

**MONITORING  
MULFORD'S MILKVETCH  
(*ASTRAGALUS MULFORDIAE*)  
ON THE OWYHEE FRONT:  
2003 RESULTS**



Idaho Conservation Data  
Center  
Idaho Department of Fish  
and Game  
PO Box 25  
Boise, Idaho  
83707



Michael Mancuso and Jennifer Miller

2004

Challenge Cost-Share Project  
Lower Snake River District BLM  
and  
Idaho Department of Fish and Game



## **ABSTRACT**

Mulford's milkvetch (*Astragalus mulfordiae*) is a low, slender forb endemic to the western Snake River Plain in southwestern Idaho and adjacent eastern Oregon. Its limited distribution, tendency to occur in low numbers, and habitat loss and degradation problems have made this species a conservation concern for the Bureau of Land Management (BLM) and others in both Idaho and Oregon for many years. Northern Owyhee County represents one of the three population centers for Mulford's milkvetch in Idaho. It has been recognized for some time that monitoring information is needed to help BLM resource managers be pro-active in their conservation efforts for Mulford's milkvetch in the Owyhee Front area. In 2003, the BLM and Idaho Conservation Data Center initiated a monitoring program to provide the BLM with trend information concerning the long-term conservation of Mulford's milkvetch and its habitat in Owyhee County. The monitoring protocol is designed to collect Mulford's milkvetch census, ground disturbance, and plant community information. This report summarizes monitoring methods and baseline information collected in 2003.

## **ACKNOWLEDGMENTS**

A big thank you to BLM botanist Valerie Geertson for her field assistance and overall project support.

**TABLE OF CONTENTS**

ABSTRACT ..... i

ACKNOWLEDGMENTS ..... i

TABLE OF CONTENTS ..... ii

LIST OF TABLES ..... iii

LIST OF APPENDICES ..... iii

INTRODUCTION ..... 1

METHODS ..... 2

RESULTS ..... 5

DISCUSSION ..... 9

REFERENCES ..... 10

**LIST OF TABLES**

Table 1. Mulford's milkvetch occurrences monitored in 2003 ..... 2

Table 2. Mulford's milkvetch census monitoring information, 2003..... 5

Table 3. Microplot cover class tally by weed species..... 6

Table 4. Total weed cover class tally by transect, 2003..... 6

Table 5. Weed species microplot cover class tally by transect, 2003 ..... 6

Table 6. Microplot cover class tally by ground disturbance activity, 2003..... 7

Table 7. Total ground disturbance cover class tally by transect, 2003 ..... 7

Table 8. Plant community information for Mulford's milkvetch monitoring stations, 2003..... 9

**LIST OF APPENDICES**

Appendix 1. Map locations for Mulford's milkvetch monitoring transects in the Owyhee Front.

Appendix 2. Mulford's milkvetch monitoring transect location forms and GPS coordinates.

Appendix 3. Transect sampling information and observation notes.

Appendix 4. Mulford's milkvetch census monitoring data sheets, 2003.

Appendix 5. Disturbance factor monitoring data sheets, 2003.

Appendix 6. Community Survey and Ocular Plant Species data sheets, 2003.

Appendix 7. Summary of plant community information, 2003.

## INTRODUCTION

Mulford's milkvetch (*Astragalus mulfordiae*) is a low, slender, spring-flowering perennial forb in the legume family. It is endemic to the western Snake River Plain in southwestern Idaho and adjacent eastern Oregon, an area approximately 100 miles by 100 miles in extent (Mancuso 1999). The Owyhee Front (an area bordered by the Snake River to the north and the Owyhee Plateau further south) in northern Owyhee County represents one of the three population centers for Mulford's milkvetch in Idaho. The other two are the Boise Foothills and the Weiser area. Mulford's milkvetch occurs on sandy, gentle to steep slopes that usually have a southerly or westerly aspect. In Owyhee County, Mulford's milkvetch is usually associated with an open mix of desert shrub species and a series of grass and forb species indicative of sandy habitats. More detailed information concerning the distribution, habitat, and ecology of Mulford's milkvetch is contained in other reports (e.g., Mancuso 1999a, Moseley 1989).

Most extant occurrences of Mulford's milkvetch in Idaho, including the Owyhee Front, are localized in extent and contain <500 plants (Idaho Conservation Data Center 2004). Several occurrences in the Boise Foothills and Owyhee Front have been fully or partially extirpated (Moseley 1989, U.S. Fish and Wildlife Service 1995). Its limited distribution, tendency to occur in low numbers, and habitat loss and degradation problems have made Mulford's milkvetch a conservation target in both Idaho and Oregon for many years. It has also been a priority conservation concern for the Bureau of Land Management (BLM) in both states for many years. It is currently a Type 2 special status plant species for the Idaho BLM. The Type 2 category is reserved for species that are imperiled rangewide and have a high likelihood of being federally listed in the foreseeable future due to their global rarity and significant endangerment factors (Bureau of Land Management 2003). Mulford's milkvetch has been given a global conservation rank of G2 by NatureServe (Idaho Conservation Data Center 2004). This rank is given to taxa imperiled because of rarity or other factors making them vulnerable to extinction. It has a state conservation rank of S2 for Idaho. This rank has the same definition as G2 and applies to the species' status in Idaho.

