their nesting season. In addition, cattle will leave the WMA one week earlier than under Alternative A, again leaving more residual cover and forage for wildlife.

Residual forage may be higher under this alternative which would benefit game and nongame species through the fall and winter months that might contribute to healthier individuals.

As with Alternative A, the water gap fence would be installed along Robb Creek to protect riparian resources. As previously described, the design of the fence is not expected to be an insurmountable barrier to local wildlife since there are already other fences defining other pasture areas within the WMA that have been navigated by wildlife.

Under this Alternative, the presence of cattle on the WMA's landscape will likely not impair or disturb general wildlife movements. The continuation of the R/L System will limit impacts to forage and cover for wildlife and continue to maintain and enhance quality/palatability for ungulates and non-game species. In addition, the three-year term of the lease will allow FWP adaptability, if needed, after evaluation of how well it met WMA objectives following a full three-year rotation.

Alternative C (Decrease Number of Cattle): If the grazing lease limited the number of cattle to 500 animals, there will be an increased level of forage and cover available for all wildlife since competition for those resources will have been reduced by about half.

Under this Alternative, the presence of cattle on the WMA's landscape will likely not impair or disturb general wildlife movements. The continuation of the R/L System will limit impacts to forage and cover for wildlife and continue to maintain and enhance quality/palatability for ungulates and nongame species. In addition, the three-year term of the lease will allow FWP adaptability, if needed, after evaluation of how well it met WMA objectives following a full three-year rotation.

However if this Alternative is not compatible with the Association's interest, the Association would likely remove their McGuire DNRC lease from the R/L System and FWP may consider other options. None of the values that are derived from the collaborative R/L System would be met on the McGuire property.

Alternative D (Shortest Grazing Season, No Riparian Fence): Similar to Alternatives A, B, and C in terms of increased cover and forage for wildlife in the high elevation pastures, but would substantially exceed those same values in the low elevation pastures due to the short duration of livestock grazing there. There would be no riparian zone fence, so there would be no real or perceived inhibition to wildlife movements.

Under this Alternative, the presence of cattle on the WMA's landscape will likely not impair or disturb general wildlife movements. The continuation of the R/L System will limit impacts to forage and cover for wildlife and continue to maintain and enhance quality/palatability for ungulates and nongame species. In addition, the three-year term of the lease will allow FWP adaptability, if needed, after evaluation of how well it met WMA objectives following a full three-year rotation.

However, if this Alternative is not compatible with the Association's interest, the Association would likely remove their McGuire DNRC lease from the R/L System and FWP may consider other options. None of the values that are derived from the collaborative R/L System would be met on the McGuire property.

Alternative E (No Action): Larger amounts of winter forage will exist on deeded and DNRC leased lands controlled by FWP since cattle would no longer be consuming a portion of the vegetation each year. By not grazing livestock, any benefits from removing old forage to improve the quality/palatability of grass for ungulates and nongame species would not exist on deeded FWP land. Any impacts caused by cattle movements through nesting or burrow sites will be eliminated.

Since the DNRC McGuire property would not be a part of a cooperative grazing regime, residual forage levels for ungulates would likely be substantially reduced because of continual grazing by cattle. It is unknown what management direction the BLM might take in this situation since grazing on their lands has been tied to the Robb/Ledford WMA land base and livestock use.

4. Soil Resources

Some rock outcrops exist, but soil is generally free of gravel to depths of 6-12 inches. Over the past 50 years, the soils of the WMA have been exposed to disturbances from cattle movements, as well as resident and transient wildlife. No significant changes to existing soils conditions are anticipated if one of the proposed action alternatives were implemented. Disturbances to unique geological features will not be necessary for the installation of the water gap fence.

III. EVALUATION OF IMPACTS ON THE HUMAN ENVIRONMENT

1. Access and Recreation

The WMA is located in deer and elk Hunting District 324. Recreation hunting pressure is high with approximately 1764 elk hunters recreating for 11,082 days in 2008 in this HD. Mule and white-tailed deer populations provided hunting recreation in HD 324 for approximately 507

hunters for 3,372 days in 2008. Some limited moose hunting opportunities exist on the WMA because it serves primarily as winter range. However, abundant opportunity exists on surrounding Forest Service lands where wintering moose from the WMA spend the spring, summer, and fall. There is also antelope hunting recreation provided on the WMA, and for the district as a whole recreation was provided for approximately 201 hunters and 448 hunter days in 2008.

Fishing opportunities for various species of trout and sculpin exist in many of the creeks within the WMA and the properties associated with the R/L System. Specific species locations were previously identified in Section II, Fisheries and Water Resources. Angling pressure is limited to mainly residents because of their remote locations.

Opportunities for camping, hiking, and other forms of non-consumptive recreation are boundless.

Alternative A: The grazing system would run from June 22 to October 22, with a maximum of 3235 AUMs. The presence of cattle will not significantly restrict recreational use of the WMA. Some individuals may find livestock along their fishing stream or in other areas offensive, but this is not expected to be a significant problem to the majority of the public that use the WMA. Livestock will only occupy approximately one-sixth of the WMA that is a part of the R/L System at any give time during the grazing season. Livestock will be removed by October 22 each year prior to or a day or two past the initiation of the majority of the big game hunting that occurs on the WMA. Hunters are allowed full access and use of the WMA, even in pastures that may be occupied by cattle. The latter removal date for cattle will overlap with the opening week(s) of the antelope season and in some years the general big game season. Prior to this change and since FWP initiated rest rotation grazing on the WMA in 1991, there has been no conflict with the general big game season, and only a few days overlap with the opening of the antelope season. The potential exists for this degree of overlap to be perceived as problematic by hunters.

Non-consumptive recreation would be impacted aesthetically if individuals recreated in use pastures. However, livestock is a part of the Montana landscape and users have varying tolerances for livestock presence. No significant changes to recreational opportunities are anticipated if this alternative was implemented.

Alternative B (Shorter Grazing Period) and Alternative C (Decrease Number of Cattle): Under either of these alternatives, there would be no changes to access and recreational opportunities within the publicly owned lands just as described for Alternative A. There would be little overlap with antelope seasons and none with the general big game season under Alternative B. Non-consumptive recreation would be impacted the same as under Alternative A.

Alternative D (Shortest Grazing Season, No Riparian Fence): Similar to Alternatives A, B, and C in terms of overall access and recreation. This alternative is the same as B with regard to the least amount of overlap with hunting seasons.

Alternative E (No Action): Same as Alternative A with regard to recreational access. Cattle would not be present on the WMA to offend some segments of the public who do not like to recreate on public land in the presence of livestock. There would be no grazing, and grazing

impacts to vegetation along fishing streams that might have been viewed negatively by some individuals will begin to recover over time. There would be no cattle present during the upland bird and big game seasons. Most non-consumptive users would feel no negative impact.

2. Community Impacts and Land Use

Alternative A: The grazing system would run from June 22 to October 22, with a maximum of 3235 AUMs. Locally owned ranches represented in the Ledford Creek Grazing Association (Association) will be allowed to utilize portions of the WMA for summer livestock grazing. Summer pasture is in short supply, and is important for the economic viability of ranches that do not have adequate summer grazing on their own land to support their operations. This alternative would result in no change in the total number of 1118 AUs or 3235 AUMs that are allowed to graze the WMA.

Alternative B (Shorter Grazing Period): There would be a reduction of 559 AUMs compared to Alternative A. Other then that, there are no additional changes to the local community or the existing use of the land than what was noted for Alternative A from a shorter grazing period. The only change to the proposed grazing lease would be that cattle would be placed on the pastures one week later and depart one week earlier than under the terms of the Alternative A. The proposed water gap fence would still be installed along Robb Creek to protect the riparian corridor. The Association would be left to find an additional week of June pasture prior to entering the R/L System as compared to Alternative A.

Alternative C (Decrease Number of Cattle): Similar to Alternative A, the use of the grazing system's lands would continue to be grazed maintaining some level of agricultural use that has been occurring over the past five decades. FWP would limit the number of cattle accessing the grazing system to 500 animals. Under this alternative, there would be a reduction of 708 AUMs and 149 AUMs compared to Alternatives A and B, respectively. The Association's members would still be able to make full use of public summer pastures (FS and BLM allotments) but use of the R/L system pastures for only a portion of their collective herd. It is unknown if the remaining amount of the Association's cattle would be placed on another public-grazing property or kept on private property if this adjustment to the lease terms were approved. It is also unknown if this Alternative is compatible with Association interests. If not, the impacts on the McGuire property and the Association's operations would be similar to those described in Alternative E below. However, if this Alternative is not compatible with the Associations interest, the Association would likely remove their McGuire DNRC lease from the R/L System and FWP may consider other options. None of the collective values that are derived from the collaborative R/L System would be met on the McGuire property.

Alternative D (Shortest Grazing Season, No Riparian Fence): Under this alternative, there would be a reduction of 1118 AUMS, 410 AUMS, and 559 AUMs compared to alternatives A, B, and C, respectively. The Association members would still be able to make full use of their FS and BLM allotments. However, the Association would have tough decisions to make concerning the gaps in use allowed between the public land (FS and BLM) allotments and use of the R/L system pastures. It is also unknown if this Alternative is compatible with Association interests. If not, the impacts on the McGuire property and the Association's operations would be similar to

those described in Alternative E below. However, if this Alternative is not compatible with the Associations interest, the Association would likely remove their McGuire DNRC lease from the R/L System and FWP may consider other options. None of the collective values that are derived from the collaborative R/L System would be met on the McGuire property.

Alternative E (No Action): No grazing would be allowed on the WMA lands controlled by the FWP. FWP would continue to manage the WMA for the benefit of its natural resources (wildlife, fisheries, and vegetation) while providing the public access for hunting, fishing, and hiking activities.

Association members would have to locate additional summer grazing lands for their livestock if the level of forage within the McGuire property is insufficient. It is unknown if the Association would be able to utilize the BLM lands for grazing since the BLM property is tied to the base property of the WMA. These issues could possibly create additional expenses for Association members if they needed to move their livestock great distances to other summer pastures within the area other than using all of the properties included within the R/L cooperative grazing management system.

3. Cultural and Historic Resources

Livestock grazing has been a practice on southwest Montana rangelands since the latter half of the 1800's including the properties incorporated in the coordinated grazing management system.

If Alternatives A, B, C, or D were implemented, the grazing of cattle on the WMA is not expected to disturb cultural or historic resources. Previous fencing and water system improvements that were installed as part of the 2000 grazing lease did not uncover previously unknown sensitive sites. If cultural or historic resources are discovered during the installation of the proposed water gap fence under Alternatives A, B, and C, FWP will contact the State Historic Preservation Office (SHPO) for guidance and assistance.

If Alternative E were chosen, FWP would continue to watch for previously undiscovered resources and consult with SHPO if some were located.

4. Risk/Health Hazards

All four of the livestock alternatives will increase tall larkspur poisoning risk to cattle over movement practices that occurred under the current lease. This assessment is primarily based on the hard calendar dates for movement in all four livestock alternatives. Due to the broad distribution of tall larkspur throughout the higher elevation pastures and the limited capacities in the lower elevation pastures, this risk will need to be addressed by the livestock owners through their use of silent herder or some other livestock supplement in order to reduce their risk of cattle loss. None of the alternatives are expected to result in increased risk or health hazards to humans or wildlife. Noxious weed control within the WMA will involve the use of chemicals, and these chemicals will be applied in recommended amounts that should have minimal impacts on non-target vegetation under all alternatives.

5. Public Services

Alternative A: The grazing system would run from June 22 to October 22, with a maximum of 3235 AUMs. This alternative will result in the commitment of FWP funds for the water gap fence and continuing management oversight to maintain the R/L System. Some ongoing maintenance of the fence is expected because of the use of the area by cattle, by cattle and bison on adjacent privately controlled land, and by wildlife. Any maintenance expenses will be covered by the existing operations and maintenance budget for the WMA.

If the proposed grazing lease were approved, public interest in the agreement is anticipated because of previous public feedback FWP received from the 2000 grazing lease and its associated fencing and water system improvements.

Alternative B (Shorter Grazing Period): Expected consequences to FWP are the same as those described for Alternative A.

Alternative C (Decrease Number of Cattle):
Expected consequences to FWP are the same as those described for Alternative A. However if under Alternative C the Association finds it not compatible with their interests, impacts will be similar as those described under Alternative E with regard to the McGuire property. In addition if this Alternative is not compatible with the Association's interest, the Association would likely remove their McGuire DNRC lease from the R/L System and FWP may consider other options. None of the values that are derived from the collaborative R/L System would be met on the McGuire property.

Alternative D (Shortest Grazing Season, No Riparian Fence): Under this alternative, expected commitments to FWP are the same as those described for Alternatives A, B, and C, with the exception that there will be no riparian fence needed along Robb Creek. However if under Alternative C the Association finds it not compatible with their interests, impacts will be similar as those described under Alternative E with regard to the McGuire property. In addition if this Alternative is not compatible with the Association's interest, the Association would likely remove their McGuire DNRC lease from the R/L System and FWP may consider other options. None of the values that are derived from the collaborative R/L System would be met on the McGuire property.

Alternative E (No Action): This alternative will not have the new construction costs related to the water gap fence along Robb Creek, but this alternative would require FWP to install a fence along the McGuire property border to keep the Association's cattle from grazing on the WMA. This boundary fence could cost as much as $120,000 for its 12-mile length. Additionally, there is no boundary fence separating BLM and WMA lands in the Taylor Creek Drainage. Assuming BLM continues to graze this area, FWP would likely need to install 5.25 miles of additional boundary fence. This cost would be approximately $52,500.

Some maintenance costs associated with the boundary fences would likely impact the WMA's budget, but staff commitments for the oversight of a grazing system could be redirected to other WMA business.

Under this alternative, the previously installed improvements (water system and fencing) within the WMA for the benefit of R/L grazing system would be abandoned, removed, or reconfigured. Since 2000, FWP has invested $460,893.76 into the livestock watering system from Kelly Springs and removed old fencing and installed new fencing to meet the pasture designations of the R/L System. The water system at Kelley Springs would continue to require some maintenance for and by downstream users even though it might be turned off on the WMA portion of the line. Internal fencing completed for the rest-rotation system at some future date would be removed from within the WMA at an additional expense to FWP.

Impacts to FWP would be most significant under this alternative both in financial and staffing resources.

PART IV. PUBLIC PARTICIPATION

1. **Public involvement:**

The public will be notified in the following manners to comment on this current EA, the proposed action, and alternatives:

- Two public notices in each of these papers: *Bozeman Chronicle* and *Butte Standard*
- One statewide press release
- Public notice on the Fish, Wildlife & Parks web page: *http://fwp.mt.gov*, and
- Copies of this environmental assessment will be distributed to the neighboring landowners and interested parties to ensure their knowledge of the proposed project.

Three public meetings will be scheduled to coincide with the public comment period. They will be held in Butte, Bozeman, and Sheridan. Information identifying the specific dates, times, and venues of those meetings will be advertised within local papers and posted on the FWP website as they become available.

2. **Duration of comment period:**

The public comment period will extend for (45) forty-five days. Written comments will be accepted until 5:00 p.m., October 5, 2009 and can be mailed to the address below:

Robb/Ledford WMA Grazing Lease
Montana Fish, Wildlife & Parks
1400 S. 19th Ave.
Bozeman, MT 59718-5496

Or email comments to: RLGrazing@mt.gov

PART V. EA PREPARATION

1. **Based on the significance criteria evaluated in this EA, is an EIS required? (YES/NO)?** No
   If an EIS is not required, explain <u>why</u> the EA is the appropriate level of analysis for this proposed action.

   Based upon the above assessment, which has identified a very limited number of minor impacts from the proposed action that can be mitigated, an EIS in not required and an environmental assessment is the appropriate level of review.

2. **Persons responsible for preparing the EA:**

Rebecca Cooper	Kurt Alt
MEPA Coordinator	Regional Wildlife Manager
Montana Fish, Wildlife & Parks	Montana Fish, Wildlife & Parks
1420 E 6th Ave.	1400 S. 19th Ave.
Helena, MT 59601	Bozeman, MT 59718
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3. **List of agencies or offices consulted during preparation of the EA:**

   Ecological Solutions Group, LLC
   Montana Fish, Wildlife & Parks:
   Fish and Wildlife Division, Legal Bureau
   Montana Natural Heritage Program – Natural Resources Information System (NRIS)
   U.S. Department of Agriculture – Natural Resources Conservation Service

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APPENDICES

A. Robb/Ledford Management Plan
B. Robb/Ledford Coordinated Grazing System

C. Proposed 2009- 2010 Grazing Lease and Exchange of Use Agreement
D. Map of WMA and Location Map of Water Gap Fence
E. 2006 Robb Creek and Ledford Creek Riparian and Wetland Inventory Assessment Report
F. Vegetation Monitoring Transect Data
G. Wildlife Survey and Inventory Data
H. 2000 Robb/Ledford Grazing Lease Environmental Assessment

APPENDIX A

Robb/Ledford Wildlife Management Area Management Plan

DESCRIPTION OF AREA

The Robb/Ledford WMA (WMA) is located in Madison and Beaverhead Counties in Southwestern Montana (Figure 1). It is situated on the western slopes of the Snowcrest Mountains approximately 20 miles south of Alder, Montana, along the Robb and Ledford Creek drainages of the Ruby River. This WMA borders the Beaverhead National Forest (BNF), Bureau of Land Management (BLM), Department of Natural Resources (DNRC), Montana Fish, Wildlife & Parks (FWP), Blacktail WMA, and private lands in Madison and Beaverhead Counties south of Alder, Montana.

The area ranges in elevation from approximately 6000 feet along Ledford and Robb Creeks to 9200 feet on the upper reaches of the WMA. The basic character of the land involves open rolling rangelands intersected with perennial streams and a small amount of timber in the upper reaches. Rangelands are grass and grass-shrub mixes with timber primarily Douglas fir.

Average annual precipitation is 15-20 inches, much of which occurs in the form of snow. The soil type is Underwood-Babb. Some rock outcrops exist, but soil is generally free of gravel to depths of 6-12 inches.

The WMA was purchased in one acquisition. The total deeded acreage of the WMA is 17,291 acres. Along with the purchase, FWP acquired a lease of 10,818 acres of DNRC land within the WMA. In addition, there are 6,802 acres of BLM land associated with the WMA. The entire area associated with the WMA then, is 34,911 acres.

HISTORY OF AREA

The WMA was acquired in July 1988 from the Rocky Mountain Elk Foundation. The Rocky Mountain Elk Foundation (RMEF) acquired the property from the Ledford Creek Grazing Association the same year, acting as an intermediary until FWP was able to purchase the land using Habitat Montana dollars.

At the time FWP purchased the WMA the Association retained grazing rights for 16,000 animal unit months (AUM) from May 1 through November 30 annually for three years (1988-1990). These grazing rights were compensation for the mineral rights granted in the sale of the WMA. These grazing rights expired on November 1, 1990. Since that time, the Association has leased the grazing privileges under a rest rotation grazing formula from June 15 through October 15 each year. This grazing has been leased for a fee based on fair market value. This lease has expired each year on October 15.

The Association also holds permits for grazing on three federal livestock allotments. These are directly adjacent to the WMA on Forest Service land to the east, and on BLM and Forest Service land to the south, adjacent to the Blacktail WMA.

From about 1958 to 1988, the previous owners grazed about 2200 cow/calf pairs on the range associated with the WMA. This use occurred on an annual basis and followed a semi-regular schedule which involved using the same pastures at the same time each year. Grazing occurred generally from early May through November every year. In addition, during the majority of the previous ownership, several hay meadows along Robb and Ledford Creeks were irrigated for cattle grazing. This continued until the latter 1980's when the irrigation ceased. Prior to the previous ownership then, it is evident that these meadows were probably harvested for hay.

PHYSICAL DEVELOPMENTS

Buildings and Structures: The buildings on the WMA include several on Robb Creek that were the old Ledford Creek Grazing Association (Association) headquarters. Currently, these are used to provide quarters for a summer rider for the Association, which is presently grazing the WMA. Some of the buildings also provide storage for this rider and for the field crews from FWP that perform maintenance activities on the WMA. There are also corrals at this location for the horses, which are used by the rider for managing livestock on the WMA. There are also some buildings and corrals on Ledford Creek, which are not used by FWP. Some other corrals in the middle of the WMA are used by the Association grazing the WMA for purposes of sorting their cattle and separating the calves prior to their shipping calves' home.

Canals and Ditches: Existing canals and ditches have been abandoned for irrigation purposes.

Bridges, Culverts and Cattleguards: Several of these structures exist on the WMA in various locations and all will be maintained.

Roads and Trails: Several miles of roads and trails exist on the WMA. These will be monitored to identify problems with erosion and corrective action will be taken as appropriate. Many old roads and trails have been closed to motorized use and are becoming revegetated naturally.

Public Use Facilities: There are no public use facilities on the WMA and commercial development is prohibited by law.

Signs: Boundary signs have been placed along exterior boundaries. Annual maintenance will be conducted on these signs as fences are checked each spring. Additionally, road designation signs have been put up to help recreationists identify open and closed roads and trails and will be checked annually. Special seasonal closure and entrance signs have also been constructed and will be maintained.

Fences: Many miles of fences exist on the WMA. When a permanent grazing system is established some of these may be used and others will need to be removed. Necessary existing fences now and in the future will be maintained annually as needed.

VEGETATION

Bluebunch wheatgrass and Idaho fescue grasslands is the predominant vegetation with some Douglas fir occurring at higher elevations. Sagebrush (both big sage and black sage), rabbitbrush, and mountain mahogany occur in association with these grass species. Willow stands are common along stream courses and in wet areas. Scattered patches of aspen and serviceberry can be found on the more mesic sites.

FWP has made no herbaceous seedings and has no plans to do any seeding. However, some smooth brome and timothy persists in areas that were formerly hayed.

TRAVEL MANAGEMENT

The travel plan for the WMA was last updated in 1996. Travel restriction updates on the WMA are coordinated through planning of the Interagency Visitor map for Southwest Montana produced by the BNF. This travel plan is updated approximately every three years. Consult the latest Travel Plan map for the latest travel restrictions. The Fish, Wildlife and Parks Commission establish rules and regulations for access on the WMA. Presently the WMA is closed to all public use each year from December 2 through May 15. However, county roads that exist through the WMA are open year-long.

WILDLIFE

ELK

The WMA was the first acquisition by FWP using Habitat Montana (HB526) funds raised through the sale of big game combination licenses, both nonresident and resident. It was acquired primarily as an elk winter range. At the time of FWP's acquisition, a wintering population of 500-800 elk were found on and adjacent to the WMA, and this remains the number of wintering elk in the area. Depending on winter conditions and elk distribution, a larger number of elk can be found on and adjacent to the WMA as a part of the approximately 3000 elk that winter in the larger area including the Robb/Ledford and Blacktail WMA's.

This elk population principally summers in the Gravelly and Snowcrest Mountains on the BNF. However, the bulk of the elk winter range occurs on the Robb/Ledford and Blacktail WMA's. Therefore, acquisition of the WMA secured a very important link in the seasonal distribution chain of this elk herd. Seasonal elk distribution data are summarized in annual progress reports by Hamlin and Ross (1996).

DEER

Mule and whitetail deer spend spring, summer and fall on the WMA. In addition, the WMA serves as part of a major winter range to a wintering mule deer population from the Snowcrest

Mountains. Recent trend surveys for this area put the population at approximately 700-800 animals ranging in the last ten years from approximately 600 to 1300.

MOOSE

Prior to 1972, an estimated 10 to 35 moose resided on or near the WMA. While riparian areas are recovering from long-term continuous grazing, moose populations have not recovered to their levels of 20 years ago.

ANTELOPE

There is a large population of antelope in the hunting district that encompasses the WMA, the largest district in the Region. A large segment of this population uses the WMA yearlong but most significantly as winter range on portions of the WMA.

GAME BIRDS

Blue grouse, sage grouse, occasional ruffed grouse and Hungarian partridge exist on the WMA and will benefit from improved range condition on the WMA. No population estimates have been made, but all species will undoubtedly benefit from the increased food and cover afforded the WMA as range condition improves.

WATERFOWL

Some waterfowl nesting occurs along the numerous beaver dams located along Robb and Ledford Creeks. The principal waterfowl use is by mallards and teal. Nesting success and brood rearing sites for waterfowl will be improved by the rest rotation grazing system that has been implemented on the WMA.

FISHERIES

The WMA contains portions or all of Crows Nest, Ledford, Robb, Rock, Swamp and Taylor Creeks. If grazing on the WMA is coordinated with BLM, Indian Creek and several miles of the East Fork of Blacktail Creek may also be influenced by the grazing system that is implemented.

Ledford Creek supports rainbow, rainbow-cutthroat hybrids, brown trout and mottled sculpin. Based on an inventory in 1991, total densities of trout were estimated at approximately 240 per mile. Brown trout were the predominant species representing 74% of the catchable (6 inches or longer) fish. Habitat was limited in the inventoried section, due to a low abundance of willows and other shrubs in riparian areas. Stream and riparian conditions appeared to have been influenced by historic livestock use.

The East Fork of Blacktail Creek fishery is primarily comprised of brook and rainbow trout. Mountain whitefish and mottled sculpin are also present. In 1995, a short section of stream was inventoried downstream of the mouth of Rough Creek. Brook trout were the only trout species captured. Sizes ranged from 4 to 9 inches and densities were very low, estimated at 66 per mile.

Westslope cutthroat trout (WCT) are present in the headwaters at similar densities. Analysis of several fish indicated they were 88% genetically pure. Instream flow reservation was requested and granted at 18 cubic feet per second.

Robb Creek is dominated by brook trout, but maintains a small population of WCT. Mottled sculpin are also present. A survey in 1991 estimated catchable size fish at 496 per mile. Brook trout averaged nearly eight inches in length, with the largest exceeding 12 inches. Westslope cutthroat trout averaged only 6% of the game fish population. Sizes ranged to 9 inches in length. Habitat in the surveyed area consisted primarily of a network of beaver ponds connected by short reaches of stream. The majority of habitat was provided by the ponds or woody debris associated with the dams. Livestock impacts had influenced portion of the inventoried stream reach.

Rock Creek contains exclusively WCT. Population densities range from 160 to 300 catchable size fish per mile, with the largest fish exceeding 12 inches in length. Fish habitat is limited throughout most of the stream. Two reservoirs appear to provide over-winter habitat to a significant portion of the population. Primary factors influencing the habitat include the outlet of the upper reservoir, which has eroded a 15 foot gully for approximately 200 yards. This has largely obliterated habitat features for a significant distance downstream. In addition, a natural slump has confined the channel resulting in steep, eroding banks, which continue to introduce high levels of sediment. Livestock are also impacting streambanks and riparian condition.

The genetic status of this population has not been adequately determined. Preliminary analysis of cutthroat collected in 1995 indicated this population was genetically pure. Subsequent fish collected in 1997 and analyzed in 1998 suggest that the population is either slightly hybridized or carries a rare WCT allele that is electrophoretically indistinguishable from that characteristic in Yellowstone cutthroats or rainbow trout.

Fisheries inventories have not been conducted on Crows Nest Creek, Taylor Creek, Swamp or Indian Creeks, thus their status as fisheries is not known.

Status of Westslope Cutthroat Trout in Montana

In June 1997, the Fish and Wildlife Service receive a formal petition to list WCT as threatened throughout its range. In January 1998 the Service received an amended petition, from the copetitioners, which contained a substantial amount of new information to support their requested action. The Fish and Wildlife Service will likely make a decision on WCT listing by July 1999.

Genetically pure populations of WCT presently occupy 2.9% of their historic distribution. A viability assessment on 144 populations (90 - 100% genetically pure) in the Upper Missouri River drainage was completed in 1996. Results indicated most populations are at a high risk of going extinct. Based largely on the results of this assessment and recommendations from the WCT Technical Committee, the Forest Service and Bureau of Land Management are giving stream habitats with slightly hybridized WCT populations (90 - 99% pure) the same emphasis as those supporting entirely pure populations. Similarly, the WCT Conservation Plan (in draft form,

but likely finalized within a couple of months) stipulates that 90 - 99% pure populations must be managed as pure until a watershed plan is formalized, defining conservation objectives. If that population or stream is not part of the specified objectives, management will revert back to sport fisheries status and emphasis will become similar to other streams with comparable recreational value.

It is unknown how hybridized populations will be viewed under the Endangered Species Act, if WCT becomes listed. Management direction defined by the WCT Conservation Plan or the Endangered Species Act has implications for Robb and Rock Creeks on the WMA.

NON GAME/PREDATORS/FURBEARERS

At present, there is no formal inventory of nongame, predators or furbearers for the WMA. Dennis Flath, statewide non-game coordinator, conducted an inventory of ferruginous hawks and prairie falcons beginning in the late 1970's and continued periodically since that time. The most recent information indicates that there are an estimated 5-10 pairs of ferruginous hawks and a few pairs of prairie falcons that occupy the WMA. Beaver are found in the major drainages.

SPECIES LISTS

The following listing of all game and nongame species that inhabit the WMA was prepared by Lonner in 1986.

BIRDS (57 SPECIES)

Northern Harrier (*Circus cyaneus)*
Sharp shinded hawk (*Accipiter striatus)*
Cooper's hawk (*Accipiter cooperii)*
Northern goshawk (*Accipiter gentilis)*
Red-tail hawk (*Buteo jamaicensis)*
Ferruginous hawk (*Buteo regalis)*
Rough-leg hawk (*Buteo lagopus)*
Golden eagle (*Aquila chrysaetos)*
American kestrel (*Falco sparverius)*
Prairie falcon (*Falco mexicanus)*

Blue grouse (*Dendragapus obscurus)*
Ruffed grouse (*Bonasa umbellus)*
Sage grouse (*Centrocerus urophasianus)*

Sandhill crane (*Grus canadensis*)
Killdeer (*Charadrius vociferus)*
Spotted sandpiper (*Actitis macularia)*
Long-billed curlew (*Numenius americanus)*

Great horned owl (*Bubo virginianus)*

Belted kingfisher (*Ceryle alcyon)*

Yellow bellied sapsucker (*Sphyrapicus varius)*
Hairy woodpecker (*Picoides villosus)*
Northern flicker (*Colaptes auratus)*

Horned lark (*Eremophila alpestris)*
Tree swallow (*Tachycineta bicolor)*
Violet-green swallow (*Tachycineta thalassina)*
N Rough-wing swallow (*Stelgieopteryx serripennis)*

Gray jay (*Perisoreus canadensis)*
Stellar's jay (*Cyanocitta stelleri)*
Clark's nutcracker (*Nucifraga columciana)*
Black billed magpie (*Pica pica)*
Common raven (*Corvus corax)*

Black-capped chickadee (*Parus atricapillus)*
Mountain chickadee *(Parus gambeli)*
Red-breasted nuthatch *(Sitta canadensis)*
Brown creeper (*Certhia americana)*

Bohemian waxwing (*Bombycilla garrulus)*
Northern shrike (*Lanius excubitor)*
European starling (*Sturnus vulgaris)*

Yellow warbler (*Dendroica petechia)*
Yellow-rumped warbler (*Dendrocia coronata)*
Macgillivray's warbler (*Oporornis tolmiei)*
Common yellowthroat (*Geothlypis trichas)*

Western tanager (*Piranga ludoviciana)*

American tree sparrow (*Spizella arborea)*
Chipping sparrow (*Spizella passerina)*
Vesper sparrow (*Pooecetes gramineus)*
Song sparrow (*Melospiza melodia)*
White-crowned sparrow (*Zonotrichia albicollis)*
Dark-eyed junco (*Junco hyemalis)*

Western meadowlark (*Strurnella neglecta)*

Brewer's blackbird (*Euphagus cyanocephalus)*

Rosy finch (gray*) (Leucosticte arctoa)*

Rosy finch (black) (*Leucosticte arctoa*)
Pine grosbeak (*Pinicola enucleator)*
Cassin's finch (*Carpodacus cassinii)*
White-winged crossbill (*Loxia leucoptera)*
Pine siskin (*Carduelis pinus)*

LARGE MAMMALS

Black Bear (*Ursus americanus*)
Mountain Lion (*Felis concolor*)
Elk (*Cervus elaphus*)
Mule Deer (*Odocoileus hemionus*)
White-tailed Deer (*Odocoileus virginianus*)
Moose (*Alces alces*)
Pronghorn Antelope (*Antilocapra americana*)

AMPHIBIANS

Boreal (Western) Toad (*Bufo boreas*)
Spotted Frog (*Rana pretiosa*)

REPTILES

Rubber Boa (*Charina bottae*)
Common Garter Snake (*Thamnophis sirtalis*)

SMALL MAMMALS (26 SPECIES)

Masked Shrew (*Sorex cinereus*)
Montane Shrew (*Sorex monticola*)
Small-footed Myotis (*Myotis subulatus*)

Little Brown Myotis (*Myotis lucifugus*)
Long-legged Myotis (*Myotis volans*)
Pika (*Ocotona princeps*)
Nuttall's Cottontail (*Sylvilagus nuttallii*)
Snowshoe Rabbit (*Lepis Americanus*)
White-tailed Jackrabbit (*Lepus townsendii*)
Least Chipmunk (*Eutamias minimus*)
Yellow-pine Chipmunk (*Eutamias amoenus*)
Yellow-bellied Marmot (*Marmota flaviventris*)
Uinta Ground Squirrel (*Spermophilus armatus*)
Red Squirrel (*Tamiasciurus hudsonicus*)
Northern Pocket Gopher (*Thomomys talpoides*)
Deer Mouse (*Peromyscus maniculatus*)
Busy-tailed woodrat (*neotoma cinerea*)
Gapper's Red-backed Vole (*Clethrinomys gapperi*)
Western Jumping Mouse (*Zapus princeps*)
Porcupine (*Erethizon doratum*)
Coyote (*Canis latrans*)
Red Fox (*Vulpes vulpes*)
Long-tailed Weasel (*Mustela frenata*)
Badget (*Taxidea taxus*)
Stripped Skunk (*Mephitis mephitis*)
Bobcat (*Lynx rufus*)

FISH

Rainbow Trout *(Oncorhynchus mykiss)*
Westslope Cutthroat Trout *(Oncorhynchus clarki lewisi)*
Rainbow - Cutthroat (trout) hybrids *(NA)*
Brown Trout *(Salmo trutta)*
Brook Trout *(Salvelinus fontinalis)*
Mottled Sculpin *(Cottus bairdi)*
Mountain Whitefish *(Prosopium williamsoni)*

GAME ANIMAL DEPREDATION

Private landowners in the Robb/Ledford area were concerned with the effects of elk on their ranching operations prior to the acquisition of the WMA. Since that time, some complaints still occur but they are minimal. In addition, the adjacent private land with the greatest potential for game damage complaints is not presently open to public hunting. Antelope and both species of deer use hayfields and haystacks on this private land.

ZONE OF INFLUENCE

The WMA has a far reaching zone of influence. Hamlin and Ross (1992) report elk radioed on the WMA are distributed widely throughout the Gravelly Range during the summer. Also, with the winter range providing for mule and whitetail deer and antelope, the WMA has a far reaching influence for these species as well. Game bird species are year around residents of the WMA.

MINERAL-OIL/GAS

At present there are no mining, oil or gas activities on the WMA. The majority of the mineral rights and oil and gas leasing rights are under federal government jurisdiction. However, when FWP purchased the property, 51.52% of the private mineral rights were also assigned to FWP. The potential for exploration exists. Requests will be considered as received in compliance with the Montana Environmental Policy Act and cooperatively with the BLM. DNRC land (approximately 10,000 acres) associated with the WMA is leased for agricultural purposes only and FWP has no control over minerals.

LIVESTOCK GRAZING

Livestock grazing on the WMA is and will continue to be conducted under a rest-rotation grazing system incorporating the principles developed by Hormay (1970). This system involves the grazing of cattle through each pasture on a three year rotation of early use (mid-June to seed ripe mid-August), late use (seed ripe to October), and then complete rest.

Presently, the status of this grazing system and coordination with adjacent public land managing agencies (USFS, BLM) is not finalized. In 1999 and 2000, FWP will be completing a planning process, which will develop a long term grazing management plan based on the objectives developed for the WMA listed on page 13. In addition, FWP intends to enter into an "exchange of use" agreement with DNRC lands leased to the Association in order to manage a 3,600 acre inholding within the WMA for habitat protection.

LIVESTOCK WATER DEVELOPMENTS

Approximately 14 miles of water lines supplied by two separate springs make up a complex and lengthy pipeline system that flows into 17 tanks for livestock water. This network of pipes and tanks are crucial to the success of an efficient livestock grazing program on the WMA. Many areas of the WMA which include the lower reaches of the Dry Hollow drainage and high ridges that separate Ledford Creek from Robb Creek, Robb Creek from Dry Hollow and Dry Hollow from Spring Brook have no water that is naturally available to livestock through the grazing season. In addition to supplying water where none is available, water tanks placed in the appropriate locations will increase the opportunity to disperse livestock throughout the pasture system and reduce the grazing pressure in riparian areas.

HOGBACK SPRING

This spring, it's development and water line starts on land that is owned by the United States Forest Service. This line initially feeds two tanks on the Forest Service pasture then continues ½ mile to the north before crossing the boundary of the WMA. This water line will then continue north along the top of the ridge between Robb Creek and Ledford Creek for a total of three miles feeding water to four tanks.

At this time the complete system is in very poor condition, which includes the development at the spring box. A cooperative effort between FWP and the U.S. Forest Service to improve and re-build this line will need to be initiated.

KELLY SPRING

There are two separate water lines that originate from Kelly Spring. One line feeds a series of tanks along the ridge between Dry Hollow and Robb Creek ending to the north on land owned by the Snowcrest Ranch.

On the WMA this line is approximately five miles long and supplies water to seven different tanks. A separate line from Kelly Spring feeds water initially to the west then runs north along the ridge between the Spring Creek drainage and Dry Hollow. This line is approximately six miles long and supplies water to six tanks. In addition to supplying livestock water to the WMA pastures, this line also is used by three other landowners for their grazing programs.

The Kelly Spring lines and tanks are in very poor condition and are in need of major replacement. As we design a new pasture system, tanks will need to be added to the line to improve our opportunity to disperse livestock.

Currently the NRCS located in Sheridan has been organizing the landowners that use the Kelly Spring to combine their efforts to rebuild the complete water system. FWP has been an active participant in this effort since its beginning. Necessary for the success of the project will be the completion of a memorandum of understanding for the common use of the water right from Kelly Spring.

FIRE PROTECTION

The Robb/Ledford WMA is split between two counties. Beaverhead County on the west and the eastern part of the WMA lies in Madison County. Protection for the WMA falls within the State-County Fire Protection Agreement. First responders to a fire on our project would be with the appropriate county areas depending on where the fire was. If a fire becomes too large for county areas to handle or if the fire expands outside of the county jurisdiction then the DNRC, Fire Management out of Dillon, will be called in for assistance.

NOXIOUS WEED MANAGEMENT

Since the purchase of the WMA in 1988, FWP has been actively involved in the control of noxious weeds on our lands. Noxious weeds that have been identified on the WMA include: Spotted Knapweed, Canadian Thistle, Field Scabiosa, Blackleaf henbane, Hounds Tongue, Musk Thistle and Mullen. The largest and most dispersed infestation of noxious weed type is Hounds Tongue. The other varieties are found in smaller amounts and no Leafy Spurge has been identified on the WMA.

Our efforts to date have initially been to treat the roadsides where infestations are first started and most abundant, then to work out into surrounding rangelands. Weed control has been accomplished with the use of chemicals, specifically Tordon, both with contract (private applicators) and FWP personnel and equipment.

FWP intends to continue and expand its commitment to control noxious weeds. New infestations will be identified and treated as quickly as possible and other areas of previous treatment will be revisited. Budgets will determine how much of an effort we can have from year to year to manage weed infestations that are located in more dispersed and isolated locations.

TIMBER MANAGEMENT

No timber management activities are planned on the very limited forested portions of the WMA. Just prior to acquisition, the former owners were considering some harvest in the Taylor creek drainage on the south end of the WMA. Department acquisition of the WMA prevented harvest of this important fall security and winter thermal cover.

RECREATION

A significant number of elk hunter days occur on or adjacent to the WMA. While no quantitative data exists specific to the WMA, a survey of the number of opening day hunter camps through 1990 on the adjacent East Fork Blacktail Deer Creek is as follows:

Year:	1978	979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Camps:	71	79	85	37	56	51	98	67	82	121	105	--	94

The WMA is located in Hunting District 324. Recreation hunting pressure is high, with approximately 2400 elk hunters recreating for 13,025 days annually.

The deer population provides hunting recreation in district 324, which has approximately 1650 hunters for 8835 days annually.

There is a significant amount of antelope hunting recreation that is provided on the WMA and for the district as a whole recreation is provided for approximately 1155 hunters and 2385 hunter days annually.

WATER MANAGEMENT

With the purchase of the WMA, FWP acquired 22 water rights, consisting of one stock watering right and 21 irrigation rights. The sources for the irrigation rights are Ledford, Robb and Warm Springs creeks and a tributary spring to the W. F. Ruby Creek. During the first stage of the ongoing statewide water adjudication, objections to 15 of FWP's claimed rights were filed in 1991. One objection (by the BLM) has been resolved. Fourteen objections, which were filed by a former owner of property adjacent to the WMA, are now the jurisdiction of the DNRC. Issues raised in the objections have not been completely resolved as yet.

WMA MANAGEMENT PROGRAM

STATEMENT OF PURPOSE:

Robb/Ledford Wildlife Management Area (WMA) (Figure 1) was purchased in 1988, primarily to provide winter range for elk. Additionally, the WMA was purchased to provide habitat for other plant and wildlife species that are products of the local soils and climate.

Purchase Price:	$1.82 million
Total Cost:	$1.99 million
Percent Federal Aid (PR):	0%
Percent State License (HB526):	100%

GOAL

The goal for the WMA is to maximize the productivity of the soil, vegetation, and watershed and the game and nongame wildlife that are products of that environment. A secondary goal will be to provide public access to these and adjacent public properties (BLM, DNRC and USFS) for sport hunting and other recreational pursuits. Management emphasis is to attain stated Management Objectives (below) which includes maximizing soil/vegetation interrelationships that will result in a productive environment for all wildlife species. Secondary management emphasis will be to meet Region Three objectives for big game species, upland game bird and nongame species management plans. Livestock grazing will be used as a tool to help achieve wildlife and vegetative objectives.

PROBLEMS

1. Several miles of sheep tight fence exists that is a major deterrent to movements of antelope, one of the primary inhabitants of the WMA yearlong.

2. Several miles of unnecessary cross fence and small interior pasture fences exist which create livestock distribution and resource damage problems.

3. Livestock grazing is presently utilizing pre-existing pasture fences, which has created management problems.

4. Elk traditionally use private lands adjacent to the WMA as winter range.

5. Perception by some that WMA is only an elk winter range, and that FWP does not manage for a diversity of wildlife species and vegetative communities.

6. Some adjacent private lands are closed to hunting.

7. Potential for subdivision adjacent to the WMA.

8. Public roads (county) pose problems with restricting public use on the WMA in the winter.

9. Increased public use of the WMA will require road and gate maintenance and improvement.

10. Potential listing of westslope cutthroat trout under Endangered Species Act may require more intensive management of riparian areas.

