

**MONITORING TOBIAS' SAXIFRAGE (*SAXIFRAGA BRYOPHORA* VAR. *TOBIASIAE*)
ON THE PAYETTE NATIONAL FOREST: FIRST YEAR RESULTS**

By

Michael Mancuso
Conservation Data Center

December 2001

Idaho Department of Fish and Game
Natural Resource Policy Bureau
600 South Walnut, P.O. Box 25
Boise, ID 83707
Rod Sando, Director



Payette National Forest
Idaho Department of Fish and Game
Challenge Cost-Share Agreement No. 00-CS-11041215-027

ABSTRACT

Tobias' saxifrage (*Saxifraga bryophora* var. *tobiasiae*) is a rare plant endemic to the mountains north of McCall, in west-central Idaho. It is known from five extant occurrences, plus an additional occurrence that was extirpated as a result of a wildfire in 1994. Its limited distribution and the small number of known populations makes Tobias' saxifrage one of the rarest plant species in Idaho and an important conservation concern for the Payette National Forest, where all occurrences are located. Little information is available for this species concerning population and habitat trends, especially in regard to several known and potential threat factors. In an effort to address this information need, the Payette National Forest and the Idaho Department of Fish and Game's Conservation Data Center entered into a collaborative agreement to design and implement a rangewide monitoring program. The objective of the program is to provide trend information concerning the long-term conservation of Tobias' saxifrage and its habitat. Baseline monitoring information was collected at a series of permanently marked transects established in 2001. A census of Tobias' saxifrage and weed and ground disturbance information was collected at each monitoring transect. Plant community information was collected for all transect areas and a series of photographs taken to provide visual documentation as well. Another goal of the program was to reintroduce plants to the extirpated North Fork Pearl Creek occurrence and monitor the success of this experiment. This report summarizes the monitoring methods and baseline data collected in 2001.

ACKNOWLEDGMENTS

I want to thank Alma Hanson, botanist with the Payette National Forest, for providing overall project direction, securing the funding, and helping with some of the monitoring field work. Kim Pierson, botanist for the Sawtooth National Forest, freely shared her wealth of knowledge and insight about Tobias' saxifrage and helped me relocate several of her original research plots. Also, a large thank you is due to Idaho Department of Fish & Game volunteer Kirsten Severud for her cheerful assistance in the field.

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 12

REFERENCES 13

LIST OF TABLES

Table 1. Tobias' saxifrage census monitoring data for 2001 6

Table 2. Presence/absence of disturbance factors at Tobias' saxifrage monitoring transects in 2001 7

Table 3. Distance to nearest road, trail, and fire zone for Tobias' saxifrage monitoring transects..... 7

Table 4. Vegetation plot data for Tobias' saxifrage monitoring stations in 2001 8

Table 5. Vegetation plot data for North Fork Pearl Creek reintroduction transects in 2001.. 12

LIST OF APPENDICES

Appendix 1. Element Occurrence Records for Tobias' saxifrage.

Appendix 2. Map locations of Tobias' saxifrage monitoring and reintroduction transects.

Appendix 3. GPS coordinates for Tobias' saxifrage monitoring and reintroduction transects.

Appendix 4. Tobias' saxifrage transect location forms.

Appendix 5. Transect information for Tobias' saxifrage monitoring and reintroduction transects.

Appendix 6. Tobias' saxifrage monitoring transect data sheets.

Appendix 7. Community Survey and Ocular Plant Species data sheets.

INTRODUCTION

Tobias' saxifrage (*Saxifraga bryophora* var. *tobiasiae*) is a rare plant endemic to the mountains north of McCall, in west-central Idaho. It is known from five extant occurrences, plus an additional occurrence that was extirpated as a result of the 1994 Blackwell Fire (Moseley 1996). All six occurrences are located on the Payette National Forest (Payette NF), scattered over an area approximately 11 miles wide by 10 miles long.

Within an occurrence, suitable habitat for Tobias' saxifrage tends to occur in patches that may be locally common or more scattered in distribution. Individual patches vary in size, but are generally small, often approximately 10 meters long, and perhaps half as wide. The complex of patches or "micro-habitat islands" comprising an occurrence may be spread over from less than one to several acres. However, occupied habitat is less than an acre at most, if not all locations. All occurrences support over 1,000, and in some cases over 10,000 individuals, with plant density varying from very high to sparse.

Tobias' saxifrage occurs in subalpine forest community openings among slabs of exposed bedrock, rock ledges, or other rocky outcroppings. Micro-habitats are characterized by considerable cover of exposed bare soil and a relatively high level of substrate instability related to meltwater runoff or pocket gopher activity (Moseley 1989). The elevation of known occurrences ranges between 6,900 and 8,400 feet, but most are located within a couple hundred feet of the 7,500 foot contour. General location, size, habitat, and other information for each occurrence is contained in Appendix 1.