Mulford's milkvetch is known from 14 widely scattered occurrences along the Owyhee Front. Occurrences extend from near the town of Bruneau, westward for approximately 40 miles to near the town of Murphy. The majority of populations in the Owyhee Front area occur on BLM land. In contrast, most populations elsewhere in Idaho are located on private land. These ownership patterns make conservation of the Owyhee Front population center critical to the species' long-term viability in Idaho. BLM biologists and others have reported a number of disturbances that threaten Mulford's milkvetch and its habitat in the Owyhee Front, and reductions in population size and/or habitat quality have been documented at some occurrences (Idaho Conservation Data Center 2004). The main long-term conservation threat facing Mulford's milkvetch in Owyhee County is habitat degradation, especially weed invasion from fires, off-road motorized vehicles (ORV), and livestock grazing (Moseley 1989; U.S. Fish and Wildlife Service 1995). Outright habitat loss tends to be more localized and mostly associated with user-created ORV trails and mining activities. All occurrences along the Owyhee Front are vulnerable to one or more of these threat factors.

It has been recognized for some time that monitoring information is needed to help BLM resource managers be pro-active in their conservation efforts for Mulford's milkvetch in the Owyhee Front area. To help meet this need, the Lower Snake River District BLM contracted with the Idaho Conservation Data Center (IDCDC) in 2003 to establish a monitoring program for Mulford's milkvetch in northern Owyhee County. The objective of the monitoring program is to provide trend information concerning the long-term conservation of Mulford's milkvetch and its

habitat. This will help the BLM meet their stewardship objective of maintaining viable populations of special status plant species on lands they administer within a multiple-use management framework.

In 2003, monitoring transects were established at a subset of Mulford's milkvetch occurrences along the Owyhee Front. This is an initial step towards the goal of a comprehensive monitoring program that is proposed to include all Mulford's milkvetch occurrences located on BLM property in the Owyhee Front area. This report summarizes baseline monitoring information collected in 2003.

## METHODS

In 2003, we established permanently marked monitoring stations at five Mulford's milkvetch occurrences located on BLM property in northern Owyhee County (Table 1). The monitoring protocol we used is modified from methods initially developed to monitor Mulford's milkvetch in the lower Boise Foothills (Mancuso 1999b, Mancuso 2001). At each occurrence, we conducted a reconnaissance to determine the distribution of Mulford's milkvetch in the area. The majority of Mulford's milkvetch occurrences tend to be comprised of a mix of widely scattered individual plants and interspersed denser plant groupings. This distribution pattern makes fully random transect location impractical. To ensure adequate sampling, we subjectively located monitoring plots in areas containing a relatively high abundance of Mulford's milkvetch plants. A total of six transects were established for the five occurrences sampled in 2003.

Table 1. Mulford's milkvetch occurrences monitored in 2003.

<b>Occurrence #</b>	<b>Occurrence name</b>	<b>USGS quadrangle</b>	<b>Legal description</b>
010	Vinson Wash	Vinson Wash	T5S R3E Sec 30
013	Con Shea Basin	Initial Point	T2S R1W Sec 5
014	Noble Island	Walters Butte	T1S R2W Sec 28
022	SE of Guffey Butte	Walters Butte	T2S R2W Sec 12
025	Lower Vinson Wash	Vinson Wash	T5S R2E Sec 23

To help relocate monitoring plots in the future, the location of each transect was mapped (Appendix 1) and a navigation grade (Garmin 12XL) GPS unit used to obtain UTM coordinates at each transect marker stake (Appendix 2). In addition, we completed a "Monitoring Site Location Form" for each transect (also in Appendix 2). It provides directions, a sketch map with landmarks, and other relocation information. The IDCDC's Element Occurrence number (a three-digit identifier code for each occurrence in the IDCDC database) was used to label and identify each transect.

The monitoring protocol is designed to collect the following information: (1) Mulford's milkvetch census information; (2) ground disturbance information; (3) plant community information; and (4) photo point photographs. Protocols for each component of the monitoring program are outlined below.

### Monitoring transects

Mulford's milkvetch census and ground disturbance monitoring information is collected along permanently marked transects. Most monitoring plots are comprised of a single variable length belt transect. The transects established in 2003 ranged in length from 20 to 30 m long. One

occurrence (SE of Guffey Butte) is sampled a differently and explained separately below. A red-painted rebar stake marks the starting point of each transect, and a large metal spike references the transect end point. A metric tape is stretched between the start and end points. Beginning at the 1 m mark, a 1 m square quadrat (microplot) is aligned flush against the tape. Sampling occurs at each meter mark along the transect tape. Mulford's milkvetch census and disturbance factor information is recorded on special monitoring forms developed for this project. Transect length and azimuth, side of tape sampled, and other sampling information for each transect is summarized in Appendix 3.