ROBB/LEDFORD WMA OBJECTIVES

OBJECTIVE 1. Manage the vegetation to allow succession toward climax vegetative communities and the potential natural vegetation as determined by soil types and climate. Specifically, uplands would be managed as Idaho Fescue and Bluebunch Wheatgrass communities. Riparian sites would be managed for the maintenance and improvement of willow communities and bank stability.

ISSUE 1: Vegetation needs to be allowed adequate rest periods for health and vigor. The continuation of livestock use of the WMA would be required to attain Objectives 2 & 3 (below). Properly managed livestock grazing can be utilized to attain Objective 1.

Strategy 1: Utilize livestock grazing on the WMA as designated by a management plan and under a rest-rotation system that would allow plants two years of growing season rest to achieve and/or maintain health and vigor. Each pasture will be rested during the growing period two out of every three years with one of the pastures being totally rested (year long).

Sub-Strategy 1: Address concerns related to livestock concentrations by: water developments, salting, herding, pasture layout and timing of use.

Sub-Strategy 2: Address problem related to potential larkspur poisoning to livestock by the use of medicated feeds (Silent Herder), limited used of electric fencing, pasture layout and timing of livestock movements.

ISSUE 2: Noxious weeds occur on the property.

Strategy 1: Control noxious weed infestations when they are found to occur as outlined in the Region 3 WMA Weed Control Management Plan.

Strategy 2: Require that any livestock utilizing the WMA grazing system (that will be given hay before arriving on the game range) be fed only "weed free" hay at least two weeks prior to the "on date."

ISSUE 3: Documenting success of reaching vegetative objectives.

Strategy: Monitor grass and shrub species by permanent photo and/or other physical measurements to ensure health, vigor and plant succession is moving toward desired conditions as noted in Objective 1. Employ the assistance of the Montana Riparian Association to assist in this effort.

OBJECTIVE 2. Expand the benefits of managing the deeded WMA land as wildlife habitat to adjoining DNRC Land.

ISSUE 1: The Ledford Creek Grazing Association has the grazing rights to the 3,620 acres of DNRC property (McGuire) found within the boundaries of the WMA with a

rated carrying capacity of 1059 AUMs. The McGuire property is important elk winter range and wildlife habitat.

Strategy: Enter into an exchange of use, whereby the Association is allowed to graze livestock on the WMA in return for FWP being allowed to include the McGuire in the management of the WMA.

ISSUE 2: FWP presently leases over 10,000 acres of DNRC land associated with the WMA. This land is important wildlife habitat and an intregal part of the WMA. The cost of leasing DNRC land will continue to increase and could eventually be cost prohibitive.

Strategy: Continue to lease the grazing rights to the Association to help cover the cost of the lease, upkeep and improvements. The lease would allow FWP to maintain management of these lands.

OBJECTIVE 3. Showcase the WMA as a demonstration area where both wildlife and livestock can co-exist in a rest-rotation grazing system that will allow for the maintenance of a healthy range ecosystem.

ISSUE 1: Wildlife and livestock both require the perpetual maintenance of a healthy rangeland ecosystem for their long-term existence. Both compete for similar resources. These resources exist on both private and public land throughout the state (65% of which is private).

Strategy 1: Implement a livestock rest-rotation system on the WMA that will meet the needs of wildlife, livestock and the rangeland resource.
Strategy 2: Use the anticipated success of this partnership between the wildlife and ranching community for educational purposes in tours and presentations for public and private land managers and the general public.

OBJECTIVE 4. Provide an adequate amount of vegetation across the entire WMA annually to supply the winter forage requirements of elk (as designated in the Elk Management Plan) and to reduce elk depredation on neighboring private land.

ISSUE 1: Providing adequate amounts of highly palatable residual forage on the WMA to meet the needs of wintering elk.

Strategy: Use rest-rotation grazing to manage vegetation to keep it more palatable for elk forage and provide adequate amounts of total forage for elk by each year resting one-third of WMA that is under grazing management.

ISSUE 2: Provide adequate winter elk forage distributed throughout the WMA.
Strategy 1: Design pasture layout to provide for the best distribution of habitat values across the WMA (i.e. annual rest pasture distribution).
Strategy 2: Utilize a conservative stocking level (based on approximately 6 acres/AUM).

ISSUE 3: Documenting the success of leaving an adequate distribution of residual vegetation for wintering elk throughout the WMA.

Strategy 1: Utilize a method or methods (qualitative or quantitative) of determining if an adequate distribution of residual vegetation remains after livestock use. The type of method (visual determination, photo plots, agronomy cages, etc.) used for a particular site will vary dependant on management concerns and objectives.

OBJECTIVE 5. Provide for the cover, forage and water quality needs for other fish and wildlife species using the WMA. For example, residual cover is important for ground nesting birds and small mammals. Shrubby vegetation such as sagebrush is important for cover, nesting and forage for a number of wildlife species. Riparian vegetation is critical to maintain fisheries and wildlife values.

ISSUE 1: Loss of residual vegetation due to livestock grazing .

Strategy 1: Design the grazing system to provide vegetation rested from livestock grazing on one-third of the WMA each year. An additional one-third of the pastures will be rested until seed-ripe (mid-August).
Strategy 2: Utilize a conservative stocking level (based on approximately 6 acres/AUM) in an effort to maintain a distribution of residual forage for all wildlife, including non-game species in pastures utilized by livestock.
Strategy 3: Design pasture layout to accommodate desired wildlife habitat distribution across the WMA.
Strategy 4: Utilize a method or methods (qualitative or quantitative) to determine if an adequate distribution of residual vegetation remains after livestock use. The type of method (visual determination, photo plots, agronomy cages, etc.) used for a particular site will vary dependant on management concerns and objectives.

ISSUE 2: Maintain adequate stream function and riparian habitat necessary to promote an abundance of wild trout representing a spectrum of age classes and where appropriate, ensuring Westslope Cutthroat conservation objectives are met.

Strategy 1: Use rest-rotation grazing to provide for improvement of stream side riparian habitats critical to fisheries and the cutthroat trout.
Strategy 2: Consider the use of herding to manage livestock in some areas in conjunction with the rest-rotation system.
Strategy 3: Develop pipelines and water tanks to facilitate proper cattle distribution away from riparian areas.
Strategy 4: Adjust grazing plan where necessary to consider Westslope Cutthroat trout concerns.

OBJECTIVE 6. Enhance wildlife benefits on adjacent lands where feasible, through cooperative agreements with State and Federal landowner(s).

ISSUE: Habitat for a variety of wildlife species including elk winter range is found on adjacent public land.

Strategy 1: Where advantageous for the management of the WMA and wildlife objectives, consider the incorporation the adjacent Federal allotment(s) and additional DNRC leases.

OBJECTIVE 7. Manage public access to provide a diversity of wildlife and fishery related recreational opportunities.

ISSUE: Distribute public use with minimal impact on land, fisheries and wildlife.

Strategy 1: Maintain an adequate road system to allow public use of the WMA without causing excessive use, sedimentation or off-road travel.
Strategy 2: Install cattle guards and improve the roadway where necessary for safety purposes.
Strategy 3: Exclude public use of the WMA during the winter to prevent disturbance to big game. Request the County Commission seasonally close the county roads on the game range during the winter if significant conflicts develop between winter big game and recreational use.

OBJECTIVE 8. Provide for aesthetics along riparian zones and uplands.

ISSUE: How to minimize human related impacts on the WMA.

Strategy 1: Maintain a conservative stocking rate in order to allow a distribution of residual vegetation in portions of the Ause≅ pastures that will provide a degree of wildlife forage and cover. A conservative grazing rate of approximately 6 acres per AUM will be a starting point to establish an initial level. Further adjustments could be made either upward or downward based on monitoring results related to objectives.
Strategy 2: Remove unneeded fencing.
Strategy 3: No off-road travel.
Strategy 4: Layout fences to minimize livestock concentrations and heavy trailing scars.
Strategy 5: Consider the exclusion of livestock from some locations of high public use such as the trailhead/camping area at the end of the road on Ledford Creek.
Strategy 6: Salt blocks and water tank placement should be placed away from open public roads and water.

OBJECTIVE 9. Increase public awareness and appreciation for the diversity of wildlife, fisheries and plant communities present on the Robb/Ledford WMA.

ISSUE: How to educate the public on the purpose and use of the WMA.

Strategy 1: Placement of educational signs in some locations, media releases and/or a brochure.
Strategy 2: Educational field tours.

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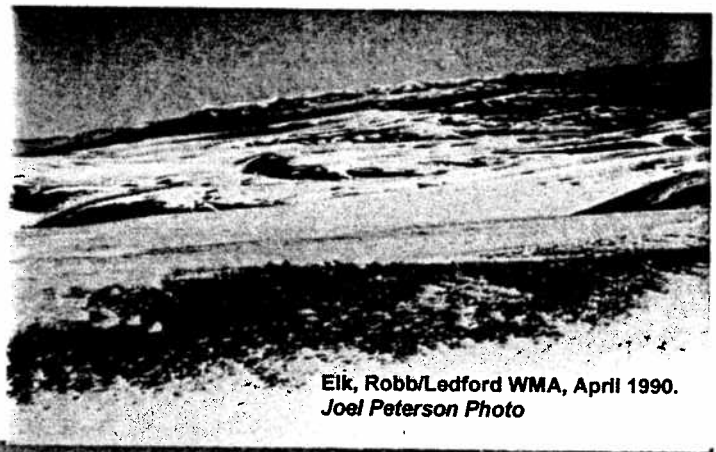
LIVESTOCK GRAZING PLAN

ROBB/LEDFORD COORDINATED GRAZING SYSTEM

REGION THREE



Elk, Robb/Ledford WMA, April 1990.
Joel Peterson Photo

Cows grazing in upper pasture
Hellon's Robb/Ledford
WMA, 1997

Montana Fish, Wildlife & Parks

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Introduction

This plan provides a strategy for livestock grazing as outlined in the Montana Fish, Wildlife & Parks (MFWP) Management Plan for the Robb/Ledford Wildlife Management Area (R/LWMA) and encouraged by the Rocky Mountain Elk Foundation (RMEF) (MFWP 1999 and Phillips 1991). As addressed in the Management Plan, the grazing strategy emphasizes rest-rotation grazing concepts developed by Hormay (1970) and applies strategies used on similar MFWP projects to effectively manage wildlife and livestock on the same rangelands while expanding the influence of the WMA (Frisina and Morin 1991, Alt et al. 1992, MFWP no date, MFWP 1997).

In this case, the WMA area of influence is expanded by an "exchange of use" agreement with the Ledford Grazing Association (LGA). The agreement incorporates about 3,600 acres of Montana Department of Natural Resources (DNRC) lands leased by the LGA into the grazing system. The coordinated management of the MFWP R/LWMA with lands leased by the LGA is termed the Robb/Ledford Coordinated Grazing System (R/LCGS), which this document describes.

History

The R/LWMA was acquired in 1988 from the RMEF. The RMEF purchased the property from the LGA. With acquisition of the WMA, MFWP acquired the aforementioned DNRC leases. At the time MFWP purchased the R/LWMA the LGA retained the grazing rights until Nov 1, 1990 (MFWP 1999). In 1999 the LGA acquired a lease from the DNRC on the 3,600-acre McGuire property. The McGuire property was formerly in private ownership and was deeded to DNRC as part of a land exchange. MFWP considers the McGuire property important wildlife habitat (MFWP 1999). Therefore, MFWP entered into an "exchange of use" agreement with the LGA which allows the McGuire property to be included in the R/LCGS (MFWP 1999a).

Lands within the R/LCGS are suitable livestock range as evidenced by a long history of livestock grazing (MFWP 1999). DNRC lands are leased for livestock grazing to provide funds for the School Trust and when in private ownership lands deeded to MFWP were managed as range and hay land for livestock production (MFWP 1999). Purchase of the R/LWMA by MFWP changed the land management emphasis from livestock production to wildlife production, primarily elk.

Since 1989 an interim or temporary grazing system was implemented on the R/LWMA utilizing existing fences and water developments. In 2000 the interim system will be replaced by implementation of the R/LCGS described in this plan.

Range conditions within riparian areas on the WMA have generally improved since 1992 (Hansen 1999). The permanent grazing system proposed in this plan builds upon the success of the interim grazing plan.

Land Base

The R/LCGS land base is located in southwest Montana about 20 miles south of Alder and includes about 29,218 acres (Figure 1.) The land ownership involved in the R\LCGS consists of about 15,980 acres deeded to MFWP, 12,558 acres of DNRC lands leased by the LGA and MFWP, and 680 acres of scattered Bureau of Land Management (BLM) land tracts within the R/LWMA. BLM and Forest Service Allotments adjacent to the R/LCGS are coordinated with this grazing system but are managed under separate agreements (FS 1972 and BLM 1975). As a result of this plan the BLM Robb Creek Allotment (adjacent to the R\L CGS) will include about 640 acres of DNRC lands leased by MFWP and about 1,311 acres of MFWP deeded R/LWMA lands. R/LWMA and associated lands are described in the Robb/Ledford Wildlife Management Area Management Plan (MFWP 1999).

Grazing Strategy

The grazing system employs rest-rotation concepts described by Hormay (1970), requirements for grazing livestock on MFWP lands (Frisina 1991), and riparian grazing strategies recommended by Ehrhart and Hansen (1997) and Ehrhart and Hansen (1998).

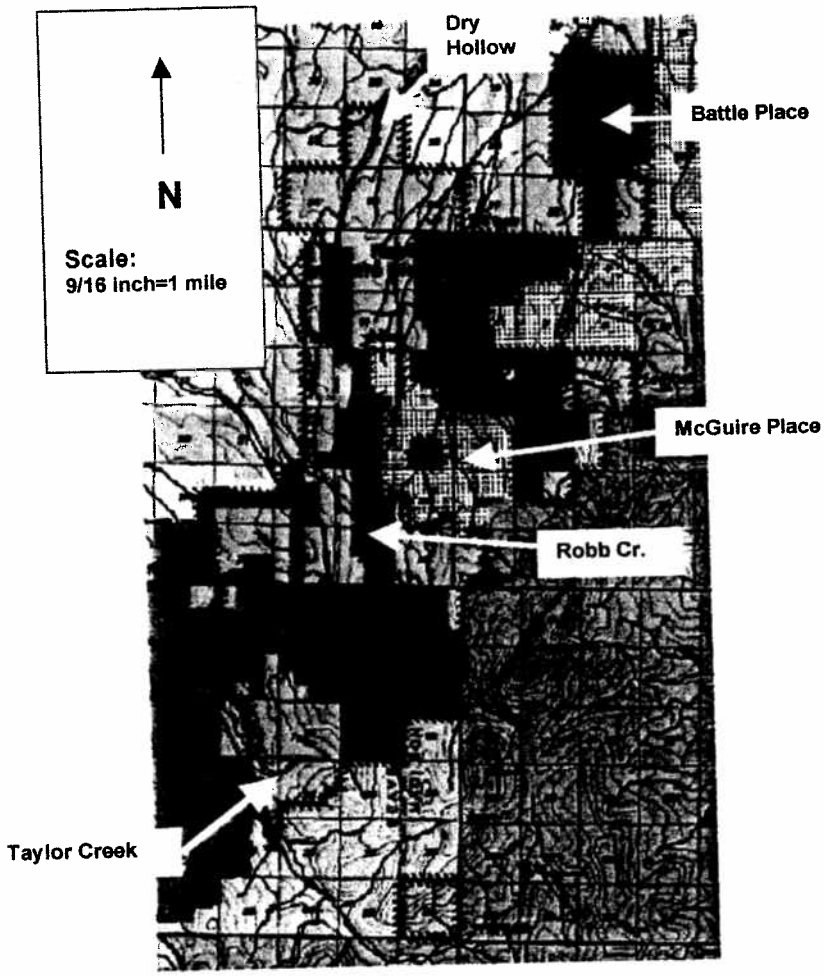

Figure 1. Approximate location of lands included within the Robb/Ledford Coordinated Grazing System noted by red shading.

Stocking Rate

The stocking rate of 1,168 Animal Units or maximum of 3,267 Animal Unit Months (AUM's) of cattle grazing will be permitted each year, the current stocking rate in place under the interim-grazing plan. The stocking rate takes into consideration the need of MFWP to comply with objectives in the R/LWMA Management Plan (MFWP 1999). It also considers the desire of MFWP to merge about 3,600 acres of DNRC land (McQuire Place) leased by the Ledford Grazing Association with management of the R/LWMA.

A comparison of recommended livestock stocking rates by the NRCS and Montana State University Agriculture Extension service indicate the stocking rate for the Robb/Ledford Cooperative Grazing System is conservative (NRCS 1981and Lacey et al. 1994).

Table 1. Size in Acres for individual pasture units within the Robb/Ledford Coordinated Grazing System.

Pastures	Size in Acres	Pastures	Size in Acres	Pastures	Size in Acres
1L-Battle Place	2,590	*2L-Lower Robb Cr.*	2,996	*3L-Dry Hollow*	5,096
1H-Ledford Ridge	5,410	*2H-Upper Robb Cr.*	5,941	*3H-Swamp/Rock Cr.*	7,185
Total 1L/1H	8,000	*Total 2L/2H*	8,993	*Total 3L/3H*	12,281

Pasture size varies due to differences in terrain and water availability (Table 1 and Table 2). Depending on which pastures are actually grazed each year, total annual grazing intensity ranges from 5.2 to 6.5 acres per AUM and averages 6.0 acres per AUM over the three year grazing cycle (Table 2). This figure is conservative as acreages of rest pastures were not included in grazing intensity calculations. Annually, livestock density varies for individual pastures depending on the size of pasture and scheduled grazing treatment. Grazing intensity for pastures grazed during early or mid-summer varies from 4.0 to 8.7 acres per AUM, while pastures scheduled for grazing during late-summer or early fall are stocked at a density of 4.4 to 9.6 acres per AUM (Appendix A). Each individual pasture is rested from livestock grazing every third year (Table 2).

Beginning of Grazing Season

The starting date for the livestock grazing season is mid-June each year. Beginning the grazing season at this time of year is consistent with placing livestock on the range when plant growth has developed to a point where adequate plant production can be achieved in the presence of livestock grazing. Adequate plant production is defined as producing enough forage for the livestock to remain in the scheduled low elevation pasture for the allotted time while still meeting

WMA objectives. The starting date is consistent with similar grazing areas at similar elevations in southwest Montana (FS no date).

The starting date is not intended to be a predefined calendar date, but may vary by a few days each year depending on when rapid growth on bluebunch wheatgrass (*Agropyron spicatum*) occurs. The cattle may be placed in the first pasture at or after the time of rapid plant growth initiation, which occurs about mid-June in this area.

Grazing by livestock placed on the range prior to rapid growth can reduce the amount the amount of total forage produced in the pasture that year. The scheduled rest periods from livestock grazing are designed to maintain the vegetation regardless of when the grazing season is initiated. The initiation of the grazing season will be monitored relative to objectives listed in the management plan.

Ending of Grazing Season

Cattle grazing will cease on the WMA by October 15th each year. This ending date is based on a desire by MFWP to have livestock removed from the WMA prior to opening of the Montana General Big Game Hunting Season.

Pasture Layout

The layout of pastures is illustrated in Figure 2 (Appendix B). There are six pastures, three at the systems lower elevations (L) and three on the systems higher elevations (H). Pastures were designed to provide for cattle movement up drainages from lower to higher elevations as the growing season progresses and then move down drainages from higher to lower elevations as summer ends and fall begins.

Grazing Schedule

The grazing rotation schedule for each pasture in the system is described in Table 2. Refer to Figure 2 for location of individual pastures. Each year cattle will be placed in a low-elevation or early use pasture about mid-June. They will remain in this pasture until early July when they will be moved to the upper-elevation pasture scheduled for grazing. Livestock will remain in this upper-elevation pasture until seedripe on bluebunch wheatgrass (mid-August). Additionally, about July 15th 402 AU's will leave the R/LCGS and enter the Forest Service Allotment.

At seedripe (mid-August) cattle will enter a second high-elevation pasture scheduled for grazing. At this time 400 AU's will be removed from the R/LCGS and be placed on the BLM Robb Cr. Allotment.

On September 15th 400 AU's will re-enter the grazing system from the BLM Robb Cr. Allotment and on October 1st 402 AU's will re-enter the grazing system from the Forest Service Snowcrest C & H Allotment. During early October cattle will be allowed to drift into the low-elevation pasture scheduled for late-season grazing. On October 15th all livestock will be removed from the grazing system.

Table 2. Robb/Ledford Coordinated Grazing System livestock grazing rotation formula.

YEAR	PASTURES						
	Grazing Intensity in Acres/AUM	[1]Battle Place(1L)	Lower Robb Cr(2L)	Dry Hollow (3L)	Ledford Ridge (1H)	Upper Robb Cr. (2H)	Swamp/ Rock Cr. (3H)
2000	6.2	B'	C	A'	B	C	A
2001	6.5	C	A'	B'	C	A	B
2002[2]	5.2	A'	B'	C	A	B	C

[1]Grazing Treatments: A' = Livestock grazing from mid-June to early-July
A = Livestock grazing from early-July to mid-August (seed-ripe)
B = Livestock grazing from mid-August (seed-ripe) to October 1
B' = Livestock grazing from October 1 to October 15.
C = Rest from livestock grazing for the entire year.

[2]In the year 2003 and every fourth year the rotation is repeated by beginning again with the rotation at year 2000.

In summary, each year two pastures will be grazed during the plant growing season from mid-June to seed-ripe (mid-August). One pasture will be a low-elevation (L) pasture and the other a high-elevation (H) pasture. The low-elevation pasture will be grazed for about two weeks from mid-June to early-July. The high-elevation pasture will be grazed for about 1.5 months from early-July to mid-August. In mid-August cattle will enter a second high elevation pasture and this unit will be available for grazing through early October. From early October to mid-October, cattle will use a second low elevation pasture. The third high- and low-elevation pastures will be rested from livestock grazing for the entire year (Appendix C).

When a pasture is grazed during the plant growing season in Year 1, it is deferred from grazing until after seed-ripe in Year 2 and rested for the entire year in Year 3. Each year cattle begin and spend the first half of the grazing season in pastures that were rested the previous year. Cattle spend the after seed-ripe portion of the grazing season in pastures that were grazed during the

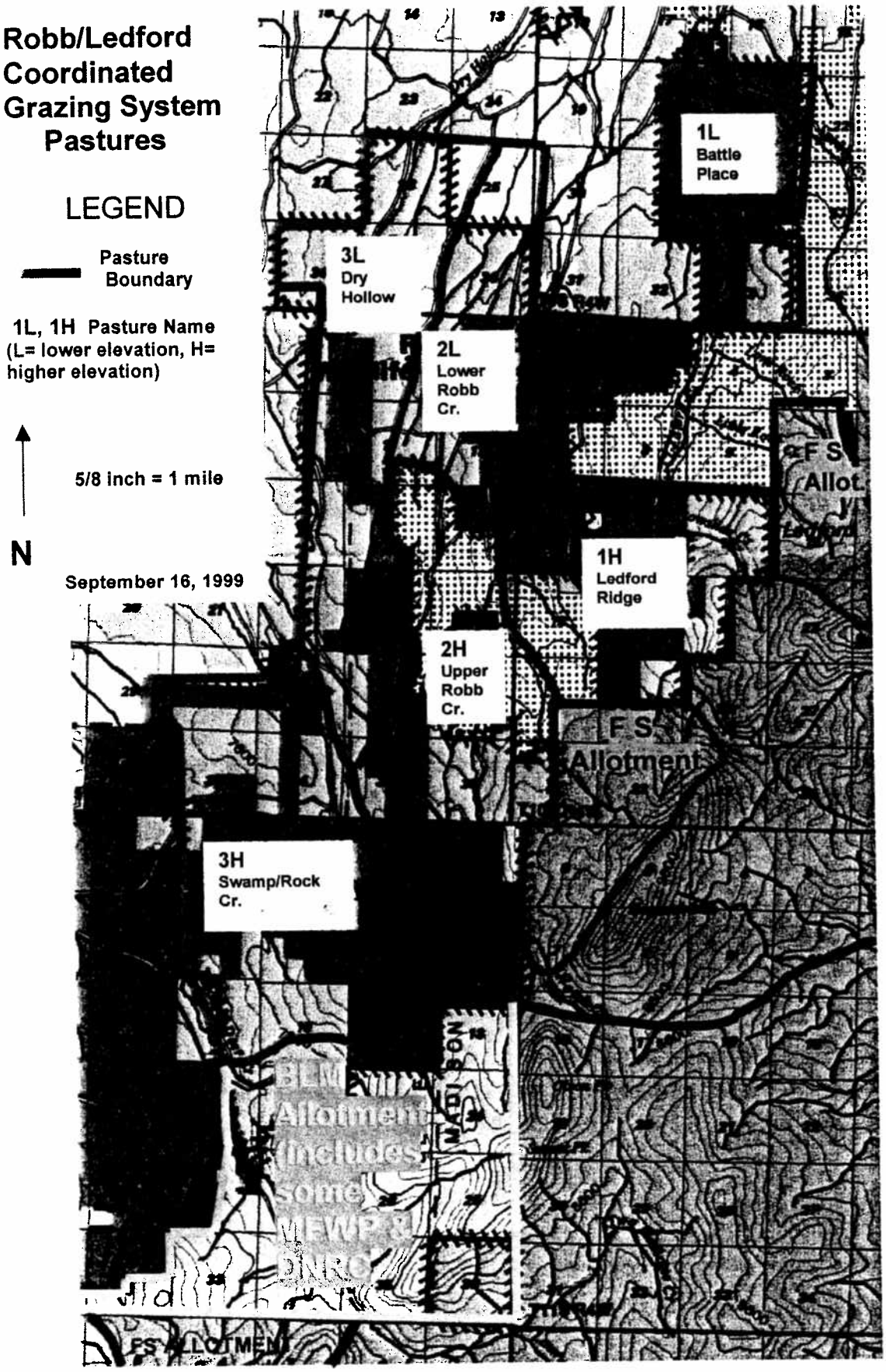

Figure 2. Pasture layout of Robb/Ledford Coordinated Grazing System

growing season the previous year. Pastures grazed by cattle after seed-ripe are rested the next year. Under this approach plants are only grazed while they are actively growing once every third year, but each pasture is available for livestock grazing two out of every three years.

Tall Larkspur

Tall larkspur (*Delphinium occidentale*) occurs in all three high-elevation (H) pastures (Figure 2). Tall larkspur is fatally poisonus to cattle (USDA 1937, Leininger et al. 1977, Whitson 1987). When conditions are suitable for its growth, tall larkspur can occur within the grazing system in significant amounts. When necessary, larkspur areas will be fenced using electric fencing to prevent cattle poisoning. Larkspur poisoning is usually a potential problem until mid- or late-July. Once the plants are beyond their poisonous growth stage, the electric fencing will be taken down to allow cattle to use the entire pasture. This will require construction of about 13 miles of electric fence scattered across the three high elevation (H) pastures. However, only a portion of the electric fence areas will have to be maintained at any one time as cattle only use one pasture at a time. Also, the larkspur poisoning threat is normally over about two weeks after cattle enter the appropriate high-elevation pasture.

Holding livestock in a low-elevation (L) pasture until the larkspur poisoning threat is over was also considered. This alternative was rejected as it would require holding cattle in the beginning low-elevation pasture for at least two weeks longer than it is normally planned for grazing use. At current stocking levels this would require very intense grazing in the beginning pasture (~ 2.2 acres/Aum at times) and is inconsistent with good land management and the WMA objectives. To graze cattle in the beginning use pasture until the larkspur threat passes would require either starting the grazing season about two weeks later than planned (July 1) or reducing the number of cattle using the first pasture by about half.

Range Improvements

To implement this planned grazing system it will be necessary to construct about 26 miles of new barbed wire fence, 14 miles of one strand electric fence, and develop a more reliable stock-water source (Peterson 1999). Estimated costs as presented by Peterson (1999) are itemized in Table 3 and may total $314,000.

Table 3. Range improvement costs associated with implementation of the Robb/Ledford Coordinated grazing system. Data as presented by Peterson (1999).

IMPROVEMENT	ESTIMATED COST	JUSTIFICATION
26 miles of barbed wire fence	$166,400 (@$6,400 per mile)	Essential new internal pasture fence. Required to accomplish the rotation of livestock to protect soils and vegetation.
14 miles of one strand electric fence.	$28,000 (@$2,000 per mile)	Essential to prevent larkspur poisoning of livestock. Without this fence the proposed grazing rotation and livestock numbers proposed by this plan cannot be accomplished.
Develop Kelly Spring into a reliable water source for livestock on using WMA	The total obligation is currently unknown, but could potentially be in the vicinity of $120,000	A more reliable water source is essential in order to maintain livestock numbers and accomplish the grazing rotation proposed by this plan.
TOTALS FOR IMPROVEMENTS	$314,000	These improvements are essential for MFWP to maintain the number of livestock proposed in this plan and implement a grazing system that addresses the WMA objectives.

Objectives

The R/LWMA Management Plan lists 9 objectives and associated issues for the WMA. This section addresses how the R/LCGS helps meet these objectives.

OBJECTIVE 1. Manage the vegetation to allow succession towards climax vegetative communities and the potential natural vegetation as determined by soil types and climate. Specifically, uplands would be managed as Idaho fescue and bluebunch wheatgrass communities. Riparian sites would be managed for the maintenance and improvement of willow communities and bank stability.

ISSUE 1: Vegetation needs to be allowed adequate rest periods for health and Vigor.
ISSUE 2: Noxious weeds occur on the property.

The R/LCGS promotes the maintenance of healthy native vegetation by encouraging long rest periods from livestock grazing during plant growth periods. Each year two pastures are deferred from livestock grazing until after seed-ripe (B or B' Table 2). Seed-ripe focuses on bluebunch

wheatgrass which is one of the slowest maturing plants in the grazing system. By waiting until bluebunch wheatgrass has produced seed, all other plants in the pasture will have had an opportunity to complete their biological processes and produce seed that year. According to the grazing rotation in Table 2, the next year after receiving the after seed-ripe grazing treatment the pasture is rested from livestock grazing. This gives the plant a second year of rest from use during the growing season and provides one year for any established seedlings to develop a root system prior to grazing by livestock. With this approach after plants are grazed during the growing season (when the above ground portion of the plant is biologically active) those same plants are given a rest the next year from grazing while they are growing followed by a total rest the third year from livestock grazing.

As recommended by Ehrhart and Hansen (1997) and Ehrhart and Hansen (1998) riparian grazing is addressed within the design of the R\LCGS. Availability of water at sites away from riparian areas, salting at locations away from riparian areas, herding, pasture layout, timing of use, rest periods, and maintaining an appropriate livestock density, are all important tools to prevent unacceptable use by livestock of riparian areas (Ehrhart and Hansen 1997 and Ehrhart and Hansen 1998). All of the aforementioned have been incorporated into the design of the R/LCGS.

The R/LCGS encourages the maintenance and improvement of native plant communities. Establishment of noxious weeds is encouraged by soil disturbance. Since the grazing system encourages the establishment of native vegetation on all sites it is an important consideration in the effort to control the spread of noxious weeds.

Although tall larkspur is a native plant it is, at times, very poisonous to domestic livestock. This conflict is resolved in the design of the R/LCGS by fencing out larkspur from livestock use during time periods when it is poisonous.

OBJECTIVE 2. Expand the benefits of managing the deeded WMA land as wildlife habitat to adjoining DNRC land.

ISSUE 1. The Ledford Creek Grazing Association has the grazing rights to the 3,620-acre of DNRC (McGuire) found within the boundaries of the WMA with a rated (*livestock*) carrying capacity of 1059 AUMs The McGuire property is important elk winter range and wildlife habitat.

ISSUE 2. FWP presently leases over 10,000 acres of DNRC lands associated with the WMA. This land is important wildlife habitat and an integral part of the WMA. The cost of leasing DNRC land will continue to increase and could eventually be cost prohibitive.

Through an exchange of use agreement with the LGA and implementation of the R/LCGS management of the McGuire property is incorporated into management of the R/LWMA. They are

managed as a single unit. Fees generated by allowing the LGA to graze on the WMA and DNRC lands leased by MFWP helps cover the costs of the MFWP DNRC leases. Since the DNRC lands are leased to MFWP for livestock grazing as a means to raise funds for the School Trust this arrangement allows MFWP to maintain management of these lands.

OBJECTIVE 3. Showcase the WMA as a demonstration area where both wildlife and livestock can co-exist in a rest-rotation grazing system that will allow for the maintenance of a healthy range ecosystem.

ISSUE 1: Wildlife and livestock both require the perpetual maintenance of a healthy rangeland ecosystem for their long-term existence. Both compete for similar resources. These resources exist on both private and public land throughout the state (65% of which is private).

Refer to discussion under **OBJECTIVE 1**. As a result of the R/L CGS design, use by livestock is limited to 2 of 6 pastures until late summer. Two of 6 pastures are rested from livestock use for the entire year. Additionally, an average stocking rate of 6.0 acres per AUM, over a 3 year grazing cycle, provides for maintenance of residual vegetation for forage and habitat in grazed pastures (Figure 3).

Figure 3. Within Battle Place Pasture of interim plan. Pasture 1L in this plan (Figure 2). Photo taken on 9/29/99 after livestock grazing in the pasture was completed. During 1999 this pasture was grazed from 6/13 to July 1. *Joel Peterson photo.*

OBJECTIVE 4. Provide an adequate amount of vegetation across the entire WMA annually to supply the winter forage requirements of elk (as designated in the Elk Management Plan) and to reduce elk depredation on neighboring private land.

ISSUE 1: Providing adequate amounts of highly palatable residual forage on the WMA to meet needs of wintering elk.
ISSUE 2: Provide adequate winter elk forage distributed throughout the WMA.
ISSUE 3: Documenting the success of leaving an adequate distribution of residual vegetation for wintering elk throughout the WMA.

Elk and cattle can both be managed successfully on the same range (Anderson and Scherzinger 1975, Frisina and Morin 1991, Frisina 1991, Alt et al. 1992,Yeo et al. 1993, and Werner and Urness 1996).

In Montana's Elkhorn Mountains elk selected as spring feeding sites, areas that were grazed by cattle the previous growing season (Grover and Thompson 1986). Similarly, cattle grazing treatments applied the previous summer may help establish high quality early spring foraging for elk the following spring (Frisina 1992). Grazing by domestic livestock may improve accessibility, palatability, or nutritive quality of forage plants preferred by wild herbivores (Jourdonnais and Bedunah 1990, Clark et al. 2000).

Two pastures are rested from livestock grazing each year. All of the vegetation produced in these pastures is available for wintering elk. A conservative stocking rate of 6.0 acres per AUM (average for one cycle of the system, Table 2) is employed to provide adequate residual vegetation left in all grazed pastures. There is especially abundant residual vegetation left along ridge-tops and steeper side slopes that are important winter range sites for elk, but of secondary range value to cattle (Figure 4).

Figure 4. Within the Robb Cr. Lakes Pasture of the interim plan. Pasture 3H of this plan (Figure 2). Photo taken on 9/29/99 after cattle grazing was completed. During 1999 this pasture was grazed from mid-August to mid-September. *Joel Peterson photo.*

The combination of rested pastures and conservative stocking rate provides for an adequate distribution of winter forage for elk. Observations of winter elk use and numbers of elk observed indicate there is currently more residual vegetation left as winter forage than elk are utilizing.

A visual inspection of the pastures scheduled for rest at the end of the grazing season can serve as partial documentation that adequate residual vegetation is left for elk.

OBJECTIVE 5. Provide for the cover, forage and water quality needs for other fish and wildlife species using the WMA. For example, residual cover is important for ground nesting birds and small mammals. Shrubby vegetation such as sagebrush is important for cover, nesting and forage for a number of wildlife species. Riparian vegetation is critical to maintain fisheries and wildlife values.

ISSUE 1. Loss of residual vegetation due to livestock grazing.
ISSUE 2. Maintain adequate stream function and riparian habitat necessary to promote an abundance of wild trout representing a spectrum of age classes and where appropriate, ensuring westslope cutthroat conservation objectives are met.

The grazing system provides for two large pastures to be rested from livestock grazing each year. Additionally, two pastures are rested from livestock grazing until late summer. All of the vegetation produced in these deferred and rested pastures is available as habitat for small birds and small mammals for most of the summer months. Those pastures scheduled for grazing are stocked at a conservative stocking rate (average-6.0 acres per AUM), which leaves residual vegetation for wildlife forage and habitat. When managing grazing in areas used by upland sandpipers (*Bartramia longicauda*), and upland nesting bird, the habitat complex should include fields undisturbed during the nesting season (Bowen and Kruse 1993). Maintaining fenced pastures which control grazing intensity, timing, and location may create a mosaic of habitats and thus bird communities of differing structure and composition (DeGraaf et al. 1991). In the R/LCGS the grazing season does not begin until mid-June. Five of the grazing systems six pastures are left as undisturbed nesting habitat for upland birds until early-July. The nesting period for Montana sage grouse is from mid-April to late-June (Wallestad 1975).

Adequate small mammal populations to serve as a prey base for raptors can be maintained within a rest-rotation grazing system (Frisina and Douglass 1993)

Riparian areas can be successfully managed with the presence of livestock grazing (Ehrhart and Hansen 1997, Erhart and Hansen 1998). As described under **OBJECTIVE 1** the need to maintain proper functioning riparian habitats was given careful consideration in the design of the grazing system. Considering the importance of westslope cutthroat trout, having an area that demonstrates their sustainability in a managed system could be important for their conservation.

OBJECTIVE 6. Enhance wildlife benefits on adjacent lands where feasible, through cooperative agreements with State and Federal landowner(s).

ISSUE: Habitat for a variety of wildlife species including elk winter range is found on adjacent public land.

The R/LCGS includes about 3600-acres of DNRC lands (McGuire Place) leased by the LGA. The McQuire Place is important elk winter range and wildlife habitat (MFWP 1999). The R/LCGS also includes about 10,000 acres of DNRC lands leased by MFWP that are important elk winter range and wildlife habitat.

The R/LCGS is coordinated with the scheduled movements of livestock on the FS Snowcrest C & H Allotment and BLM Taylor Creek Allotment (FS 1972 and BLM 1975). These Federal grazing allotments include important wildlife habitat.

OBJECTIVE 7. Manage public access to provide a diversity of wildlife and fishery related recreational opportunities.

ISSUE: Distribute public use with minimal impact on land, fisheries, and wildlife.

Cattle are only in one pasture at a time, leaving the majority of grazing system land base available for those who wish to recreate in areas without livestock present. Each year, four of six large pastures are left un-grazed for most of the summer, two of which are rested the entire year. These are available for people to use for recreation in an un-grazed setting. Additionally a conservative stocking rate is maintained in pastures scheduled for grazing.

Each year, cattle are removed from the grazing system prior to opening of the Montana General Big Game Hunting Season.

OBJECTIVE 8. Provide for aesthetics along riparian zones and uplands.

ISSUE: How to minimize human related impacts on the WMA.

Two thirds of the pastures in the grazing system are rested for most of the summer months. Those pastures scheduled for grazing are stocked at a conservative stocking rate.

Unneeded fences will be removed as the grazing system is developed.

New fences will be located to minimize livestock concentrations and encourage desired livestock distribution.

Salt blocks and water tank locations will be located away from open public roads and riparian areas.

OBJECTIVE 9. Increase public awareness and appreciation for the diversity of wildlife, fisheries and plant communities present on the Robb/Ledford WMA.

ISSUE: How to educate the public on the purpose and use of the WMA.

The R/LCGS can serve as an example of effective land management for the benefit of a variety of wildlife. An example of practical management applicable to situations in Montana and other western States.

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Preparer: Michael R. Frisina
Range Coordinator

Contributors to preparation of plan:

Joel Peterson: Compliance with objectives.
Grazing system design.
Costs and photographs.

Fred King: Grazing system design.
Costs and Photographs.

Steve Knapp: Compliance with objectives.
Program oversight.

Appendix A

Grazing intensity analysis in acres/AUM for each pasture when the various grazing treatments are applied.

ROBB/LEDFORD COORDINATED GRAZING SYSTEM
GRAZING INTENSITY ANALYSIS

For pastures receiving the early- or mid-summer (growing season/most intensive) grazing treatments.

[1]AUs, AUMs, and acres:AUM represent the years when the A' grazing treatment (mid-June to early-July) is applied to each of the L series (low elevation) patures.

Pasture 3L Dry Hollow 8.7 Acres:AUM	Pasture 2L Lower Robb Cr. 5.1 Acres:AUM	Pasture 1L Battle Place 4.4 Acres:AUM
1168 AUs	1168 AUs	1168 AUs
584 AUMs	584 AUMs	584 AUMs
5,096 Acres	2,996 Acres	2,590 Acres

[1]AUs, AUMs, and acres:per AUM represent the years when the A grazing treatment (early-July to mid-August) is applied to the H series (high elevation) pastures.

Pasture 3H Swamp/Rock Cr. 5.3 Acres:AUM	Pasture 2H Upper Robb Cr. 4.4 Acres:AUM	Pasture 1H Ledford Ridge 4.0 Acres:AUM
766-1168 AUs	766-1168 AUs	766-1168 AUs
1350 AUMs	1350 AUMs	1350 AUMs
7,185 Acres	5,941 Acres	5,410 Acres

[1]AUs, AUMs, and acres:AUM are approximations and do not include the rest pasture acreage.

ROBB/LEDFORD COORDINATED GRAZING SYSTEM
GRAZING INTENSITY ANALYSIS

For pastures receiving the late-summer or early-fall grazing treatments.

[1]AUs, AUMs, and acres:AUM represent the years when the B' grazing treatment (early-October- October 15) is applied to each of the L series (low elevation) patures.

Pasture 3L
Dry Hollow
8.7 Acres:AUM

1168 AUs

584 AUMs

5,096 Acres

Pasture 2L
Lower Robb Cr.
5.1 Acres:AUM

1168 AUs

584 AUMs

2,996 Acres

Pasture 1L
Battle Place
4.4 Acres:AUM

1168 AUs

584 AUMs

2,590 Acres

[1]AUs, AUMs, and acres:per AUM represent the years when the B grazing treatment (mid-August to early October) is applied to the H (high elevation) series pastures.