Tobias' saxifrage is a Forest Service Region 4 Sensitive Species for the Payette NF. Its limited distribution and the small number of known populations makes it one of the rarest plant species in Idaho and an important conservation concern for the Payette NF. The life history, reproductive biology and general ecology of Tobias' saxifrage have been well studied (Pierson 1999). In contrast, there is little information available on population and habitat trends, especially in regard to several known and potential threats. This kind of information is important to resource managers charged with ensuring the conservation of Tobias' saxifrage. In an effort to address this information need, the Payette NF and the Idaho Department of Fish and Game's Conservation Data Center (CDC) entered into a collaborative agreement to design and implement a rangewide monitoring program for Tobias' saxifrage - the goal being to provide trend information concerning the long-term conservation of Tobias' saxifrage and its habitat. The primary objectives for 2001 were:

- 1) Develop a monitoring plan to provide rangewide population trend information.
- 2) Establish permanent monitoring plots and photo-points at each of the five known extant occurrences – Fisher Creek Saddle, Beaverdam Peak South, East of Duck Lake, Slab Butte, and Granite Mountain. Also obtain GPS coordinates for all the monitoring stations.
- 3) Reintroduce plants to the extirpated North Fork Pearl Creek occurrence and establish associated monitoring stations.
- 4) Assess the restoration of degraded sites at the Fisher Creek Saddle and Granite Mountain occurrences.

METHODS

We wanted to develop a monitoring protocol that would provide trend information for population numbers, habitat conditions, and a selected group of existing and potential threat factors. In addition, we wanted to monitor the results of our reintroduction of Tobias' saxifrage at the extirpated North Fork Pearl Creek.

To help ensure adequate sampling, monitoring transects at the extant occurrences were subjectively located in patches supporting a relatively high abundance of Tobias' saxifrage. The exception was at the Fisher Creek Saddle occurrence, where most of the transects were superimposed over pre-existing plots initially established in the late 1990s by Kim Pierson for her Master thesis research project (Pierson 1999). The monitoring transects at this occurrence had variable Tobias' saxifrage density in 2001. Monitoring transects for the reintroduction of Tobias' saxifrage at the extirpated North Fork Pearl Creek occurrence were subjectively placed in suitable-appearing sites near the area where plants were documented prior to the 1994 Blackwell Fire.

Red- or orange-painted rebar stakes were hammered into the ground to permanently mark the beginning of each transect. The ends of each transect were marked with a round metal tag nailed into the ground to help future placement of the transect tape. The azimuth of each transect was recorded on the appropriate plot form. All compass readings associated with the monitoring protocol were read with the declination set at 0°.

Transect lengths vary, depending on the size of the "micro-habitat island" being sampled, and range from 8 to 17 meters long. Most occurrences have more than one transect, resulting in a total of 13 monitoring transects for the five extant occurrences. The location of each monitoring transect was marked on a USGS topographic quadrangle (Appendix 2). In addition, GPS coordinates were obtained at each transect marker stake using a navigation grade (Garmin 12XL) unit (Appendix 3). A "Transect Location Form" was completed in the field at each transect and provides directions and a sketch map showing landmarks and other details to help relocate transects in the future (Appendix 4). The CDC's Element Occurrence number (a three-digit identifier code for each occurrence in the CDC database) was used to label and identify the transects. Sampling and other transect information has been summarized in Appendix 5.

A census of Tobias' saxifrage and weed and ground disturbance information was collected at each monitoring transect. Plant community information was also collected at all transect areas. A series of photographs were taken at every transect to provide visual documentation. Because Tobias' saxifrage had to be reintroduced to the extirpated North Fork Pearl Creek occurrence, a modified version of the monitoring protocol was used for this area. Information collected in 2001 represents the baseline against which future monitoring results will be measured.

Monitoring protocol

Monitoring plots are comprised of a single, variable-length belt transect. The rebar stake referencing the location of the transect also marks the starting point of the transect. The transect is set up by stretching a metric tape along the transect azimuth from the stake to the end point of the transect. A 0.5 m X 0.5 m quadrat (microplot) is sampled at regular intervals along the belt transect. Most transects are sampled at each meter mark, but a few are sampled at each half-meter mark along the tape. The microplot frame is

aligned flush against the tape when sampling and data are recorded on special monitoring sheets developed for this project.