Mulford's milkvetch has a dispersed distribution pattern at the SE of Guffey Butte (022) occurrence that makes sampling more than just a few Mulford's milkvetch plants impossible along a single transect length. Because of this limitation, we altered the methodology for collecting Mulford's milkvetch census information at this occurrence. An 11.3 m radius (0.1 acre) circular plot was established in the portion of the occurrence containing the greatest number of Mulford's milkvetch plants. This plot serves as both the Mulford's milkvetch and the plant community sampling areas. A rebar stake marks the plot center point. From the center point, we walked three equidistant concentric circles within the plot and flagged each Mulford's milkvetch plant encountered. Census information was recorded for each flagged plant. Distance and azimuth measurements from the center stake will allow the relocation and monitoring of each plant in the future. Disturbance information was collected along two randomly chosen 11 m long transects emanating from plot center using the same methods as for other occurrences.

Mulford's milkvetch census monitoring

Census and density information is collected by counting every Mulford's milkvetch plant rooted within the quadrat microplot and assigning each plant to one of three life stage class categories: (1) Reproductive stage class (R) - all individuals with flowers and/or fruits; (2) Non-reproductive stage class (N) - non-flowering/fruited individuals that are obviously not seedlings; or (3) Seedlings (S) – tiny germinants, usually <2 cm tall. Cotyledons are sometimes present, along with one or occasionally two pair of leaves. In addition to stage class, the location of each Mulford's milkvetch plant is recorded. This is done by referencing the appropriate microplot frame cell in which the plant occurs. The microplot plot frame is divided into nine equal segments or cells referenced by the letters A through I (see below). As an example: a microplot contains one reproductive plant in cell A, and a cluster of five seedlings in cell F. This is recorded on the data sheet as A/R and F/S5 respectively.

A	B	C
D	E	F
G	H	I

One square meter microplot frame and microplot reference cells.

Disturbance factor monitoring

Information regarding several disturbance factors is recorded for each microplot along the transect, including:

(1) Weed species – this monitoring attribute targets all non-native weed species rooted within the microplot. The cover of each weedy species is estimated and assigned to one of the

following five cover class values: 1 = <1% (trace) cover; 2 = 1 - 10% cover; 3 = 11 - 25% cover; 4 = 26 - 50% cover; 5 = >50% cover. Cover class represents the percentage of the microplot area occupied or covered by the weed species. A total weed cover class is assigned to each microplot as well.

(2) Ground disturbances – this attribute targets surface disturbances such as ORV tracks and wildlife or cattle prints occurring within each microplot. The cover of each disturbance factor is estimated and assigned to one of five cover classes. The cover classes use the same percentage values as the weed disturbance attribute. The assigned value represents the percentage of ground surface within the microplot clearly broken, crushed, or sloughing due to the disturbance factor. A total ground disturbance cover class is assigned to each microplot as well.

(3) Insect damage and disease – each plant is inspected for evidence of insect and/or disease damage. Individual plants and their associated damage are referenced on the field data sheet.

(4) Herbivory and trampling - each plant is inspected for evidence of non-insect herbivory or trampling damage. Individual plants and their associated damage are referenced on the field data sheet.

#### Plant community monitoring

At each transect, plant community and other ecological data are collected for Mulford's milkvetch habitat using the methods of Bourgeron et al. (1992). Plant community information is based on visual estimates of cover class values for all vascular plant species occurring in a 0.1 acre circular plot. Estimates are also made for ground cover categories such as bare ground, litter, and microbotic crust. Two forms are used to collect the plot information. A "Community Survey Form" provides location, environmental feature, and general site description information. An "Ocular Plant Species Data Form" contains the list of vascular plant species occurring within the plot and their associated percent cover. Plant community changes are monitored by comparing the plant species and cover values recorded one year against another year. This method has an acceptable accuracy standard of +/- one cover class and requires an increase or decrease of two or more classes to indicate measurable change. Plant community cover class values are as follows:

1 = <1%	30 = 25 – 34.9%	70 = 65 – 74.9%
3 = 1 – 4.9%	40 = 35 – 44.9%	80 = 75 – 84.9%
10 = 5 – 14.9%	50 = 45 – 54.9%	90 = 85 – 94.9%
20 = 15 – 24.9%	60 = 55 – 64.9%	98 = 95 – 100%

#### Photo points

Photo point photographs provide a visual, time-lapse record of the vegetation and other habitat characteristics for each monitoring site. Repeat photo monitoring is useful to document site-specific change or lack of change to landscape features of interest (Hall 2001). In 2003, photographs were taken using a wide-angle lens and 35 mm print film. A switch to digital images is being considered for future monitoring years. The rebar stake marking the location of the transect serves as the reference point (the photo point) from which the photos are taken. A minimum of six photos are taken at each monitoring site. Four photos, at bearings of 0°, 90°, 180°, and 270° are taken at each photo point. They provide a panoramic overview of the monitoring site area. Two additional photos are taken; one from 3 m behind the rebar stake along the transect azimuth, the other from 3 m behind the end stake along the back azimuth. These photos provide an overview of the immediate transect area. Additional photos to show

the rebar marker stake, the vegetation plot, disturbances, or some other landscape feature are optional.