Pasture 3H
Swamp/Rock Cr.
9.6 Acres:AUM

366-1168 AUs

749 AUMs

7,185 Acres

Pasture 2H
Upper Robb Cr.
7.9 Acres:AUM

366-1168 AUs

749 AUMs

5,941 Acres

Pasture 1H
Ledford Ridge
7.2 Acres:AUM

366-1168 AUs

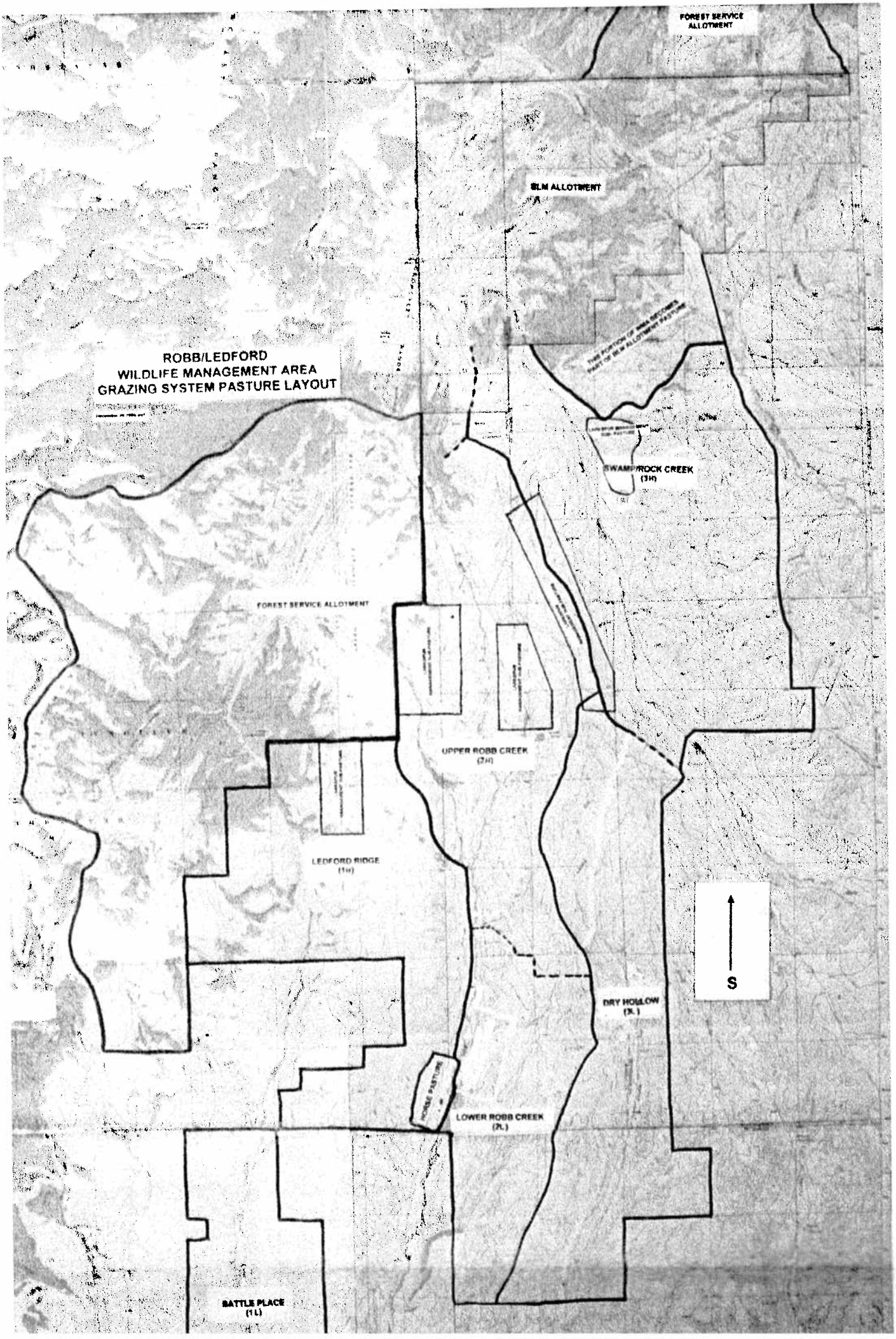
749 AUMs

5,410 Acres

[1]AUs, AUMs, and acres:AUM are approximations and do not include the rest pasture acreage or A' or A grazed pastures.

Appendix B

Topographic map illustrating the location of pastures, larkspur management pastures, and horse pasture.


FOREST SERVICE ALLOTMENT
BLM ALLOTMENT
ROBB/LEDFORD
WILDLIFE MANAGEMENT AREA
GRAZING SYSTEM PASTURE LAYOUT
SWAMP/ROCK CREEK
(3H)
FOREST SERVICE ALLOTMENT
UPPER ROBB CREEK
(2H)
LEDFORD RIDGE
(1H)
S
DRY HOLLOW
(3L)
LOWER ROBB CREEK
(2L)
BATTLE PLACE
(1L)

Appendix C

Schematics describing how livestock are rotated through the pastures and timing of grazing by year.

Robb Cr WMA Grazing Rotation for the Year 2000
(year 1 of the rotation)

1168 AUs enter pasture 3L to begin the grazing season

Oct. 15, livestock return to private lands for the winter

Pasture 3L
Dry Hollow

All 1168 AUs graze from mid-June to early- July.

(584 AUMS total)

Pasture 2L
Lower Robb Cr.

Rested from livestock grazing for the year.

Pasture 1L
Battle Place

The first week in October cattle begin drifting into this pasture from pasture 1H. All 1168 AUs wind up here by Oct. 15
(584 AUMS total)

Pasture 3H
Swamp/Rock Cr.
All 1168 AUs graze from early-July to July 15.

July 15, 402 AUs go to Forest Allotment.

July 15 to mid-August 766 AUs remain in pasture
(1350 AUMS total)

Pasture 2H
Upper Robb Cr.

Rested from livestock grazing for the year.

Pasture 1H
Ledford Ridge
366 AUs from mid-August to Sept. 15.
+
Sept. 15, 400AUs enter this pasture from the BLM Allotment.
+
Oct. 1, 402 AUs enter this pasture from the FS Allotment.
(749 AUMS total)

On August 15, 400 AUs go to BLM Allotment, remaining livestock go to Pasture 1H

Total AUMS = 3,267 mid-June to October 15
Total AUs = ranges from 366 to 1168 mid-June to October 15

Robb Cr WMA Grazing Rotation for the Year 2001
(year 2 of the rotation)

Oct. 15, livestock return to private lands for the winter

1168 AUs enter pasture 2L to begin the grazing season

Pasture 3L
Dry Hollow
The first week in October cattle begin drifting into this pasture from pasture 3H. All 1168 AUs wind up here by Oct. 15

(584 AUMS total)

Pasture 2L
Lower Robb Cr.

All 1168 AUs graze from mid-June to early- July.

(584 AUMS total)

Pasture 1L
Battle Place

Rested from livestock grazing for the year.

Pasture 3H
Swamp/Rock Cr.
366 AUs from mid-August to Sept. 15.
+
Sept. 15, 400AUs enter this pasture from the BLM Allotment.
+
Oct. 1, 402 AUs enter this pasture from the FS Allotment.
(749 AUMS total)

Pasture 2H
Upper Robb Cr.
All 1168 AUs graze from early-July to July 15.

July 15, 402 AUs go to Forest Allotment.

July 15 to mid-August 766 AUs remain in pasture
(1350 AUMS total)

Pasture 1H
Ledford Ridge

Rested from livestock grazing for the year.

On August 15, 400 AUs go to BLM Allotment, remaining livestock go to Pasture 3H

Total AUMS = 3,267 mid-June to October 15.
Total AUs = ranges from 366 to 1168 mid-June to October 15.

Robb Cr WMA Grazing Rotation for the Year 2002
(year 3 of the rotation)

Oct. 15, livestock return to private lands for the winter

1168 AUs enter pasture 1L to begin the grazing season

Pasture 3L
Dry Hollow

Rested from livestock grazing for the year.

Pasture 2L
Lower Robb Cr.

The first week in October cattle begin drifting into this pasture from pasture 2H. All 1168 AUs wind up here by Oct. 15 (584 AUMS total)

Pasture 1L
Battle Place

All 1168 AUs graze from mid-June to early- July.

(584 AUMS total)

Pasture 3H
Swamp/Rock Cr.

Rested from livestock grazing for the year.

Pasture 2H
Upper Robb Cr.
366 AUs from mid-August to Sept. 15.
+
Sept. 15, 400AUs enter this pasture from the BLM Allotment.
+
Oct. 1, 402 AUs enter this pasture from the FS Allotment.
(749 AUMS total)

Pasture 1H
Ledford Ridge
All 1168 AUs graze from early-July to July 15.

July 15, 402 AUs go to Forest Allotment.

July 15 to mid-August 766 AUs remain in pasture
(1350 AUMS total)

On August 15, 400 AUs go to BLM Allotment, remaining livestock go to Pasture 2H

Total AUMS = 3,267 mid-June to October 15.
Total AUs = ranges from 366 to 1168 mid-June to October 15.

Designated Area: Robb/Ledford Wildlife Management Area

Grazing Lease No. 3022.7 (B) 02

Montana Fish, Wildlife & Parks

THIS LEASE entered into this th day of , between the Montana Department of Fish, Wildlife and Parks, an agency of the State of Montana, whose main address is P.O. Box 200701, 1420 East 6th Avenue, Helena, Montana 59620-0701, hereafter referred to as the "Department" and Ledford Grazing Association, whose address is 615 Ruby River Drive, Sheridan, MT 59749 made up of the following members; Silver Springs Ranch, **Individually as,** Neil Barnosky, (406) 842-5252, 585 Ruby River Drive, Sheridan, MT 59749; Gilman IH Cattle Company, **Individually as** Charles Leslie Gilman (406) 842-5290, P.O. Box 36, Alder, MT 59710; Malesich Ranch, **Individually as,** Edward Malesich (406) 683-5482, 9575 HWY 41, Stop C, Dillon, MT 59725; Lombardi Ranches, **Individually as,** Ray Lombardi, (406) 287-5015, 55 Hanson Lane, Whitehall, MT 59759. , hereafter referred to as the "Lessee".

STATEMENT OF BENEFIT TO VEGETATION & WILDLIFE: To manage the vegetation of FWP deeded, DNRC, and BLM lands within the grazing systems of the Robb/Ledford WMA in order to improve and/or maintain soil and vegetation conditions for the benefit of elk and other species of fish and wildlife.

The Department is the owner of or has under its control, certain real property located in Madison & Beaverhead Counties, more particularly described in "Appendix C & D" attached hereto & incorporated herein.

The Department, in consideration of the payment of rentals specified in this lease and the mutual agreements contained in this lease, leases the property described above to the Lessee named above for livestock grazing purposes established for the period beginning June 22, 2010, and ending October 22, 2012.

The Lessee, in consideration of the payment of rentals specified in this lease and the mutual agreements contained in this lease, hereby agrees to pay the rentals specified in this lease.

The parties to this lease mutually agree to the following terms and conditions:

1. **GRAZING SEASON AND CAPACITY.** The grazing season hereunder is the period beginning June 22nd and ending on October 22nd of the same year.

   A maximum of 3235 Animal Unit Months (AUM's) of grazing is permitted during each yearly grazing season. Rentals will be paid on the basis of actual AUM's grazed on the leased property.

   1 Cow/Calf pair = 1.0 AUM 1 Bull = 1.5 AUM Yearling = 0.8 AUM 1 Horse = 1.25 AUM

2. **RENTAL.** The rental is $ * (2008-grazing fees for deeded acreage) and $* x 2 = $* (2008-grazing fees for DNRC acreage per AUM each year.

   (NOTE): *Grazing fees will be adjusted annually based on the Agricultural Statistics Board report for private land leases (for deeded land) and DNRC annual AUM lease charges. The rate charged the Ledford Creek Grazing Association (LCGA) grazing DNRC acreage is double the standard lease assessed by DNRC in order to cover maintenance costs.*

   x Payment is to be in cash.

   x Payment is to be in services to be rendered in the manner agreed upon and more fully set out in Paragraph 14.

   ALL GRAZING RENTALS, WHETHER CASH OR SERVICES, ARE DUE BY November 15th EACH YEAR FOR GRAZING CONDUCTED DURING THAT CALENDAR YEAR. FAILURE TO PAY THE AGREED UPON RENTAL OR TO PROVIDE THE SERVICES SET OUT IN PARAGRAPH 14 BY November 15th AUTOMATICALLY TERMINATES THIS LEASE. A NOTICE OF RENTAL DUE WILL BE SENT TO LESSEE AT THE ABOVE ADDRESS ONLY, UNLESS A CHANGE OF ADDRESS HAS BEEN PROVIDED IN WRITING TO THE DEPARTMENT'S LIAISON AS IDENTIFIED IN THIS LEASE.

   The Department shall have a lien upon all improvements, whether movable or not, and livestock grazed upon the land for any rentals due the Department.

3. **RENTAL ADJUSTMENTS.** The Department reserves the right to determine the grazing capacity of the leased lands annually or from time to time as the Department in its discretion shall determine necessary and to increase or decrease the grazing capacity. If the Department determines that the grazing capacity of the leased lands should be increased or decreased, the Lessee agrees to pay an increased or decreased rental based upon the Department's determination, provided the Lessee actually grazes livestock to the level of any increased grazing capacity.

4. **LESSEE AGREES TO:**

a. Use the lands in a manner that will not cause over-grazing, streambank damage or other soil erosion, according to the usual and customary course of good grazing practices.

b. Use the premises only for grazing purposes. Any other use of the premises by Lessee without prior written approval of the Department shall subject this lease to immediate cancellation.

c. Provide the Department with the number of AUM's used by Lessee on the premises for that year.

d. Take all reasonable precautions to prevent fires and take such actions as are within the means of the Lessee to suppress fires.

e. Use the land in such a manner as to control growth and spread of noxious weeds and to promote conservation of the leased lands.

f. Not commit waste or damage to leased lands or allow any to be done.

g. Comply with all applicable laws, rules and regulations in effect at the date of this lease, or which may, from time to time, be adopted.

h. Indemnify and hold harmless the Department, its officers, agents and employees against any claim of damage to person or property arising out of use of the leased lands, except for any such damage caused by the negligence for willful misconduct of the Department, its officers, agents or employees.

i. Immediately, upon termination or expiration of the term of this lease, peaceably surrender and deliver up the leased lands to the Department.

j. Not use the leased lands or this lease agreement as collateral for credit financing, or in any way, which would encumber the title to the property herein described. Failure to comply with this provision shall automatically terminate this lease and in no way shall it be construed as to cause the Department any financial obligation or responsibility.

k. Not disturb or remove any archaeological, historical, or other cultural features or any improvements, which may currently exist, or may be found to exist, on the premises.

l. LIVESTOCK VACCINATED AS PER MONTANA LAW

m. LESSEES MUST FOLLOW STATE OF MONTANA BRUCELLOSIS ACTION PLAN DATED 1/13/09. — ? wait for O.K.

n. LIVESTOCK MUST RESIDE IN THE STATE FOR 30 DAYS PRIOR TO BEING PUT ON WMA TO PREVENT NOXIOUS WEED INVASION.

l. Remedies for Unauthorized Uses and Practices –In the event the lessee violates, by the Department's determination, the grazing plan prescribed in Exhibit "B" of this lease, the lessee agrees to pay a fee equal to 3 times the number of animals found in violation of the grazing plan. This fee will be three times the AUM rental fee assigned by this lease, or **(See #2)** per AUM. The Department at its sole discretion, and in addition to other remedies provided for in this lease, may require this fee of the lessee. The lessee agrees to pay this fee no later than the termination date of this lease. If this lease is renewed with the lessee in subsequent years, the Department at its sole discretion, may reduce the number of animals allowed to graze the land under this lease a multiple of three times the number of animals found in violation, for up to two years after the year of violation.

5. **PUBLIC ACCESS.** All lands leased in this agreement shall remain open to the public for hunting, fishing and other recreational activities, subject to applicable Federal and State laws and regulations.

6. **HERBICIDES AND PESTICIDES.** Lessee agrees that any use of herbicides or pesticides on the leased lands will be in compliance with all provisions of Federal and State laws regulating such substances. Any application of such substances must be approved in advance, by the Department's liaison as identified in this lease.

7. **IMPROVEMENTS.** No improvements may be placed upon the premises without prior written approval of the Department.

8. **TERMINATION.** The Department reserves the power and authority, at its discretion, to terminate this lease prior to expiration upon ___days written notice for violation for any of the terms of this lease by Lessee. The Department also reserves the power to cancel this lease for fraud or misrepresentations, or for concealment of facts relating to its issue, which if known would have prevented its issue in the form or to the party issued; for using the land for other purposes than those specifically authorized by the lease, for any unlawful or other misuse of the lands, and for any other cause which in the judgment of the Department makes the cancellation of the lease necessary in order to do justice to all parties concerned, and to protect the interest of the Department. Notice of termination shall be deemed given upon deposit in the United States mails, addressed to the Lessee at the address shown above, unless a change of address has been provided in writing to the Department's liaison. The Lessee shall, upon termination of this lease, promptly and peaceably surrender possession and occupancy of the leased lands, leaving them in as good a condition as existed at the beginning of the term of this lease. Upon such termination, all rights of the Lessee in and to the leased lands shall cease and the Lessee shall not be entitled to any refunds of the rentals paid. Termination of the lease does not terminate the Lessee's liability for rentals accruing prior to termination.

9. **SUBLEASING AND ASSIGNMENT.** Lessee shall not sublease or assign all or any part of the leased lands or assign this lease in whole or in part to any other person or entity. Such a sublease or assignment automatically terminates this lease.

10. **MODIFICATIONS.** This document constitutes the sole and entire agreement between the parties. No statements, promises or inducements made by either party which are not contained in this agreement are valid or binding unless evidenced in writing and signed by both parties; except that the provisions of Paragraph 3 may be implemented by written notice from the Department.

11. **SUCCESSORS IN INTEREST.** All terms, conditions and provisions of this lease shall be binding upon, inure to the benefit of, and be enforceable by and upon the successors in interest of the Department and the Lessee.

12. **VENUES AND APPLICABLE LAW.** Venue for any court action arising under this lease shall be in the First Judicial District in and for the County of Lewis and Clark, Montana and this lease shall be interpreted according to the laws of the State of Montana.

13. **DEPARTMENT LIAISON.** The Department designates **Kurt Alt –Region Three –Wildlife Manager (406) 994-6935, Bozeman contact and Fred King –Wildlife Area Manager (406) 994-2654**, as liaisons under this lease. Lessee will make all official contacts with the Department through the liaisons.

14. **SPECIAL CONDITIONS: See attachment.**

IN WITNESS WHEREOF, THE PARTIES HAVE EXECUTED THIS LEASE ON THE DAY AND YEAR FIRST ABOVE WRITTEN.

_____ Date: _____
Montana Fish, Wildlife & Parks

_____ Date: _____
Department Attorney Approval
(As Needed)

_____ Date: _____
Lessee –Ledford Creek Grazing Association –Neil Barnosky - President

_____ Date: _____
Silver Springs Ranch, **Neil Barnosky**
585 Ruby River Drive
Sheridan, MT 59749

_____ Date: _____
Gilman IH Cattle Company, **Charles Leslie Gilman**
PO Box 36
Alder, MT 59710

_____ Date: _____
Malesich Ranch, **Edward Malesich**
9575 Hwy 41, Stop C
Dillon, MT 59725

_____ Date: _____
Lombardi Ranches, **Ray Lombardi**
55 Hanson Lane
Whitehall, MT 59759

EXHIBIT A

ROBB/LEDFORD WMA
LEASE FORMULA

1118 = Total Animal Units (AUs) entering the WMA on June 22
x 4 months (June 22 – October 22) = 4472 AUMs

4472 Total Animal Use Months (AUMs) = This includes all of the AUMs on Forest Service, BLM, DNRC and FWP deeded lands from June 22-October 22.

(-) 880 AUMs = This number of AUMs will be on FS (352 AUs x 2.5 months = 880)

(-) 57 AUMs = This number of AUMs will be on scattered custodial BLM tracts on the north half of the WMA in the Robb/Ledford Coordinated Grazing System **(R/LCGS)** - see Grazing Plan.

(-) 300 AUMs = This number of AUMs is a **two year average*** of what will be utilizing the BLM and FS lands on the south end of the WMA in the BLM Robb Creek Allotment **(BRCA)** -see Grazing Plan. The total AUMs on BLM and FS would be 600 for two years and 200 AUMs would be used in two years on the FWP portion of the **BRCA**.

3235 AUMs (4472 minus 880 & 57 & 300) =Total AUMs using FWP deeded and DNRC lands (includes McGuire and both **R/LCGS** and **BRCA** grazing allotments). These (except for 170 from the McGuire) are the AUMs FWP will charge to the Ledford Creek Grazing Association **(LCGA)**as follows:

Out of the 3235 AUMs, 170 are not charged to the Association because of the McGuire exchange. This leaves 3065 AUMs on the WMA deeded and DNRC (3235 – 170 = 3065) that will be charged to the Association. Out of this 3065 AUMs, 75 of these AUMs will be charged at the DNRC rate and 25 at the deeded land rate for the **BRCA** pasture. This leaves 2965 AUMs in the **R/LCGS** (3065 less 75 and 25 = 2965). Over each three year cycle** an average of 37% of the cattle use on the WMA (excludes the **BRCA** and the McGuire), will occur on DNRC lands. Therefore, 1097 AUMs (2065 x 37% = 1097) will annually be charged at the DNRC rate and 1868 (2965 less 1097 = 1868) will be charged at the deeded land rate. Therefore:

1172 AUMs TOTAL charged at DNRC rate (75 AUMs **BRCA** + 1097 **R/LCGS**)
1893 AUMs TOTAL charged for FWP deeded (1868 **R/LCGS** O+ 25 **BRCA**)
170 AUMs from the McGuire exchange agreement (not charged)
3235 AUMs TOTAL

Charge to the Ledford Creek Grazing Association:

1172 FWP DNRC AUMs x 2 x
1893 FWP DEEDED AUMs x
TOTAL
LESS FOR McGUIRE EXCHANGE= $25,000.00

TOTAL LCGA OWES FWP =

*(NOTE): Grazing fees will be adjusted annually based on the Agricultural Statistics Board report for private land leases (for deeded land) and DNRC annual AUM lease charges. The rate charged **LCGA** grazing DNRC is double the standard lease assessed by DNRC in order to cover maintenance costs.*

*This AUM averaging works this way: The **BRCA** is two pastures: the south pasture (400 AUMs all BLM & FS) and a north pasture (200 AUMs BLM and 200 AUMs FWP). Each year one pasture is rested and one is grazed for one month with 400 Animal Units (400 AUMs). This system is reversed each year. The total use over two years (800 AUMs) will be averaged annually for billing purposes (600 AUMs FS & BLM and 200 AUMs FWP = 300/100 AUMs per year). Additionally, of the 100 FWP AUMs, 75 will be charged the DNRC rate since approximately 75% of the use is on DNRC. *(NOTE): The ratio of BLM to FWP grazing acreage and related AUM figures used for these calculations may be adjusted based on livestock use and distribution.*

The livestock use of DNRC on the **R/LCGS (excluding **BRCA** and the McGuire) is based on the approximate percentage of DNRC land grazed each year compared to the total acres grazed. This is averaged over the three year grazing cycle for billing purposes: 2001 (48%); 2002 (29%); 2003 (34%). Therefore, 48 + 29 + 34 divided by 3 = 37%.

Addendum for Year _____

Ledford Creek Grazing Association _____

Date: _____

Montana Fish, Wildlife & Parks _____

Date: _____

Attachment

14. Special Conditions:

For partial payment ($25,000) of this lease, the Association will allow the Department the use of the DNRC McGuire Unit within the WMA grazing system (Exhibit B). Grazing schedule is contained in the Robb/Ledford Coordinated Grazing System Livestock Grazing Plan (March 2000). Deeded (Exhibit C) and DNRC leased acres (Exhibit D) and Associated agreements (Exhibits E & F) are attached. A review after the 2002 grazing season will assess objectives and lease compliance. Per provision #8 of this lease, this contract can be cancelled for violations of the terms of the lease. Additionally, FWP's DNRC lease expires in 2002. If fee increases or other reasons cause FWP to lose the DNRC lease, the lease with the Ledford Creek Grazing Association would become invalid in its existing form.

EXHIBIT "C"

ROBB/LEDFORD WMA DEEDED LANDS

Township	Range	Section	Description
T09S	R04W	05	W½SW¼
T09S	R04W	06	E½, SW¼, E½NW¼
T09S	R04W	17	SE¼SE¼
T09S	R04W	20	E½
T09S	R04W	21	All
T09S	R04W	28	N½, SW¼, W½SE¼, NE¼SE¼
T09S	R04W	29	E½
T09S	R04W	33	W½
T10S	R04W	05	N½, N½SW¼, NW¼SE¼
T10S	R04W	06	All
T10S	R04W	07	W½
T10S	R04W	17	N½, SW¼, W½SE¼
T10S	R04W	18	E½SE¼, also a 6/7 interest in N½NE¼, SW¼NE¼, W½SE¼, W½
T10S	R04W	20	All
T10S	R04W	21	W½NW¼
T10S	R04W	29	NW¼
T10S	R05W	01	E½, E½W½
T10S	R05W	02	Lots 9, 10 and 11
T10S	R05W	03	SE¼NE¼, E½SE¼
T10S	R05W	10	E½E½
T10S	R05W	11	Lots 1, 2, 3 and 4
T10S	R05W	12	E½, E½NW¼
T10S	R05W	13	N½NE¼, SW¼NE¼, E½NW¼,also a 6/7 interest in E½SE¼, SE¼NE¼
T10S	R05W	14	Lot 1, E½W½, SW¼SE¼
T10S	R05W	22	SE¼SE¼
T10S	R05W	23	W½, W½E½
T10S	R05W	24	E½SW¼, W½SE¼
T10S	R05W	26	W½NE¼, E½W½, SE¼
T10S	R05W	27	E½W½NW¼, E½NW¼, SW¼NE¼, N½SW¼, SE¼SW¼, W½SE¼
T10S	R05W	28	N½S½
T10S	R05W	29	E½SE¼
T10S	R05W	33	SE¼, SE¼SW¼
T10S	R05W	34	E½W½
T10S	R05W	35	E½, E½NW¼
T11S	R05W	01	W½, W½E½, SE¼SE¼

T11S	R05W	02	All
T11S	R05W	03	All
T11S	R05W	04	E½, SW¼, E½NW¼
T11S	R05W	09	NE¼NE¼, W½E½, NE¼SW¼, W½SW¼, NW¼
T11S	R05W	10	E½, NE¼SW¼, NW¼
T11S	R05W	11	All
T11S	R05W	12	All
T11S	R05W	13	N½N½
T11S	R05W	14	All
T11S	R05W	15	SW¼SE¼, SW¼, SE¼NW¼, W½NW¼
T11S	R05W	21	Portions of E½SE¼ & NE¼ lying east of the East Fork of Blacktail Deer Creek
T11S	R05W	21	Those portions of E½NW¼ & W½SE¼ lying east of the East Fork of Blacktail Deer Creek
T11S	R05W	22	Lots 1, 2, 3, E½NW¼, NE¼SW¼, NE¼, NW¼SE¼
T11S	R05W	28	Portions of Lot 1 & SE¼NE¼ lying east of the East Fork of Blacktail Deer Creek

EXHIBIT "D"
State Lands Grazing Lease #1891 - Robb/Ledford WMA

Subdivision	Sect.	Town.	Range	Total Acres	AUMs
E½	33	9S	4W	320.00	92
All	26	9S	5W	640.00	146
N½, N½S½, Lots 1,2,3,4	34	9S	5W	657.21	184
N½, N½S½, Lots 1,2,3,4	35	9S	5W	664.88	172
N½, N½S½, Lots 1,2,3,4	36	9S	5W	678.12	160
All	16	10S	4W	640.00	162
E½W½, Lots 2,3,4	31	10S	4W	280.36	105
Lots 4,5,7,8	1	10S	5W	166.28	38
Lots 5,6,7,8,12 S½NE¼, SE¼NW¼, E½SW¼, N½SE¼, SW¼SE¼	2	10S	5W	567.36	125
Lot 1, SW¼NE¼, W½SE¼	3	10S	5W	159.33	47
W½E½	10	10S	5W	160.00	31
NE¼, E½W½, N½SE¼	11	10S	5W	400.00	103
Lot 4, SW¼NW¼, SW¼	12	10S	5W	243.35	69
Lots 2,3,4	14	10S	5W	140.65	46
E½	15	10S	5W	320.00	111
E½NE¼, W½E½, NE¼SE¼	22	10S	5W	280.00	100
Lots 1,4, NW¼SW¼	25	10S	5W	117.12	53
Lots 1,2,3,4	26	10S	5W	157.45	46
E½E½, NW¼NE¼, SW¼SW¼	27	10S	5W	240.00	70
S½S½	28	10S	5W	160.00	40
N½, N½SW¼, SW¼SW¼	33	10S	5W	440.00	132
E½, W½W½	34	10S	5W	480.00	146
Lots 1-5 inc., NE¼SW¼	35	10S	5W	231.59	81
All	36	10S	5W	641.80	280
Lot 4, SW¼NW¼	4	11S	5W	66.94	22
SE¼SW¼, SE¼NE¼, E½SE¼	9	11S	5W	160.00	51
Lots 3,4, SE¼SW¼	10	11S	5W	134.39	40
NE¼, NE¼NW¼, N½SE¼, SE¼ SE¼	15	11S	5W	320.00	74
E½	16	11S	5W	320.00	91
All	36	11S	5W	640.00	119
TOTAL				10426.83	2936

EXHIBIT "E"

ROBB/LEDFORD WMA FENCE MAINTENANCE

For the term of the 2010-2012 grazing lease on the Robb/Ledford WMA, the lessee agrees to maintain the fences on the WMA. Lessee agrees to be reimbursed by the Department for this fence maintenance at the rate of $8.052 per hour* (current wage for Groundskeeper II, #373112). Lessee agrees to maintain fences where necessary up to 10 hours per week during each year of this lease, not to exceed a total of 170 hours. The total fee for fence maintenance will be no more than $1,368.84. The Department agrees to reimburse the lessee for this fence maintenance by the end of the grazing season, based on written documentation of this activity to be received from the Lessee by November 15th each year.

*As the hourly rate of reimbursement changes for this position, from year to year, this change will be made for the purpose of fence maintenance on the Robb/Ledford WMA.

EXHIBIT "F"

Lessee agrees to:

Provide FWP with a written report on or before November 15 of each year indicating the number of AUM's (as described in the Grazing Plan) by class of livestock that were grazed on the WMA for the year.

Lessee understands:

Livestock grazing on the WMA are any livestock physically present on the WMA whether in a holding facility, being trailed or freely grazing.

Horses used for regulating livestock may be maintained on the WMA. Horses are to be kept in the proper horse pasture when not in use. Up to 7 horses may be maintained for livestock management purposes.

Robb Cr WMA Grazing Rotation for the Year 2010
(year 1 of the rotation)

Oct. 22nd, livestock return to private lands for the winter

1118 AUs enter pasture 2L to begin the grazing season

Pasture 3L *2
Dry Hollow
The first week in October cattle begin drifting into this pasture from pasture 3H. All 1118 AUs wind up here by Oct. 22nd.

Pasture 2L
Lower Robb Cr.

All 1118 AUs graze from June 22nd to July 5th. ***1**

Pasture 1L
Battle Place

Rested from livestock grazing for the year.

Pasture 3H *2
Swamp/Rock Cr.
366 AUs from mid-August to Sept. 15th.
+
Sept. 15th, 400 AUs enter this pasture from the BLM Allotment.
+
Oct. 1st, 352 AUs enter this pasture from the FS Allotment.

Pasture 2H
Upper Robb Cr.
All 1118 AUs graze from July 6th to July 15th.

July 15th, 352 AUs go to Forest Allotment.

July 15th to mid-August 766 AUs remain in pasture

Pasture 1H
Ledford Ridge

Rested from livestock grazing for the year.

On August 15th, 400 AUs go to BLM **NORTH SIDE** allotment. Remaining livestock go to **Pasture 3H**.

***1** – July 5th is the last day that livestock can stay in the **2L** pasture. No matter what the condition of Tall Larkspur is in the **2H** pasture the Ledford Creek Grazing Association has agreed to take responsibility for keeping livestock away from the dangers of Tall Larkspur. Livestock **must** be moved to the **2H** pasture on July 6th.

***2** – Depending on weather and conditions on the ground livestock will be kept in the **3H** pasture for as long as possible until the 22nd of October. On October 22nd livestock are removed from the pasture.

Robb Cr WMA Grazing Rotation for the Year 2011
(year 2 of the rotation)

Oct. 22nd, livestock return to private lands for the winter.

1118 AUs enter pasture 1L to begin the grazing season

Pasture 3L
Dry Hollow

Rested from livestock grazing for the year.

Pasture 2L
Lower Robb Cr.

The second week in October cattle begin drifting into this pasture from pasture **2H**. All 1118 AUs wind up here by Oct.22nd.

Pasture 1L
Battle Place

All 1118 AUs graze from June 22nd to July 5th. ***1**

Pasture 3H
Swamp/Rock Cr.

Rested from livestock grazing for the year.

Pasture 2H *2
Upper Robb Cr.
366 AUs from mid-August to Sept. 15th.
+
Sept. 15th, 400 AUs enter this pasture from the BLM Allotment.
+
Oct.1st, 352 AUs enter this pasture from the FS Allotment.

Pasture 1H
Ledford Ridge
All 1118 AUs graze from July 6th to July 15th.

July 15th, 352 AUs go to Forest Allotment.

July 15th to mid-August 766 AUs remain in pasture

On August 15th, 400 AUs go to BLM **SOUTH SIDE** allotment, remaining livestock go to Pasture **2H**.

***1** – July 5th is the last day that livestock can stay in the **1L** pasture. No matter what the condition of Tall Larkspur is in the **1H** pasture the Ledford Creek Grazing Association has agreed to take responsibility for keeping livestock away from the dangers of Tall Larkspur. Livestock **must** be moved to the **1H** pasture on July 6th.

***2** – Depending on weather and conditions on the ground livestock will be kept in the **2H** pasture for as long as possible until the 22nd of October. On October 22nd livestock are removed from the pasture.

Robb Cr WMA Grazing Rotation for the Year 2012
(year 3 of the rotation)

1118 AUs enter pasture **3L** to begin the grazing season

↓

Pasture 3L
Dry Hollow

All 1118 AUs graze from June 22nd to July 5th. ***1**

↓

Pasture 3H
Swamp/Rock Cr.
All 1118 AUs graze from July 6th to July 15th.

July 15th, 352 AUs go to Forest Allotment.

July 15th to mid-August 766 AUs remain in pasture.

Pasture 2H
Upper Robb Cr.

Rested from livestock grazing for the year.

Pasture 2L
Lower Robb Cr.

Rested from livestock grazing for the year.

Pasture 1H *2
Ledford Ridge
366 AUs from mid-August to Sept. 15th.
+
Sept. 15th, 400 AUs enter this pasture from the BLM Allotment.
+
Oct. 1st, 352 AUs enter this pasture from the FS Allotment.

↑

Pasture 1L
Battle Place

The second week in October cattle begin drifting into this pasture from pasture **1H**. All 1118 AUs wind up here by Oct. 22nd.

↑

Oct.22nd livestock return to private lands for the winter.

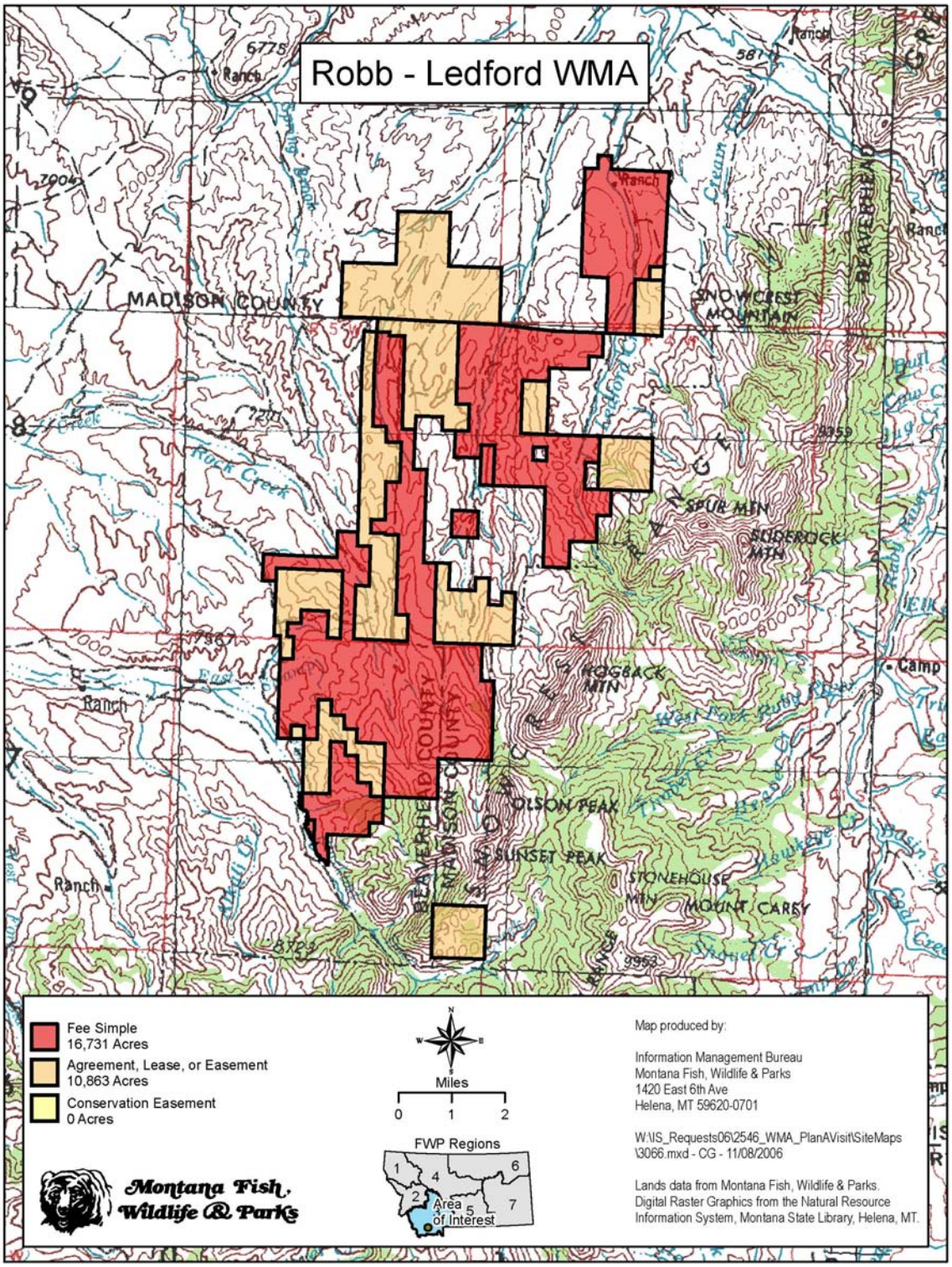
On August 15th, 400 AUs go to BLM **NORTH SIDE** allotment, remaining livestock go to Pasture **1H**.

***1** – July 5th is the last day that livestock can stay in the **3L** pasture. No matter what the condition of Tall Larkspur is in the **3H** pasture the Ledford Creek Grazing Association has agreed to take responsibility for keeping livestock away from the dangers of Tall Larkspur. Livestock must be moved to the **3H** pasture on July 6th.

***2** – Depending on weather and conditions on the ground livestock will be kept in the **1H** pasture for as long as possible until the 22nd of October. On October 22nd livestock are removed from the **3L** pasture and from the Robb/Ledford WMA.

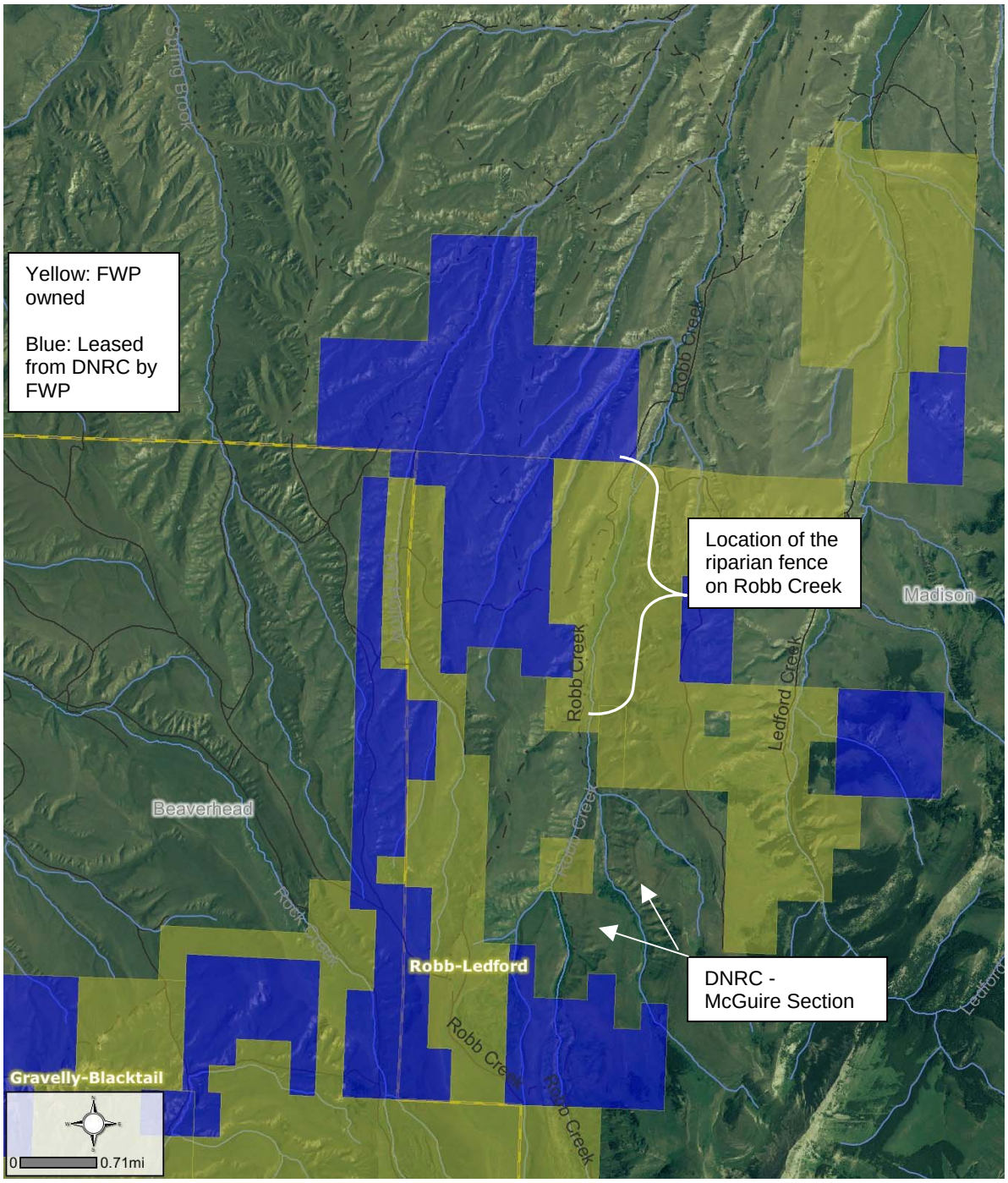
APPENDIX D

Robb/Ledford Wildlife Management Area Map



APPENDIX D continued

Robb/Ledford Water Gap Fence Map



RIPARIAN AND WETLAND INVENTORY AND HEALTH ASSESSMENT ON ROBB CREEK AND LEDFORD CREEK IN THE ROBB/LEDFORD WILDLIFE MANAGEMENT AREA

Prepared by:

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January 2006

Bitterroot Restoration, Inc.
Corvallis, Montana, USA

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EXECUTIVE SUMMARY

During the summer of 2005 Bitterroot Restoration, Inc. (BRI) conducted riparian inventory along 6.8 miles of stream on reaches of Robb Creek (2.9 miles) and Ledford Creek (3.9 miles) within the Robb/Ledford Wildlife Management Area. This was a re-inventory of reaches previously done in 1999. The purpose was to assess the nature and extent of any change that might have occurred since that time. During the intervening six years, general riparian health on Robb Creek is found to have declined, while that along Ledford Creek has improved. Table 1 compares the summary statistics of riparian health status along these two streams from the two assessments. Both streams, however, currently remain in the general category "Functional, At Risk (healthy, but with problems)." Both streams still have tremendous potential for improvement.