## RESULTS

Reconnaissance of Mulford's milkvetch occurrences, monitoring plot establishment, and monitoring data collection took place between May 13 and June 12, 2003. Monitoring stations were established at five of seven occurrences receiving reconnaissance. We did not establish monitoring stations at the Mud Flat Oolite RNA (009), nor the Twentymile Gulch (011) occurrences because of the very low number of plants found during reconnaissance visits. Only one Mulford's milkvetch plant was encountered within Mud Flat Oolite RNA, in the vicinity of Poison Triangulation Point ridge. This ridge area was known to support a series of Mulford's milkvetch groupings in the past. Conditions looked very dry in the occurrence area and some desert shrubs appeared to be dying. At Twentymile Gulch, fewer than a dozen scattered Mulford's milkvetch plants were found despite searching several subpopulation sites. These subpopulations contained higher numbers of Mulford's milkvetch plants in the past.

### Mulford's milkvetch census monitoring

A total of 299 Mulford's milkvetch plants were tallied at the six transects in 2003. The number of plants/transect ranged from a low of 27, to a high of 84. The average number of plants/transect was 49.8. Census information was collected from a total of 120 microplots. Ninety-one (76%) of the transect microplots contained at least one Mulford's milkvetch plant. Overall, non-reproductive plants were the most common. They were the dominant life stage at four of the six transects. All transects had non-reproductive and seedling plants, but reproductive plants were absent from the two transects at the Vinson Wash occurrence (010). Census results indicate Mulford's milkvetch life stage class ratios can be highly variable between sites in a given year, and that little or no reproduction takes place at some occurrences some years. Copies of the census information field data sheets are in Appendix 4. Census information for each transect is summarized in Table 2.

Table 2. Mulford's milkvetch census monitoring information, 2003.

<b>Transect</b>	<b># of plants</b>	<b>Reproductive (%)</b>	<b>Non-reproductive (%)</b>	<b>Seedling (%)</b>
010-1	50	0	47 (94)	3 (6)
010-2	84	0	70 (83)	14 (17)
013-1	51	7 (14)	22 (43)	22 (43)
014-1	27	5 (19)	17 (62)	5 (19)
022-1	30	18 (60)	8 (27)	4 (13)
025-1	57	9 (16)	7 (12)	41 (72)
Sum	299	39 (13)	171 (57)	89 (30)

### Disturbance factor monitoring

#### *Weed species*

Two weed species, cheatgrass (*Bromus tectorum*) and hairy falseflax (*Camelina microcarpa*), were observed along the six monitoring transects in 2003. A non-native bluebunch wheatgrass (*Agropyron* spp.) cultivar interseeded into the area was recorded as a weed at one transect as

well. Cheatgrass was the only weed found at every transect. It occurred in 132 of the 140 (94%) disturbance factor microplots sampled. Cheatgrass had more than trace cover (>1% cover) in the majority of microplots in which it occurred. The hairy falseflax and bluebunch cultivar each occurred at only one transect. Weed species and cover class data are summarized in Tables 3, 4, and 5.

Table 3. Microplot cover class tally by weed species, 2003. Cover classes are defined in the methods section. Total of 140 microplots.

Species	Weed cover class					# of microplots (%)
	1	2	3	4	5	
Cheatgrass	57	38	27	9	1	132 (94)
Hairy falseflax	1					1 (<1)
Bluebunch cultivar	22	1				23 (16)

Table 4. Total weed cover class tally by transect, 2003. Cover classes are defined in the methods section. Total of 140 microplots.

Transect	# microplots	Total weed cover class					
		No weeds	1	2	3	4	5
010-1	20	2	17	1			
010-2	25		24	1			
013-1	20			3	14	3	
014-1	25			9	10	5	1
022-1	20		10	7	2	1	
025-1	30		11	18	1		
Totals (%)		2 (1)	62 (44)	39 (29)	27 (19)	9 (6)	1 (>1)

Table 5. Weed species microplot weed cover class tally by transect, 2003.

Transect	# microplots	Species	Weed cover class					
			None	1	2	3	4	5
010-1	20	Cheatgrass	2	17	1			
010-2	25	Cheatgrass	6	19				
		Bluebunch cultivar	2	22	1			
013-1	20	Cheatgrass	0		3	14	3	
014-1	25	Cheatgrass	0	0	9	10	5	1
		Hairy falseflax	24	1				
022-1	20	Cheatgrass	0	10	7	2	1	
025-1	30	Cheatgrass	0	11	18	1		

*Ground disturbance*

The loose, sandy soil characterizing Mulford's milkvetch habitat readily leaves evidence of trampling, compression, churning, and other disturbances. All transects had at least some level of ground disturbance in 2003. Less than one-half (45%) of all transect microplots had evidence of ground disturbing activity. Transects at Con Shea Basin and Noble Island had the most ground disturbance. The most commonly recorded ground disturbance was divots or compressions of unknown origin. These varied in size, and were usually round in outline with either smooth or irregular edges. Many are likely old animal (livestock or wildlife) prints, but they lack sufficient definition to confidently determine their origin. Other ground disturbances identified along the transects included motorcycle or ORV tracks, roads, cow droppings, small burrows, deer prints, and human footprints. Ground disturbance data collected in 2003 are summarized in Tables 6 and 7.

Table 6. Microplot cover class tally by ground disturbance activity, 2003. Cover classes are defined in the methods section. Total of 140 microplots.

Ground disturbance	Ground disturbance cover class					# of microplots (%)
	1	2	3	4	5	
Divots-unknown origin	4	20	2			26 (19)
Motorized tracks	2	13				15 (11)
Road edge	1	2				3 (2)
Small burrow	2					2 (1)
Cow dropping	7	1				8 (6)
Deer print	4					4 (3)
Human footprint	2	12				14 (10)

Table 7. Total ground disturbance cover class tally by transect, 2003. Cover classes are defined in the methods section. Total of 140 microplots.

Transect	# microplots	No disturbance	Ground disturbance cover class				
			1	2	3	4	5
010-1	20	17	1	2			
010-2	25	19	4	2			
013-1	20	1	1	16	2		
014-1	25	5	2	13	5		
022-1	20	9	4	5	2		
025-1	30	26	3	1			
Totals (%)		77 (55)	15 (11)	39 (29)	9 (6)		

*Insect damage and disease*

Evidence of insect damage or disease was not observed at any of the monitoring transects in 2003. Owen et al. (1994) reported a rust that infects Mulford's milkvetch throughout its range. We did not observe plant lesions indicative of infection at any of the transects.

*Herbivory and trampling*

Herbivory was recorded on four Mulford's milkvetch plants at SE of Guffey Butte and five plants at Lower Vinson Wash. In all cases one or more branches were obviously nipped off. At least some of the branches likely had flowers and/or fruits. Deer and/or rabbits were most likely responsible at SE of Guffey Butte. Prints or droppings for both were observed in the general

area. Pellets in the area suggested rabbits were likely responsible at the Lower Vinson Wash site. Trampling of Mulford's milkvetch plants was not observed at any of the transects.

#### *General observations*

Copies of the disturbance factor information field data sheets are in Appendix 5. Most monitoring stations had evidence of cattle and ORV use in the general area. Disturbance observations for each occurrence is summarized below:

Vinson Wash (transect 010-1) - Dry cow feces were scattered in the transect area, but no recent cattle use was observed. A two-track dirt road bisects the Mulford's milkvetch subpopulation, but appears to receive little use. We observed a few (<5) motorcycle tracks leaving the road near the transect area.

Vinson Wash (transect 010-2) - Dry cow feces were scattered in the transect area, but no recent cattle use was observed. We observed a few (<5) off-road motorcycle tracks near the transect area.

Con Shea Basin (transect 013-1) - Dry cow feces were scattered across the transect slope and most, if not all, of the many small depressions dotting the slope were likely caused by cattle trampling. These small depressions were where most of the cheatgrass was rooted. We did not see evidence of off-road traffic in the immediate transect area, but ORV tracks were fairly common on the broad gently sloping benches located upslope (south) of the transect area.

Noble Island (transect 014-1) – Off-road motorcycle tracks were observed in the general transect area. We also observed a number of small grasshoppers in the area. One Mulford's milkvetch plant had a few grasshoppers on it, but no obvious plant damage.

SE of Guffey Butte (transect 022-1) - A few dry cow feces were present in the plot area, but no recent cattle use was observed. Off-road motorcycle tracks were present on nearby ridges. Two stray treads that passed through the transect area did not appear very recent.

Lower Vinson Wash (transect 025-1) - Dry cow feces were scattered in the transect area, but no recent cattle use was observed. We did not see any ORV tracks in or near the transect.

#### Plant community monitoring

Plant community information was collected at each monitoring plot. The vegetation at most sites is characterized by an open mix of desert shrub species, low grass species diversity, and a relatively diverse suite of forbs, all with low cover. Bare ground (sand) strongly dominates the ground surface at all monitoring plots. Biological crust cover is sparse when present. A total of 53 vascular plant species were tallied for the six plant community plots in 2003, including 12 shrub, 5 grass, and 36 forb taxa. Two grasses and three forbs are introduced species. Plant community plots, along with disturbance factor transects show no noxious or aggressive perennial forb weed species to be established at the occurrences sampled in 2003. Table 8 summarizes selected plant community information for each monitoring site. Copies of the plant community field data sheets are in Appendix 6. The complete plant community dataset has been tabulated in Appendix 7.