Table 1. Summary of riparian health change on Robb Creek and Ledford Creek as an average along each stream (Values given in percent ratings, where 100 percent would represent perfect health.)

Creek	Year	Vegetation	Physical	Overall	Overall Category[1]
Robb	1999	68	87	78	FAR
Robb	2005	61	76	70	FAR
Ledford	1999	52	52	52	NF
Ledford	2005	63	67	65	FAR

[1] **Categories:**
PFC (Proper Functioning Condition) = score rating from 80 to 100 percent
FAR (Functional at Risk [Healthy, but with problems]) = score rating from 60 to 80 percent
NF (Nonfunctional [Unhealthy]) = score rating below 60 percent

Over the six years there has been good improvement on overall vegetation cover of the riparian zone on Robb Creek, including improvements in preferred tree and shrub species regeneration and in browse utilizations rates of these species. However, these gains are more than offset by increases in the amount of invasive species (weeds) and undesirable herbaceous species present. On the physical side of the assessment, Robb Creek has seen considerable decline since 1999. Channel incisement and human caused alterations to both the banks and to the rest of the riparian zone have more than offset modest improvements in rootmass protection of the banks and in the amount of human caused bare ground. Ledford Creek shows significant improvement on both vegetation and physical factors. Strong improvements were recorded in overall vegetation cover, preferred tree and shrub regeneration, streambank rootmass protection, amount of bare ground, and the amount of human caused bank alteration. As on Robb Creek, major negative factors on Ledford Creek are increased presence of invasive species and channel incisement.

INTRODUCTION

In 1999 several streams within the Robb/Ledford Wildlife Management Area (RLWMA) were inventoried for lotic riparian conditions. Among these were Robb Creek (2.9 miles) and Ledford Creek (3.9 miles) (Figure 1) near the boundary between the RLWMA and Turner Enterprises private property. During early August of 2005 Bitterroot Restoration, Inc. (BRI) repeated the inventory along the reaches of Robb Creek and Ledford Creek that was first done in 1999. The purpose was to assess the nature and extent of any change that might have occurred since that time. Both Robb Creek and Ledford Creek are perennial streams within active grazing pastures.

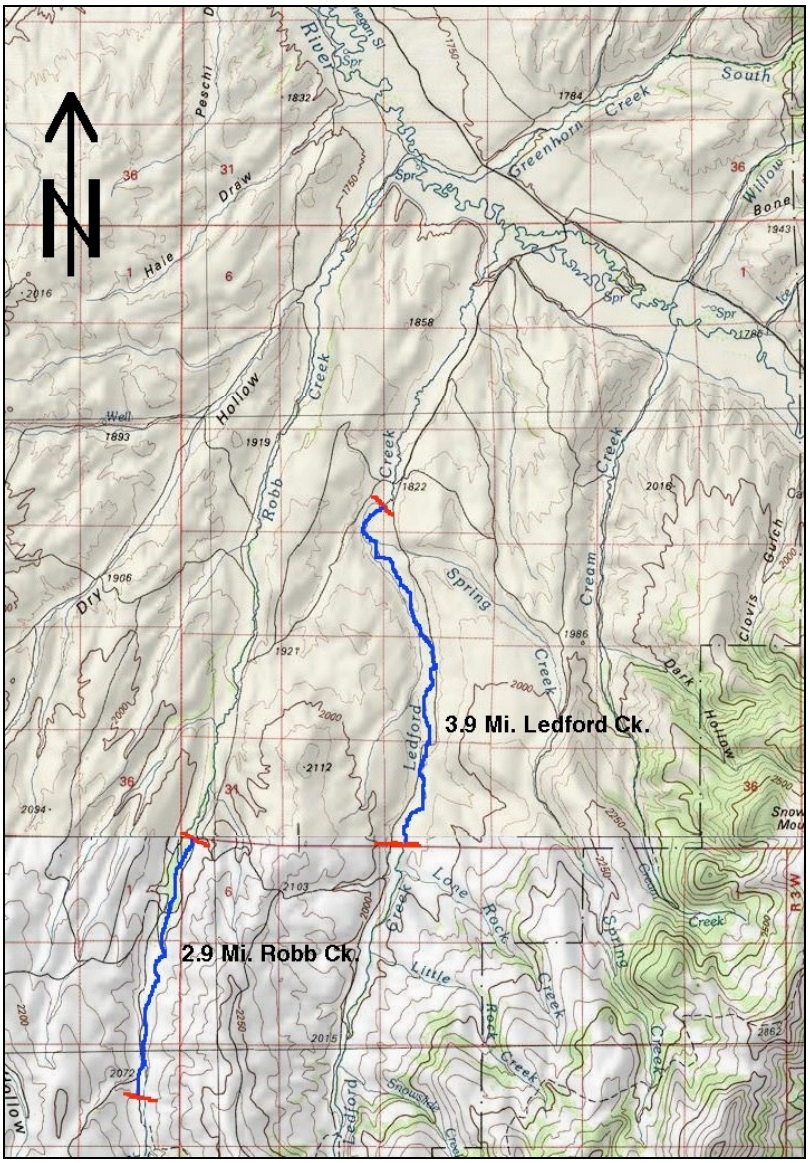

Figure 1. Overview map of Robb Creek and Ledford Creek vicinity, showing location of reaches inventoried

SUMMARY OF LOTIC INVENTORY AND HEALTH ASSESSMENT ON LEDFORD CREEK

In early August of 2005 BRI conducted follow-up lotic riparian inventory on 7 polygons on Ledford Creek, a perennial stream in sections 17, 21, 28, and 33 of township 9S, range 4W (Figures 2 and 3). Elevation on this reach of Ledford Creek ranges from approximately 6,300 feet at the upper end down to approximately 5,985 feet at the lower end. This reach of stream had previously been inventoried six years earlier in 1999 and found to be in nonfunctional condition (unhealthy) at that time. In the intervening six years, the riparian health of Ledford Creek has improved well into the Functional, at Risk (healthy, but with problems) category.

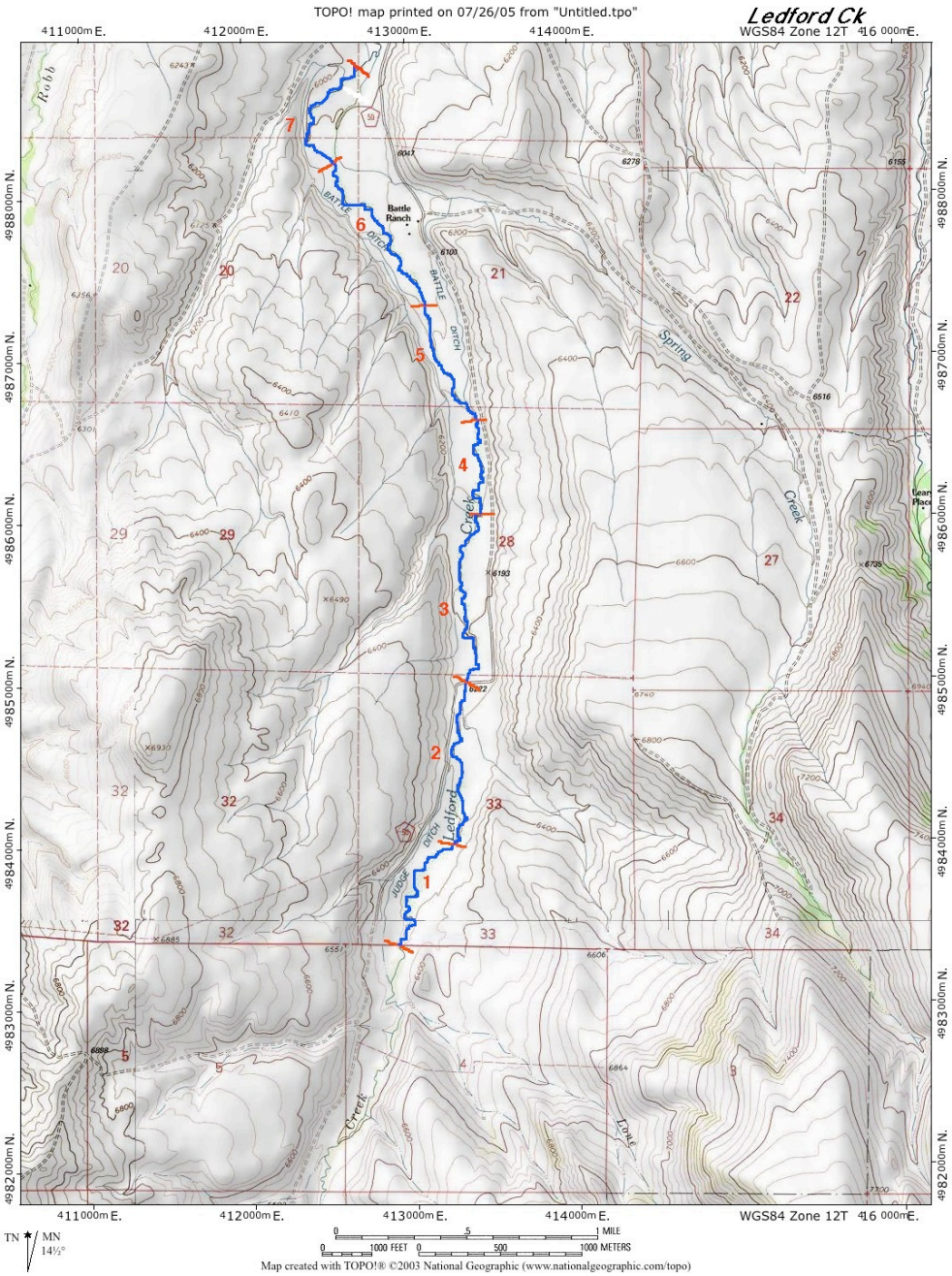

Figure 2. Topographic map of Ledford Creek showing sampled polygon locations

Figure 3. Overview of Ledford Creek showing riparian zone strip and wide, sub-irrigated pasture bottom

Although the same length of stream was inventoried (3.9 miles) again in 2005, the average riparian zone width was estimated much wider in this latter inventory. The riparian zone area included in all seven polygons on Ledford Creek was estimated in 1999 as 15.5 acres. The riparian zone area in 2005 was estimated at 48.3 acres. Although the estimation of width made in 1999 appears to have been low, certain kinds of riparian degradation can result in a narrowing of the riparian zone, and the healing process can widen it again. This process usually involves the lowering and raising again of the water table, so often with the help of beaver. That has been the case on Ledford Creek, where the average riparian zone width was 33 feet in 1999. In 2005 the average riparian zone width had increased to 102 feet, accompanied with a dramatic increase in active beaver presence (Figure 4).

Figure 4. Beaver dam on Ledford Creek in 2005 showing raised elevation of water level

Vegetation

The total number of plant species observed on the Ledford Creek riparian zone has increased since 1999 from 69 (including one tree species, 14 shrub species, 14 graminoid species, and 40 forb species) to 113 in 2005 (including one tree species, 15 shrub species, 26 graminoid species, and 71 forb species). This does not mean that so many more species have come in, but rather that the widened riparian zone now encompasses more area with a wider range of hydrologic conditions.

The only tree species observed on Ledford Creek was *Juniperus scopulorum* (Rocky Mountain juniper). The inventoried reaches are willow dominated. The most common shrub species observed were *Salix boothii* (Booth willow), *Salix exigua* (sandbar willow), *Betula occidentalis* (water birch), and *Salix bebbiana* (Bebb willow). The most significant difference in the woody vegetation composition since 1999 is the increased cover of *Salix exigua* (sandbar willow) due to the raised water table and expanded riparian zone, and to the reduced browse utilization level. The reduced browse utilization may be the combined result of management change and decreased accessibility in the greater area flooded by beaver.

The herbaceous layer (graminoids and forbs) is drastically altered from native composition, currently dominated by aggressive invader species (weeds), undesirable disturbance increasers, and exotic grasses introduced for tame pasture.

Habitat Type/Community Type

Half the area of this expanded riparian zone is accounted for by the *Salix geyeriana* (Geyer willow) community type. This community type is a degraded community occupying sites of the *Salix geyeriana* (Geyer willow/beaked sedge) habitat type, where long term, heavy grazing use has displaced the sedges and native grasses by drier, grazing tolerant grasses. Due to the transitional state from what was once a very wet, beaver dominated, site, to a dried and disturbed site with beaver gone, and now back again to a wetted site; the community is very diverse with lots of transitional microsites in vegetative flux. The *Juniperus scopulorum* (Rocky Mountain juniper) plants observed were all young, immature plants in trace amounts.

Invasive Species (Weeds)

Invasive species have increased since 1999. This is a major factor detracting from riparian functional health on Ledford Creek. In 1999 *Cirsium arvense* (Canada thistle) and *Cynoglossum officinale* (common hound's-tongue) were recorded on Ledford Creek in every polygon. These have increased their coverage and have also now been joined by *Cardaria draba* (whitetop), *Tanacetum vulgare* (common tansy), and *Chrysanthemum leucanthemum* (ox-eye daisy). Canada thistle and hound’s-tongue are still the two most abundant forb species on Ledford Creek.

Browse Evaluation

Browse utilization continues to be very heavy on all available shrubs. This condition is not much changed from 1999, when all accessible willow plants exhibited the "arrested growth type." (Figure 5) No determination was made of whether browsing was being done by livestock or wildlife. It is likely that both are responsible.

Figure 5. Example of browsed shrubs on Ledford Creek in 2005 showing "arrested growth type"

Physical Site Conditions

Currently, this reach of Ledford Creek is in transition back into a beaver dominated system with a series of dams and ponds spreading water over a wide floodplain lacking a continuous single thread channel. Much of the reach now is still in a Rosgen C5 or C6 channel type, characterized by eroding and depositing along alternate banks of a meandering channel

In 1999 the channel bed was dominated by small cobbles and gravel throughout all polygons. The 2005 data show a shift in dominance to smaller materials on the channel bed. This can also be explained by the readjustment of the large amount of stored sediment associated with a beaver dominated stream system when the beaver do not maintain the dams. In 1999, the beaver dams were mostly all breached and the channel was starting to cut through the sediment piled behind them and down into underlying gravels. The beaver are well on their way now to reestablishing a series of new dams along this stream.

Health Assessment

In the six years from 1999 to 2005, overall riparian health on Ledford Creek has certainly improved, but the success is a mixed bag. Good gains are recorded on key vegetative factors of overall plant cover of the riparian zone and in regeneration of preferred tree and shrub species, but a major negative continuing to worsen is the invasive weed problem. Good gains have also occurred in the amount of deep, binding rootmass protection of the streambanks, in reducing the amount of human caused bare ground, and in reducing the amount of human caused alteration of the streambanks. However, channel incisement presents a potentially serious problem on Ledford Creek. The incisement is now in early stages, and may only be a transitional result of destabilization due to the movement of large amounts of sediment previously stored behind old beaver dams (Figure 6). The renewed beaver activity that has already helped to positively affect the vegetation aspects of functional health here could also quickly remedy this potentially serious problem, if the beaver are allowed to thrive and are kept from over-populating the site. Channel incisement is a very serious problem, if allowed to proceed unchecked. It leads to loss of water table availability to vegetation on the floodplain. The extent of incisement at this early stage can be held in check and reversed by relatively inexpensive grazing management change designed to promote healthy woody plant recruitment and maintenance, which will in turn promote continued beaver presence. The beaver are key to the hydrologic conditions that maintain the health of this kind of riparian system.

Figure 6. The stream scouring a deep channel through a failing beaver dam

In 1999 the polygon health ratings for Ledford Creek were uniformly low, ranging from 49 percent to 58 percent. There has been some dramatic changes since then, some positive and some negative, but with an overall trend of improvement (Tables 2 and 3). In Table 2 the health rating is broken out by polygon along Ledford Creek, so that

the problem and success areas can be identified to kind and location. Table 3 shows the individual factor items as they were scored with points out of a potential maximum. This gives a precise indication of what items remain problematic and which ones have responded positively to management change.

The change from 1999 to 2005 is shown in detail in Table 3. The answer to each question on the lotic health assessment is compared between the two observations at each polygon. Total vegetation and regeneration of preferred tree and shrub species have improved dramatically, while the presence of invasive plants has negated a lot of those gains on all polygons. Among the physical site questions, we find that the streambank factors of deep, binding rootmass protection and the amount of human caused streambank alteration were significantly improved since 1999, as well as reduction in the amount of human caused bare ground. Only the amount of alteration to areas beyond the streambank and the incipient channel incisement were serious negatives.

Table 2. Summary of riparian health change on Ledford Creek by polygon between 1999 and 2005 (Values given in percent ratings, where 100 percent would represent perfect health.) (Polygon 1 is most upstream)

Polygon	Year	Vegetation	Physical	Overall	Overall Category[1]
1	1999	63	53	58	NF
	2005	59	80	70	FAR
2	1999	52	53	53	NF
	2005	63	63	63	FAR
3	1999	44	53	49	NF
	2005	63	73	68	FAR
4	1999	44	60	53	NF
	2005	67	63	65	FAR
5	1999	59	43	51	NF
	2005	63	73	68	FAR
6	1999	63	50	56	NF
	2005	63	67	65	FAR
7	1999	37	60	49	NF
	2005	67	43	54	NF

[1] **Categories:**
PFC (Proper Functioning Condition) = score rating from 80 to 100 percent
FAR (Functional at Risk [Healthy, but with problems]) = score rating from 60 to 80 percent
NF (Nonfunctional [Unhealthy]) = score rating below 60 percent

Table 3. Breakout of the Ledford Creek health assessment scoring by item and polygon (Polygon 1 is most upstream)

Health Item Question	Item Weight (Full Points)	Year	Ledford Creek Polygon Number 1	2	3	4	5	6	7
1. Total Vegetation Cover	6	1999	2	2	2	4	2	2	4
		2005	6	6	6	6	6	6	6
2a, 2b. Invasive Weeds	6	1999	4	4	4	4	4	4	2
		2005	0	1	1	1	1	1	1
3. Undesirable Herbs	3	1999	2	1	2	1	3	2	2
		2005	1	1	2	2	2	2	2
4. Tree & Shrub Regeneration	6	1999	2	2	4	6	6	6	2
		2005	6	6	6	6	6	6	6
5. Tree & Shrub Utilization	3	1999	0	0	0	0	0	0	0
		2005	1	1	0	1	0	0	0
6. Dead & Decadent Wood	3	1999	2	1	2	2	2	2	2
		2005	2	2	2	2	2	2	3
Vegetation Sub Total	27	1999	12	10	14	17	17	16	12
		2005	16	17	17	18	17	17	18
7. Deep, Binding Rootmass	6	1999	2	2	2	2	2	2	0
		2005	6	6	6	6	6	6	2
8. Human Caused Bare Ground	6	1999	2	4	2	2	2	2	4
		2005	6	4	4	4	4	4	4
9. Altered Streambanks	6	1999	0	0	0	0	0	0	2
		2005	4	2	4	2	4	2	2
10. Altered Riparian Zone	3	1999	3	3	3	3	2	0	3
		2005	2	1	2	1	2	2	2
11. Channel Incisement	9	1999	9	9	9	9	9	9	9
		2005	6	6	6	6	6	6	3
Physical Sub Total	30	1999	16	18	16	16	15	13	18
		2005	24	19	22	19	22	20	13
Overall Total	**57**	**1999**	**28**	**28**	**30**	**33**	**32**	**29**	**30**
		2005	**40**	**36**	**39**	**37**	**39**	**37**	**31**

SUMMARY OF LOTIC INVENTORY AND HEALTH ASSESSMENT ON ROBB CREEK

In early August of 2005 BRI conducted follow-up lotic riparian inventory on 6 polygons on Robb Creek, a perennial stream in sections 1, 12, and 13 of township 10S, range 5W and section 6 of township 10S, range 4W (Figures 7 and 8). Elevation on this reach of Robb Creek ranges from approximately 6,740 feet at the upper end to approximately 6,440 feet at the lower end. This reach of stream had previously been inventoried six years earlier in 1999 and found to be functional at risk (healthy, but with problems) at that time. Six years later in 2005, this reach of Robb Creek remains on average in the same broad category of health, but has suffered some decline in functional health.

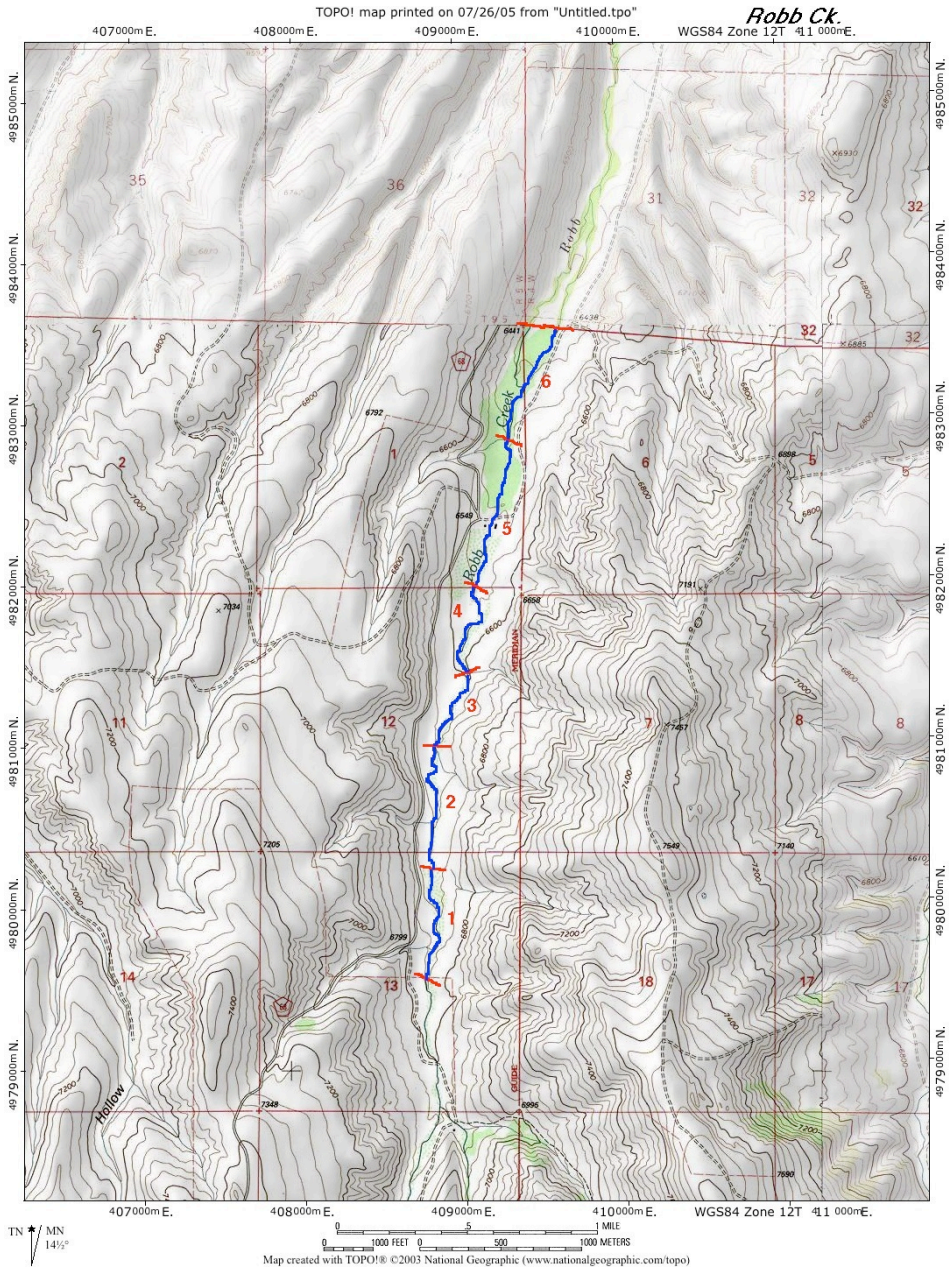

Figure 7. Topographic map of Robb Creek showing sampled polygon locations

Figure 8. Overview of Robb Creek near the lower end showing split riparian community

Although the same length of stream was inventoried as in 1999 (2.9 miles), the average riparian zone width was estimated much wider in this 2005 latter inventory. The riparian zone areas included in the six polygons on Robb Creek was estimated in 1999 as 16.4 acres. This area in 2005 was estimated at 76.1 acres. The riparian zone width appears to have been underestimated previously, because conditions on the reach are not such as would result in a widening of the wetted area or of the area with riparian vegetation. This reach of Robb Creek has suffered further degradation since 1999, the kind that would result in the narrowing of the riparian zone, not widening. However, Figure 9, taken near the upper end in polygon 1, shows a good perspective of the riparian zone width.

Figure 9. View of Robb Creek riparian zone near the upper end showing wide valley bottom

Vegetation

The total number of plant species observed on the Robb Creek riparian zone has increased since 1999 from 67 (including one tree species, 12 shrub species, 14 graminoid species, and 40 forb species) to 98 in 2005 (including one tree species, 13 shrub species, 27 graminoid species, and 57 forb species). It does not mean that so many more species have come in, but rather that the wider area considered to be the riparian zone now encompasses more area with a wider range of hydrologic conditions and plant diversity.

Approximately 60 percent of the riparian zone within these polygons of Robb Creek is covered by the canopy of willows. The only tree species, *Juniperus scopulorum* (Rocky Mountain juniper), was recorded in every polygon along Robb Creek, accounting for only one percent of the riparian zone area. The largest presence is a patch at the lower end of polygon 5 and upper end of polygon 6. Worth noting is the fact that much of the juniper cover is of younger plants.

In 1999 graminoid cover ranged from 50 to 70 percent on all polygons, but has increased now to range from 70 to 90 percent. However, this graminoid cover is dominated by introduced exotic species. The primary native graminoids present are *Carex rostrata* (beaked sedge) and *Juncus balticus* (Baltic rush). Major exotic graminoids are *Poa pratensis* (Kentucky bluegrass), *Phleum pratense* (common timothy), *Bromus inermis* (smooth brome), and *Agrostis stolonifera* (redtop). Among the large diversity of forb species, the two most abundant are the invasive weeds *Cirsium arvense* (Canada thistle) and *Cynoglossum officinale* (common hounds-tongue), and the remaining long list is dominated by exotic and less than desirable species.

Livestock utilization level was not evenly distributed. Heavy use was recorded this season in polygons 1, 2, and 6; while the middle section (polygons 3, 4, and 5) had been only lightly or not utilized this year at the date of this inventory.

Habitat Type/Community Type

Most of the Robb Creek riparian zone on this reach is currently occupied by the *Salix geyeriana/Carex rostrata* (Geyer's willow/beaked sedge) habitat type, or one of its seral stages. The greatest part of the area is in the *Salix geyeriana* (Geyer's willow) community type, which is a grazing induced seral stage of the *Salix geyeriana/Carex rostrata* (Geyer's willow/beaked sedge) habitat type.

Invasive Species (Weeds)

Cirsium arvense (Canada thistle) and *Cynoglossum officinale* (Common Hound's-tongue) were recorded on Robb Creek with significant patches in every polygon. These two invasive species were the two most abundant forbs on this reach of Robb Creek. Since 1999 the additional invasive weed *Cardaria draba* (whitetop) has been recorded on Robb Creek. This occurrence is in the vicinity of the old ranch buildings near the middle of polygon 5.

Browse Evaluation

The level of shrub browse utilization was unevenly distributed in the same pattern as general forage use. The middle polygons (3, 4, and 5) have recently been used lightly, or not at all, while on the upper end (polygons 1 and 2) and the lowest polygon (number 6) utilization was heavy. The willows exhibited "uninterrupted growth type" only on sites inaccessible to livestock and "released growth type" on much of the middle three polygons. On the more accessible sites most willow plants have "arrested growth type." Figure 10 shows a willow community in the recently unimpacted polygon 3. Figure 11 shows heavily browsed and trampled willows in polygon 6.

Figure 10. Lightly impacted willow community in polygon 3

Figure 11. Heavily impacted willows in polygon 6

Health Assessment

In the six years since 1999, polygon health ratings for Robb Creek remained in the functional, at risk (healthy, but with problems) category, but have declined from the upper end to the middle of its range of 60 to 79 percent.

As on Ledford Creek, Robb Creek shows gains on some factors and declines on others. However, on Ledford Creek, the declines out weigh the gains. Major negative vegetative factors are increased infestation of invasive weeds and in the amount of undesirable herbaceous species cover. Gains were recorded on the physical side of site conditions in increased deep, binding rootmass protection of the streambanks and in a reduced amount of human caused bare ground, but these gains were offset by increased human caused alteration and channel incisement (Figures 12 and 13). As on Ledford Creek, it appears that the extent of incisement at this early stage can readily be held in check and reversed by relatively inexpensive changes in grazing management designed to promote healthy woody plant recruitment and maintenance, which will in turn promote continued beaver presence. The beaver are key to the hydrologic conditions that maintain the health of this kind of riparian system.

Figure 12. Human caused alteration in and along the channel of Robb Creek in polygon 6

In 1999 the polygon health ratings for Robb Creek were moderately high, with scores for polygons 3 and 5 falling into the lower range of proper functioning condition (healthy), and the remaining four polygons all scoring in the upper range of functional, at risk (healthy, but with problems) categories. Since 1999 there have been both positive and negative changes, with an overall declining trend (Tables 4 and 5). Only two polygons (2 and 4) held their overall rating score unchanged over this period. Polygon 6 at the lower end fell from 74 percent to 51 percent, dropping it from the upper end of the functional, at risk category to nonfunctional (unhealthy). In Table 4 the health rating is broken out by polygon along Ledford Creek, so that the problem and success areas can be identified to kind and location.

Figure 13. Early stages of incisement of blown beaver dam in polygon 6

Table 4. Summary of riparian health change on Robb Creek by polygon between 1999 and 2005 (Values given in percent ratings, where 100 percent would represent perfect health.) (Polygon 1 is most upstream)

Polygon	Year	Vegetation	Physical	Overall	Overall Category[1]
1	1999	63	87	75	FAR
	2005	59	77	68	FAR
2	1999	70	93	82	PFC
	2005	59	70	65	FAR
3	1999	63	87	75	FAR
	2005	59	90	77	FAR
4	1999	81	93	88	PFC
	2005	67	90	79	FAR
5	1999	70	87	79	FAR
	2005	63	90	77	FAR
6	1999	67	80	74	FAR
	2005	59	43	51	NF

[1] **Categories:**
PFC (Proper Functioning Condition) = score rating from 80 to 100 percent
FAR (Functional at Risk [Healthy, but with problems]) = score rating from 60 to 80 percent
NF (Nonfunctional [Unhealthy]) = score rating below 60 percent

Table 5 shows the individual factor items as they were scored out of a potential maximum. This indicates which items remain problematic and which have responded positively to management change. The change from 1999 to 2005 is shown in detail in Table 5. The result to each question on the lotic health assessment is compared between the two assessments at each polygon. As on Ledford Creek, total vegetation cover improved on all polygons.

Browse utilization and regeneration of preferred tree and shrub species improved marginally, but the presence of invasive weeds and the amount of undesirable herbaceous cover more than offset those gains. Among the physical questions, we found improvement in deep, binding rootmass protection and reduction in human caused bare ground. On the other hand there was increased human caused alteration to both the streambanks and to the polygon outside the banks. However, the most serious physical impairment to riparian health is the increase in channel incisement. This is a major red flag of warning. While this condition is presently still in a stage that can be fairly easily reversed, continued streambed degradation can mean almost complete loss of riparian function when the water table becomes lowered beyond reach of the riparian vegetation on the floodplain. As on Ledford Creek, beaver represent the solution to riparian health on these streams.

Physical Site Conditions

The channel bed is dominated by cobbles and gravel throughout all polygons. The floodplain and banks are primarily silt and clay, with significant sand or gravel. The channel in the upper five polygons is only about 8 to 12 feet wide that alternates between a Rosgen B and C type. Part of polygon 6 is degraded into the incised Rosgen F type that cannot readily escape the banks. Gradient drops from about 2.5 percent at the upper end to about 1.5 percent at the lower end. There is very little lateral cutting of the streambanks due to the dense vegetation cover and excellent deep, binding rootmass in all but a few spots. Human-caused alteration of the channel banks due to livestock trampling damage is a problem only in polygon 6 at the lower end. Only polygon 2 was vertically unstable, with one headcut present. There was very little human-caused bare ground on any polygon. Figure 14 illustrates the lush sedge and willow production that is possible when beaver flood a wider area that livestock find inaccessible due to boggy conditions.

Figure 14. Lush sedge and willow production due to beaver maintained high water table

Table 5. Breakout of the Robb Creek health assessment scoring by item and polygon (Polygon 1 is most upstream)

Health Item Question	Item Weight (Full Points)	Year	Ledford Creek Polygon Number 1	2	3	4	5	6
1. Total Vegetation Cover	6	1999	4	4	4	6	4	4
		2005	6	6	6	6	6	6
2a, 2b. Invasive Weeds	6	1999	4	4	4	4	4	4
		2005	1	1	1	3	1	1
3. Undesirable Herbs	3	1999	2	2	2	2	2	2
		2005	0	0	0	1	0	1
4. Tree & Shrub Regeneration	6	1999	4	6	4	6	6	6
		2005	6	6	6	4	6	6
5. Tree & Shrub Utilization	3	1999	1	1	1	1	1	0
		2005	1	1	2	2	2	0
6. Dead & Decadent Wood	3	1999	2	2	2	3	2	2
		2005	2	2	2	2	2	2
Vegetation Sub Total	27	1999	17	19	17	22	19	18
		2005	16	16	17	18	17	16
7. Deep, Binding Rootmass	6	1999	4	6	4	6	4	4
		2005	6	4	6	6	6	4
8. Human Caused Bare Ground	6	1999	4	4	4	4	4	4
		2005	4	4	6	6	6	4
9. Altered Streambanks	6	1999	6	6	6	6	6	4
		2005	6	6	6	6	6	2
10. Altered Riparian Zone	3	1999	3	3	3	3	3	3
		2005	1	1	3	3	3	0
11. Channel Incisement	9	1999	9	9	9	9	9	9
		2005	6	6	6	6	6	3
Physical Sub Total	30	1999	26	28	26	28	26	24
		2005	23	21	27	27	27	13
Overall Total	**57**	**1999**	**43**	**47**	**43**	**50**	**45**	**42**
		2005	**39**	**37**	**44**	**45**	**44**	**29**

SITE OVERVIEW - ROBB/LEDFORD WMA

Location	SiteName	Exclosure_	In_Exclosure	Comments	Latitude	Longitude	Elevation	Slope	Landform	EcoRegion	MinOfVisitDate
ROBB-LEDF	Site 1 High Elevation Site	No	No	Returning during 2004 growing season to get another Daubenmire reading for grasses & forbs.	44.92803	-112.1829	7878	None	Mountain Foot Hills	Middle Rockies	9/9/2003
ROBB-LEDF	Site 2 Moderate Elevation Site	No	No		44.98301	-112.1707	6952	Moderate	Mountain Foot Hills	Middle Rockies	7/23/2004
ROBB-LEDF	Site 3 Bench Site	No	No		44.9972	-112.158	6806	None	Mountain Foot Hills	Middle Rockies	7/20/2004
ROBB-LEDF	Site 4 Robb Creek Site	No	No	In 2003, Harrington established and read line intercepts (canopy) of Big Sagebrush (Artr). In 2004 Taylor/Harrington read all six transects at the site for Daubenmire frames. In 2008, Harrington/Horton/Aldrich/Messer read only the first three transects	44.95934	-112.1577	6874	Gentle	Mountain Foot Hills	Middle Rockies	9/22/2003
ROBB-LEDF	Site 5 Battle Ranch Site	No	No		45.03871	-112.0916	6188	None	Mountain Foot Hills	Middle Rockies	9/15/2003

TRANSECT OVERVIEW - ROBB/LEDFORD WMA

Location	SiteName	TransectNumber	VisitDate	Investigator	Comments
ROBB-LEDFORD	Site 1 High Elevation Site	1	9/9/2003	Bob Harrington	Returning during 2004 growing season to get another Daubenmire reading for grasses & forbs.
ROBB-LEDFORD	Site 1 High Elevation Site	2	9/9/2003	Bob Harrington	
ROBB-LEDFORD	Site 1 High Elevation Site	3	9/9/2003	Bob Harrington	
ROBB-LEDFORD	Site 1 High Elevation Site	4	9/9/2003	Bob Harrington	
ROBB-LEDFORD	Site 1 High Elevation Site	5	9/9/2003	Bob Harrington	
ROBB-LEDFORD	Site 1 High Elevation Site	6	9/9/2003	Bob Harrington	
ROBB-LEDFORD	Site 1 High Elevation Site	1	7/21/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 1 High Elevation Site	2	7/21/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 1 High Elevation Site	3	7/21/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 1 High Elevation Site	4	7/21/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 1 High Elevation Site	5	7/21/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 1 High Elevation Site	6	7/21/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 1 High Elevation Site	1	7/21/2008	Bob Harrington/Jane Horton	Transects 1-6 read from north to south, or to the left of T1. GPS reading was +-9 feet, taken at 11:30am
ROBB-LEDFORD	Site 1 High Elevation Site	2	7/21/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 1 High Elevation Site	3	7/21/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 1 High Elevation Site	4	7/21/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 1 High Elevation Site	5	7/21/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 1 High Elevation Site	6	7/21/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 2 Moderate Elevation Site	1	7/23/2004	Kevin & Amy Taylor & Bob Harrington	
ROBB-LEDFORD	Site 2 Moderate Elevation Site	2	7/23/2004	Kevin & Amy Taylor & Bob Harrington	
ROBB-LEDFORD	Site 2 Moderate Elevation Site	3	7/23/2004	Kevin & Amy Taylor & Bob Harrington	
ROBB-LEDFORD	Site 2 Moderate Elevation Site	4	7/23/2004	Kevin & Amy Taylor & Bob Harrington	
ROBB-LEDFORD	Site 2 Moderate Elevation Site	5	7/23/2004	Kevin & Amy Taylor & Bob Harrington	
ROBB-LEDFORD	Site 2 Moderate Elevation Site	6	7/23/2004	Kevin & Amy Taylor & Bob Harrington	
ROBB-LEDFORD	Site 2 Moderate Elevation Site	1	7/24/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 2 Moderate Elevation Site	2	7/24/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 2 Moderate Elevation Site	3	7/24/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 2 Moderate Elevation Site	4	7/24/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 2 Moderate Elevation Site	5	7/24/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 2 Moderate Elevation Site	6	7/24/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 3 Bench Site	1	7/20/2004	Kevin & Amy Taylor & Bob Harrington	
ROBB-LEDFORD	Site 3 Bench Site	2	7/20/2004	Kevin & Amy Taylor & Bob Harrington	

ROBB-LEDFORD	Site 3 Bench Site	3	7/20/2004	Kevin & Amy Taylor & Bob Harrington	
ROBB-LEDFORD	Site 3 Bench Site	4	7/20/2004	Kevin & Amy Taylor & Bob Harrington	
ROBB-LEDFORD	Site 3 Bench Site	5	7/20/2004	Kevin & Amy Taylor & Bob Harrington	
ROBB-LEDFORD	Site 3 Bench Site	6	7/20/2004	Kevin & Amy Taylor & Bob Harrington	
ROBB-LEDFORD	Site 3 Bench Site	1	7/23/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 3 Bench Site	2	7/23/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 3 Bench Site	3	7/23/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 3 Bench Site	4	7/23/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 3 Bench Site	5	7/23/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 3 Bench Site	6	7/23/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 4 Robb Creek Site	1	9/22/2003	Bob Harrington	
ROBB-LEDFORD	Site 4 Robb Creek Site	2	9/22/2003	Bob Harrington	
ROBB-LEDFORD	Site 4 Robb Creek Site	3	9/22/2003	Bob Harrington	
ROBB-LEDFORD	Site 4 Robb Creek Site	4	9/22/2003	Bob Harrington	
ROBB-LEDFORD	Site 4 Robb Creek Site	5	9/22/2003	Bob Harrington	
ROBB-LEDFORD	Site 4 Robb Creek Site	6	9/22/2003	Bob Harrington	
ROBB-LEDFORD	Site 4 Robb Creek Site	1	7/19/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 4 Robb Creek Site	2	7/19/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 4 Robb Creek Site	3	7/19/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 4 Robb Creek Site	4	7/19/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 4 Robb Creek Site	5	7/19/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 4 Robb Creek Site	6	7/19/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 4 Robb Creek Site	1	7/30/2008	Harrington/Horton/Aldrich/Messer	SEDE, Club moss:Selaginella densa, was counted within the cryptogam row, rather than its own row.
ROBB-LEDFORD	Site 4 Robb Creek Site	2	7/30/2008	Harrington/Horton/Aldrich/Messer	SEDE, Club moss:Selaginella densa, was counted within the cryptogam row, rather than its own row.
ROBB-LEDFORD	Site 4 Robb Creek Site	3	7/30/2008	Harrington/Horton/Aldrich/Messer	SEDE, Club moss:Selaginella densa, was counted within the cryptogam row, rather than its own row.
ROBB-LEDFORD	Site 4 Robb Creek Site	4	7/30/2008	Horton/Aldrich	
ROBB-LEDFORD	Site 4 Robb Creek Site	5	7/30/2008	Horton/Aldrich	
ROBB-LEDFORD	Site 4 Robb Creek Site	6	7/30/2008	Horton/Aldrich	
ROBB-LEDFORD	Site 5 Battle Ranch Site	1	9/15/2003	Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	2	9/15/2003	Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	3	9/15/2003	Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	4	9/15/2003	Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	5	9/15/2003	Bob Harrington	