Most plant community plots have five or six different shrub species. Total shrub canopy cover within plots ranges from cover classes 3 to 40. With one exception, no shrub species occurs at a cover class >10 in any of the plots. Fourwing saltbush (*Atriplex canescens*) and green rabbitbrush (*Chrysothamnus viscidiflorus*) have the highest constancy among shrub species.

Four shrub species occur in only one plot. Cheatgrass and Indian ricegrass (*Oryzopsis hymenoides*) are the only grass species found in all six plant community plots. Cheatgrass cover is highest (cover class = 30) at the Con Shea Basin and Noble Island monitoring plots. Needle-and-thread (*Stipa comata*) cover is also relatively high at Noble Island (cover class = 20), otherwise, native graminoid cover tends to be sparse at the monitoring sites. Mulford's milkvetch and white-stemmed mentzelia (*Mentzelia albicaulis*) are the only forbs occurring in all six monitoring plots. Twelve other forb species are found in at least one-half of the plots, while seventeen species are restricted to a single plot. Individual forb species cover is consistently low, never exceeding a cover value of 3. Sixteen (44%) of the forbs are desert annuals.

Table 8. Plant community information for Mulford's milkvetch monitoring stations, 2003.

Transect	Community type	# of species			Comments
		shrubs	grasses	forbs	
010-1	Mix desert shrub/needle-and-thread	6	4	17	
010-2	Mix desert shrub/needle-and-thread & bluebunch cultivar	6	5	16	
013-1	Mix desert shrub/cheatgrass	2	2	10	Cheatgrass = 30 cc
014-1	Mix desert shrub/needle-and-thread & cheatgrass	5	3	13	Cheatgrass = 30 cc
022-1	Mix desert shrub/cheatgrass	6	4	12	
025-1	Mix desert shrub/Indian ricegrass	5	3	14	Relatively high total shrub cover (40 cc)

#### Photo points

All photographs were labeled, organized in a three-ring binder, and given to the Lower Snake River District BLM. A duplicate set is on file at the IDCDC in Boise.

#### **DISCUSSION**

Research in Oregon has shown Mulford's milkvetch population numbers can fluctuate substantially over time (Bureau of Land Management 1998, Pyke 1996, J. Findley, BLM botanist, pers. comm.). This suggests monitoring needs to be more than a simple annual tally of Mulford's milkvetch numbers if it is to have relevance to resource managers. For this reason, the monitoring program established for the Owyhee Front includes habitat and disturbance attributes, in addition to Mulford's milkvetch demographics. The Mulford's milkvetch monitoring program we established in 2003 is designed to collect habitat and population trend information. Although it is not designed or able to decipher "cause and effect" relationships, it will document whether Mulford's milkvetch abundance, weed species, ORV tracks, livestock trampling, and other measured attributes have stable, increasing, decreasing, or fluctuating trends over time. Monitoring will provide the BLM with quantitative information that can help substantiate or refute reports of population and/or habitat declines at Owyhee County occurrences. This information will assist the BLM in their efforts to ensure the long-term conservation of Mulford's milkvetch on lands they manage along the Owyhee Front.

We had no major problems with the monitoring protocol in 2003. However, we recommend changing the sampling regime to a series of short transects for the monitoring station at SE Guffey Butte. This contrasts with the alternative variable azimuth-distance method we used in 2003. It is likely that future occurrences added to the monitoring program will also have

Mulford's milkvetch thinly and evenly distributed, similar to SE Guffey Butte. These occurrences may also benefit from a series of short transects rather than one long transect.

Initial monitoring results indicate the Con Shea Basin and Noble Island occurrences may need closer management scrutiny if a management goal is to minimize ground disturbing activities at Mulford's milkvetch sites. We anticipate expanding the monitoring program to most or all Mulford's milkvetch occurrences located on BLM land in Owyhee County, beginning in 2004.

## REFERENCES

- Bourgeron, P.S., R.L. DeVelice, L.D. Engeling, G. Jones, and E. Muldavin. 1992. Western Heritage Task Force site and community survey manual. Version 92B. Western Heritage Task Force, Boulder, CO. 24 p.
- Bureau of Land Management. 1998. *Astragalus mulfordiae*. Unpublished summary prepared by the Bureau of Land Management, Vale District, Vale, OR, 10 p.
- Bureau of Land Management. 2003. Sensitive species supplement to the Master Memorandum of Understanding between the Idaho Department of Fish and Game and the Bureau of Land Management. BLM MOU ID-253, Supp. 3., March 2003.
- Findley, J. Botanist, Vale District, Bureau of Land Management, Vale, OR. Personal communication, 2004.
- Idaho Conservation Data Center. 2004. Element occurrence database. Idaho Department of Fish and Game, Idaho Conservation Data Center, Boise, ID.
- Hall, F.C. 2001. Ground-based photographic monitoring. General Technical Report PNW-GTR-503. United States Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR 340 p.
- Mancuso, M. 1999a. A review of *Astragalus mulfordiae* (Mulford's milkvetch) in Idaho, and results of field investigations in the Owyhee Front and Boise Foothills. Idaho Department of Fish and Game, Idaho Conservation Data Center, Boise, ID. 26 p., plus appendices.
- Mancuso, M. 1999b. Monitoring Mulford's milkvetch at Camel's Back Reserve, Boise, Idaho. Idaho Department of Fish and Game, Idaho Conservation Data Center, Boise, ID. 4 p., plus appendices.
- Mancuso, M. 2001. Monitoring Mulford's milkvetch (*Astragalus mulfordiae*) in the Boise Foothills: 2000 results. Idaho Department of Fish and Game, Idaho Conservation Data Center, Boise, ID. 12p., plus appendices.
- Moseley, R.K. 1989. Report on the conservation status of *Astragalus mulfordiae* in Idaho. Idaho Department of Fish and Game, Idaho Conservation Data Center, Boise, ID. 31 p., plus appendices.
- Owen, W.R., Hoffman, J.T., Hennen, J.F., and L.C. Smithman. 1994. The occurrence of *Uromyces punctatus* on *Astragalus mulfordiae*, a rare vascular plant from western Idaho and eastern Oregon. Plant Disease 78(12) 1217.

Pyke, D.A. 1996. Comparative demography of three sensitive and morphologically similar species of *Astragalus*. 1996 Annual Report. Forest and Rangeland Ecosystem Science Center, Corvallis, OR. 15 p., plus figures.

U.S. Fish and Wildlife Service. 1995. Habitat conservation assessment for Mulford's milkvetch (*Astragalus mulfordiae*). U.S. Fish and Wildlife Service, Boise, ID. 13 p., plus appendices.

## Appendix 1

Map locations for Mulford's milkvetch monitoring transects in the Owyhee Front.

## Appendix 2

Mulford's milkvetch monitoring transect location forms and GPS coordinates.

### GPS coordinates

GPS coordinates: based on Universal Transverse Mercator grid - zone 11 (UTM 11T), and North American Map Datum NAD 27.

Vinson Wash (010) – transect 010-1:	start stake	4755990 N 569263 E
	end stake	4755967 N 569267 E
Vinson Wash (010) – transect 010-2:	start stake	4756147 N 569419 E
	end stake	4756154 N 569448 E
Con Shea Basin (013) – transect 013-1:	start stake	4792159 N 541164 E
	end stake	4792182 N 541151 E
Noble Island (014) – transect 014-1	start stake	4794352 N 533641 E
	end stake	4794375 N 533637 E
SE of Guffey Butte (022) - transect 022-1	start stake	4790766 N 539221 E
	no end stake	
Lower Vinson Wash (025) – transect 025-1	start stake	4748292 N 567153 E
	end stake	no reading

## Appendix 3

Transect sampling information and observation notes.

All compass readings taken with declination set at 16°.

#### Vinson Wash (010) – Transect 010-1

Transect length = 20 m  
Transect bearing = 170°  
Transect sampled on the east side of tape

Plant community plot: plot center is located 11.3 m (37 ft) @ 270° from the transect's rebar marker stake. This positions the stake at the edge of the 0.1 acre plot.

The rebar marker stake is at ground level and located near the base of a fourwing saltbush (*Atriplex canescens*) shrub. This shrub was ca 40 cm tall in 2003. The transect end spike is located 20.5 m @ 90° from the rebar marker stake. It is hidden beneath a small green rabbitbrush shrub and a mounded cushion buckwheat (*Eriogonum ovalifolium*) subshrub.

Mulford's milkvetch observations: Greater than 100 (100 -150) Mulford's milkvetch plants were observed within the subpopulation area. Nearly all (>90%) were non-reproductive individuals. The majority were only 5 cm tall or less and had relatively few leaves.

#### Vinson Wash (010) – Transect 010-2

Transect length = 25 m  
Transect bearing = 77°  
Transect sampled on the south (right hand) side of tape

Plant community plot: plot center is located 11.3 m @ 90° from the transect's rebar marker stake. This positions the stake at the edge of the 0.1 acre plot.

The rebar marker stake is at ground level and located between two low green rabbitbrush shrubs. The dead stem of another rabbitbrush shrub occurs adjacent to the stake, so that together, the three stems form sort of a triangle around the stake. The transect end spike is located 28.2 m @ 77° from the rebar marker stake. This location provides some protection by nearby shrubs.

Mulford's milkvetch observations: Greater than 100 (100 -150) Mulford's milkvetch plants were observed over an approximately 0.5 acre subpopulation area. None of the plants were reproductive. Most individuals were ca 5 cm, and none exceeded 10 cm in height.