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ROBB-LEDFORD	Site 5 Battle Ranch Site	6	9/15/2003	Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	7	9/15/2003	Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	8	9/15/2003	Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	9	9/15/2003	Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	10	9/16/2003	Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	11	9/16/2003	Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	12	9/16/2003	Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	13	9/16/2003	Bob Harringgton	
ROBB-LEDFORD	Site 5 Battle Ranch Site	14	9/16/2003	Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	15	9/16/2003	Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	16	9/16/2003	Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	1	7/22/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	2	7/22/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	3	7/22/2004	Amy & Kevin Taylor & Bob Harrington	Mossy cryptogram present but often looks dried & dead.
ROBB-LEDFORD	Site 5 Battle Ranch Site	4	7/22/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	5	7/22/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	6	7/22/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	7	7/22/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	8	7/22/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	9	7/22/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	10	7/22/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	11	7/22/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	12	7/22/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	13	7/22/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	14	7/22/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	15	7/22/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	16	7/22/2004	Amy & Kevin Taylor & Bob Harrington	
ROBB-LEDFORD	Site 5 Battle Ranch Site	1	7/22/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 5 Battle Ranch Site	2	7/22/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 5 Battle Ranch Site	3	7/22/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 5 Battle Ranch Site	4	7/22/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 5 Battle Ranch Site	5	7/22/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 5 Battle Ranch Site	6	7/22/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 5 Battle Ranch Site	7	7/22/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 5 Battle Ranch Site	8	7/22/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 5 Battle Ranch Site	9	7/22/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 5 Battle Ranch Site	10	7/22/2008	Bob Harrington/Jane Horton	
ROBB-LEDFORD	Site 5 Battle Ranch Site	11	7/22/2008	Bob Harrington/Jane Horton	

ROBB-LEDFORD	Site 5 Battle Ranch Site	12	7/22/2008	Bob Harrington/Jane Horton
ROBB-LEDFORD	Site 5 Battle Ranch Site	13	7/22/2008	Bob Harrington/Jane Horton
ROBB-LEDFORD	Site 5 Battle Ranch Site	14	7/22/2008	Bob Harrington/Jane Horton
ROBB-LEDFORD	Site 5 Battle Ranch Site	15	7/22/2008	Bob Harrington/Jane Horton
ROBB-LEDFORD	Site 5 Battle Ranch Site	16	7/22/2008	Bob Harrington/Jane Horton

TRANSECT SUMMARY - ROBB/LEDFORD WMA

Location	Year	SiteName	TransectNumber	TransDesc	Achillea millefolium	Agoseris glauca	Agropyron smithii	Agropyron sp_	Agropyron spicatum
ROBB-LEDFORD	2003	Site 1 High Elevation Site	1	#			2.75		
ROBB-LEDFORD	2003	Site 1 High Elevation Site	2	#			2.75		
ROBB-LEDFORD	2003	Site 1 High Elevation Site	3	#			4.25		
ROBB-LEDFORD	2003	Site 1 High Elevation Site	4	#			0.75		
ROBB-LEDFORD	2003	Site 1 High Elevation Site	5	#			0.75		
ROBB-LEDFORD	2003	Site 1 High Elevation Site	6	#			0.5		
ROBB-LEDFORD	2003	Site 1 High Elevation Site	98	Ave			1.958333333		
ROBB-LEDFORD	2003	Site 1 High Elevation Site	99	StdDev			5.933758568		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	#	2.75	2.5	7		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	#	1	3.5	11.75		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	#	1	2.25	13.25		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	#	0.5	0.75	5		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	#	2.5	4.75			7.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	#	2.5	1.75	22.5		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	98	Ave	1.708333333	2.583333333	9.916666667		1.25
ROBB-LEDFORD	2004	Site 1 High Elevation Site	99	StdDev	20.00886667	30.29113174	140.4919803		38.19226761
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	#	0.5	0.75			1.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	#	0.25			3.5	
ROBB-LEDFORD	2008	Site 1 High Elevation Site	3	#		0.75		1.25	
ROBB-LEDFORD	2008	Site 1 High Elevation Site	4	#	0.25	0.5		1.5	
ROBB-LEDFORD	2008	Site 1 High Elevation Site	5	#	0.75	4.25		1	
ROBB-LEDFORD	2008	Site 1 High Elevation Site	6	#		0.5		4.5	
ROBB-LEDFORD	2008	Site 1 High Elevation Site	98	Ave	0.291666667	1.125		1.958333333	0.25
ROBB-LEDFORD	2008	Site 1 High Elevation Site	99	StdDev	16.66717447	16.27838333		23.40375534	33.64507868
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	#					14.75
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	#	0.25				9.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	#	0.25				12
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	#	0.75				16
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	#					8.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	#					15.75
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	98	Ave	0.208333333				12.75
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	99	StdDev	14.40120397				140.9513169
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	#			2.5		1.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	#	0.25		2.5		4

ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	#			1	10
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	#	0.5		2.25	9.75
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	#	0.25	0.25	1	3.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	#			2.25	6.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	98	Ave	0.166666667	0.041666667	1.916666667	5.875
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	99	StdDev	17.45791898	31.71493033	22.13909365	71.0643333
ROBB-LEDFORD	2004	Site 3 Bench Site	1	#			7.5	
ROBB-LEDFORD	2004	Site 3 Bench Site	2	#			8.75	
ROBB-LEDFORD	2004	Site 3 Bench Site	3	#			10	
ROBB-LEDFORD	2004	Site 3 Bench Site	4	#	0.25		8.75	
ROBB-LEDFORD	2004	Site 3 Bench Site	5	#	0.25		8.75	
ROBB-LEDFORD	2004	Site 3 Bench Site	6	#	0.75		8.5	
ROBB-LEDFORD	2004	Site 3 Bench Site	98	Ave	0.208333333		8.708333333	
ROBB-LEDFORD	2004	Site 3 Bench Site	99	StdDev	14.15285274		82.36494979	
ROBB-LEDFORD	2008	Site 3 Bench Site	1	#			2.25	4
ROBB-LEDFORD	2008	Site 3 Bench Site	2	#			6.25	5.5
ROBB-LEDFORD	2008	Site 3 Bench Site	3	#			2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	4	#	0.5		4.5	3.75
ROBB-LEDFORD	2008	Site 3 Bench Site	5	#	1.5		2.25	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	6	#	2.5		5	0.25
ROBB-LEDFORD	2008	Site 3 Bench Site	98	Ave	0.75		3.791666667	3.083333333
ROBB-LEDFORD	2008	Site 3 Bench Site	99	StdDev	13.18052628		40.44541861	32.20424097
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	#	0.75		0.25	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	#	1		0.5	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	#	0.75		2.25	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	#	2		0.25	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	#	2		0.25	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	#	1.5			
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	98	Ave	1.333333333		0.583333333	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	99	StdDev	20.30171722		19.90079563	
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	1	#	0.75			1.25
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	#	1.75		0.25	0.75
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	3	#	1.25			0.25
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	98	Ave	0.625		0.041666667	0.375
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	99	StdDev	8.210025206		10.19420791	6.112515621
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	#	1.25		8.25	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	#	1.25		9.5	

ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	#	2.5	13.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	#	0.5	14.25
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	#	2.25	4.75
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	#	0.5	2
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	#	1.5	3.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	#	0.25	11
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	#	1.25	3.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	#	4	7
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	#	2.25	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	#	1	2.75
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	#	5	3.75
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	#	1.25	6.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	#	4	8
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	#	4.25	8.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	98	Ave	2.0625	6.828125
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	99	StdDev	48.6453639	165.9254478

Androsace sp_	Antennaria microphylla	Antennaria sp_	Arabis sp_	Arenaria congesta	Arnica sp_	Artemisia frigida	Artemisia ludoviciana	Artemisia tridentata	Artemisia tripartita
			0.75	0.5	0.25				
	2		0.25	1					
			1.25	1					
	0.25		0.25	1.75	1.5				
			0.5	1.5					
	0.25		0.75						
	0.416666667		0.625	0.958333333	0.291666667				
	17.74338035		12.43457415	14.84842397	22.37236173				
			0.25						
	0.5								
	0.25								
	0.25			0.5					
				0.5					
	1.5			1.75					
	0.416666667		0.041666667	0.458333333					
	16.33050305		35.79181218	18.77878963					
		8.25		0.25		1.75			
		16				3.75			
		12.5				3.5			
		17				7.5			
		14.75				3.5			
		20.5				2			
		14.83333333		0.041666667		3.666666667			
		164.8397247		26.9044735		37.50883384			
	11			0.5		0.5			
	18.25					1.5			

	12.25			1			
	14.75		0.25	1.75			
	18.25		0.25	1			
	16		0.25	0.75			
	15.08333333		0.208333333	1.083333333			
	189.8077259		14.92344469	14.17648761			
				5.5			
				3.5			
				3.25			
		0.25		7			
			0.25	2.75			
		0.25		3.25			
		0.083333333	0.041666667	4.208333333			
		18.31627995	26.4305957	37.54310794			
				4			
				7.25			
	0.25			1.5			
	0.25			5.5			
				1.5			
	0.25			2			
	0.125			3.625			
	14.04150181			38.49619314			
		1.75	3.5			36.75	
		6.5				39	
		6.75				45.5	
0.25		18.75	0.75			40.5	
0.25		6.5	0.5			49	
0.25		5			1.5	42.75	3.75
0.125		7.541666667	0.791666667		0.25	42.25	0.625
26.81780089		85.51445622	25.94599091		45.53249755	500.3923808	44.52059449
	3.75						
	6.25						
	4.75						
	2.458333333						
	31.95376977						
		3.75	6.25			22.25	
0.25		1.5				38.75	

			0.5	8	
			1.5	20.25	
	1.75		0.25	14	
				27.25	
	3.25	0.25		35.25	
	4.75			25	
	2	0.25		28	
	5.75			13	
0.25	10.25			19.5	
0.25	1.5		0.25	12.5	
	4		0.25	18	
	1.75		0.25	28.25	
	1.75			22.75	
	9.25				5.5
0.046875	3.203125	0.421875	0.1875	20.796875	0.34375
13.32376162	85.03757897	22.30521517	9.763391411	527.0337477	32.66409146

Asteraceae	Astragalus purshii	Astragalus sp_	Bare Soil	Besseya wyomingensis	Campanula rotundifolia	Carex filifolia	Carex sp_	Cerastium arvense	Ceratoides lanata
			0.75			7.5			
			9			5			
			17.25			2.25			
			5			5			
			0.25			8.75			
			1.75			22.75			
						8.541666667			
			21.0211809			34.8056276			
			0.5	2.5			11	16.5	
			1	2.75			8.5	8.75	
			1.5	1.5			8.25	2.25	
			0	2.75	0.25		12.5	4.75	
			0	4			14.5	3.25	
			0	6.5			30	8.75	
				3.333333333	0.041666667		14.125	7.375	
			12.42409826	39.84410448	34.9112466		185.4592102	93.80961376	
0.25			0	0.5			3.25	28.25	
0.75			1	2			3.5	14.25	
			2	0.5			5	5.5	
			5	0.5			8.75	2.75	
			7	1.25			10.75	16	
			1.75	1.25			14.25	11.75	
0.166666667				1			7.583333333	13.08333333	
24.31682873			29.86756552	14.23824848			85.31216338	150.8618249	
			19.5				1		
			19.5				0.5		
			19.5				0.5		
			19.5				1.25		
			26.5			0.5			
		0.5	28.5				0.5		
		0.083333333				0.083333333	0.625		
		26.34974436	248.9991552			26.34974436	10.58789272		
			22						
	0.25		18.25				1.5		

		11.25		1.75	
		19.5		2.25	
		27.5		0.75	
0.5	2	26.25		0.5	
0.125	0.333333333			1.125	
21.69489347	29.00580641	263.6946899		15.87032958	
	0.25	12.25		0.75	
		13.5		0.5	
		17		0.75	
	0.25	23		1	
	0.25	23.75	0.25		
	0.25	25.25		1	
	0.166666667		0.041666667	0.666666667	
	12.47135607	187.2803127	26.4305957	10.07609933	
	0.75	38.25		1.5	
	0.5	35.75		1.5	0.25
	1.25	28.75		1.25	1.5
	0.5	29.5		1	0.25
	0.25	34.5		0.75	
	0.5	42.75		1.5	
	0.625			1.25	0.333333333
	8.955829754	413.0632375		12.58920715	12.81995605
		5.75		0.75	
		3.5		0.5	
		2.25		0.75	
	0.25	13		0.25	
		31.75			
		16		1	
	0.041666667			0.541666667	
	47.21052143	138.7568817		19.90644787	
		9		1	
		16.75		2.5	
		2		1	
				0.75	
		61.7419726		9.561660275	
		57			
	0.25	22	0.25		

	39.25		1.75
0.5	11.5		
0.25	35.5		0.5
	35.75		0.5
	20.5		
	32.25	0.5	
	33	0.5	
	18		2.25
	31.25		1.75
1.5	45.25		0.5
	40.75	0.5	
	28		0.25
	16.75	0.25	
	25.5		1
0.15625		0.125	0.53125
11.51024404	756.094243	10.06918935	16.91132339

Chrysothamnus nauseosus	Chrysothamnus viscidiflorus	Comandra umbellata	Delphinium glaucum	Draba sp_	Erigeron compositus	Festuca idahoensis	Geum triflorum
						18.75	
						14.5	
						22	
						26	
						21	
						19	
						20.20833333	
						91.68356536	
	4		5.25			22.5	5.75
	0.25		4.5			20.25	12.25
	1.5		3.5	0.5		24	20.75
	0.5		1.25			25	21
			3.75			25.25	27
			4.75	0.25		20.25	16.75
	1.041666667		3.833333333	0.125		22.875	17.25
	17.21042663		46.3731531	23.77721394		304.630777	228.0009683
	3.75		1			19.25	6.75
			1.75			23.75	5.5
			2.25			33.25	25.25
	1.5		2.25			26.5	13.25
						38	24.25
			1.75			32.5	13
	0.875		1.5			28.875	14.66666667
	23.82019962		19.04004369			340.0384301	169.7968719
	0.5	0.25				13.5	
1.5		0.5				21.75	
		0.75				17.25	
	1.5	0.25				19.5	
	0.25					19.5	
	1.5					13.75	
0.25	0.625	0.291666667				17.54166667	
24.56913432	11.83762393	12.12281624				195.9119065	
	2.25	2.25				27.25	
		1				24	

		0.5		22.75	
	1.5	0.25		19.5	
	2			31	
	0.25	0.75	0.25	19.5	
	1	0.791666667	0.041666667	24	
	16.65335406	13.63331805	31.71493033	305.2439835	
	18				
	14.25				
3	24				
6.5	10.5				
	24				
1.5	20.25				
1.833333333	18.5				
21.83630175	180.9759678				
	16.75				
	17				
1.5	24				
6.75	14.5				
0.25	27.75				
4.25	20.25				
2.125	20.04166667				
26.18440051	234.6351303				
1.5			0.25	35.25	3.75
				30.75	
	0.25			26.25	
				15.75	
5.25				9.75	
1.5	1.5			2.75	
1.375	0.291666667		0.041666667	20.08333333	0.625
29.03350555	32.02407948		47.21052143	234.7664472	44.52059449
0.25				21.75	3.75
	0.5			18.25	
0.25				20.25	
0.083333333	0.083333333			10.04166667	0.625
6.99795357	9.896600847			136.6612867	14.22018079
	1.75				
	4.5				

3.75	6.75			
	1.75	1.5		
	3.5	1.75		
1.75	1.5			
1.5	0.5			
3.75	4.75			
1.75	2			1.75
3.75	7.25			4
	0.5			
1.75	1.75			1.5
0.25	8.5			1.75
1.75	1.75		0.25	
	5			
5.25	14.5			1.5
1.578125	4.140625	0.203125	0.015625	0.65625
46.55756423	99.72088167	17.32148768	24.00141394	26.38917532

Gutierrezia sarothrae	Heterotheca sp_	Heterotheca villosa	Iris missouriensis	Koeleria pyramidata	Leptodactylon pungens	Lichens	Litter	Lomatium sp_
							37.5	
							31.25	
							43	
							55.25	
							62.5	
							60	
							228.9583927	
							24	
							35.25	
							35.25	
							33.25	
							30.75	
							31	
							423.3257839	
							47.75	
				0.5			50.25	
							45.25	
							54.5	
							43.25	
							68.75	0.25
				0.083333333				0.041666667
				35.28797698			612.9238913	35.79181218
0.75	3.25						37.5	
1.75							35.25	
2.25	0.5						40	
							42.75	
1.5	0.25						33	
	0.25						33	
1.041666667	0.708333333							
13.90908601	12.05387933						418.3891681	
0.25			3	1.5		3.25	33.25	
				2		2	33.5	

0.5	0.25	1	2.25	33.75
	0.25	3.5	3.5	35.5
0.25	0.25	0.5	1.75	20.5
0.25	0.25	4.75	3.75	25.25
0.208333333	0.666666667	2.208333333	2.75	
14.92344469	13.14029532	25.4258294	31.8219966	386.7458978
3				19.5
0.5				21.75
3.25				28.5
1.75				35.5
3.25				30.75
5				33
2.791666667				
23.92636756				278.5229311
1		5.75	3.5	26.5
0.25		5	2.75	21.75
0.5		6.25	1.5	41
0.5		4.5	1.75	33.5
0.25		5.5	5.25	30.75
1.5		8.75	1	21.5
0.666666667		5.958333333	2.625	
9.051278173		66.06214413	26.95750149	344.0821859
				26.25
				26.25
				34.25
				26.25
	0.25			29.5
				28.5
	0.041666667			
	47.21052143			335.55463
				33.5
				55.75
				54.75
				330.0080307
		0.5		25.25
				60.75

				33.5
3.25				39.25
				33
0.25			1.5	40.5
			0.5	45.25
2				42.75
			0.25	43
1.5				47.25
1.5				40.5
			0.25	40.5
			1.5	35.75
		1.5	0.25	52.25
1.5			1.5	54.75
			1.5	52.5
0.625		0.125	0.453125	
22.93084848		15.92078627	14.56051111	1055.832982

Lupinus leucophyllus	Lupinus sp_	Machaeranthera canescens	Mertensia sp_	Monolepis nuttalliana	Opuntia polyacantha	Other Grasses	Pedicularis sp_	Penstemon sp_	Phlox hoodii
8.5							0.25		3.5
1.5						0.25	0.25		5.5
1.5				1.5					5
6.75									2
5.5									6
9			0.25				0.25		4.5
5.458333333			0.041666667	0.25		0.041666667	0.125		4.416666667
67.98698218			34.9112466	32.05696969		34.9112466	19.41401389		54.08093108
	4.25						0.25		3.25
	0.25								7.5
	0.25								6.75
	0.75								4.5
	3								5.25
	0.5								5.25
	1.5						0.041666667		5.416666667
	17.38110238						35.79181218		59.76236458
						1		1.75	9.25
						1.5		0.5	4
						3.75		0.5	4.5
						2.5		0.25	2
		1.5				1.25		0.5	5.25
						4.75		0.5	4.25
		0.25				2.458333333		0.666666667	4.875
		24.56913432				24.34537611		9.742310596	51.05473756
									10.5
								0.75	3.25

		0.5		0.25	4
				0.25	3
		0.25			5
				0.5	4
		0.125		0.291666667	4.958333333
		21.69489347		14.61452022	59.37779721
					11.25
					5
					8
					8.25
		1.75			4.75
		0.5			3
		0.375			6.708333333
		16.38967748			62.33232137
					17
					5.25
					8.5
			1.75		10.75
		0.25			5
			0.25		5.75
		0.041666667	0.333333333		8.708333333
		25.53167287	15.70117542		98.86427255
1.75					
0.5					0.25
0.25					
0.25					
					0.5
0.458333333					0.125
22.31918084					32.8449641
	8.5				
	1.5				0.25
	0.25				
	1.708333333				0.041666667
	21.79262267				10.19420791
		1			0.5
1.75		0.5	1.5		0.5

	1.5	3.5			0.25
	9.75	0.5			3.25
	8.25	1.25			0.5
	3	1.25			0.5
	10	2.25	0.25		0.25
	1.5	5			0.5
		2			0.25
	0.25	5.25			
	0.25	2			0.5
	1.5	5.25			2
		2.25			0.25
		0.75			0.5
	0.25	1.75			0.5
		2			0.5
0.109375	2.265625	2.28125	0.015625	0.09375	0.671875
22.41802558	67.82924728	54.00691094	24.00141394	22.42638783	15.60463152

Poa juncifolia	Poa sandbergii	Poa sp_	Polygonum douglasii	Potentilla gracilis	ROCK	Rosa sp_	Saxifraga sp_	Sedum lanceolatum	Selaginella densa	Senecio sp_
									18.5	
									5.25	
									7	
									1	
									2.75	
									1.25	
									5.958333333	
									22.40259265	
6.25										
2				1.75			0.25			
				1.5						
1.5										
1.625				0.541666667			0.041666667			
27.05372313				21.48016689			34.9112466			
0.25										
0.041666667										
35.79181218										
		2.75						0.25		
		2						0.5		
		6.5						0.75		
		2.75						1.75		
		4.25						2		
		7						1		
		4.208333333						1.041666667		
		43.55491558						11.35672117		
	0.25				13.5			0.75		
					14.75			1		

			11	3
0.25	0.25		11.25	1.5
			13.5	
0.25			11.25	1.5
0.125	0.041666667		12.54166667	1.291666667
17.71380634	31.71493033		156.9399231	17.36857395
12.25				
18.25				
10				
18.25				
17				
16				
15.29166667				
148.6241492				
13.75			5.5	4.5
12.25			3	1.25
8.75			2	1.75
5			3	0.5
11.25			2	0.25
10			4.5	0.5
10.16666667			3.333333333	1.458333333
116.3047748			35.09879822	14.47694327
3.25				
1				
0.5				
7				
6				
6.75				
4.083333333				
45.81795196				
1.75			0.25	
2.25				
0.5			0.5	
0.75			0.125	
9.561660275			6.854324973	
3.25		0.25		
4		0.75		

7		1		
6				
7.5				
8.75		0.5		
14.75		0.5	0.25	
11.25		0.25		
7.5		0.25	0.25	
14.75		0.25		0.25
18		0.75		1.5
7.5		0.5		
13.5		1		0.25
8.5		0.5		
	21.5	0.5		
	18	1		
8.265625	2.46875	0.5	0.03125	0.125
215.2566687	165.7663157	12.06216893	16.61238801	12.99926756

Sphaeralcea coccinea	Stipa comata	Stipa nelsonii	Stipa sp_	Taraxacum officinale	Taraxacum sp_	Tetradymia canescens	unknown Boraginaceae	Unknown forb	unknown mustard
		0.25		2.25					0.25
		1.75		2				0.5	0.25
		0.5		1.75					0.5
		0.25		3.5					0.25
		0.75			3.75				0.5
				0.5					0.25
		0.583333333		1.666666667	0.625			0.083333333	0.333333333
		13.58908365		21.43353745	30.45836183			34.24640087	12.76920757
		2		0.5					
		2							0.25
		0.25		0.25					
		1.75		0.25					
		1		0.166666667					0.041666667
		17.43822181		19.85460752					35.79181218
0.75						0.25			
0.25						0.75			
0.25						0.25			
0.25						0.25			
0.25						3.25			
0.291666667						0.791666667			
10.84297648						11.07113991			
						0.25		0.25	
0.25						0.25		0.75	

0.25					0.5	
					2	0.25
1.5					0.5	1.5
0.25					0.25	0.25
0.375					0.625	0.5
14.4207906					11.89073032	12.84006858
1.5						
0.5					0.25	
0.75					2.25	
0.25					0.5	
1.25				0.25	2.5	
1					0.75	
0.875				0.041666667	1.041666667	
9.576386371				26.4305957	11.15864139	
1.75	0.5					
1			0.25		2.5	
0.5					3.25	
0.5	0.25		0.25		2.5	0.5
0.25			0.25		2.5	
1.25					2	
0.875	0.125		0.125		2.125	0.083333333
9.900474058	17.19725733		14.04150181		23.42003979	24.90338972
				0.25		
			0.25		3.25	0.25
			1.5		0.25	0.25
				0.75		0.75
				0.5		
				0.75	0.25	0.75
			0.291666667	0.375	0.625	0.333333333
			32.02407948	22.44901631	25.70397721	22.53862426
			0.25			
			0.25		0.75	0.25
			0.083333333		0.125	0.041666667
			6.99795357		9.693479338	10.19420791
		0.5				
		1.75		0.25	1.75	

		0.5		1.5			
	1.5	2	0.25	3.25			
			0.25	1.5			
		3.25					
				0.25		0.25	
						0.25	
				0.25	0.25	0.25	
				3.75			
		5.5		1.5			
		2.25	0.25	0.25	0.25	0.25	
		8.5			0.25		
0.25		6.25	0.25		0.25		0.25
0.5			0.25		0.25		
0.046875	0.09375	1.90625	0.09375	0.875	0.078125	0.0625	0.015625
16.31820871	22.42638783	59.76058053	9.155534493	26.46369184	10.08035586	11.37917913	24.00141394

Viola sp_____

0.75
0.5
0.5
0.5
0.25
0.416666667
20.01353709

ROBB/LEDFORD WMA - SITE 1

Location	Year	SiteName	TransectNumber	TransDesc	Achillea millefolium	Agoseris glauca	Agropyron smithii	Agropyron sp_	Agropyron spicatum	Androsace sp_
ROBB-LEDFORD	2003	Site 1 High Elevation Site	1	#			2.75			
ROBB-LEDFORD	2003	Site 1 High Elevation Site	2	#			2.75			
ROBB-LEDFORD	2003	Site 1 High Elevation Site	3	#			4.25			
ROBB-LEDFORD	2003	Site 1 High Elevation Site	4	#			0.75			
ROBB-LEDFORD	2003	Site 1 High Elevation Site	5	#			0.75			
ROBB-LEDFORD	2003	Site 1 High Elevation Site	6	#			0.5			
ROBB-LEDFORD	2003	Site 1 High Elevation Site	98	Ave			1.958333333			
ROBB-LEDFORD	2003	Site 1 High Elevation Site	99	StdDev			5.933758568			
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	#	2.75	2.5	7			
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	#	1	3.5	11.75			
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	#	1	2.25	13.25			
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	#	0.5	0.75	5			
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	#	2.5	4.75			7.5	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	#	2.5	1.75	22.5			
ROBB-LEDFORD	2004	Site 1 High Elevation Site	98	Ave	1.708333333	2.583333333	9.916666667		1.25	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	99	StdDev	20.00886667	30.29113174	140.4919803		38.19226761	
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	#	0.5	0.75			1.5	
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	#	0.25			3.5		
ROBB-LEDFORD	2008	Site 1 High Elevation Site	3	#		0.75		1.25		
ROBB-LEDFORD	2008	Site 1 High Elevation Site	4	#	0.25	0.5		1.5		
ROBB-LEDFORD	2008	Site 1 High Elevation Site	5	#	0.75	4.25		1		
ROBB-LEDFORD	2008	Site 1 High Elevation Site	6	#		0.5		4.5		
ROBB-LEDFORD	2008	Site 1 High Elevation Site	98	Ave	0.291666667	1.125		1.958333333	0.25	
ROBB-LEDFORD	2008	Site 1 High Elevation Site	99	StdDev	16.66717447	16.27838333		23.40375534	33.64507868	

Antennaria microphylla	Antennaria sp_	Arabis sp_	Arenaria congesta	Arnica sp_	Artemisia frigida	Artemisia ludoviciana	Artemisia tridentata	Artemisia tripartita	Asteraceae
		0.75	0.5	0.25					
2		0.25	1						
		1.25	1						
0.25		0.25	1.75	1.5					
		0.5	1.5						
0.25		0.75							
0.416666667		0.625	0.958333333	0.291666667					
17.74338035		12.43457415	14.84842397	22.37236173					
		0.25							0.25
0.5									0.75
0.25									
0.25			0.5						
			0.5						
1.5			1.75						
0.416666667		0.041666667	0.458333333						0.166666667
16.33050305		35.79181218	18.77878963						24.31682873

Astragalus purshii	Astragalus sp_	Bare Soil	Besseya wyomingensis	Campanula rotundifolia	Carex filifolia	Carex sp_	Cerastium arvense	Ceratoides lanata	Chrysothamnus nauseosus
		0.75			7.5				
		9			5				
		17.25			2.25				
		5			5				
		0.25			8.75				
		1.75			22.75				
					8.541666667				
		21.021181			34.8056276				
		0.5	2.5			11	16.5		
		1	2.75			8.5	8.75		
		1.5	1.5			8.25	2.25		
		0	2.75	0.25		12.5	4.75		
		0	4			14.5	3.25		
		0	6.5			30	8.75		
			3.333333333	0.041666667		14.125	7.375		
		12.424098	39.84410448	34.9112466		185.4592102	93.80961376		
		0	0.5			3.25	28.25		
		1	2			3.5	14.25		
		2	0.5			5	5.5		
		5	0.5			8.75	2.75		
		7	1.25			10.75	16		
		1.75	1.25			14.25	11.75		
			1			7.583333333	13.08333333		
		29.867566	14.23824848			85.31216338	150.8618249		

Chrysothamnus viscidiflorus	Comandra umbellata	Delphinium glaucum	Draba sp_	Erigeron compositus	Festuca idahoensis	Geum triflorum	Gutierrezia sarothrae	Heterotheca sp_	Heterotheca villosa
					18.75				
					14.5				
					22				
					26				
					21				
					19				
					20.20833333				
					91.68356536				
4		5.25			22.5	5.75			
0.25		4.5			20.25	12.25			
1.5		3.5	0.5		24	20.75			
0.5		1.25			25	21			
		3.75			25.25	27			
		4.75	0.25		20.25	16.75			
1.041666667		3.833333333	0.125		22.875	17.25			
17.21042663		46.3731531	23.77721394		304.630777	228.0009683			
3.75		1			19.25	6.75			
		1.75			23.75	5.5			
		2.25			33.25	25.25			
1.5		2.25			26.5	13.25			
					38	24.25			
		1.75			32.5	13			
0.875		1.5			28.875	14.66666667			
23.82019962		19.04004369			340.0384301	169.7968719			

Iris missouriensis	Koeleria pyramidata	Leptodactylon pungens	Lichens	Litter	Lomatium sp_	Lupinus leucophyllus	Lupinus sp_	Machaeranthera canescens	Mertensia sp_
				37.5					
				31.25					
				43					
				55.25					
				62.5					
				60					
				228.9583927					
				24		8.5			
				35.25		1.5			
				35.25		1.5			
				33.25		6.75			
				30.75		5.5			
				31		9			0.25
						5.458333333			0.041666667
				423.3257839		67.98698218			34.9112466
				47.75			4.25		
	0.5			50.25			0.25		
				45.25			0.25		
				54.5			0.75		
				43.25			3		
				68.75	0.25		0.5		
	0.083333333				0.041666667		1.5		
	35.28797698			612.9238913	35.79181218		17.38110238		

Monolepis nuttalliana	Opuntia polyacantha	Other Grasses	Pedicularis sp_	Penstemon sp_	Phlox hoodii	Poa juncifolia	Poa sandbergii	Poa sp_	Polygonum douglasii
			0.25		3.5	6.25			
		0.25	0.25		5.5				
1.5					5	2			
					2				
					6	1.5			
			0.25		4.5				
0.25		0.041666667	0.125		4.416666667	1.625			
32.05696969		34.9112466	19.41401389		54.08093108	27.05372313			
			0.25		3.25	0.25			
					7.5				
					6.75				
					4.5				
					5.25				
					5.25				
			0.041666667		5.416666667	0.041666667			
			35.79181218		59.76236458	35.79181218			

Potentilla gracilis	ROCK	Rosa sp_	Saxifraga sp_	Sedum lanceolatum	Selaginella densa	Senecio sp_	Sphaeralcea coccinea	Stipa comata	Stipa nelsonii	Stipa sp_
					18.5					
					5.25					
					7					
					1					
					2.75					
					1.25					
					5.958333333					
					22.40259265					
									0.25	
									1.75	
1.75			0.25						0.5	
1.5									0.25	
									0.75	
0.541666667			0.041666667						0.583333333	
21.48016689			34.9112466						13.58908365	
									2	
									2	
									0.25	
									1.75	
									1	
									17.43822181	

Taraxacum officinale	Taraxacum sp_	Tetradymia canescens	unknown Boraginaceae	Unknown forb	unknown mustard	Viola sp_
2.25					0.25	
2				0.5	0.25	
1.75					0.5	
3.5					0.25	
	3.75				0.5	
0.5					0.25	
1.666666667	0.625			0.083333333	0.333333333	
21.43353745	30.45836183			34.24640087	12.76920757	
0.5						
					0.25	
0.25						
0.25						
0.166666667					0.041666667	
19.85460752					35.79181218	

ROBB/LEDFORD WMA - SITE 2

Location	Year	SiteName	TransectNumber	TransDesc	Achillea millefolium	Agoseris glauca	Agropyron smithii	Agropyron sp_	Agropyron spicatum
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	#					14.75
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	#	0.25				9.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	#	0.25				12
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	#	0.75				16
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	#					8.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	#					15.75
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	98	Ave	0.208333333				12.75
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	99	StdDev	14.40120397				140.9513169
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	#			2.5		1.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	#	0.25		2.5		4
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	#			1		10
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	#	0.5		2.25		9.75
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	#	0.25	0.25	1		3.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	#			2.25		6.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	98	Ave	0.166666667	0.041666667	1.916666667		5.875
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	99	StdDev	17.45791898	31.71493033	22.13909365		71.0643333

Androsace sp_	Antennaria microphylla	Antennaria sp_	Arabis sp_	Arenaria congesta	Arnica sp_	Artemisia frigida	Artemisia ludoviciana	Artemisia tridentata	Artemisia tripartita
		8.25		0.25		1.75			
		16				3.75			
		12.5				3.5			
		17				7.5			
		14.75				3.5			
		20.5				2			
		14.83333333		0.041666667		3.666666667			
		164.8397247		26.9044735		37.50883384			
	11			0.5		0.5			
	18.25					1.5			
	12.25					1			
	14.75			0.25		1.75			
	18.25			0.25		1			
	16			0.25		0.75			
	15.08333333			0.208333333		1.083333333			
	189.8077259			14.92344469		14.17648761			

Asteraceae	Astragalus purshii	Astragalus sp_	Bare Soil	Besseya wyomingensis	Campanula rotundifolia	Carex filifolia	Carex sp_	Cerastium arvense	Ceratoides lanata
			19.5				1		
			19.5				0.5		
			19.5				0.5		
			19.5				1.25		
			26.5			0.5			
		0.5	28.5				0.5		
		0.083333333				0.083333333	0.625		
		26.34974436	248.9991552			26.34974436	10.58789272		
			22						
	0.25		18.25				1.5		
			11.25				1.75		
			19.5				2.25		
			27.5				0.75		
	0.5	2	26.25				0.5		
	0.125	0.333333333					1.125		
	21.69489347	29.00580641	263.6946899				15.87032958		

Chrysothamnus nauseosus	Chrysothamnus viscidiflorus	Comandra umbellata	Delphinium glaucum	Draba sp_	Erigeron compositus	Festuca idahoensis	Geum triflorum
	0.5	0.25				13.5	
1.5		0.5				21.75	
		0.75				17.25	
	1.5	0.25				19.5	
	0.25					19.5	
	1.5					13.75	
0.25	0.625	0.291666667				17.54166667	
24.56913432	11.83762393	12.12281624				195.9119065	
	2.25	2.25				27.25	
		1				24	
		0.5				22.75	
	1.5	0.25				19.5	
	2					31	
	0.25	0.75			0.25	19.5	
	1	0.791666667			0.041666667	24	
	16.65335406	13.63331805			31.71493033	305.2439835	

Gutierrezia sarothrae	Heterotheca sp_	Heterotheca villosa	Iris missouriensis	Koeleria pyramidata	Leptodactylon pungens	Lichens	Litter	Lomatium sp_
0.75	3.25						37.5	
1.75							35.25	
2.25	0.5						40	
							42.75	
1.5	0.25						33	
	0.25						33	
1.041666667	0.708333333							
13.90908601	12.05387933						418.3891681	
0.25		3		1.5		3.25	33.25	
				2		2	33.5	
0.5		0.25		1		2.25	33.75	
		0.25		3.5		3.5	35.5	
0.25		0.25		0.5		1.75	20.5	
0.25		0.25		4.75		3.75	25.25	
0.208333333		0.666666667		2.208333333		2.75		
14.92344469		13.14029532		25.4258294		31.8219966	386.7458978	

Lupinus leucophyllus	Lupinus sp_	Machaeranthera canescens	Mertensia sp_	Monolepis nuttalliana	Opuntia polyacantha	Other Grasses	Pedicularis sp_	Penstemon sp_	Phlox hoodii
						1		1.75	9.25
						1.5		0.5	4
						3.75		0.5	4.5
						2.5		0.25	2
		1.5				1.25		0.5	5.25
						4.75		0.5	4.25
		0.25				2.458333333		0.666666667	4.875
		24.56913432				24.34537611		9.742310596	51.05473756
									10.5
								0.75	3.25
		0.5						0.25	4
								0.25	3
		0.25							5
								0.5	4
		0.125						0.291666667	4.958333333
		21.69489347						14.61452022	59.37779721

Poa juncifolia	Poa sandbergii	Poa sp_	Polygonum douglasii	Potentilla gracilis	ROCK	Rosa sp_	Saxifraga sp_	Sedum lanceolatum	Selaginella densa	Senecio sp_
		2.75						0.25		
		2						0.5		
		6.5						0.75		
		2.75						1.75		
		4.25						2		
		7						1		
		4.208333333						1.041666667		
		43.55491558						11.35672117		
	0.25				13.5			0.75		
					14.75			1		
					11			3		
	0.25	0.25			11.25			1.5		
					13.5					
	0.25				11.25			1.5		
	0.125	0.041666667			12.54166667			1.291666667		
	17.71380634	31.71493033			156.9399231			17.36857395		

Sphaeralcea coccinea	Stipa comata	Stipa nelsonii	Stipa sp_	Taraxacum officinale	Taraxacum sp_	Tetradymia canescens	unknown Boraginaceae	Unknown forb	unknown mustard
0.75						0.25			
0.25						0.75			
0.25						0.25			
0.25						0.25			
0.25						3.25			
0.291666667						0.791666667			
10.84297648						11.07113991			
						0.25		0.25	
0.25						0.25		0.75	
0.25						0.5			
						2		0.25	
1.5						0.5		1.5	
0.25						0.25		0.25	
0.375						0.625		0.5	
14.4207906						11.89073032		12.84006858	

Viola sp_____

ROBB/LEDFORD WMA - SITE 3

Location	Year	SiteName	TransectNumber	TransDesc	Achillea millefolium	Agoseris glauca	Agropyron smithii	Agropyron sp_	Agropyron spicatum
ROBB-LEDFORD	2004	Site 3 Bench Site	1	#			7.5		
ROBB-LEDFORD	2004	Site 3 Bench Site	2	#			8.75		
ROBB-LEDFORD	2004	Site 3 Bench Site	3	#			10		
ROBB-LEDFORD	2004	Site 3 Bench Site	4	#	0.25		8.75		
ROBB-LEDFORD	2004	Site 3 Bench Site	5	#	0.25		8.75		
ROBB-LEDFORD	2004	Site 3 Bench Site	6	#	0.75		8.5		
ROBB-LEDFORD	2004	Site 3 Bench Site	98	Ave	0.208333333		8.708333333		
ROBB-LEDFORD	2004	Site 3 Bench Site	99	StdDev	14.15285274		82.36494979		
ROBB-LEDFORD	2008	Site 3 Bench Site	1	#			2.25		4
ROBB-LEDFORD	2008	Site 3 Bench Site	2	#			6.25		5.5
ROBB-LEDFORD	2008	Site 3 Bench Site	3	#			2.5		2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	4	#	0.5		4.5		3.75
ROBB-LEDFORD	2008	Site 3 Bench Site	5	#	1.5		2.25		2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	6	#	2.5		5		0.25
ROBB-LEDFORD	2008	Site 3 Bench Site	98	Ave	0.75		3.791666667		3.083333333
ROBB-LEDFORD	2008	Site 3 Bench Site	99	StdDev	13.18052628		40.44541861		32.20424097

Androsace sp_	Antennaria microphylla	Antennaria sp_	Arabis sp_	Arenaria congesta	Arnica sp_	Artemisia frigida	Artemisia ludoviciana	Artemisia tridentata	Artemisia tripartita
						5.5			
						3.5			
						3.25			
		0.25				7			
			0.25			2.75			
		0.25				3.25			
		0.083333333	0.041666667			4.208333333			
		18.31627995	26.4305957			37.54310794			
						4			
						7.25			
	0.25					1.5			
	0.25					5.5			
						1.5			
	0.25					2			
	0.125					3.625			
	14.04150181					38.49619314			

Asteraceae	Astragalus purshii	Astragalus sp_	Bare Soil	Besseya wyomingensis	Campanula rotundifolia	Carex filifolia	Carex sp_	Cerastium arvense	Ceratoides lanata
		0.25	12.25				0.75		
			13.5				0.5		
			17				0.75		
		0.25	23				1		
		0.25	23.75			0.25			
		0.25	25.25				1		
		0.166666667				0.041666667	0.666666667		
		12.47135607	187.2803127			26.4305957	10.07609933		
		0.75	38.25				1.5		
		0.5	35.75				1.5		0.25
		1.25	28.75				1.25		1.5
		0.5	29.5				1		0.25
		0.25	34.5				0.75		
		0.5	42.75				1.5		
		0.625					1.25		0.333333333
		8.955829754	413.0632375				12.58920715		12.81995605

Chrysothamnus nauseosus	Chrysothamnus viscidiflorus	Comandra umbellata	Delphinium glaucum	Draba sp_	Erigeron compositus	Festuca idahoensis	Geum triflorum
	18						
	14.25						
3	24						
6.5	10.5						
	24						
1.5	20.25						
1.833333333	18.5						
21.83630175	180.9759678						
	16.75						
	17						
1.5	24						
6.75	14.5						
0.25	27.75						
4.25	20.25						
2.125	20.04166667						
26.18440051	234.6351303						

Gutierrezia sarothrae	Heterotheca sp_	Heterotheca villosa	Iris missouriensis	Koeleria pyramidata	Leptodactylon pungens	Lichens	Litter	Lomatium sp_
3							19.5	
0.5							21.75	
3.25							28.5	
1.75							35.5	
3.25							30.75	
5							33	
2.791666667								
23.92636756							278.5229311	
1				5.75		3.5	26.5	
0.25				5		2.75	21.75	
0.5				6.25		1.5	41	
0.5				4.5		1.75	33.5	
0.25				5.5		5.25	30.75	
1.5				8.75		1	21.5	
0.666666667				5.958333333		2.625		
9.051278173				66.06214413		26.95750149	344.0821859	

Lupinus leucophyllus	Lupinus sp_	Machaeranthera canescens	Mertensia sp_	Monolepis nuttalliana	Opuntia polyacantha	Other Grasses	Pedicularis sp_	Penstemon sp_	Phlox hoodii
									11.25
									5
									8
									8.25
		1.75							4.75
		0.5							3
		0.375							6.708333333
		16.38967748							62.33232137
									17
									5.25
									8.5
						1.75			10.75
		0.25							5
						0.25			5.75
		0.041666667				0.333333333			8.708333333
		25.53167287				15.70117542			98.86427255

Poa juncifolia	Poa sandbergii	Poa sp_	Polygonum douglasii	Potentilla gracilis	ROCK	Rosa sp_	Saxifraga sp_	Sedum lanceolatum	Selaginella densa	Senecio sp_
	12.25									
	18.25									
	10									
	18.25									
	17									
	16									
	15.29166667									
	148.6241492									
	13.75				5.5				4.5	
	12.25				3				1.25	
	8.75				2				1.75	
	5				3				0.5	
	11.25				2				0.25	
	10				4.5				0.5	
	10.16666667				3.333333333				1.458333333	
	116.3047748				35.09879822				14.47694327	