#### Con Shea Basin (013) – Transect 013-1

Transect length = 20 m  
Transect bearing = 342°  
Transect sampled on the west (downhill) side of tape. Due to the location of the transect, the 1 square m sampling microplot is positioned close to the edge of the foot/horse trail that bisects the subpopulation.

Plant community plot: plot center is located 11.3 m @ 90° from the transect's rebar marker stake. This positions the stake at the downhill edge of the 0.1 acre plot. To minimize disturbance on the moderately steep, sandy, west-facing slope, just one pass was made through the plot area to assemble the plant list and make cover class estimates.

The rebar marker stake is at ground level and located at the base of a gray rabbitbrush (*Chrysothamnus nauseosus*) shrub. The transect end spike is positioned at the base of a nearly dead rabbitbrush shrub.

Mulford's milkvetch observations: The transect area supported Mulford's milkvetch plants of various size, including several large individuals up to ca 30 cm tall and with >100 fruit pods. Mulford's milkvetch occurred uphill and downslope of the transect zone. If seedlings are included in the tally, a minimum of 100 genets were observed at the subpopulation.

#### Noble Island (014) – Transect 014-1

Transect length = 25 m  
Transect bearing = 355°  
Transect sampled on the east (uphill) side of tape

Plant community plot: plot center is located 11.3 m @ 90° from the transect's rebar marker stake. This positions the stake at the downhill edge of the 0.1 acre plot.

The rebar marker stake is at ground level and located at the base of a green rabbitbrush shrub (mostly dead and ca 40 cm tall in 2003). It is embedded in a thatch of cheatgrass. The transect end spike is 23 m @ 355° from the rebar marker stake and partially hidden by a shrub.

Mulford's milkvetch observations: Most Mulford's milkvetch plants were small, roughly 5 cm in height.

#### SE of Guffey Butte (022) – Transect 022-1

Census information: An alternative sampling method was used to collect Mulford's milkvetch census information at this site (explained in Methods section of report). The transect census information data sheet for this plot (Appendix 4) lists the distance and azimuth from the marker stake to each of the 30 Mulford's milkvetch plants sampled.

Disturbance information: Two 10 m long transects were sampled to record disturbance data. The randomly chosen azimuth for the first disturbance transect is 344°. It is sampled on the east (right hand) side of the tape. The second transect runs at a perpendicular azimuth of 245° and is sampled on the south (left hand) side of the tape.

Plant community plot: the rebar marker stake is the center of the 0.1 acre plot.

The rebar stake is at ground level and located atop a small, raised, crusty mound near the center of the small "bowl" characterizing the appearance of the subpopulation site.

Mulford's milkvetch observations: An estimated 50 –100 Mulford's milkvetch plants scattered over roughly 0.2 acre were observed in the general plot area. Only a few additional plants were observed outside this limited area. Reproductive plants varied in size from about 7 to 20 cm tall.

#### Lower Vinson Wash (025) – Transect 025-1

Transect length = 30 m  
Transect bearing = 344°  
Transect sampled on the north (right hand) side of tape

Plant community plot: plot center is located 11.3 m @ 90° from the transect's rebar marker stake. This positions the stake at the edge of the 0.1 acre plot.

The rebar marker stake is at ground level and located near the base of a horsebrush (*Tetradymia glabrata*) shrub. The transect end spike is 30 m @ 344° from the rebar marker stake.

Mulford's milkvetch observations: Approximately 50 Mulford's milkvetch plants were observed within the subpopulation. Most plants were <10 cm tall. All were <15 cm in height. Reproductive plants contained relatively few flowers.

## Appendix 4

Mulford's milkvetch census monitoring data sheets, 2003.

Appendix 5.

Disturbance factor monitoring data sheets, 2003.

Appendix 6.

Community Survey and Ocular Plant Species data sheets, 2003.

Appendix 7.

Summary of plant community information, 2003.



Species	Plot						Constancy
	010-1	010-2	013-1	014-1	022-1	025-1	
<i>Lupinus pusillus</i>	1	1	1		1	1	83
<i>Macaeranthera canescens</i>			1	1	1		50
<i>Malacothrix glabrata</i>	1			1		3	50
<i>Mentzelia albicaulis</i>	3	1	3	3	1	3	100
<i>Nama aretioides</i>	1	1		1		1	67
<i>Oenothera pallida</i>					3		17
<i>Opuntia polyacantha</i>	1						17
<i>Penstemon acuminatus</i>					1		17
<i>Phacelia glandulifera</i>	1	1				1	50
<i>Sisymbrium altissimum</i>				1			17
<i>Strepanthella longirostris</i>	1						17
Unknown		1				1	33
Total forb cover	10	10	3	3	10	10	
<b>GROUND COVER</b>							
Bare ground/soil	80	80	80	60	80	80	
Gravel	1	1	3		3	1	
Rock				3	3		
Litter	10	3	3	30	1	10	
Wood	1	1		1	1		
Moss/lichen	3	3		3	3	3	
Basal vegetation	10	10	10	10	10	10	