Sphaeralcea coccinea	Stipa comata	Stipa nelsonii	Stipa sp_	Taraxacum officinale	Taraxacum sp_	Tetradymia canescens	unknown Boraginaceae	Unknown forb	unknown mustard
1.5									
0.5						0.25			
0.75						2.25			
0.25						0.5			
1.25					0.25	2.5			
1						0.75			
0.875					0.041666667	1.041666667			
9.576386371					26.4305957	11.15864139			
1.75	0.5								
1				0.25		2.5			
0.5						3.25			
0.5	0.25			0.25		2.5		0.5	
0.25				0.25		2.5			
1.25						2			
0.875	0.125			0.125		2.125		0.083333333	
9.900474058	17.19725733			14.04150181		23.42003979		24.90338972	

Viola sp_____

ROBB/LEDFORD WMA - SITE 4

Location	Year	SiteName	TransectNumber	TransDesc	Achillea millefolium	Agoseris glauca	Agropyron smithii	Agropyron sp_	Agropyron spicatum
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	#	0.75		0.25		
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	#	1		0.5		
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	#	0.75		2.25		
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	#	2		0.25		
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	#	2		0.25		
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	#	1.5				
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	98	Ave	1.333333333		0.583333333		
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	99	StdDev	20.30171722		19.90079563		
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	1	#	0.75				1.25
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	#	1.75		0.25		0.75
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	3	#	1.25				0.25
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	98	Ave	0.625		0.041666667		0.375
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	99	StdDev	8.210025206		10.19420791		6.112515621

Androsace sp_	Antennaria microphylla	Antennaria sp_	Arabis sp_	Arenaria congesta	Arnica sp_	Artemisia frigida	Artemisia ludoviciana	Artemisia tridentata	Artemisia tripartita
		1.75	3.5					36.75	
		6.5						39	
		6.75						45.5	
0.25		18.75	0.75					40.5	
0.25		6.5	0.5					49	
0.25		5					1.5	42.75	3.75
0.125		7.541666667	0.791666667				0.25	42.25	0.625
26.81780089		85.51445622	25.94599091				45.53249755	500.3923808	44.52059449
	3.75								
	6.25								
	4.75								
	2.458333333								
	31.95376977								

Asteraceae	Astragalus purshii	Astragalus sp_	Bare Soil	Besseya wyomingensis	Campanula rotundifolia	Carex filifolia	Carex sp_	Cerastium arvense	Ceratoides lanata
			5.75				0.75		
			3.5				0.5		
			2.25				0.75		
		0.25	13				0.25		
			31.75						
			16				1		
		0.041666667					0.541666667		
		47.21052143	138.7568817				19.90644787		
			9				1		
			16.75				2.5		
			2				1		
							0.75		
			61.7419726				9.561660275		

Chrysothamnus nauseosus	Chrysothamnus viscidiflorus	Comandra umbellata	Delphinium glaucum	Draba sp_	Erigeron compositus	Festuca idahoensis	Geum triflorum
1.5				0.25		35.25	3.75
						30.75	
	0.25					26.25	
						15.75	
5.25						9.75	
1.5	1.5					2.75	
1.375	0.291666667			0.041666667		20.08333333	0.625
29.03350555	32.02407948			47.21052143		234.7664472	44.52059449
0.25						21.75	3.75
	0.5					18.25	
0.25						20.25	
0.083333333	0.083333333					10.04166667	0.625
6.99795357	9.896600847					136.6612867	14.22018079

Gutierrezia sarothrae	Heterotheca sp_	Heterotheca villosa	Iris missouriensis	Koeleria pyramidata	Leptodactylon pungens	Lichens	Litter	Lomatium sp_
							26.25	
							26.25	
							34.25	
							26.25	
			0.25				29.5	
							28.5	
			0.041666667					
			47.21052143				335.55463	
							33.5	
							55.75	
							54.75	
							330.0080307	

Lupinus leucophyllus	Lupinus sp_	Machaeranthera canescens	Mertensia sp_	Monolepis nuttalliana	Opuntia polyacantha	Other Grasses	Pedicularis sp_	Penstemon sp_	Phlox hoodii
1.75									
0.5									0.25
0.25									
0.25									
									0.5
0.458333333									0.125
22.31918084									32.8449641
	8.5								
	1.5								0.25
	0.25								
	1.708333333								0.041666667
	21.79262267								10.19420791

Poa juncifolia	Poa sandbergii	Poa sp_	Polygonum douglasii	Potentilla gracilis	ROCK	Rosa sp_	Saxifraga sp_	Sedum lanceolatum	Selaginella densa	Senecio sp_
	3.25									
	1									
	0.5									
	7									
	6									
	6.75									
	4.083333333									
	45.81795196									
	1.75					0.25				
	2.25									
	0.5					0.5				
	0.75					0.125				
	9.561660275					6.854324973				

Sphaeralcea coccinea	Stipa comata	Stipa nelsonii	Stipa sp_	Taraxacum officinale	Taraxacum sp_	Tetradymia canescens	unknown Boraginaceae	Unknown forb	unknown mustard
					0.25				
				0.25		3.25		0.25	
				1.5		0.25		0.25	
					0.75			0.75	
					0.5				
					0.75	0.25		0.75	
				0.291666667	0.375	0.625		0.333333333	
				32.02407948	22.44901631	25.70397721		22.53862426	
				0.25					
				0.25		0.75		0.25	
				0.083333333		0.125		0.041666667	
				6.99795357		9.693479338		10.19420791	

Viola sp_
0.75
0.5
0.5
0.5
0.25
0.416666667
20.01353709

ROBB/LEDFORD WMA - SITE 5

Location	Year	SiteName	TransectNumber	TransDesc	Achillea millefolium	Agoseris glauca	Agropyron smithii	Agropyron sp_	Agropyron spicatum
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	#	1.25		8.25		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	#	1.25		9.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	#	2.5		13.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	#	0.5		14.25		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	#	2.25		4.75		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	#	0.5		2		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	#	1.5		3.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	#	0.25		11		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	#	1.25		3.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	#	4		7		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	#	2.25		2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	#	1		2.75		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	#	5		3.75		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	#	1.25		6.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	#	4		8		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	#	4.25		8.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	98	Ave	2.0625		6.828125		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	99	StdDev	48.6453639		165.9254478		

Androsace sp_	Antennaria microphylla	Antennaria sp_	Arabis sp_	Arenaria congesta	Arnica sp_	Artemisia frigida	Artemisia ludoviciana	Artemisia tridentata	Artemisia tripartita
		3.75	6.25					22.25	
0.25		1.5						38.75	
						0.5		8	
						1.5		20.25	
		1.75				0.25		14	
								27.25	
		3.25	0.25					35.25	
		4.75						25	
		2	0.25					28	
		5.75						13	
0.25		10.25						19.5	
0.25		1.5				0.25		12.5	
		4				0.25		18	
		1.75				0.25		28.25	
		1.75						22.75	
		9.25							5.5
0.046875		3.203125	0.421875			0.1875		20.796875	0.34375
13.32376162		85.03757897	22.30521517			9.763391411		527.0337477	32.66409146

Asteraceae	Astragalus purshii	Astragalus sp_	Bare Soil	Besseya wyomingensis	Campanula rotundifolia	Carex filifolia	Carex sp_	Cerastium arvense	Ceratoides lanata
			57						
		0.25	22			0.25			
			39.25				1.75		
		0.5	11.5						
		0.25	35.5				0.5		
			35.75				0.5		
			20.5						
			32.25			0.5			
			33			0.5			
			18				2.25		
			31.25				1.75		
		1.5	45.25				0.5		
			40.75			0.5			
			28				0.25		
			16.75			0.25			
			25.5				1		
		0.15625				0.125	0.53125		
		11.51024404	756.094243			10.06918935	16.91132339		

Chrysothamnus nauseosus	Chrysothamnus viscidiflorus	Comandra umbellata	Delphinium glaucum	Draba sp_	Erigeron compositus	Festuca idahoensis	Geum triflorum
	1.75						
	4.5						
3.75	6.75						
	1.75	1.5					
	3.5	1.75					
1.75	1.5						
1.5	0.5						
3.75	4.75						
1.75	2					1.75	
3.75	7.25					4	
	0.5						
1.75	1.75					1.5	
0.25	8.5					1.75	
1.75	1.75			0.25			
	5						
5.25	14.5					1.5	
1.578125	4.140625	0.203125		0.015625		0.65625	
46.55756423	99.72088167	17.32148768		24.00141394		26.38917532	

Gutierrezia sarothrae	Heterotheca sp_	Heterotheca villosa	Iris missouriensis	Koeleria pyramidata	Leptodactylon pungens	Lichens	Litter	Lomatium sp_
				0.5			25.25	
							60.75	
							33.5	
3.25							39.25	
							33	
0.25						1.5	40.5	
						0.5	45.25	
2							42.75	
						0.25	43	
1.5							47.25	
1.5							40.5	
						0.25	40.5	
						1.5	35.75	
				1.5		0.25	52.25	
1.5						1.5	54.75	
						1.5	52.5	
0.625				0.125		0.453125		
22.93084848				15.92078627		14.56051111	1055.832982	

Lupinus leucophyllus	Lupinus sp_	Machaeranthera canescens	Mertensia sp_	Monolepis nuttalliana	Opuntia polyacantha	Other Grasses	Pedicularis sp_	Penstemon sp_	Phlox hoodii
		1							0.5
1.75		0.5				1.5			0.5
	1.5	3.5							0.25
	9.75	0.5							3.25
	8.25	1.25							0.5
	3	1.25							0.5
	10	2.25			0.25				0.25
	1.5	5							0.5
		2							0.25
	0.25	5.25							
	0.25	2							0.5
	1.5	5.25							2
		2.25							0.25
		0.75							0.5
	0.25	1.75							0.5
		2							0.5
0.109375	2.265625	2.28125			0.015625	0.09375			0.671875
22.41802558	67.82924728	54.00691094			24.00141394	22.42638783			15.60463152

Poa juncifolia	Poa sandbergii	Poa sp_	Polygonum douglasii	Potentilla gracilis	ROCK	Rosa sp_	Saxifraga sp_	Sedum lanceolatum	Selaginella densa	Senecio sp_
	3.25		0.25							
	4		0.75							
	7		1							
	6									
	7.5									
	8.75		0.5							
	14.75		0.5			0.25				
	11.25		0.25							
	7.5		0.25			0.25				
	14.75		0.25							0.25
	18		0.75							1.5
	7.5		0.5							
	13.5		1							0.25
	8.5		0.5							
		21.5	0.5							
		18	1							
	8.265625	2.46875	0.5			0.03125				0.125
	215.2566687	165.7663157	12.06216893			16.61238801				12.99926756

Sphaeralcea coccinea	Stipa comata	Stipa nelsonii	Stipa sp_	Taraxacum officinale	Taraxacum sp_	Tetradymia canescens	unknown Boraginaceae	Unknown forb	unknown mustard
			0.5						
			1.75		0.25	1.75			
			0.5			1.5			
		1.5	2		0.25	3.25			
					0.25	1.5			
			3.25						
						0.25		0.25	
								0.25	
						0.25	0.25	0.25	
						3.75			
			5.5			1.5			
			2.25		0.25	0.25	0.25	0.25	
			8.5				0.25		
0.25			6.25		0.25		0.25		0.25
0.5					0.25		0.25		
0.046875	0.09375		1.90625		0.09375	0.875	0.078125	0.0625	0.015625
16.31820871	22.42638783		59.76058053		9.155534493	26.46369184	10.08035586	11.37917913	24.00141394

Viola sp_____

LINE INTERSEPT DATA - ROBB/LEDFORD WMA

Location	SiteName	TransectNu	Year	ScientificName	TransectLe	InterceptLength	PercentCanopy	Comments
ROBB-LEDFORD	Site 4 Robb Creek Site	1	2008	Artemisia tridentata wyomingensis	3000	1050	35	
ROBB-LEDFORD	Site 4 Robb Creek Site	1	2003	Artemisia tridentata	3000	773	25.76666667	
ROBB-LEDFORD	Site 4 Robb Creek Site	2	2003	Artemisia tridentata	3000	1022	34.06666667	
ROBB-LEDFORD	Site 4 Robb Creek Site	2	2008	Artemisia tridentata wyomingensis	3000	1199	39.96666667	
ROBB-LEDFORD	Site 4 Robb Creek Site	3	2008	Artemisia tridentata wyomingensis	3000	1269	42.3	
ROBB-LEDFORD	Site 4 Robb Creek Site	3	2003	Artemisia tridentata	3000	1012	33.73333333	
ROBB-LEDFORD	Site 4 Robb Creek Site	4	2003	Artemisia tridentata	3000	1092	36.4	
ROBB-LEDFORD	Site 4 Robb Creek Site	4	2008	Artemisia tridentata wyomingensis	3000	1216	40.53333333	
ROBB-LEDFORD	Site 4 Robb Creek Site	5	2008	Artemisia tridentata wyomingensis	3000	1077	35.9	
ROBB-LEDFORD	Site 4 Robb Creek Site	5	2003	Artemisia tridentata	3000	840	28	
ROBB-LEDFORD	Site 4 Robb Creek Site	6	2003	Artemisia tridentata	3000	975	32.5	
ROBB-LEDFORD	Site 4 Robb Creek Site	6	2008	Artemisia tridentata wyomingensis	3000	1212	40.4	
ROBB-LEDFORD	Site 5 Battle Ranch Site	1	2008	Artemisia tridentata wyomingensis	3000	995	33.16666667	
ROBB-LEDFORD	Site 5 Battle Ranch Site	1	2003	Artemisia tridentata	3000	683	22.76666667	
ROBB-LEDFORD	Site 5 Battle Ranch Site	2	2003	Artemisia tridentata	3000	445	14.83333333	
ROBB-LEDFORD	Site 5 Battle Ranch Site	2	2008	Artemisia tridentata wyomingensis	3000	854	28.46666667	
ROBB-LEDFORD	Site 5 Battle Ranch Site	3	2008	Artemisia tridentata wyomingensis	3000	338	11.26666667	
ROBB-LEDFORD	Site 5 Battle Ranch Site	3	2003	Artemisia tridentata	3000	150	5	
ROBB-LEDFORD	Site 5 Battle Ranch Site	4	2003	Artemisia tridentata	3000	604	20.13333333	
ROBB-LEDFORD	Site 5 Battle Ranch Site	4	2008	Artemisia tridentata wyomingensis	3000	799	26.63333333	
ROBB-LEDFORD	Site 5 Battle Ranch Site	5	2008	Artemisia tridentata wyomingensis	3000	568	18.93333333	
ROBB-LEDFORD	Site 5 Battle Ranch Site	5	2003	Artemisia tridentata	3000	570	19	
ROBB-LEDFORD	Site 5 Battle Ranch Site	6	2003	Artemisia tridentata	3000	702	23.4	
ROBB-LEDFORD	Site 5 Battle Ranch Site	6	2008	Artemisia tridentata wyomingensis	3000	965	32.16666667	
ROBB-LEDFORD	Site 5 Battle Ranch Site	7	2008	Artemisia tridentata wyomingensis	3000	1002	33.4	
ROBB-LEDFORD	Site 5 Battle Ranch Site	7	2003	Artemisia tridentata	3000	740	24.66666667	
ROBB-LEDFORD	Site 5 Battle Ranch Site	8	2003	Artemisia tridentata	3000	365	12.16666667	
ROBB-LEDFORD	Site 5 Battle Ranch Site	8	2008	Artemisia tridentata wyomingensis	3000	640	21.33333333	
ROBB-LEDFORD	Site 5 Battle Ranch Site	9	2008	Artemisia tridentata wyomingensis	3000	686	22.86666667	
ROBB-LEDFORD	Site 5 Battle Ranch Site	9	2003	Artemisia tridentata	3000	437	14.56666667	
ROBB-LEDFORD	Site 5 Battle Ranch Site	10	2003	Artemisia tridentata	3000	330	11	
ROBB-LEDFORD	Site 5 Battle Ranch Site	10	2008	Artemisia tridentata wyomingensis	3000	672	22.4	
ROBB-LEDFORD	Site 5 Battle Ranch Site	11	2008	Artemisia tridentata wyomingensis	3000	476	15.86666667	
ROBB-LEDFORD	Site 5 Battle Ranch Site	11	2003	Artemisia tridentata	3000	199	6.633333333	

ROBB-LEDFORD	Site 5 Battle Ranch Site	12	2003	Artemisia tridentata	3000	660	22
ROBB-LEDFORD	Site 5 Battle Ranch Site	12	2008	Artemisia tridentata wyomingensis	3000	800	26.66666667
ROBB-LEDFORD	Site 5 Battle Ranch Site	13	2008	Artemisia tridentata wyomingensis	3000	710	23.66666667
ROBB-LEDFORD	Site 5 Battle Ranch Site	13	2003	Artemisia tridentata	3000	426	14.2
ROBB-LEDFORD	Site 5 Battle Ranch Site	14	2003	Artemisia tridentata	3000	766	25.53333333
ROBB-LEDFORD	Site 5 Battle Ranch Site	14	2008	Artemisia tridentata wyomingensis	3000	856	28.53333333
ROBB-LEDFORD	Site 5 Battle Ranch Site	15	2008	Artemisia tridentata wyomingensis	3000	523	17.43333333
ROBB-LEDFORD	Site 5 Battle Ranch Site	15	2003	Artemisia tridentata	3000	181	6.033333333
ROBB-LEDFORD	Site 5 Battle Ranch Site	16	2003	Artemisia tridentata	3000	32	1.066666667
ROBB-LEDFORD	Site 5 Battle Ranch Site	16	2008	Artemisia tridentata wyomingensis	3000	141	4.7

RAW DATA - ROBB/LEDFORD WMA

Location	Year	SiteName	TransectNumber	ScientificName	1	2	3	4	5	6	7	8	9	10
ROBB-LEDFORD	2003	Site 1 High Elevation Site	1	Bare Soil	0	0	2.5	0	0	2.5	2.5	0	0	0
ROBB-LEDFORD	2003	Site 1 High Elevation Site	1	Litter	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	1	Agropyron smithii			2.5			2.5	2.5	2.5	15	2.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	1	Carex filifolia	2.5	2.5	15	2.5	15	2.5	2.5	2.5	15	15
ROBB-LEDFORD	2003	Site 1 High Elevation Site	1	Festuca idahoensis	15	15		15	15	37.5	37.5	37.5		15
ROBB-LEDFORD	2003	Site 1 High Elevation Site	1	Selaginella densa	15	37.5	62.5	37.5	15			15	2.5	
ROBB-LEDFORD	2003	Site 1 High Elevation Site	2	Bare Soil	0	15	2.5	15	2.5	0	15	2.5	0	37.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	2	Litter	15	15	37.5	15	37.5	62.5	15	37.5	62.5	15
ROBB-LEDFORD	2003	Site 1 High Elevation Site	2	Agropyron smithii			15	2.5			2.5	2.5	2.5	2.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	2	Carex filifolia	15	15	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	2	Festuca idahoensis	15	15	2.5	2.5	2.5	37.5	15	15	37.5	2.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	2	Selaginella densa	37.5					15				
ROBB-LEDFORD	2003	Site 1 High Elevation Site	3	Bare Soil	0	0	0	2.5	15	85	62.5	2.5	2.5	2.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	3	Litter	62.5	62.5	62.5	37.5	37.5	15	15	37.5	62.5	37.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	3	Agropyron smithii		2.5	15		2.5	15	2.5	2.5		2.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	3	Carex filifolia	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	3	Festuca idahoensis	37.5	37.5	15	15	62.5		15		37.5	
ROBB-LEDFORD	2003	Site 1 High Elevation Site	3	Selaginella densa				37.5			15		15	2.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	4	Bare Soil	0	15	0	15	2.5	15	2.5	0	0	0
ROBB-LEDFORD	2003	Site 1 High Elevation Site	4	Litter	62.5	37.5	62.5	15	62.5	62.5	62.5	62.5	62.5	62.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	4	Agropyron smithii	2.5								2.5	2.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	4	Carex filifolia	2.5	2.5	2.5	2.5	15	15	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	4	Festuca idahoensis		15	37.5	37.5		15	15	62.5	62.5	15
ROBB-LEDFORD	2003	Site 1 High Elevation Site	4	Selaginella densa		2.5	2.5			2.5		2.5		
ROBB-LEDFORD	2003	Site 1 High Elevation Site	5	Bare Soil	0	0	2.5	0	0	0	0	0	0	0
ROBB-LEDFORD	2003	Site 1 High Elevation Site	5	Litter	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	5	Agropyron smithii	2.5	2.5							2.5	
ROBB-LEDFORD	2003	Site 1 High Elevation Site	5	Carex filifolia	15	15	2.5	2.5	2.5	2.5	2.5	15	15	15
ROBB-LEDFORD	2003	Site 1 High Elevation Site	5	Festuca idahoensis	37.5	15	37.5	37.5	37.5	37.5	2.5		2.5	2.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	5	Selaginella densa	2.5		2.5	15	2.5	2.5		2.5		
ROBB-LEDFORD	2003	Site 1 High Elevation Site	6	Bare Soil	2.5	0	0	0	0	0	0	0	15	0
ROBB-LEDFORD	2003	Site 1 High Elevation Site	6	Litter	62.5	62.5	62.5	62.5	37.5	62.5	62.5	62.5	62.5	62.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	6	Agropyron smithii			2.5						2.5	
ROBB-LEDFORD	2003	Site 1 High Elevation Site	6	Carex filifolia	2.5	15	37.5	37.5	15	15	37.5	37.5	15	15
ROBB-LEDFORD	2003	Site 1 High Elevation Site	6	Festuca idahoensis	37.5	15	2.5	2.5	15	37.5	2.5	2.5	37.5	37.5
ROBB-LEDFORD	2003	Site 1 High Elevation Site	6	Selaginella densa	2.5	2.5	2.5	2.5						2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Bare Soil	0	0	2.5	0	0	0	2.5	0	0	0
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Litter	15	15	37.5	15	15	37.5	15	37.5	15	37.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Agropyron smithii	2.5	2.5	37.5	2.5	2.5	2.5	2.5	2.5		15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Carex sp.	2.5	2.5	15	2.5	15	2.5	2.5	15	37.5	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Festuca idahoensis	15	37.5		37.5	15	37.5	37.5	15	15	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Poa juncifolia				62.5						

ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Stipa nelsonii	2.5									
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Achillea millefolium		2.5			2.5		2.5	2.5	15	2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Agoseris glauca	2.5		2.5		2.5	2.5	15			
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Arabis sp.	2.5		2.5	2.5						
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Arenaria congesta	2.5					2.5				
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Arnica sp.				2.5						
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Besseya wyomingensis	15	2.5						2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Cerastium arvense	15	62.5		2.5	15	15	15	2.5		37.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Delphinium glaucum	2.5			2.5		2.5	15		15	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Geum triflorum			15		2.5	2.5			37.5	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Lupinus leucophyllus					85					
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Pedicularis sp.			2.5							
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Phlox hoodii			2.5			15		15	2.5	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Taraxacum officinale	2.5	2.5			15				2.5	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	unknown mustard									2.5	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	1	Chrysothamnus viscidiflorus			2.5	37.5						
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Bare Soil	0	0	2.5	2.5	2.5	0	2.5	0	0	0
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Litter	37.5	37.5	37.5	37.5	37.5	37.5	15	37.5	37.5	37.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Agropyron smithii	2.5	2.5	37.5	2.5		15	37.5	2.5	15	2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Carex sp.	15	15	15	2.5	15		2.5	2.5	15	2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Festuca idahoensis	15	37.5	15	2.5	2.5	15	37.5	37.5	37.5	2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Other Grasses					2.5					
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Stipa nelsonii				15			2.5			
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Achillea millefolium	2.5	2.5		2.5		2.5				
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Agoseris glauca	2.5						15	15	2.5	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Antennaria microphylla		2.5	15	2.5						
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Arabis sp.					2.5					
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Arenaria congesta	2.5			2.5	2.5			2.5		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Besseya wyomingensis				2.5	15	2.5	2.5	2.5	2.5	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Cerastium arvense			37.5	15	15	2.5		15		2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Delphinium glaucum		2.5				2.5	2.5			37.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Geum triflorum		37.5		15			15	2.5	37.5	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Lupinus leucophyllus						15				
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Pedicularis sp.				2.5						
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Phlox hoodii	37.5		2.5			15				
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Taraxacum officinale	2.5				15	2.5				
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Unknown forb				2.5						2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	unknown mustard		2.5								
ROBB-LEDFORD	2004	Site 1 High Elevation Site	2	Chrysothamnus viscidiflorus				2.5						
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Bare Soil	0	0	0	0	0	15	0	0	0	0
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Litter	37.5	37.5	37.5	37.5	37.5	15	37.5	37.5	37.5	37.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Agropyron smithii	2.5	2.5	15	2.5	2.5	62.5	37.5	2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Carex sp.	15	2.5	15	15	2.5			2.5	15	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Festuca idahoensis	85	15	2.5	15	62.5	2.5	15	2.5	37.5	2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Poa juncifolia	2.5		15			2.5				
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Stipa nelsonii								2.5		2.5

ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Achillea millefolium			2.5		2.5			2.5	2.5	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Agoseris glauca		2.5		15	2.5				2.5	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Arabis sp.	2.5					2.5	2.5	2.5		2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Arenaria congesta		2.5	2.5	2.5				2.5		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Besseya wyomingensis	2.5	2.5	2.5	2.5		2.5		2.5		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Cerastium arvense	2.5		2.5		2.5					15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Delphinium glaucum	2.5			2.5	15		15			
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Draba sp.						2.5	2.5			
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Geum triflorum	15	37.5	37.5	2.5		15		62.5		37.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Lupinus leucophyllus				15						
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Monolepis nuttalliana						15				
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Phlox hoodii		2.5		15			2.5		15	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Potentilla gracilis								2.5		15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Saxifraga sp.									2.5	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Taraxacum officinale		2.5							15	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	unknown mustard	2.5	2.5								
ROBB-LEDFORD	2004	Site 1 High Elevation Site	3	Chrysothamnus viscidiflorus			15							
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Bare Soil	0	0	0	0	0	0	0	0	0	0
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Litter	15	37.5	37.5	37.5	37.5	37.5	62.5	37.5	15	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Agropyron smithii	15	2.5	2.5	2.5	2.5	2.5	2.5	15	2.5	2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Carex sp.	15	2.5	15	2.5	15	15	15	15	15	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Festuca idahoensis	15	15	37.5	37.5	2.5	37.5	15	37.5	37.5	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Stipa nelsonii	2.5									
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Achillea millefolium			2.5					2.5		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Agoseris glauca	2.5		2.5	2.5						
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Antennaria microphylla	2.5									
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Arabis sp.				2.5						
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Arenaria congesta				2.5		15				
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Arnica sp.								15		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Besseya wyomingensis	2.5	2.5			2.5	2.5	2.5	15		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Campanula rotundifolia										2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Cerastium arvense	15			15					15	2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Delphinium glaucum			2.5	2.5				2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Geum triflorum	15	37.5	15		62.5	2.5	15			62.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Lupinus leucophyllus	15	37.5	15							
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Phlox hoodii		2.5	2.5			15				
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Potentilla gracilis									15	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Taraxacum officinale		2.5	15	15		2.5				
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	unknown mustard						2.5				
ROBB-LEDFORD	2004	Site 1 High Elevation Site	4	Chrysothamnus viscidiflorus							2.5	2.5		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Bare Soil	0	0	0	0	0	0	0	0	0	0
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Litter	37.5	15	15	15	37.5	37.5	37.5	37.5	37.5	37.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Agropyron spicatum	2.5	2.5	15	15	2.5	2.5	2.5	2.5	15	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Carex sp.	15	37.5	2.5	2.5	2.5	2.5	15	37.5	15	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Festuca idahoensis	15	37.5	15	37.5	62.5	37.5	15	2.5	15	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Poa juncifolia	15									

ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Stipa nelsonii		2.5				2.5	2.5			
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Achillea millefolium		2.5			2.5	2.5			2.5	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Agoseris glauca		2.5			15			15	15	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Arabis sp.		2.5					2.5			
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Arenaria congesta	2.5			2.5	2.5	2.5		2.5	2.5	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Besseya wyomingensis	2.5	2.5		15	15		2.5		2.5	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Cerastium arvense	2.5	15	2.5	2.5	2.5			2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Delphinium glaucum		15		2.5	2.5	2.5				15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Geum triflorum	15	15	62.5				62.5	37.5	15	62.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Lupinus leucophyllus				2.5		37.5			15	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Phlox hoodii	15		2.5	37.5	2.5	2.5				
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	Taraxacum sp.	2.5				15	15	2.5	2.5		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	5	unknown mustard	2.5	2.5								
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Bare Soil	0	0	0	0	0	0	0	0	0	0
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Litter	37.5	15	15	15	37.5	37.5	15	37.5	37.5	62.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Agropyron smithii	2.5	2.5	37.5	37.5	37.5	15	2.5	37.5	37.5	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Carex sp.	15	37.5	15	37.5	15	2.5	85	62.5	15	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Festuca idahoensis	37.5	15	15	15	15	37.5		15	15	37.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Achillea millefolium	2.5					15	2.5		2.5	2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Agoseris glauca							15			2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Antennaria microphylla		2.5								
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Arabis sp.	2.5					2.5				2.5
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Besseya wyomingensis	2.5			15	15	2.5			15	15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Cerastium arvense	2.5	15		15		37.5	2.5	15		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Delphinium glaucum	2.5				15		15			15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Draba sp.			2.5							
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Geum triflorum		37.5	85			15	15	15		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Lupinus leucophyllus				37.5				15	37.5	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Mertensia sp.									2.5	
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Pedicularis sp.						2.5				
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Phlox hoodii	15	15								15
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	Taraxacum officinale						2.5		2.5		
ROBB-LEDFORD	2004	Site 1 High Elevation Site	6	unknown mustard	2.5									
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Bare Soil	15	15	15	37.5	15	15	37.5	15	15	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Litter	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Agropyron spicatum	2.5	15	15	15	15	15	37.5	15	15	2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Carex sp.	2.5			2.5	2.5					2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Festuca idahoensis	15	15	15	15	15	15	15		15	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Other Grasses	2.5						2.5	2.5		2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Poa sp.	2.5	2.5				2.5		2.5	15	2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Antennaria sp.	15	15	2.5		15	15		2.5	15	2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Arenaria congesta			2.5							
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Comandra umbellata										2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Heterotheca sp.			2.5	15		15				
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Penstemon sp.								2.5		15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Phlox hoodii	15		15	2.5	2.5	15	2.5	37.5	2.5	

ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Sedum lanceolatum					2.5				
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Chrysothamnus viscidiflorus	2.5								2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Gutierrezia sarothrae		2.5	2.5						2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	1	Artemisia frigida			15	2.5					
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Bare Soil	15	15	37.5	37.5	15	15	15	15	15	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Litter	37.5	37.5	37.5	15	37.5	37.5	37.5	37.5	37.5	37.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Agropyron spicatum	15	2.5	15	15	15		15		15	2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Carex sp.						2.5		2.5		
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Festuca idahoensis	15	15	15	15	15	15	37.5	15	37.5	37.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Other Grasses		2.5		2.5	2.5	2.5		2.5		2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Poa sp.	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Achillea millefolium										2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Antennaria sp.	15	15	15	15	15	15	2.5	37.5	15	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Comandra umbellata						2.5				2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Penstemon sp.		2.5							2.5	
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Phlox hoodii		2.5	15			2.5	15		2.5	2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Sedum lanceolatum			2.5			2.5				
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Sphaeralcea coccinea			2.5		2.5					2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Chrysothamnus nauseosus							15			
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Gutierrezia sarothrae	15									2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Tetradymia canescens								2.5		
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	2	Artemisia frigida	2.5	2.5		15	2.5	15				
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Bare Soil	15	15	37.5	15	37.5	15	15	15	15	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Litter	37.5	37.5	37.5	37.5	37.5	62.5	37.5	37.5	37.5	37.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Agropyron spicatum	15	2.5	15	15	15	37.5		2.5	2.5	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Carex sp.	2.5	2.5								
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Festuca idahoensis	15	15	37.5	15	15	15	15	15	15	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Other Grasses	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	15	2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Poa sp.	2.5	15		2.5	15		15	15		
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Achillea millefolium					2.5					
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Antennaria sp.	15	15	2.5	15	15	15	15	15	15	2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Comandra umbellata			2.5	2.5				2.5		
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Heterotheca sp.			2.5							2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Penstemon sp.								2.5		2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Phlox hoodii		15	2.5	2.5		2.5	2.5	15	2.5	2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Sedum lanceolatum	2.5	2.5		2.5						
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Sphaeralcea coccinea					2.5					
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Gutierrezia sarothrae	2.5	2.5	2.5					15		
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Tetradymia canescens	2.5				2.5		2.5			
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	3	Artemisia frigida			15				2.5		2.5	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Bare Soil	15	15	15	15	37.5	15	15	15	37.5	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Litter	37.5	37.5	37.5	15	37.5	37.5	62.5	62.5	37.5	62.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Agropyron spicatum	15	15	2.5	15	15	15	15	15	15	37.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Carex sp.	2.5			2.5	2.5	2.5			2.5	
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Festuca idahoensis	15	15	37.5	15	15	15	37.5	15	15	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Other Grasses	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Poa sp.	2.5	2.5	15			2.5		2.5		2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Achillea millefolium		2.5	2.5					2.5		
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Antennaria sp.	2.5	15	15	15	15	15	37.5	2.5	37.5	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Comandra umbellata				2.5						
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Penstemon sp.			2.5							
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Phlox hoodii	2.5		2.5	2.5	2.5	2.5		2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Sedum lanceolatum	2.5	2.5	2.5		2.5	2.5	2.5		2.5	
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Sphaeralcea coccinea						2.5				
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Chrysothamnus viscidiflorus								15		
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Tetradymia canescens										2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	4	Artemisia frigida	15	15				15		15	15	
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Bare Soil	15	15	15	15	37.5	62.5	37.5	15	37.5	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Litter	37.5	37.5	37.5	37.5	37.5	15	37.5	37.5	15	37.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Agropyron spicatum	15	15	2.5	15	2.5	15		2.5	2.5	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Carex filifolia							2.5			2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Festuca idahoensis	15	15	15	37.5	15	15	15	15	37.5	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Other Grasses	2.5		2.5	2.5			2.5			2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Poa sp.	15	2.5				2.5	2.5	2.5	2.5	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Antennaria sp.	15	15	15	2.5	15	15	15	37.5	2.5	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Heterotheca sp.	2.5									
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Machaeranthera canescens						15				
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Penstemon sp.		2.5						2.5		
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Phlox hoodii	15	2.5	2.5	15			15		2.5	
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Sedum lanceolatum	2.5	2.5	2.5	2.5	2.5	2.5	2.5		2.5	
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Sphaeralcea coccinea							2.5			
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Chrysothamnus viscidiflorus	2.5									
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Gutierrezia sarothrae					15					
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Tetradymia canescens			2.5							
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	5	Artemisia frigida				15	2.5		2.5		15	
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Bare Soil	15	15	37.5	37.5	37.5	37.5	15	15	37.5	37.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Litter	37.5	37.5	37.5	37.5	37.5	15	37.5	37.5	15	37.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Agropyron spicatum	15	15	15	37.5	15	15	15		15	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Carex sp.		2.5						2.5		
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Festuca idahoensis	15	15	15	15	15	2.5	15	15	15	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Other Grasses	2.5		2.5	2.5	15	2.5	2.5	15	2.5	2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Poa sp.	2.5	2.5	15	2.5		15	15	15	2.5	
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Antennaria sp.	15	37.5	15	15	2.5	37.5	15	37.5	15	15
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Astragalus sp.			2.5			2.5				
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Heterotheca sp.					2.5					
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Penstemon sp.							2.5			2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Phlox hoodii	2.5	2.5	15	2.5	2.5		15		2.5	
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Sedum lanceolatum		2.5					2.5		2.5	2.5
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Sphaeralcea coccinea			2.5							
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Chrysothamnus viscidiflorus		15								
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Tetradymia canescens		15			15	2.5				
ROBB-LEDFORD	2004	Site 2 Moderate Elevation Site	6	Artemisia frigida		15					2.5		2.5	

ROBB-LEDFORD	2004	Site 3 Bench Site	1	Bare Soil	15	2.5	2.5	2.5	15	2.5	15	15	37.5	15
ROBB-LEDFORD	2004	Site 3 Bench Site	1	Litter	15	37.5	15	37.5	15	15	15	15	15	15
ROBB-LEDFORD	2004	Site 3 Bench Site	1	Agropyron smithii	15	15	15	2.5	15	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	1	Carex sp.			2.5			2.5			2.5	
ROBB-LEDFORD	2004	Site 3 Bench Site	1	Poa sandbergii	15	2.5	2.5	15	2.5	2.5	15	37.5	15	15
ROBB-LEDFORD	2004	Site 3 Bench Site	1	Astragalus sp.								2.5		
ROBB-LEDFORD	2004	Site 3 Bench Site	1	Phlox hoodii	15	15	15	15	15	15	2.5	2.5	2.5	15
ROBB-LEDFORD	2004	Site 3 Bench Site	1	Sphaeralcea coccinea		2.5	2.5			2.5	2.5	2.5	2.5	
ROBB-LEDFORD	2004	Site 3 Bench Site	1	Chrysothamnus viscidiflorus	2.5	15	15	62.5	15	37.5	15		2.5	15
ROBB-LEDFORD	2004	Site 3 Bench Site	1	Gutierrezia sarothrae	2.5	2.5		2.5	2.5	15		2.5	2.5	
ROBB-LEDFORD	2004	Site 3 Bench Site	1	Artemisia frigida	2.5	2.5	15		15	15	2.5	2.5		
ROBB-LEDFORD	2004	Site 3 Bench Site	2	Bare Soil	2.5	15	15	15	15	15	37.5	2.5	2.5	15
ROBB-LEDFORD	2004	Site 3 Bench Site	2	Litter	15	15	15	15	15	37.5	15	37.5	37.5	15
ROBB-LEDFORD	2004	Site 3 Bench Site	2	Agropyron smithii	2.5	2.5	2.5	15	2.5	2.5	15	15	15	15
ROBB-LEDFORD	2004	Site 3 Bench Site	2	Carex sp.				2.5	2.5					
ROBB-LEDFORD	2004	Site 3 Bench Site	2	Poa sandbergii	15	15	15	2.5	15	15	37.5	15	37.5	15
ROBB-LEDFORD	2004	Site 3 Bench Site	2	Phlox hoodii	2.5	15		15		2.5				15
ROBB-LEDFORD	2004	Site 3 Bench Site	2	Sphaeralcea coccinea				2.5						2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	2	Chrysothamnus viscidiflorus	15		37.5	15	15	15	15		15	15
ROBB-LEDFORD	2004	Site 3 Bench Site	2	Gutierrezia sarothrae	2.5					2.5				
ROBB-LEDFORD	2004	Site 3 Bench Site	2	Tetradymia canescens									2.5	
ROBB-LEDFORD	2004	Site 3 Bench Site	2	Artemisia frigida	2.5		2.5	2.5	15	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	3	Bare Soil	15	2.5	15	2.5	2.5	15	37.5	62.5	15	2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	3	Litter	15	37.5	15	37.5	37.5	37.5	37.5	15	15	37.5
ROBB-LEDFORD	2004	Site 3 Bench Site	3	Agropyron smithii	2.5	15	2.5	2.5	15	15	15	2.5	15	15
ROBB-LEDFORD	2004	Site 3 Bench Site	3	Carex sp.	2.5		2.5			2.5				
ROBB-LEDFORD	2004	Site 3 Bench Site	3	Poa sandbergii	15	15	2.5	15	2.5	15	2.5	15	2.5	15
ROBB-LEDFORD	2004	Site 3 Bench Site	3	Phlox hoodii	2.5	2.5	2.5	2.5	37.5	15	15	2.5		
ROBB-LEDFORD	2004	Site 3 Bench Site	3	Sphaeralcea coccinea					2.5	2.5				2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	3	Chrysothamnus nauseosus			15							15
ROBB-LEDFORD	2004	Site 3 Bench Site	3	Chrysothamnus viscidiflorus	15	37.5	37.5	37.5	15	15	15	15	37.5	15
ROBB-LEDFORD	2004	Site 3 Bench Site	3	Gutierrezia sarothrae					15	15	2.5			
ROBB-LEDFORD	2004	Site 3 Bench Site	3	Tetradymia canescens	2.5	2.5		2.5					15	
ROBB-LEDFORD	2004	Site 3 Bench Site	3	Artemisia frigida	2.5		2.5	2.5	2.5	15	2.5		2.5	2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	4	Bare Soil	15	37.5	15	15	15	2.5	15	62.5	37.5	15
ROBB-LEDFORD	2004	Site 3 Bench Site	4	Litter	37.5	37.5	37.5	62.5	37.5	37.5	37.5	15	15	37.5
ROBB-LEDFORD	2004	Site 3 Bench Site	4	Agropyron smithii	2.5	2.5	15	15	15	2.5	15	2.5	2.5	15
ROBB-LEDFORD	2004	Site 3 Bench Site	4	Carex sp.	2.5				2.5				2.5	2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	4	Poa sandbergii	37.5	37.5	15	2.5	15	15	15	15	15	15
ROBB-LEDFORD	2004	Site 3 Bench Site	4	Achillea millefolium							2.5			
ROBB-LEDFORD	2004	Site 3 Bench Site	4	Antennaria sp.	2.5									
ROBB-LEDFORD	2004	Site 3 Bench Site	4	Astragalus sp.										2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	4	Phlox hoodii	15	2.5		15	15	2.5	15		15	2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	4	Sphaeralcea coccinea									2.5	
ROBB-LEDFORD	2004	Site 3 Bench Site	4	Chrysothamnus nauseosus					2.5	62.5				
ROBB-LEDFORD	2004	Site 3 Bench Site	4	Chrysothamnus viscidiflorus	2.5	15	37.5		2.5	2.5	15		15	15

ROBB-LEDFORD	2004	Site 3 Bench Site	4	Gutierrezia sarothrae								2.5		15
ROBB-LEDFORD	2004	Site 3 Bench Site	4	Tetradymia canescens					2.5	2.5				
ROBB-LEDFORD	2004	Site 3 Bench Site	4	Artemisia frigida	2.5	15	2.5	2.5	15	15			2.5	15
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Bare Soil	37.5	15	37.5	2.5	37.5	2.5	37.5	37.5	15	15
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Litter	15	37.5	15	37.5	37.5	37.5	37.5	15	37.5	37.5
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Agropyron smithii	2.5	2.5	15	15	15	15	2.5	2.5	15	2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Carex filifolia					2.5					
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Poa sandbergii	15	37.5	2.5	37.5	2.5	15	15	15	15	15
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Achillea millefolium	2.5									
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Arabis sp.						2.5				
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Astragalus sp.					2.5					
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Machaeranthera canescens								2.5	15	
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Phlox hoodii	2.5	2.5		15	2.5	15	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Sphaeralcea coccinea	2.5		2.5					2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Taraxacum sp.				2.5						
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Chrysothamnus viscidiflorus	2.5	37.5	62.5	37.5	15	15	2.5	15	15	37.5
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Gutierrezia sarothrae	2.5							15	15	
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Tetradymia canescens	15	2.5		2.5		2.5	2.5			
ROBB-LEDFORD	2004	Site 3 Bench Site	5	Artemisia frigida		15	2.5	2.5	2.5	2.5	2.5			
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Bare Soil	37.5	37.5	15	15	62.5	37.5	15	15	15	2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Litter	15	37.5	37.5	37.5	15	37.5	37.5	37.5	37.5	37.5
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Agropyron smithii	15	15	15	15	2.5	2.5	2.5		2.5	15
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Carex sp.		2.5			2.5		2.5			2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Poa sandbergii	15	15	15	15	15	2.5	15	37.5	15	15
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Achillea millefolium		2.5				2.5				2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Antennaria sp.	2.5									
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Astragalus sp.							2.5			
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Machaeranthera canescens				2.5	2.5					
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Phlox hoodii		2.5	2.5	2.5	2.5	2.5			15	2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Sphaeralcea coccinea	2.5				2.5				2.5	2.5
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Chrysothamnus nauseosus				15						
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Chrysothamnus viscidiflorus	2.5	2.5	37.5	37.5	2.5	37.5	15	15	37.5	15
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Gutierrezia sarothrae	2.5		2.5	2.5	2.5			37.5	2.5	
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Tetradymia canescens	2.5			2.5					2.5	
ROBB-LEDFORD	2004	Site 3 Bench Site	6	Artemisia frigida		15						2.5		15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	Bare Soil	0	2.5	15	15	2.5	15	0	2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	Litter	15	37.5	37.5	15	37.5	15	15	37.5	15	37.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	Agropyron smithii										2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	Carex sp.			2.5	2.5		2.5				
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	Festuca idahoensis	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	15	37.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	Poa sandbergii		15	2.5					15		
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	Achillea millefolium	2.5				2.5					2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	Antennaria sp.	15	2.5								
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	Arabis sp.					2.5			15	15	2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	Draba sp.				2.5						
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	Geum triflorum				37.5						

ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	Lupinus leucophyllus		2.5							15	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	Taraxacum sp.										2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	Artemisia tridentata	85	15		2.5	2.5	15	85	15	85	62.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	1	Chrysothamnus nauseosus								15		
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	Bare Soil	2.5	0	0	0	0	15	0	0	2.5	15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	Litter	37.5	37.5	37.5	37.5	15	15	37.5	15	15	15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	Agropyron smithii					2.5		2.5			
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	Carex sp.				2.5	2.5					
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	Festuca idahoensis	37.5	37.5	37.5	15	15	15	37.5	37.5	37.5	37.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	Poa sandbergii		2.5		2.5		2.5			2.5	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	Achillea millefolium			2.5	2.5		2.5				2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	Antennaria sp.	15		2.5	2.5				15	15	15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	Lupinus leucophyllus	2.5									2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	Phlox hoodii										2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	Taraxacum officinale		2.5								
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	Unknown forb					2.5					
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	Viola sp.				2.5			2.5	2.5		
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	Artemisia tridentata	37.5	37.5	85	15	85	15	37.5	37.5	37.5	2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	2	Tetradymia canescens						15			2.5	15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	Bare Soil	2.5	0	0	15	0	2.5	2.5	0	0	0
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	Litter	37.5	85	15	2.5	37.5	37.5	37.5	37.5	15	37.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	Agropyron smithii				2.5				15	2.5	2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	Carex sp.				2.5			2.5			2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	Festuca idahoensis	15	37.5	37.5	15	15	37.5	15	37.5	37.5	15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	Poa sandbergii								2.5		2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	Achillea millefolium				2.5				2.5		2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	Antennaria sp.	2.5	15	2.5	15	15				2.5	15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	Lupinus leucophyllus									2.5	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	Taraxacum officinale	15									
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	Unknown forb		2.5								
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	Viola sp.				2.5					2.5	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	Artemisia tridentata	62.5	15	37.5	85	85	62.5	15	15	62.5	15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	Chrysothamnus viscidiflorus			2.5							
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	3	Tetradymia canescens									2.5	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	Bare Soil	2.5	2.5	37.5	15	2.5	15	0	37.5	2.5	15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	Litter	37.5	37.5	15	15	15	37.5	15	15	37.5	37.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	Agropyron smithii								2.5		
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	Carex sp.						2.5				
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	Festuca idahoensis	15	2.5	2.5	15	37.5	37.5	15	2.5	15	15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	Poa sandbergii	2.5	15	2.5	15	2.5		15	15	2.5	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	Achillea millefolium			2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	Androsace sp.							2.5			
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	Antennaria sp.		62.5	37.5	37.5	15	15	2.5	2.5	15	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	Arabis sp.			2.5		2.5	2.5				
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	Astragalus sp.	2.5									
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	Taraxacum sp.				2.5				2.5		2.5

ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	Unknown forb	2.5					2.5		2.5		
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	Viola sp.	2.5	2.5								
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	4	Artemisia tridentata	37.5	15	37.5	37.5	37.5	37.5	62.5	15	62.5	62.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	Bare Soil	97.5	85	15	37.5	0	37.5	15	15	15	0
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	Litter	2.5	15	37.5	15	37.5	37.5	37.5	37.5	37.5	37.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	Agropyron smithii							2.5			
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	Festuca idahoensis	2.5		2.5	15	15	15	15	2.5	15	15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	Poa sandbergii		2.5	15	2.5	15	2.5	2.5	2.5	2.5	15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	Achillea millefolium	2.5		2.5		2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	Androsace sp.								2.5		
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	Antennaria sp.			2.5	15	2.5	15	15	15		
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	Arabis sp.				2.5					2.5	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	Iris missouriensis									2.5	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	Lupinus leucophyllus					2.5					
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	Taraxacum sp.	2.5									2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	Viola sp.									2.5	2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	Artemisia tridentata	2.5	37.5	62.5	15	62.5	15	85	62.5	62.5	85
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	5	Chrysothamnus nauseosus					37.5			15		
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Bare Soil	2.5	0	15	37.5	37.5	15	37.5	0	0	15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Litter	15	37.5	37.5	37.5	15	15	15	37.5	37.5	37.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Carex sp.			2.5		2.5		2.5			2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Festuca idahoensis	2.5		2.5	2.5	2.5	2.5				15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Poa sandbergii	2.5	15		2.5	2.5		15	15	15	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Achillea millefolium	2.5				2.5		2.5	2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Androsace sp.							2.5			
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Antennaria sp.		15			2.5	2.5		15		15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Artemisia ludoviciana				15						
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Phlox hoodii	2.5						2.5			
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Taraxacum sp.			2.5			2.5	2.5			
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Unknown forb	2.5			2.5					2.5	
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Viola sp.							2.5			
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Artemisia tridentata	37.5	62.5	37.5	37.5	15	85	15	37.5	85	15
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Artemisia tripartita	37.5									
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Chrysothamnus nauseosus				15						
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Chrysothamnus viscidiflorus					15					
ROBB-LEDFORD	2004	Site 4 Robb Creek Site	6	Tetradymia canescens										2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	Bare Soil	85	85	2.5	62.5	37.5	97.5	37.5	85	15	62.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	Litter	15	15	37.5	15	15	2.5	37.5	15	62.5	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	Agropyron smithii	15	15	2.5	2.5	2.5		2.5	2.5	37.5	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	Koeleria pyramidata	2.5						2.5			
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	Poa sandbergii				15				2.5		15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	Stipa sp.			2.5				2.5			
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	Achillea millefolium	2.5			2.5				2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	Antennaria sp.					37.5					
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	Arabis sp.				62.5						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	Machaeranthera canescens	2.5	2.5		2.5	2.5					

ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	Phlox hoodii						2.5		2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	Polygonum douglasii							2.5			
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	Artemisia tridentata		15	62.5	15		15		15	85	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	1	Chrysothamnus viscidiflorus							2.5	15		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Bare Soil	37.5	15	0	2.5	15	97.5	37.5	15	0	0
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Litter	37.5	62.5	62.5	85	85	2.5	62.5	62.5	62.5	85
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Agropyron smithii	15	2.5		15	2.5		15	15	15	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Carex filifolia										2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Other Grasses									15	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Poa sandbergii	15	2.5	2.5	2.5				15		2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Stipa sp.			2.5							15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Achillea millefolium			2.5		2.5		2.5	2.5		2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Androsace sp.				2.5						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Antennaria sp.										15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Astragalus sp.		2.5								
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Lupinus leucophyllus					2.5					15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Machaeranthera canescens	2.5		2.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Phlox hoodii		2.5					2.5			
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Polygonum douglasii	2.5	2.5		2.5						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Taraxacum sp.				2.5						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Artemisia tridentata	15		37.5	85	85	2.5	62.5		37.5	62.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Chrysothamnus viscidiflorus		15						15		15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	2	Tetradymia canescens							2.5	15		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Bare Soil	2.5	62.5	15	62.5	37.5	62.5	37.5	37.5	37.5	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Litter	37.5	15	62.5	15	62.5	15	37.5	37.5	37.5	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Agropyron smithii	37.5	15	15	2.5	2.5	2.5	15	15	15	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Carex sp.								2.5	15	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Poa sandbergii	15	15		2.5	2.5	2.5	2.5	15	15	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Stipa sp.		2.5	2.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Achillea millefolium	2.5			2.5	2.5		15		2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Lupinus sp.						15				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Machaeranthera canescens	2.5			15	2.5	15				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Phlox hoodii			2.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Polygonum douglasii				2.5	2.5		2.5		2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Artemisia tridentata			37.5	2.5	37.5					2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Chrysothamnus nauseosus										37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Chrysothamnus viscidiflorus	37.5	15							15	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Tetradymia canescens			15							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	3	Artemisia frigida	2.5						2.5			
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Bare Soil	2.5	2.5	2.5	15	2.5	0	37.5	0	37.5	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Litter	2.5	37.5	37.5	15	62.5	37.5	37.5	62.5	37.5	62.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Agropyron smithii	37.5	15	2.5	15	2.5	2.5	15		15	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Poa sandbergii	2.5	15	2.5	15		2.5	2.5	15	2.5	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Stipa comata		15								
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Stipa sp.	2.5				15			2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Achillea millefolium			2.5	2.5						

ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Astragalus sp.			2.5	2.5					
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Comandra umbellata									15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Lupinus sp.						97.5			
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Machaeranthera canescens				2.5	2.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Phlox hoodii		15		15			2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Taraxacum sp.			2.5						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Artemisia tridentata			15		85		2.5	62.5	37.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Chrysothamnus viscidiflorus			15					2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Gutierrezia sarothrae	15	15	2.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Tetradymia canescens	15	2.5	15							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	4	Artemisia frigida	15									
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Bare Soil	37.5	37.5	15	37.5	37.5	37.5	15	62.5	37.5	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Litter	37.5	37.5	37.5	15	37.5	37.5	37.5	15	37.5	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Agropyron smithii	2.5	2.5	15	2.5	2.5	15	2.5		2.5	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Carex sp.								2.5		2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Poa sandbergii	2.5	2.5	2.5	15	2.5	15	15	2.5	15	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Achillea millefolium	2.5			15	2.5				2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Antennaria sp.			15						2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Astragalus sp.	2.5									
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Comandra umbellata							2.5	15		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Lupinus sp.			15		37.5		15	15		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Machaeranthera canescens			2.5			2.5		2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Phlox hoodii	2.5		2.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Taraxacum sp.				2.5						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Artemisia tridentata	2.5	62.5		15		2.5	15	2.5	2.5	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Chrysothamnus viscidiflorus	2.5		15			2.5	15			
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Tetradymia canescens					15					
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	5	Artemisia frigida								2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Bare Soil	85	15	62.5	0	15	15	37.5	62.5	2.5	62.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Litter	15	62.5	15	37.5	62.5	37.5	37.5	37.5	62.5	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Agropyron smithii	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Carex sp.			2.5							2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Poa sandbergii	2.5	2.5	15	2.5	2.5	15	15	2.5	15	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Stipa sp.		2.5		15					15	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Achillea millefolium					2.5	2.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Lupinus sp.				15			15			
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Machaeranthera canescens			2.5		2.5	2.5		2.5		2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Phlox hoodii							2.5			2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Polygonum douglasii			2.5		2.5					
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Artemisia tridentata	15	85		62.5		15	15	2.5	62.5	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Chrysothamnus nauseosus			2.5	15						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Chrysothamnus viscidiflorus					15					
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Gutierrezia sarothrae			2.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	6	Leptodactylon pungens						15				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Bare Soil	37.5	62.5	2.5	2.5	15	2.5	2.5	62.5	2.5	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Litter	15	37.5	62.5	37.5	15	62.5	85	15	85	37.5

ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Agropyron smithii	15	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Poa sandbergii	15	2.5	37.5	15	2.5	15	15	15	15	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Achillea millefolium				2.5		2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Antennaria sp.					15	15				2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Arabis sp.	2.5									
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Lupinus sp.				37.5	62.5					
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Machaeranthera canescens			2.5		15	2.5		2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Phlox hoodii	2.5									
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Polygonum douglasii	2.5					2.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Unknown forb								2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Artemisia tridentata	15	37.5	62.5	15		37.5	85		62.5	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Chrysothamnus nauseosus									15	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Chrysothamnus viscidiflorus					2.5			2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Leptodactylon pungens							2.5	2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Rosa sp.					2.5					
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Tetradymia canescens	2.5									
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	7	Opuntia polyacantha							2.5			
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Bare Soil	62.5	37.5	37.5	15	15	62.5	2.5	2.5	2.5	85
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Litter	15	37.5	15	37.5	37.5	37.5	85	85	62.5	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Agropyron smithii	15	15	15	15	15	2.5	2.5		15	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Carex filifolia					2.5					2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Poa sandbergii	15	15	15	15	2.5	2.5	15	15	15	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Achillea millefolium						2.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Antennaria sp.					15	2.5			15	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Lupinus sp.				15						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Machaeranthera canescens		15	15	15			2.5	2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Phlox hoodii		2.5							2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Polygonum douglasii										2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Unknown forb					2.5					
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Artemisia tridentata		2.5			2.5		85	97.5	62.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Chrysothamnus nauseosus				37.5						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Chrysothamnus viscidiflorus	15				15	15			2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	8	Gutierrezia sarothrae					15	2.5	2.5			
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Bare Soil	37.5	0	37.5	37.5	62.5	2.5	15	37.5	62.5	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Litter	62.5	62.5	37.5	37.5	15	85	62.5	37.5	15	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Agropyron smithii	2.5		2.5	2.5	2.5	2.5	2.5	15	2.5	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Carex filifolia									2.5	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Festuca idahoensis				2.5	15					
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Poa sandbergii	15	15	15	2.5	15	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Achillea millefolium	2.5		2.5		2.5		2.5		2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Antennaria sp.		2.5	2.5					15		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Arabis sp.					2.5					
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Machaeranthera canescens			2.5		2.5				15	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Phlox hoodii									2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Polygonum douglasii										2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Artemisia tridentata	37.5	37.5	15	37.5		85	62.5		2.5	2.5

ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Chrysothamnus nauseosus	2.5	15							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Chrysothamnus viscidiflorus			2.5		2.5				15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Leptodactylon pungens		2.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	9	Rosa sp.							2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Bare Soil	37.5	15	37.5	37.5	15	2.5	15	2.5	15	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Litter	37.5	37.5	37.5	15	37.5	85	37.5	85	62.5	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Agropyron smithii	15	15	2.5	2.5		2.5	2.5		15	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Carex sp.	15	2.5			2.5					2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Festuca idahoensis					37.5	2.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Poa sandbergii	2.5	15	15	15	2.5	15	15	37.5	15	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Achillea millefolium		15	2.5	2.5		2.5			2.5	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Antennaria sp.	2.5			2.5			15			37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Lupinus sp.							2.5			
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Machaeranthera canescens	2.5	15	15	15	2.5	2.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Polygonum douglasii		2.5								
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Senecio sp.							2.5			
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	unknown Boraginaceae				2.5						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Unknown forb									2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Artemisia tridentata			15			15		62.5	37.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Chrysothamnus nauseosus			37.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Chrysothamnus viscidiflorus	2.5		37.5			2.5			15	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Gutierrezia sarothrae				15						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	10	Tetradymia canescens			2.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Bare Soil	2.5	62.5	37.5	62.5	15	2.5	85	15	15	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Litter	62.5	15	37.5	15	62.5	85	15	37.5	37.5	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Agropyron smithii	15	2.5	2.5						2.5	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Carex sp.								2.5		15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Poa sandbergii	37.5	15	2.5	15	2.5	15	2.5	37.5	37.5	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Achillea millefolium			15			2.5	2.5	2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Androsace sp.			2.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Antennaria sp.								2.5	62.5	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Lupinus sp.				2.5						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Machaeranthera canescens		2.5	2.5	15						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Phlox hoodii	2.5		2.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Polygonum douglasii	2.5	2.5	2.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Senecio sp.								15		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Artemisia tridentata					62.5	85	15	15	2.5	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Chrysothamnus viscidiflorus								2.5		2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Gutierrezia sarothrae				15						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	11	Tetradymia canescens	37.5									
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Bare Soil	15	62.5	37.5	62.5	85	85	2.5	62.5	2.5	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Litter	37.5	15	15	37.5	15	15	85	37.5	85	62.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Agropyron smithii		15		2.5	2.5	2.5		2.5		2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Carex sp.				2.5		2.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Festuca idahoensis							15			
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Poa sandbergii	15	2.5	2.5	15	2.5	2.5	15	15	2.5	2.5

ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Stipa sp.	37.5	2.5	15						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Achillea millefolium						2.5	2.5	2.5		2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Androsace sp.	2.5									
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Antennaria sp.			15							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Astragalus sp.			15							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Lupinus sp.		15								
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Machaeranthera canescens		2.5	15	15	15			2.5	2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Phlox hoodii			2.5	2.5	15					
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Polygonum douglasii				2.5					2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Artemisia tridentata		15	15		2.5	2.5	15		37.5	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Chrysothamnus nauseosus			15					2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Chrysothamnus viscidiflorus	15	2.5								
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Leptodactylon pungens									2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Tetradymia canescens	15									
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	12	Artemisia frigida	2.5									
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Bare Soil	15	62.5	15	15	62.5	37.5	37.5	62.5	37.5	62.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Litter	62.5	15	37.5	37.5	15	37.5	37.5	37.5	62.5	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Agropyron smithii	15	2.5	15				2.5			2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Carex filifolia			2.5		2.5					
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Festuca idahoensis				15	2.5					
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Poa sandbergii	37.5	2.5	15	15	2.5	15	15	15	15	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Stipa sp.			15	2.5		2.5		2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Achillea millefolium	2.5	15		15	15	2.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Antennaria sp.			37.5						2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Machaeranthera canescens		15			2.5			2.5		2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Phlox hoodii						2.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Polygonum douglasii				2.5	2.5			2.5		2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Senecio sp.						2.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Taraxacum sp.			2.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	unknown Boraginaceae			2.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Unknown forb										2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Artemisia tridentata			37.5			15	37.5	15	37.5	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Chrysothamnus nauseosus					2.5					
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Chrysothamnus viscidiflorus	37.5	15		15					15	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Leptodactylon pungens							15			
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Tetradymia canescens						2.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	13	Artemisia frigida							2.5			
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Bare Soil	37.5	37.5	37.5	37.5	37.5	15	37.5	2.5	0	37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Litter	37.5	37.5	15	37.5	62.5	62.5	37.5	85	85	62.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Agropyron smithii	15	15	2.5	15	15					2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Carex sp.				2.5						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Koeleria pyramidata					15					
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Poa sandbergii	15	15	2.5	2.5	2.5		15	15	2.5	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Stipa sp.	15	15	2.5	15		15	2.5	2.5	2.5	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Achillea millefolium		2.5		2.5	2.5		2.5	2.5		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Antennaria sp.		2.5								15

ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Draba sp.			2.5						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Machaeranthera canescens	2.5					2.5		2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Phlox hoodii	2.5		2.5						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Polygonum douglasii				2.5					2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	unknown Boraginaceae			2.5						
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Artemisia tridentata		15	37.5	15	15	62.5	37.5	15	85
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Chrysothamnus nauseosus					2.5			15	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Chrysothamnus viscidiflorus		2.5							15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Leptodactylon pungens								2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	14	Artemisia frigida	2.5								
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Bare Soil	2.5	15	15	85	15	2.5	0	15	15	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Litter	85	62.5	37.5	15	62.5	37.5	85	37.5	62.5	62.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Agropyron smithii		2.5		15	15	2.5		15	15	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Carex filifolia									2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Poa sp.	62.5	37.5	15	2.5	37.5		15	15	15	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Stipa sp.						62.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Achillea millefolium	2.5		2.5		2.5	15	2.5	15		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Antennaria sp.						2.5			15	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Lupinus sp.			2.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Machaeranthera canescens							2.5	15		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Phlox hoodii				2.5		2.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Polygonum douglasii								2.5		2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Sphaeralcea coccinea									2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Taraxacum sp.						2.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	unknown Boraginaceae									2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	unknown mustard	2.5									
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Artemisia tridentata	15		62.5		15		97.5			37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Chrysothamnus viscidiflorus	15	2.5				15		2.5	15	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Gutierrezia sarothrae								15		
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	15	Leptodactylon pungens									15	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Bare Soil	2.5	2.5	15	62.5	2.5	15	15	62.5	62.5	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Litter	62.5	62.5	85	37.5	85	62.5	85	15	15	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Agropyron smithii	2.5		15	15	15	2.5	15	2.5	2.5	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Carex sp.	2.5			2.5				2.5	2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Festuca idahoensis	15									
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Poa sp.	15	62.5	37.5	2.5	15	15	15	2.5		15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Achillea millefolium			15	2.5	2.5	2.5	15		2.5	2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Antennaria sp.		37.5	2.5					15		37.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Machaeranthera canescens			2.5		2.5	15				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Phlox hoodii	2.5					2.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Polygonum douglasii			2.5				2.5	2.5		2.5
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Sphaeralcea coccinea						2.5			2.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Taraxacum sp.						2.5				
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	unknown Boraginaceae			2.5							
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Artemisia tripartita				2.5		15			37.5	
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Chrysothamnus nauseosus		15	37.5							

ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Chrysothamnus viscidiflorus	15	2.5	2.5		62.5	15	15	15	2.5	15
ROBB-LEDFORD	2004	Site 5 Battle Ranch Site	16	Leptodactylon pungens				15						
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Bare Soil	0	0	0	0	0	0	0	0	0	0
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Litter	62.5	62.5	62.5	62.5	62.5	37.5	37.5	15	37.5	37.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Agropyron spicatum		2.5	2.5		2.5		2.5		2.5	2.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Carex sp.								15	15	2.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Festuca idahoensis	15	15	15	37.5	15	37.5	2.5	37.5	2.5	15
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Poa juncifolia				2.5						
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Stipa nelsonii	15		2.5			2.5				
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Achillea millefolium		2.5								2.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Agoseris glauca	2.5					2.5	2.5			
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Arabis sp.		2.5								
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Asteraceae				2.5						
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Besseya wyomingensis									2.5	2.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Cerastium arvense	15	62.5	15		37.5	37.5	37.5	2.5	37.5	37.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Delphinium glaucum	2.5	2.5					2.5			2.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Geum triflorum			37.5			15			15	
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Lupinus sp.					37.5		2.5			2.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Pedicularis sp.			2.5							
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Phlox hoodii	15					2.5		15		
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Taraxacum officinale	2.5				2.5					
ROBB-LEDFORD	2008	Site 1 High Elevation Site	1	Chrysothamnus viscidiflorus				37.5						
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Bare Soil	0	0	2.5	2.5	0	0	0	0	2.5	2.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Litter	15	62.5	85	62.5	37.5	62.5	62.5	62.5	37.5	15
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Agropyron sp.	2.5	2.5	15		2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Carex sp.	2.5	2.5	2.5	2.5	15	2.5	2.5	2.5	2.5	
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Festuca idahoensis	37.5	37.5	2.5	15	2.5	37.5	37.5	37.5	15	15
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Koeleria pyramidata									2.5	2.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Stipa nelsonii	2.5			15	2.5					
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Achillea millefolium							2.5			
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Antennaria microphylla			2.5	2.5						
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Asteraceae		2.5					2.5	2.5		
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Besseya wyomingensis				2.5	15				2.5	
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Cerastium arvense		2.5	15	2.5	37.5	2.5	15	15	37.5	15
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Delphinium glaucum						2.5				15
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Geum triflorum		37.5		15				2.5		
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Lupinus sp.						2.5				
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	Phlox hoodii	37.5					37.5				
ROBB-LEDFORD	2008	Site 1 High Elevation Site	2	unknown mustard	2.5									
ROBB-LEDFORD	2008	Site 1 High Elevation Site	3	Bare Soil	0	0	2.5	0	2.5	15	0	0	0	0
ROBB-LEDFORD	2008	Site 1 High Elevation Site	3	Litter	62.5	62.5	37.5	37.5	37.5	15	62.5	62.5	37.5	37.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	3	Agropyron sp.						2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	3	Carex sp.	15	2.5	2.5	15	2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	3	Festuca idahoensis	37.5	15	37.5	37.5	85	15	37.5	2.5	62.5	2.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	3	Agoseris glauca				2.5	2.5				2.5	
ROBB-LEDFORD	2008	Site 1 High Elevation Site	3	Antennaria microphylla						2.5				

ROBB-LEDFORD	2008 Site 1 High Elevation Site	3 Besseya wyomingensis	2.5		2.5						
ROBB-LEDFORD	2008 Site 1 High Elevation Site	3 Cerastium arvense	15		2.5		2.5	2.5	15	2.5		15
ROBB-LEDFORD	2008 Site 1 High Elevation Site	3 Delphinium glaucum				2.5	2.5		15		2.5	
ROBB-LEDFORD	2008 Site 1 High Elevation Site	3 Geum triflorum	15	62.5	37.5			37.5		62.5		37.5
ROBB-LEDFORD	2008 Site 1 High Elevation Site	3 Lupinus sp.								2.5		
ROBB-LEDFORD	2008 Site 1 High Elevation Site	3 Phlox hoodii				37.5			15		15	
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Bare Soil	0	2.5	0	0	15	2.5	15	0	0	15
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Litter	62.5	37.5	85	62.5	37.5	37.5	37.5	85	62.5	37.5
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Agropyron sp.	2.5	2.5			2.5	2.5		2.5	2.5	
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Carex sp.	15	2.5	2.5	2.5	2.5	15	15	2.5	15	15
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Festuca idahoensis	2.5	15	37.5	62.5	2.5	2.5	15	62.5	62.5	2.5
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Stipa nelsonii			2.5							
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Achillea millefolium			2.5							
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Agoseris glauca	2.5					2.5				
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Antennaria microphylla	2.5									
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Arenaria congesta						2.5				2.5
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Besseya wyomingensis							2.5	2.5		
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Cerastium arvense	2.5	2.5		15		2.5			2.5	2.5
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Delphinium glaucum			15	2.5		2.5		2.5		
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Geum triflorum	15	15			85		2.5			15
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Lupinus sp.	2.5	2.5		2.5						
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Phlox hoodii		2.5	2.5			37.5		2.5		
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Taraxacum officinale			2.5							
ROBB-LEDFORD	2008 Site 1 High Elevation Site	4 Chrysothamnus viscidiflorus							15			
ROBB-LEDFORD	2008 Site 1 High Elevation Site	5 Bare Soil	0	0	15	0	0	0	15	37.5	2.5	0
ROBB-LEDFORD	2008 Site 1 High Elevation Site	5 Litter	62.5	62.5	37.5	15	62.5	15	62.5	15	62.5	37.5
ROBB-LEDFORD	2008 Site 1 High Elevation Site	5 Agropyron sp.		2.5	2.5	2.5						2.5
ROBB-LEDFORD	2008 Site 1 High Elevation Site	5 Carex sp.	37.5	37.5	2.5	2.5	2.5	2.5	2.5	15	2.5	2.5
ROBB-LEDFORD	2008 Site 1 High Elevation Site	5 Festuca idahoensis	37.5	15	37.5	37.5	85	85	15	15	37.5	15
ROBB-LEDFORD	2008 Site 1 High Elevation Site	5 Stipa nelsonii						2.5	15			
ROBB-LEDFORD	2008 Site 1 High Elevation Site	5 Achillea millefolium				2.5	2.5	2.5				
ROBB-LEDFORD	2008 Site 1 High Elevation Site	5 Agoseris glauca		2.5		2.5	15	2.5	2.5	15	2.5	
ROBB-LEDFORD	2008 Site 1 High Elevation Site	5 Arenaria congesta					2.5	2.5				
ROBB-LEDFORD	2008 Site 1 High Elevation Site	5 Besseya wyomingensis	2.5	2.5		2.5	2.5				2.5	
ROBB-LEDFORD	2008 Site 1 High Elevation Site	5 Cerastium arvense	15	62.5	15	15	2.5	2.5	2.5	15	15	15
ROBB-LEDFORD	2008 Site 1 High Elevation Site	5 Geum triflorum	15	15	37.5				37.5	37.5	15	85
ROBB-LEDFORD	2008 Site 1 High Elevation Site	5 Lupinus sp.					15			15		
ROBB-LEDFORD	2008 Site 1 High Elevation Site	5 Phlox hoodii				37.5	15					
ROBB-LEDFORD	2008 Site 1 High Elevation Site	5 Taraxacum officinale					2.5					
ROBB-LEDFORD	2008 Site 1 High Elevation Site	6 Bare Soil	0	2.5	0	0	0	0	0	0	15	0
ROBB-LEDFORD	2008 Site 1 High Elevation Site	6 Litter	62.5	62.5	85	85	85	37.5	85	62.5	37.5	85
ROBB-LEDFORD	2008 Site 1 High Elevation Site	6 Agropyron sp.	2.5		15	2.5	15	2.5		2.5	2.5	2.5
ROBB-LEDFORD	2008 Site 1 High Elevation Site	6 Carex sp.	15	15	15	37.5	2.5		37.5	2.5	15	2.5
ROBB-LEDFORD	2008 Site 1 High Elevation Site	6 Festuca idahoensis	62.5	15	15	15	62.5	62.5	2.5	15	37.5	37.5
ROBB-LEDFORD	2008 Site 1 High Elevation Site	6 Agoseris glauca								2.5		2.5
ROBB-LEDFORD	2008 Site 1 High Elevation Site	6 Antennaria microphylla		15								

ROBB-LEDFORD	2008	Site 1 High Elevation Site	6	Arenaria congesta					15				2.5	
ROBB-LEDFORD	2008	Site 1 High Elevation Site	6	Besseya wyomingensis	2.5			2.5	2.5				2.5	2.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	6	Cerastium arvense	15	15	2.5	2.5		37.5	15	15	15	
ROBB-LEDFORD	2008	Site 1 High Elevation Site	6	Delphinium glaucum	2.5				15					
ROBB-LEDFORD	2008	Site 1 High Elevation Site	6	Geum triflorum		15	37.5				37.5	37.5		2.5
ROBB-LEDFORD	2008	Site 1 High Elevation Site	6	Lomatium sp.						2.5				
ROBB-LEDFORD	2008	Site 1 High Elevation Site	6	Lupinus sp.				2.5					2.5	
ROBB-LEDFORD	2008	Site 1 High Elevation Site	6	Phlox hoodii	37.5									15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Bare Soil	15	15	15	15	15	15	15	62.5	15	37.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Litter	37.5	37.5	37.5	15	62.5	37.5	37.5	15	15	37.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Agropyron smithii	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Agropyron spicatum		2.5			2.5		2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Festuca idahoensis	37.5	37.5	37.5	15	37.5	15	37.5	2.5	15	37.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Koeleria pyramidata									15	
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Poa sandbergii						2.5				
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Antennaria microphylla	15	15	15		15	15	2.5	2.5	15	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Arenaria congesta	2.5		2.5							
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Comandra umbellata						2.5	2.5	2.5		15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Heterotheca villosa				15		15				
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Phlox hoodii	37.5	2.5	15	2.5	2.5	15		15	15	
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Sedum lanceolatum	2.5				2.5	2.5				
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Unknown forb			2.5							
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Chrysothamnus viscidiflorus	15	2.5						2.5		2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Gutierrezia sarothrae			2.5							
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Tetradymia canescens								2.5		
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Lichens			2.5	2.5	2.5	2.5	15	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	ROCK	15	2.5	37.5	15	15	2.5	15	2.5	15	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	1	Artemisia frigida			2.5	2.5						
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Bare Soil	15	2.5	15	37.5	15	15	15	15	15	37.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Litter	37.5	62.5	37.5	15	37.5	15	62.5	15	37.5	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Agropyron smithii	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Agropyron spicatum	15	2.5				2.5	2.5	2.5	15	
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Carex sp.		2.5		2.5	2.5	2.5		2.5	2.5	
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Festuca idahoensis	15	37.5	37.5	15	15	15	37.5	15	15	37.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Koeleria pyramidata	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Achillea millefolium										2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Antennaria microphylla	15	15	15	15	37.5	15	2.5	37.5	15	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Astragalus purshii						2.5				
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Comandra umbellata			2.5			2.5			2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Penstemon sp.		2.5					2.5		2.5	
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Phlox hoodii		2.5	15		2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Sedum lanceolatum	2.5	2.5	2.5					2.5		
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Sphaeralcea coccinea					2.5					
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Unknown forb	2.5			2.5			2.5			
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Tetradymia canescens			2.5							
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Lichens	2.5	2.5	2.5	2.5	2.5	2.5	2.5			2.5

ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	ROCK	37.5	15	15	15	15	15	15	15	2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	2	Artemisia frigida	2.5	2.5		2.5	2.5	2.5	2.5			
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Bare Soil	15	15	15	15	15	2.5	15	2.5	2.5	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Litter	15	15	15	62.5	15	62.5	15	62.5	37.5	37.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Agropyron smithii	2.5	2.5	2.5			2.5				
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Agropyron spicatum	2.5	2.5	15	2.5	15	15	2.5	15	15	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Carex sp.	2.5	2.5	2.5		2.5	2.5		2.5		2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Festuca idahoensis	15	2.5	37.5	15	15	15	37.5	37.5	37.5	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Koeleria pyramidata	2.5						2.5		2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Antennaria microphylla	15	37.5	2.5	15	2.5	15	2.5	2.5	15	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Comandra umbellata				2.5				2.5		
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Heterotheca villosa			2.5							
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Machaeranthera canescens		2.5	2.5							
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Penstemon sp.								2.5		
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Phlox hoodii		2.5	2.5			2.5		15	2.5	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Sedum lanceolatum	2.5	2.5		2.5	15	2.5			2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Sphaeralcea coccinea					2.5					
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Gutierrezia sarothrae	2.5		2.5							
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Tetradymia canescens	2.5				2.5					
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Lichens	2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	ROCK	2.5	2.5	37.5	2.5	15	15	15	15	2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	3	Artemisia frigida			2.5		2.5		2.5			2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Bare Soil	15	15	15	15	37.5	15	15	15	37.5	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Litter	37.5	37.5	37.5	37.5	15	37.5	37.5	37.5	15	62.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Agropyron smithii	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Agropyron spicatum	15	15	2.5	15		2.5	15	15	2.5	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Carex sp.	2.5	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Festuca idahoensis	15	15	37.5	15	15	15	37.5	15	15	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Koeleria pyramidata	2.5	2.5	2.5		2.5	2.5	2.5	2.5	15	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Poa sandbergii										2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Poa sp.			2.5							
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Achillea millefolium		2.5						2.5		
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Antennaria microphylla	2.5	15	15	15	15	15	37.5	2.5	15	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Arenaria congesta	2.5									
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Comandra umbellata				2.5						
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Heterotheca villosa		2.5								
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Penstemon sp.			2.5							
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Phlox hoodii	2.5		2.5		2.5	2.5		2.5	15	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Sedum lanceolatum	2.5		2.5	2.5		2.5	2.5		2.5	
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Unknown forb	2.5									
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Chrysothamnus viscidiflorus								15		
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Tetradymia canescens					15			2.5		2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Lichens	2.5	2.5	2.5	2.5	2.5	15	2.5		2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	ROCK	15	15	15	15	2.5	15	2.5	15	15	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	4	Artemisia frigida	15	2.5								
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Bare Soil	15	2.5	37.5	15	37.5	62.5	37.5	15	37.5	15

ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Litter	15	37.5	15	37.5	15	2.5	15	37.5	15	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Agropyron smithii				2.5	2.5	2.5	2.5			
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Agropyron spicatum	2.5	15	2.5	2.5	2.5	2.5		2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Carex sp.						2.5		2.5		2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Festuca idahoensis	15	62.5	37.5	37.5	15	15	37.5	37.5	15	37.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Koeleria pyramidata			2.5							2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Achillea millefolium						2.5				
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Agoseris glauca						2.5				
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Antennaria microphylla	15	15	15	15	37.5	15	15	37.5	15	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Arenaria congesta		2.5								
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Heterotheca villosa	2.5									
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Machaeranthera canescens							2.5			
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Phlox hoodii	15			15			15		2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Sphaeralcea coccinea							15			
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Unknown forb								15		
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Chrysothamnus viscidiflorus	2.5			15					2.5	
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Gutierrezia sarothrae									2.5	
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Tetradymia canescens		2.5	2.5							
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Lichens	2.5	2.5	2.5		2.5		2.5		2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	ROCK	15	15	15	2.5	2.5	37.5	15	15	2.5	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	5	Artemisia frigida		2.5		2.5	2.5		2.5			
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Bare Soil	15	15	15	37.5	37.5	37.5	15	15	37.5	37.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Litter	62.5	37.5	37.5	15	15	15	15	37.5	15	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Agropyron smithii	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Agropyron spicatum	2.5		15	15	15		2.5		15	
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Carex sp.		2.5				2.5				
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Festuca idahoensis	37.5	15	37.5	15	15	15	15	15	15	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Koeleria pyramidata	2.5		2.5	2.5	15	2.5	2.5	2.5	2.5	15
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Poa sandbergii							2.5			
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Antennaria microphylla	15	15	15	15	15	15	15	37.5	15	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Arenaria congesta	2.5									
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Astragalus purshii		2.5								2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Astragalus sp.			2.5	2.5		15				
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Comandra umbellata		2.5		2.5		2.5				
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Erigeron compositus						2.5				
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Heterotheca villosa							2.5			
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Penstemon sp.						2.5				2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Phlox hoodii	2.5		2.5	2.5		15	15		2.5	
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Sedum lanceolatum	2.5	2.5			2.5	2.5	2.5			2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Sphaeralcea coccinea			2.5							
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Unknown forb			2.5							
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Chrysothamnus viscidiflorus		2.5								
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Gutierrezia sarothrae						2.5				
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Tetradymia canescens		2.5								
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Lichens	2.5	15	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	ROCK	2.5	15	2.5	15	15	15	15	2.5	15	15

ROBB-LEDFORD	2008	Site 2 Moderate Elevation Site	6	Artemisia frigida		2.5					2.5		2.5	
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Bare Soil	62.5	37.5	15	15	15	37.5	37.5	62.5	62.5	37.5
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Litter	15	15	37.5	62.5	37.5	37.5	15	15	15	15
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Agropyron smithii		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Agropyron spicatum	2.5	2.5		2.5		15	2.5		15	
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Carex sp.		2.5	2.5		2.5	2.5	2.5			2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Koeleria pyramidata	2.5	2.5	2.5	15	2.5		15	15	2.5	
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Poa sandbergii	15	15	2.5	15	15	15	15	15	15	15
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Stipa comata	2.5			2.5						
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Astragalus sp.			2.5		2.5	2.5				
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Phlox hoodii	15	15	15	37.5	37.5	15	15	2.5	2.5	15
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Sphaeralcea coccinea		2.5	2.5		2.5	2.5	2.5	2.5	2.5	
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Chrysothamnus viscidiflorus		2.5	37.5	62.5	15	15	15	2.5	2.5	15
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Gutierrezia sarothrae	2.5					2.5			2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Selaginella densa	2.5	2.5		15	2.5	2.5	2.5	2.5	15	
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Lichens		2.5	2.5	15	2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	1	ROCK		2.5	2.5		15	15		2.5	15	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	1	Artemisia frigida	2.5	2.5	15		15	2.5	2.5			
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Bare Soil	62.5	85	15	15	37.5	37.5	37.5	37.5	15	15
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Litter	15	15	37.5	37.5	15	15	15	15	37.5	15
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Agropyron smithii	2.5	15	2.5	15	2.5	15	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Agropyron spicatum	2.5			2.5		15	15	2.5	15	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Carex sp.	2.5	2.5					2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Koeleria pyramidata	2.5	15	2.5	2.5	2.5	15	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Poa sandbergii	2.5	2.5	2.5	15	15	2.5	15	15	15	37.5
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Astragalus sp.				2.5		2.5				
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Phlox hoodii	2.5	2.5	2.5	15		15				15
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Sphaeralcea coccinea	2.5		2.5	2.5						2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Taraxacum officinale			2.5							
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Ceratoides lanata			2.5							
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Chrysothamnus viscidiflorus	15	2.5	37.5	15	2.5	15	15	15	37.5	15
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Gutierrezia sarothrae				2.5						
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Tetradymia canescens				2.5	15		2.5	2.5	2.5	
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Selaginella densa				2.5		2.5		2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Lichens	2.5	2.5	2.5	15					2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	2	ROCK	15	2.5		2.5	2.5	2.5		2.5		2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	2	Artemisia frigida	15	2.5	15	2.5	15	2.5	2.5		15	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Bare Soil	62.5	15	37.5	15	15	15	37.5	37.5	37.5	15
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Litter	15	62.5	37.5	62.5	62.5	62.5	15	15	15	62.5
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Agropyron smithii	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Agropyron spicatum		2.5			2.5			2.5	15	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Carex sp.	2.5	2.5				2.5	2.5	2.5		
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Koeleria pyramidata	2.5	2.5	15	2.5	2.5	2.5	2.5	2.5	15	15
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Poa sandbergii	15	15	15	15	15	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Antennaria microphylla	2.5									
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Astragalus sp.		2.5	2.5	2.5	2.5	2.5				

ROBB-LEDFORD	2008	Site 3 Bench Site	3	Phlox hoodii	2.5	2.5	15	15	15	15	15	2.5	2.5	
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Sphaeralcea coccinea					2.5					2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Ceratoides lanata				15						
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Chrysothamnus nauseosus			15							
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Chrysothamnus viscidiflorus	15	37.5	15	37.5	15	15	15	15	37.5	37.5
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Gutierrezia sarothrae	2.5				2.5					
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Tetradymia canescens	2.5	15							15	
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Selaginella densa		2.5	2.5		2.5	2.5	2.5		2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Lichens	2.5		2.5	2.5	2.5	2.5	2.5			
ROBB-LEDFORD	2008	Site 3 Bench Site	3	ROCK	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	
ROBB-LEDFORD	2008	Site 3 Bench Site	3	Artemisia frigida			2.5	2.5	2.5	2.5			2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Bare Soil	15	37.5	37.5	37.5	15	37.5	15	62.5	37.5	0
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Litter	37.5	15	15	37.5	62.5	37.5	37.5	15	15	62.5
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Agropyron smithii		2.5	2.5	2.5	15	2.5	2.5	2.5		15
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Agropyron spicatum	2.5	2.5						15	15	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Carex sp.				2.5	2.5				2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Koeleria pyramidata	15	15	2.5	2.5			2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Other Grasses						2.5	15			
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Poa sandbergii	2.5	15	15	2.5	2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Stipa comata										2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Achillea millefolium	2.5						2.5			
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Antennaria microphylla	2.5									
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Astragalus sp.	2.5						2.5			
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Phlox hoodii	15	2.5	2.5	15	37.5		15	2.5	2.5	15
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Sphaeralcea coccinea			2.5						2.5	
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Taraxacum officinale				2.5						
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Unknown forb				2.5				2.5		
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Ceratoides lanata					2.5					
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Chrysothamnus nauseosus					2.5	62.5				2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Chrysothamnus viscidiflorus	15	15	37.5	2.5	15		15	15	15	15
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Gutierrezia sarothrae									2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Tetradymia canescens	15	2.5				2.5			2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Selaginella densa			2.5							2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Lichens			2.5	2.5	2.5		2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	4	ROCK		2.5	2.5	2.5		15	2.5	2.5	2.5	
ROBB-LEDFORD	2008	Site 3 Bench Site	4	Artemisia frigida	2.5	2.5		2.5	15	15			2.5	15
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Bare Soil	15	37.5	2.5	37.5	85	15	15	85	37.5	15
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Litter	37.5	15	85	15	2.5	37.5	37.5	2.5	37.5	37.5
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Agropyron smithii	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Agropyron spicatum	2.5		2.5	15			2.5		2.5	
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Carex sp.	2.5				2.5				2.5	
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Koeleria pyramidata	2.5	15		2.5			15	2.5	15	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Poa sandbergii	15	15	15	2.5	2.5	15	15	15	2.5	15
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Achillea millefolium	15									
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Astragalus sp.								2.5		
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Machaeranthera canescens						2.5				

ROBB-LEDFORD	2008	Site 3 Bench Site	5	Phlox hoodii	2.5	2.5	2.5	2.5	2.5	15	2.5	2.5	2.5	15
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Sphaeralcea coccinea										2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Taraxacum officinale					2.5					
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Chrysothamnus nauseosus		2.5								
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Chrysothamnus viscidiflorus	15	15	62.5	15	2.5	62.5	15	15	37.5	37.5
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Gutierrezia sarothrae					2.5					
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Tetradymia canescens	15		2.5	2.5		2.5	2.5			
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Selaginella densa								2.5		
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Lichens				15	2.5	2.5	15	2.5	15	
ROBB-LEDFORD	2008	Site 3 Bench Site	5	ROCK		2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	5	Artemisia frigida			2.5	2.5	2.5	2.5	2.5			2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Bare Soil	37.5	62.5	15	37.5	85	62.5	37.5	37.5	37.5	15
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Litter	15	2.5	37.5	37.5	2.5	15	37.5	15	15	37.5
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Agropyron smithii	2.5	15	2.5	2.5	2.5	2.5	2.5	2.5	2.5	15
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Agropyron spicatum	2.5									
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Carex sp.	2.5	2.5	2.5		2.5		2.5		2.5	
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Koeleria pyramidata	2.5	2.5	2.5	15	15	2.5	15	15	2.5	15
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Other Grasses	2.5									
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Poa sandbergii	15	15	15	2.5	2.5	15	15	2.5	15	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Achillea millefolium	2.5	2.5	2.5			15				2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Antennaria microphylla	2.5									
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Astragalus sp.	2.5						2.5			
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Phlox hoodii		15	2.5	2.5	2.5	2.5		2.5	15	15
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Sphaeralcea coccinea	2.5				2.5	2.5			2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Chrysothamnus nauseosus				37.5	2.5				2.5	
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Chrysothamnus viscidiflorus	2.5	2.5	37.5	37.5	2.5	15	37.5	15	37.5	15
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Gutierrezia sarothrae								15		
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Tetradymia canescens	15			2.5					2.5	
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Selaginella densa			2.5	2.5						
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Lichens			2.5				2.5		2.5	2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	6	ROCK	2.5	2.5		15	15	2.5	2.5	2.5		2.5
ROBB-LEDFORD	2008	Site 3 Bench Site	6	Artemisia frigida		2.5						2.5		15
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	1	Bare Soil	2.5	2.5	2.5	37.5	2.5	37.5	0	2.5	2.5	0
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	1	Litter	37.5	37.5	15	15	15	15	62.5	15	37.5	85
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	1	Agropyron spicatum	2.5		2.5	2.5	2.5			2.5		
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	1	Carex sp.			2.5			2.5	2.5	2.5		
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	1	Festuca idahoensis	15	15	37.5	15	37.5	15	37.5	15	15	15
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	1	Poa sandbergii	2.5	2.5	2.5	2.5	2.5	2.5		2.5		
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	1	Achillea millefolium	2.5				2.5					2.5
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	1	Antennaria microphylla		2.5		15	2.5			15	2.5	
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	1	Geum triflorum				37.5						
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	1	Lupinus sp.		15	15	2.5		37.5			15	
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	1	Taraxacum officinale										2.5
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	1	Chrysothamnus nauseosus								2.5		
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	1	ROCK					2.5					
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	Bare Soil	62.5	62.5	2.5	15	2.5	2.5	2.5	2.5	0	15

ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	Litter	15	37.5	85	37.5	97.5	62.5	37.5	85	62.5	37.5
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	Agropyron smithii					2.5					
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	Agropyron spicatum				2.5	2.5	2.5				
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	Carex sp.				2.5	2.5	2.5			15	2.5
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	Festuca idahoensis	15	15	15	15	2.5	15	15	15	37.5	37.5
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	Poa sandbergii				15		2.5			2.5	2.5
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	Achillea millefolium		2.5	2.5	2.5	2.5	2.5		2.5		2.5
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	Antennaria microphylla	15		15					2.5	15	15
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	Lupinus sp.										15
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	Phlox hoodii										2.5
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	Taraxacum officinale		2.5								
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	Unknown forb					2.5					
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	Chrysothamnus viscidiflorus	2.5							2.5		
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	2	Tetradymia canescens						2.5			2.5	2.5
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	3	Bare Soil	15	0	0	0	0	0	0	2.5	0	2.5
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	3	Litter	15	62.5	85	37.5	85	62.5	37.5	62.5	62.5	37.5
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	3	Agropyron spicatum									2.5	
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	3	Carex sp.					2.5		2.5	2.5		2.5
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	3	Festuca idahoensis	2.5	37.5	15	2.5	15	2.5	15	37.5	37.5	37.5
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	3	Poa sandbergii						2.5	2.5			
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	3	Achillea millefolium		2.5		2.5	2.5			2.5		2.5
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	3	Antennaria microphylla	2.5	15		15	15					
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	3	Lupinus sp.									2.5	
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	3	Chrysothamnus nauseosus										2.5
ROBB-LEDFORD	2008	Site 4 Robb Creek Site	3	ROCK	2.5							2.5		

APPENDIX G

Wildlife Survey and Inventory Data

Table 1. Elk population trend data for hunting district 324, 1999 - 2009.

Year	Total	Unclass.	Antlerless	Total Bulls	Yearling Bulls	Rag Bulls	Adult Bulls
2009	2060	0	1846	214	153	45	16
2008	2086	0	1910	176	155	12	9
2007	1928	267	1410	251	202	36	13
2006	1786	257	1333	196	172	12	12
2005	1827	0	1551	276	240	30	6
2004	2491	0	2227	264	222	33	9
2003	1029	0	834	195	162	26	7
2002	2515	0	2237	278	231	34	13
2001	2761	0	2475	286	270	9	7
2000	2664	0	2209	455	352	75	28
1999	2550	0	2216	334	167	20	2

Data for 2003 are not valid trend data.

Table 2. Elk classification data for hunting district 324.

Year	Total	Unclass	Antler<	Cows	Calves	Bulls	Calf/Cow Ratio	Bull/Cow Ratio
2008	1223	0	1124	751	373	99	50	13
2007	1062	0	975	715	260	87	36	12
2006	1655	0	1514	1107	407	141	37	13
2005	1715	0	1568	1217	351	147	29	12
2004	613	0	533	403	130	80	32	20
2003	2063	0	1806	1353	453	257	33	19
2002	1245	0	1145	879	266	100	30	11
2001	1017	0	957	793	164	60	21	8
2000	1875	0	1746	1497	249	129	17	9

Table 3. Elk population trend data for hunting district 324 through 2009, by winter range.

Year	Total	Unclass.	Antlerless	Total Bulls	Yearling Bulls	Rag Bulls	Adult Bulls
Blacktail WMA							
2009	14	0	0	14	2	8	4
2008	79	0	62	17	10	3	4
2007	65	0	0	65	40	17	8
2006	138	85	33	20	1	9	10
2005	1352	0	1169	183	156	22	5
2004	1754	0	1573	181	150	26	5
2003	264	0	137	127	98	26	3
2002	1510	0	1318	192	163	26	3
2001	1796	0	1637	159	147	7	5
2000	1411	0	1141	270	215	42	13
Robb/Ledford WMA							
2009	1883	0	1741	142	125	17	0
2008	153	0	145	8	8	0	0
2007	706	267	350	89	67	17	5
2006	805	172	537	96	91	3	2
2005	475	0	382	93	84	8	1
2004	714	0	643	71	68	3	0
2003	63	0	49	14	14	0	0
2001	388	0	340	48	48	0	0
2000	1253	0	1068	185	137	33	15
Snowcrest West Face							
2009	29	0	6	23	3	8	12
2008	2	0	0	2	0	1	1
2004	19	0	11	8	2	4	2
2003	702	0	648	54	50	0	4
2002	1005	0	919	86	68	8	10
2001	427	0	375	52	48	2	2
Spring Brook							
2009	134	0	99	35	23	12	0
2008	1852	0	1703	149	137	8	4
2007	1157	0	1060	97	95	2	0
2006	843	0	763	80	80	0	0
Upper Ruby							
2004	4	0	0	4	2	0	2
2001	24	0	24	0	0	0	0
W. Fk. Blacktail							
2001	126	0	99	27	27	0	0

Table 4. Mule deer post season classification data by year, hunting district 324.

Year	Total	Unclass	Does	Fawns	F/D Ratio	Bucks	B/D Ratio	Spikes	2pts	3pts	4pts	>4pts
2008	125	0	76	33	43	16	21	4	5	4	3	0
2007	186	0	113	52	46	21	19	2	8	6	5	0
2006	181	0	84	57	68	40	48	6	11	9	14	0
2005	283	0	140	107	76	36	26	3	21	2	10	0
2004	184	0	98	56	57	30	31	4	4	4	15	3
2003	302	0	164	92	56	46	28	12	10	11	13	0
2002	207	0	97	84	87	26	27	7	2	9	8	0
2001	317	0	202	81	40	34	17	11	11	8	3	1
2000	281	0	160	96	60	25	16	7	6	10	2	0

Table 5. Mule deer spring trend data by hunting district.

Hunting District	Year	Total	Unclass	Adults	Fawns	Fawns/ 100 Adults
324	2008	358	0	243	115	47
	2007	375	0	261	114	44
	2006	406	0	284	122	43
	2005	316	12	193	111	58
	2004	336	0	244	92	38
	2002	224	0	170	54	32
	2001	337	0	259	78	30
	2000	572	0	413	159	38

Table 6. Moose survey data by hunting district (year at end of winter).

HD	Year	Total	Adults	Cows	Calves	Bulls
331	2009	35	30	1	5	1
	2008	51	46	0	5	
	2006	105	92	0	12	2
	2005	28	26	0	2	0
	2004	42	33	0	9	0
	2002	27	23	0	4	0

Table 7. Moose survey data by hunting district (year at end of winter).

HD	Year	Total	Adults	Cows	Calves	Bulls
332	2006	92	77	0	15	
	2005	37	27	0	10	0
	2004	26	22	0	4	0
	2002	14	10	0	4	0

Table 8 . WMA moose observations.

WMA	Year	Drainage	Total	Calves	Adults	Calf /Adult
Blacktail						
	2006	Alkalai Creek	9	2	7	28.6
		E. Fk. Blacktail Deer Creek	7	2	5	40.0
	2005	Alkalai Creek	5	2	3	66.7
		E. Fk. Blacktail Deer Creek	9	3	6	50.0
	2004	E. Fk. Blacktail Deer Creek	11	0	11	0.0
Robb/Ledford						
	2009	Ledford Creek	1	0	1	0.0
		Robb Creek	5	0	5	0.0
	2006	Robb Creek	9	1	8	12.5
	2005	Ledford Creek	1	0	1	0.0
		Robb Creek	5	0	5	0.0
	2004	Robb Creek - Ruby River Canyo	5	1	4	25.0

Table 9. Total pronghorn population trend data by HD through 2009.

HD	Year	Total	Fawn/ 100 Does	Buck/ 100 Does	Yearlings/ 100 Ad. Does
321	2008	2944	43.0	32.0	29.3
	2007	1596	52.7	63.6	40.8
	2006	2005	44.7	74.1	57.6
	2005	1434	55.7	34.4	21.8
	2004	2527	62.8	59.4	54.6
	2003	1826	52.8	31.5	22.5
	2002	2201	53.4	24.6	14.5
	2001	1540	21.0	38.3	31.4
	2000	1303	25.4	33.3	6.6

Data for HD 321 in 2007 are from a survey of the entire district. Remaining data are estimates from regression of trend area data against data for the entire district, except for ratio data which are from trend areas only.

APPENDIX H

2000 Robb/Ledford Grazing Lease Environmental Assessment

1400 So. 19th
Bozeman, MT 59718 February 23, 2000

TO: Governor's Office, Julie Lapeyre, Room 204, State Capitol, POB 200801, Helena, MT 59620-0801
Environmental Quality Council, Capitol Building, Room 106, POB 201704, Helena, MT 59620
Dept. Environmental Quality, Metcalf Building, POB 200901, Helena, MT 59620-0901
Montana Fish, Wildlife & Parks
Director's Office Mike Frisina
Wildlife Division Bob Harrington
Lands Division
Legal Unit
FWP Commissioners
Dennis Flath
MT Historical Society, State Historic Preservation Office, POB 201202, Helena, MT 59620-1202
MT State Library, 1515 E. Sixth Ave., POB 201800, Helena, MT 59620
James Jensen, Montana Environmental Information Center, POB 1184, Helena, MT 59624
Janet Ellis, Montana Audubon Council, POB 595, Helena, MT 59624
George Ochenski, POB 689, Helena, MT 59624
MT Wildlife Federation, P.O. Box 1175, Helena, MT 59624
Ira Holt, 548 Cielo Vista, Hamilton, MT 59840
Department of Livestock, Evaleen Starkel, 3rd Floor, Scott Hart Bldg, 301 Roberts, Helena, MT 59620
Beaverhead County Commission, Beaverhead County Courthouse, 2 So. Pacific, Dillon, MT 59725
Madison County Commission, POB 246, Virginia City, MT 59755
Representative Bill Tash, 240 Vista Drive, Dillon, MT 59725
Representative Karl Ohs, Box 212, Harrison, MT 59735
Representative Rick Dale, 175 Yellowstone Tr., Whitehall, MT 59759
Senator Chuck Swysgood, 506 So. Atlantic, Dillon, MT 59725
Senator Lorents Grosfield, HC 87 Box 2145, Big Timber, MT 59011

Ladies and Gentlemen:

Please find enclosed a draft copy of the Environmental Assessment (EA) for the proposed livestock-grazing plan on the Robb/Ledford Wildlife Management Area (WMA).

This draft EA is out for public review, comments will be accepted from February 23, 2000 until 5:00 p.m. on March 20, 2000. Comments received during that period will be considered in the final version.

Please send any comments to : Fish, Wildlife & Parks, Robb/Ledford WMA EA, 1400 So. 19th, Bozeman, MT 59718.

Sincerely,

Patrick J. Flowers
Regional Supervisor

Attachment

DRAFT (1/28/00 version)

ENVIRONMENTAL ASSESSMENT OF LIVESTOCK GRAZING ON THE ROBB LEDFORD WILDLIFE MANAGEMENT AREA

I. INTRODUCTION

In July 1988 the Montana Department of Fish, Wildlife and Parks (FWP) acquired 17,291 acres of deeded land from the Rocky Mountain Elk Foundation primarily for the purpose of protecting elk winter range. This property is known as the Robb/Ledford Wildlife Management Area (WMA). Along with the purchase, FWP acquired a lease of 10,818 acres of DNRC land associated with the deeded property. Additionally, there are 6,802 acres of BLM land associated with the WMA. The entire area associated with the WMA then, is 34,911 acres. All of these lands had been used for cattle grazing by the previous owners, the Ledford Creek Grazing Association (Association). At the time FWP purchased the WMA, the Association retained the grazing rights until November 1, 1990. Since that time, the Association has leased the grazing under a rest rotation grazing formula from June 15 through October 15 each year. In addition to the FWP deeded and DNRC lands directly tied to the WMA, the Association leases grazing on adjacent BLM, Forest Service and DNRC allotments. For further information on the grazing history or other aspects of the WMA, consult the 1999 Robb/Ledford WMA Management Plan (Management Plan). This Environmental Assessment reviews the potential impacts of continuing to allow livestock grazing on the WMA.

II. AUTHORITY AND DIRECTION

FWP has the authority under law (87-1-201) to protect, enhance and regulate the use of Montana's fish and wildlife resources for public benefit now and in the future. Any consideration of continued livestock grazing would have to conform with the direction of attaining the objectives of maintaining or improving wildlife, wildlife habitat and public access as outlined in the Management Plan (1999). Additionally, the Fish, Wildlife and Parks Commission must approve any grazing leases on Wildlife Management Areas owned by FWP. This Environmental Assessment is part of the decision-making process as directed by the Montana Environmental Policy Act (MEPA).

III. LOCATION OF THE PROJECT

The WMA is located in Madison and Beaverhead Counties in Southwestern Montana (Figure 1). It is situated on the western slopes of the Snowcrest Mountains approximately 20 miles south of Alder, Montana, along the Robb and Ledford Creek drainages of the Ruby River and a portion of the upper Blacktail Creek drainage. This WMA borders the Beaverhead National Forest (FS), Bureau of Land Management (BLM), Department of Natural Resources and Conservation (DNRC), Montana Fish, Wildlife & Parks Blacktail WMA, and private lands (Figure 1).

IV. PURPOSE AND NEED

The management of the WMA is directed towards meeting certain objectives as identified in the Management Plan (1999). A complete review of the objectives and strategies can be made by a review of that plan. A summary of the objectives include: (1) maintenance or improvement of the basic resource including vegetation, soil and water; (2) expanding benefits of FWP management to adjacent DNRC lands; (3) showcase the WMA as an area demonstrating where wildlife and livestock can co-exist while maintaining a healthy rangeland; (4) provide winter forage for elk; (5) provide habitat for all wildlife utilizing the WMA; (6) incorporate adjacent public lands into management of the WMA; (7) provide adequate public access; (8) maintain the natural character of the land; and (9) increase public awareness and appreciation for the diversity of wildlife on the WMA. FWP feels that all of the objectives listed above can be obtained by continuing and improving a properly managed livestock grazing system on the WMA. Certainly objectives 2, 3 and 6 are directly related to the continuation of livestock grazing. This EA will explore the alternatives of "no action" (which means continue the trajectory of the present management system which includes grazing and necessary improvements such as fence and water system maintenance and replacement). Whichever alternative is selected, the proper management of the natural resources on the WMA will be the foremost goal of FWP.

V. DESCRIPTION OF THE PREFERRED ALTERNATIVE

The Preferred Alternative will consolidate BLM and DNRC lands along with FWP deeded ground on the WMA into a coordinated grazing system called the Robb/Ledford Coordinated Grazing System (R/L System). Livestock utilizing this system would also make coordinated use of the adjacent FS Snowcrest Grazing Allotment (FS Allotment) and the adjacent Blacktail BLM Grazing Allotment (BLM Allotment). FWP presently leases over 10,000 acres of DNRC lands. An additional 3,600 acres of DNRC would be included in the R/L System through an exchange of use agreement with the present lessees, the Ledford Creek Grazing Association. This exchange of use allows DNRC lands (know as the McGuire property – Figure 2) leased by the Association to be included in with the R/L system. In exchange, the Association receives grazing rights in the R/L System on a value per value basis.

The R/L System will involve rest-rotation grazing principles described by Hormay (1970). The BLM Allotment (which will incorporate some FWP deeded lands) will be a two-pasture system where only one pasture will be grazed after seed-ripe in an alternating fashion each year.

The R/L System will incorporate 15,980 acres of FWP deeded land; 12,558 acres of DNRC leased land and 680 acres of scattered BLM tracts. After a realignment of fences, the R/L System will consist of 3 low elevation pastures and 3 high elevation pastures (Figure 3). Livestock grazing would occur during a 4-month period from June 15 until October 15th each year (Table 1). Livestock would be rotated through the low elevation and high elevation pastures. In mid-June (the approximate time for the beginning of rapid growth for Bluebunch wheatgrass (Agropyron spicatum) cattle would be placed in a low elevation pasture until early July. About the first of July, a significant number of cattle are moved to the adjacent FS Allotment. The remaining livestock on the WMA are moved to a higher elevation pasture within

FIGURE 2

A view into Sliderock and Spur Mountain Peaks. In the center of the photo is a portion of the 3,6000 acre McGuire property.

The R/L System where they would remain until vegetation matures and produces seed around August 15. At this time, another significant number of cattle are moved off of the R/L System to the BLM Allotment where they will remain for one month (until September 15). The remaining livestock on the WMA would be moved to a second high elevation pasture. On September 15, the cattle from the BLM Allotment return to this same second high elevation pasture on the WMA (R/L System). Cattle coming off of the FS Allotment on October 1 would also join the cattle in this second pasture. At this point, all of the livestock that had at first entered the R/L System in mid-June, are now back on the WMA. These animals would now be moved into the last (low elevation) pasture for the first two weeks of October and would leave the R/L System on October 15.

TABLE 1

ROBB CREEK WMA LIVESTOCK GRAZING ROTATION FORMULA

Robb Cr. WMA grazing rotation formula.

YEAR	PASTURES					
	[1]Battle Place(1L)	Lower Robb Cr(2L)	Dry Hollow (3L)	Ledford Ridge (1H)	Upper Robb Cr. (2H)	Swamp/Rock Cr. (3H)
2000	B[1]	C	A[1]	B	C	A
2001	C	A[1]	B[1]	C	A	B
2002[2]	A[1]	B[1]	C	A	B	C

[1]Grazing Treat Treatments: A[1] = Livestock grazing from mid-June to early-July
A = Livestock grazing from early-July to mid-August (seedripe)
B = Livestock grazing from mid-August (seedripe) to October 1
B[1] = Livestock grazing from October 1 to October 15.
C = Rest from livestock grazing for the entire year.

[2]In the year 2003 and every fourth year the rotation is repeated by beginning again with the rotation at year 2000.

In this system just described (R/L System), one-third of the pastures would be grazed from mid-June until seed ripe (mid-August), another third would be grazed from seed-ripe until October 15, and the other third would be rested. Annual livestock grazing on the WMA would be rotated so that over a three-year period each pasture receives all of the different treatments. Plants that are grazed by cattle during the growing season (June 15 - August 15) receive rest from livestock grazing during the next growing season, followed by complete rest from livestock use the third year. The animal stocking rate will be based on levels that will allow for the maintenance and enhancement of riparian and wildlife values within the system (Figure 4). Considering only the acreage grazed on a particular year and an approximate average of 6 acres/AUM, there would be a maximum of 1168 cow/calf pairs and steers allowed on the WMA. The R/L system would also employ riparian grazing strategies described by Ehrhart and Hansen (1997) and Ehrhart and Hansen (1998) that include salting, herding and stock water development.

FIGURE 4

Riparian area along Taylor Creek. Photo taken on October 23, 1998 after cattle grazing. Illustrates significant amount of residual cover remaining. This area is on deeded WMA, but grazed in conjunction with the BLM allotment.

The implementation of this system will require a significant realignment of the present pasture boundaries. The proposed stocking level is contingent upon the development of an adequate stock water system. An improvement in the watering system will be developed in cooperation with neighboring private ranches and the Natural Resources and Conservation Service (NRCS).

The system as designed above, would require the incorporation of the 3,600 DNRC McGuire property. Since the Association holds a 20-year lease on the McGuire, FWP would seek to give a long-term lease to the Association. FWP is limited to leasing their deeded property for periods of no more than 10 years. Additionally, FWP would want to review the progress in meeting WMA objectives after the first 3-year grazing cycle. Thereafter, it would be the intention of FWP to commit to a longer lease contingent on system compliance and the meeting of WMA objectives after the initial 3-year review period. Another caveat to a long-term lease hinges on FWP's ability to maintain the 10,818-acre DNRC lease. If this lease is not renewed in 2002 because of increased costs or other FWP lands priorities, the grazing program as outlined in the Preferred Alternative could not be maintained.

VI. DESCRIPTION OF REASONABLE ALTERNATIVES TO THE PREFERRED ALTERNATIVE.

1. No Action

   This alternative would have FWP continue to manage the WMA in the same manner, which is currently in operation. FWP would continue to lease the grazing rights on its 17,291 acres of deeded land and sub-lease (through a Pasturing Agreement) its 10,818 acres of DNRC leases. It would continue to manage the grazing on the 3,600 DNRC McGuire property in an exchange of use agreement with the Association. There would be no new grazing system set up. Grazing would continue to be regulated in the mixture of fenced pastures already in existence on the WMA. The AUM stocking level would remain similar to the preferred alternative. Upkeep and improvements would still be required under this alternative in fences, the water system and the potential installation of electric fencing to address the Tall larkspur poison problem.

2. Discontinue Livestock Grazing on the WMA

   This alternative would involve terminating the grazing rights on 17, 291 acres of FWP deeded lands and not sub-leasing the grazing of the 10,818 acres of DNRC land through a Pasturing agreement with a private lessee. Grazing rights on the 3,600 acre DNRC McGuire section would no longer be controlled by FWP.

VII. EVALUATION OF IMPACTS ON THE PHYSICAL ENVIRONMENT

1. Land, Water and Vegetation Resources

VEGETATIVE HEALTH

Preferred Alternative: Livestock grazing can impact soil and vegetation. Hoof action will have a variety of impacts on soil and vegetation while grazing will remove vegetative cover. The impacts of these activities would not be detrimental to overall soil and vegetative health in a properly managed system. Livestock grazing can be managed in a manner that will allow for soil and vegetation maintenance and/or improvement (Anderson and Scherzinger 1997, Frisina and Morin 1991, Frisina 1991, Alt et al. 1992, Yeo et al. 1993, and Werner and Urness 1996). Rangelands developed under a history of grazing of bison, elk and other ungulates. It is the degree and timing of such grazing that will determine the level of impacts on the land. The impacts of grazing livestock on the WMA will be mitigated through a properly managed grazing system. Plants need adequate rest in order to increase their root mass and carbohydrate storage. The Rest-rotation grazing as developed by Hormay (1970), will allow plants two years of growing season rest out of every three. This allows plants adequate opportunity to increase and/or maintain their vigor. In addition, grazing strategies in riparian areas will include herding, salting, fence location and water distribution systems to reduce the effects of livestock concentrations in these areas (Ehrhart and Hansen 1997, Ehrhart and Hansen 1998). The positive effects of this management system would be manifested on the associated DNRC lands as well as on FWP's deeded ground.

No Action Alternative: The impacts would be somewhat similar to the Preferred Alternative except: Since livestock would be continued to be confined to the existing pasture boundaries, impacts on vegetation in some areas would be greater due to less than desirable fence locations lending themselves to livestock concentrations.

No Grazing Alternative: Vegetative health would be maintained or improved on the deeded portion of the WMA. FWP would definitely lose grazing control of the 3,600 acre McGuire (DNRC) property. The McGuire property would receive annual grazing and potential reduction in vegetative health over time. Any potential benefits from the "late" season grazing treatment where matured seed is "planted" with livestock hoof action as a means to improve the establishment of new seedlings (Hormay 1970), would be lost on the deeded WMA. It is unknown what future grazing scenario the BLM might adopt in this situation.

RIPARIAN VEGETATION, STREAMBANKS AND FISHERIES

Preferred Alternative: Healthy riparian vegetation and stable stream banks are critical to maintaining a properly functioning stream, clean water and quality fish habitat. A viable fishery presently occurs on the WMA (for a full report of the fisheries values on the WMA, please consult the Management Plan). Species present include rainbow, rainbow-cutthroat hybrids, brown trout, brook trout, Westslope cutthroat trout (WCT), Mountain whitefish and mottled sculpin. WCT populations in the Rock Creek drainage are nearly pure strains of the species. The sensitivity of WCT to habitat condition and disturbance, plus the fact that it may soon be listed as a threatened species by the Fish and Wildlife Service, highlights the importance of stream viability. Livestock will remove certain amounts of vegetation and walk on stream banks in grazed pastures. This situation has the potential to create anywhere from a serious and extensive degradation problem down to a few isolated "sore" areas that might be found in stream crossings, etc. Although intensive livestock grazing prior to FWP's purchase of the WMA led to reduced riparian health on portions of the WMA (Riparian

Health Assessment, 1999), the condition of these areas has improved under the present grazing system (Paul Hansen, Montana Riparian Society, pers. comm., & Figures 5 & 6). Along with the important rest periods provided for in the rest-rotation system, livestock herding, pasture layout and the development of upland water sources (i.e. water tanks) will be important components of the R/L System to assure riparian areas improve and stay healthy. These methods have proven effective in riparian management systems (Ehrhart and Hansen 1997, and Ehrhart and Hansen 1998). Fence locations and the removal of narrow water gaps will help reduce livestock concentrations in these areas. Vegetation monitoring will be set up to assure the system is heading in the right direction so that adjustments can be made where necessary. Continued monitoring will be especially important on the WCT stream, Rock Creek. Any significant degradation attributable to livestock will be handled through necessary adjustments in AUM's, grazing patterns or whatever means FWP feels necessary to correct the situation.

No Action Alternative: The impacts on riparian habitats would be similar to the Preferred Alternative except: the existence of smaller pastures and cross fences will continue to cause livestock to concentrate in some areas causing some localized impacts to stream banks. Also, with more pastures and fences, there are more opportunities for fences to be breached by livestock.

Even under existing conditions and with some localized heavy use found in some areas of the WMA, the overall conditions of the riparian areas have improved under the present grazing system (Paul Hansen, Montana Riparian Society, pers. comm., Figures 5 & 6).

No Grazing Alternative: The riparian habitat health of the WMA deeded lands would maintain or improve. Continuous grazing that would likely occur on the DNRC lands (i.e. McGuire place) without FWP control, could lead to a further decline in riparian health in those areas.

ELK WINTER FORAGE

Preferred Alternative: Livestock will utilize the same sorts of vegetation used by wintering elk. Under the existing grazing system and livestock stocking level, significant residual forage in rest pastures and on secondary range (i.e. steeper terrain) in grazed pastures has provided standing crops of lightly or unutilized grass throughout

10/1/92

FIGURE 5

Comparative photos of Rock Creek 1992 and 1998. This pasture was grazed by livestock both years. Note improvement in willows. Stream bank vegetation has increased and raw banks decreased.

10/23/98

FIGURE 6

Top Photo: Ledford Creek
Bottom Photo: Spring Creek

Both photos were taken in 1999 following the early spring grazing treatment (Mid-June to July 1). Note stability of banks and good plant cover of willows, sedges, and other streambank vegetation.

much of the WMA (Figure 7). The proposed stocking level in the Preferred Alternative (approximately 6 acres/AUM on average) will be somewhat lighter (due to the inclusion of the McGuire property) than in the existing system.

Livestock grazing has had some positive benefits for elk in other areas. In the Elkhorn Mountains (Hunting District 380), Grover and Thompson (1986) found that elk selected feeding sites that were grazed by cattle the previous growing season. The removal of older forage by livestock may help establish a higher quality of feed for elk the following spring (Frisina 1992). Grazing by domestic livestock has been shown to improve accessibility, palatability and nutritive quality of forage plants preferred by wild herbivores (Jourdonnais and Bedunah 1990). It should be noted that any increased elk use on the WMA grazed lands may be more tied to the reduction in older standing residual forage than to increased nutritive value, since the nutritive value of grass is greatly diminished during the winter months when elk are normally on the WMA.

No Action Alternative: The impacts of this alternative on elk winter forage supplies will be similar to the Preferred alternative.

No Grazing Alternative: Abundant winter forage will exist on deeded and DNRC leased lands controlled by FWP. The DNRC McGuire property would not be under FWP grazing control and residual forage levels for elk would likely be reduced. By not grazing livestock, any benefits from removing old forage to improve the quality of grass for elk, would not exist on deeded FWP land. It is unknown what management direction the BLM might take in this situation since grazing on their lands has been tied to the Robb/Ledford WMA land base and livestock use.

GENERAL WILDLIFE HABITAT

Preferred Alternative: Livestock grazing will impact vegetation across the WMA relative to food and cover for a variety of game and non-game species. The impact will result in the reduction of vegetative cover in portions of the WMA, particularly in the lower elevations along riparian areas of grazed pastures. This impact will be reduced in the proposed grazing system by: one-third of the WMA being totally rested the entire grazing season; one-third of the WMA will not be grazed until after seed ripe in mid-August at a time when most bird nesting (including Sage grouse) would be completed; and the cattle stocking density will average no greater than 6 acres/AUM (compares to around 3.5 acres per AUM allowed on many public land leases such as what would be allowed on the McGuire if we didn't have control). This stocking level would be somewhat less than on the present WMA grazing system. While livestock may remove much of the forage along low elevation zones associated with riparian areas, there will be residual forage in portions of the grazed pastures where many of the steeper slopes in those same grazed pastures will receive little or no utilization from livestock (such as exists with the present grazing system - Figure 7). These lightly grazed areas provide food and cover for game and non-game species alike.

The distribution of grazed and ungrazed pastures may create a mosaic of habitats that can allow for a wide variety of species with different habitat requirements (DeGraaf et. Al. 1991).

No Action Alternative: The impacts to all wildlife species in general will be similar to those found in the Preferred Alternative.

No Grazing Alternative: Vegetation used for food and cover for most wildlife species would be at maximum values in all deeded and controlled lands on the WMA. Under this alternative, FWP would lose control of the 3,600-acre McGuire property and vegetative values for all wildlife species would decline due to continuous annual grazing and a higher stocking rate that would occur on the property without our control. It is unknown what might happen to the adjacent BLM property relative to grazing management and its consequences.

2. Air Resources

No significant impacts are expected from any of the three alternatives to air quality.

VIII. EVALUATION OF IMPACTS ON THE HUMAN ENVIRONMENT

1. Land Use

ACCESS

Access will not be different in any of the alternatives.

RECREATION

Preferred Alternative*:* The presence of cattle will not significantly restrict recreational use of the WMA. Some individuals may find livestock along their fishing stream or in other areas offensive, but this is not expected to be a significant problem to the majority of the public. Livestock will only occupy one-sixth of the WMA that is a part of the R/L System at any give time during the grazing season. Livestock will be removed by October 15th each year prior to the initiation of the majority of the big game hunting that occurs on the WMA. Hunters are allowed full access and use of the WMA, even in pastures that may be occupied by cattle.

No Action Alternative: Same as the preferred alternative.

FIGURE 7
Photos taken in 1999 following the early spring grazing treatment (Mid-June to July 1). Note cabin as reference. As noted in the lower photo, cattle made little use of vegetation on the slope of the hill in the background of the first picture.

No Grazing Alternative: Cattle would not be present on the WMA to offend some segments of the public who do not like to recreate on public land in the presence of livestock. There would be no grazing or grazing impacts along fishing streams that might be viewed negatively by some individuals. There would be no cattle present during the upland bird and big game seasons that occur prior to October 15.

2. Community Impacts

The Preferred Alternative: Private ranch operations will be allowed to utilize the WMA for summer livestock grazing. Summer pasture is in short supply and is important for the economic viability of ranches that do not have adequate summer grazing on their own land to support their operations. Many cattle ranches across the west have had to sell to land developers or wealthy out-of-state interests that curtail public access or subdividers. It is in the best interest of sportsmen and wildlife habitat to support keeping these smaller ranches viable. Sharing resources with the agricultural community creates a positive image of FWP in the local community that fosters good relations and communication between many ranchers, sportsmen and FWP.

No Action Alternative: Impacts are similar to the Preferred Alternative.

No Grazing Alternative: No grazing would be allowed on the WMA lands controlled by the FWP. Association members would have to locate other summer grazing lands for their livestock. It is unsure if the Association would be able to continue to graze the BLM lands since they are tied to the base property of the WMA. Livestock would have to be trailed for great distances from other summer pastures to the Snowcrest Forest Service pastures adjacent to the WMA

3. Cultural and Historic Resources

Livestock grazing has been a practice on southwest Montana rangelands since the latter half of the 1800's. The no grazing alternative would eliminate this resource on FWP deeded and DNRC leased land. No other cultural or historic resources are expected to be affected by any of the alternatives.

4. Risk/Health Hazards

None of the alternatives are expected to result in increased risk or health hazards. Weed control will involve the use of chemicals in all alternatives. These chemicals will be applied in recommended amounts that should have minimal impacts on non-target species.

5. Socio-Economic Assessment

NOTE: Costs associated with fencing for all alternatives are only based on best estimates and will likely vary some. Costs are spread over three year increments in many cases for comparison purposes. Costs may actually be spread out over longer periods in some situations.

The Preferred Alternative: The preferred alternative will result in FWP dollars and management oversight to implement and maintain a grazing system. This is a significant impact on FWP time and fiscal resources. The dollar costs involved (when the project is fully completed) includes roughly 26 miles of new internal fence construction at an estimated $6,400/mile (total estimated cost - $166,400). In addition, an electric fence would need to be constructed to keep livestock out of dense patches of Tall larkspur during certain periods of the grazing season when this plant is poisonous to cattle. Roughly 14 miles of one strand electric fence and posts would cost about $2,000/mile (total - $28,000).

When the new system is implemented, old fence will eventually be removed. Removing approximately 29 miles of fence lines would cost around $1,500/mile (total - $43,500).

It should be noted that the costs listed above for fencing - new fence ($166,400) + larkspur electric fence ($28,000) + old fence removal ($43,500) = ($237,900 total) would be spread over a period of several years. This is because interior fencing and fence removal can be spaced out over several years. Initial fence replacement, construction and removal will somewhat be governed by livestock rotation periods. Assuming the approximate fencing costs listed above are spread out over a 3-year grazing rotation period, the annual fencing costs would be $79,300/year. These figures do not include removal and replacement of exterior WMA fence common to all alternatives (see page19*).

Costs associated with fence maintenance are unknown at this time, but would be less than under the existing system (No Action Alternative) because the Preferred Alternative would have newer fences requiring less maintenance. New fences would also be located in areas that are compatible with the landscape.

FWP is working with the Natural Resources and Conservation Service (NRCS) and other local landowners to develop a reliable water source (Kelly Springs) for stock water on the WMA and surrounding private land. FWP's total obligation is unknown at this time, but could potentially be in the vicinity of $120,000. Construction of this pipeline is planned to start this summer (2000).

Costs associated with noxious weed management would likely be the same under either alternative because of our obligation to control weeds on property we manage.

The present cost of leasing the 10,818 acres of DNRC land associated directly with the WMA in 1999 was $11,907.90. This cost will likely rise some assuming the lease is

renewed in 2002. Through the use of a Pasturing Agreement between the Association, FWP and DNRC, the Association pays a fee to FWP for the use of these DNRC lands for grazing. FWP also assesses a grazing fee to the Association for grazing rights on the WMA deeded land at a value of $12.60/AUM. A majority of the grazing fees obligated to FWP by the Association are used in turn to obtain the McGuire property in an "exchange of use agreement" on a value for value basis (i.e. $25,000 of the cost of leasing the 3,600 acre McGuire property by the Association is deducted from fees charged the Association to lease FWP controlled property on the WMA).

No Action Alternative: The impact of this action will require a higher maintenance cost due to the old fence structure and the poor location of these fences. Over time, this will include removing old fences and replacing with new material. Since the old pasture structure would be kept in place, over-time, there actually would need to have more fence replaced since the total amount of fence in the old system is greater than in the new system in the Preferred Alternative.

It is estimated that the annual fence replacement costs for interior pasture could be as high as $68,466 over a three-year period. Adding the Larkspur fence cost would make this figure $77,799/year for a total cost of $233,397. These figures do not include removal and replacement of exterior WMA fence common to all alternatives (page 19*).

Water system costs would be the same as in the Preferred Alternative – approximately $120,000.

No Grazing Alternative: This alternative will not have the new construction costs related to the establishment of new pastures, but will require continued fencing to keep livestock off of the WMA. This will include boundary fence maintenance and replacement around the McGuire property. The McGuire property is right in the middle of the WMA. Involving this property there is approximately 11.5 miles of fence that would eventually cost around $90,850 to remove and replace. However, this cost would not be immediate and could again be spread over a number of years. Presently there is no boundary fence separating BLM and WMA lands in the Taylor Creek Drainage. Assuming BLM continues to graze this area, FWP would likely need to install 5.25 miles of additional boundary fence. This cost would be approximately $33,600. The total cost for both the fences would be $124,450. These figures do not include removal and replacement of exterior WMA fence common to all alternatives (page 19*).

Fence maintenance costs would be less than either the Preferred or the No Action alternative because we would not need to maintain interior fences.

Development and maintenance of a water system would not be necessary in the no grazing option. In this alternative, money would not be received from leased grazing of our deeded property or from a sub-lease of the DNRC lands (through a Pasturing Agreement) that we control. Without this transaction, the "exchange of use" agreement with the Association could not be implemented. The implementation of this alternative would have a negative economic impact on grazing lessees if they were unable to locate

other summer pasture within the same distance of their ranches. It's possible that adequate summer pasture is not even available in this area. The lessees normally hire a rider that could become unemployed with this option.

In all alternatives, the cost of leasing DNRC lands is expected to increase in the near future. In this alternative, there is a possibility that FWP might not be able to afford to continue to lease the 10,818 acres of DNRC. In this scenario, DNRC leases on this WMA may not be a cost to FWP in the future under this alternative.

This alternative would greatly decrease staff time, money and effort that would otherwise be expended on development and monitoring of a grazing system.

***COMPARISON OF COSTS (ASSOCIATED WITH GRAZING)**

ALTERNATIVE	FENCES	WATER SYSTEM
PREFERRED	$237,900 ($79,300/yr)	$120,000
NO ACTION	$233,397 ($77,799/yr)	$120,000
NO GRAZING	$124,450 ($33,600)	-0-

* These costs do not include maintenance and replacement of exterior WMA boundary fences. These would be the same in all three alternatives. This cost over time would be around $260,000. This cost includes eventual removal and replacement of 33 miles of old boundary fence at $1,500/mile removal and $6,400/mile replacement costs.

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