Tobias' saxifrage census monitoring

Census information is collected by counting the Tobias' saxifrage plants rooted within the microplot and assigning plants to one of three stage class categories: (a) plants consisting of only a basal rosette; (b) plants with bulbils, but no flowers; and (c) plants with bulbils and flowers. Furthermore, the number of plants in each stage class is assigned to one of four abundance class categories: (a) for each stage class the exact number of plants is recorded, up to 25; (b) for each stage class, 26–50 plants is recorded as 25+; (c) for each stage class, 51-100 plants is recorded as 50+; and (d) for each stage class, more than 100 plants is recorded as 100+. In addition, an estimate of the average number of vegetative bulbils/plant was obtained by randomly selecting five Tobias' saxifrage plants adjacent to the transect and counting their bulbils.

Ground disturbance and weed monitoring

Tobias' saxifrage occurs in areas open to multiple-use management for many years. Over the past decade, known or potential threats to Tobias' saxifrage and its habitat have been identified at most occurrences. The monitoring program specifically looks at habitat disturbances related to these threats, including recreation use, livestock use, weedy species invasion, and competition from alpine knotweed (*Polygonum phytolaccaefolium*), a large, aggressive native forb species. The following disturbance types are measured and recorded for each transect.

(1) Recreation-related ground disturbance: The cause of the disturbance is recorded, whether it be imprints from motorcycles, ORVs, hikers, horses, bicycles, etc. For each microplot, a tally of the number of the prints/tracks is made, and the amount of associated ground disturbance assigned to one of five cover class categories. The five disturbance cover class categories used for this monitoring program are "1" (<1% cover); "2" (1-10% cover); "3" (11-25% cover); "4" (26-50% cover); and "5" (>50% cover).

(2) Livestock-related ground disturbance: The cause of the disturbance is recorded, whether from cattle or sheep. For each microplot, a tally of the number of hoof prints is made, and the amount of associated ground disturbance assigned to one of the five cover class categories.

(3) Ground disturbance signs of unknown/unclear origin, or of other causes: This applies to ground disturbances of both uncertain origin (e.g., elk or cattle print?) and of "natural" origin (e.g., pocket gopher hole). For each microplot, a tally of the disturbance marks is made, and the amount of associated ground disturbance assigned to one of the five cover class categories. Identification, or other comments or clarifications about the disturbance are recorded in the "Comments" section of the field form.

(4) Alpine knotweed: This large, aggressive forb has been identified as a possible competitor of Tobias' saxifrage. The number of stems of alpine knotweed rooted within the microplot is recorded on the data sheet.

(5) Weedy species: This category is a catch-all for invasive introduced/exotic plant species (e.g., Canada thistle) occurring within the microplot. The name of the weed species and its cover class category are recorded on the data sheet.

Fields for the distance (<10 m, 10-100 m, and >100 m) to the nearest road, recreation trail, and fire zone are also completed for each transect.

Plant community information

At each transect or set of grouped transects, plant community and other ecological data are collected using the methods of Bourgeron et al. (1992). This methodology is more or less identical to the ECODATA methods developed by the U.S. Forest Service. The plant community information is collected by sampling a 1/10th acre (11.3 m radius) circular plot using the transect marker stake as the plot center. Two field forms are completed for each plot. The Community Survey Form includes location, description, environmental, and ecological information about the plot site. The Ocular Plant Species Data form lists all the vascular plant taxa occurring in the plot and their associated cover values. Changes in plant community composition and/or cover values can be tracked over time using this method. This method uses the following cover class values.

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

Each transect has a series of associated photographs, with the rebar stake that marks the location of the transect also serving as the photopoint reference point. A minimum of six photographs are taken for each transect. One photo is taken along the transect azimuth and provides an overview of the transect. Another photo is shot from the end of the transect looking back towards the starting point, and provides a reverse view of the transect. While standing at the marker stake, additional photos are taken at 0^o, 90^o, 180^o, and 270^o to provide a panoramic overview of the general transect area and associated habitat conditions. Additional photographs may be taken to help relocate the transect, or to show specific habitat, threat or other occurrence details. In 2001, color print photos were taken using ASA 200 film and a 35 mm camera lens.

Reintroduction of Tobias' saxifrage at North Fork Pearl Creek

The North Fork Pearl Creek occurrence (002) was apparently extirpated as a result of the large Blackwell Fire on the Payette NF in 1994 (Moseley 1996). One of our objectives for 2001 was to transplant vegetative bulbils from one of the extant populations to the North Fork Pearl Creek occurrence site and establish associated monitoring stations. I collected approximately 350 bulbils from the Granite Mountain (lower trail site) population in early September to serve as stock for the reintroduction. The bulbils were placed in sealed plastic bags and kept in an iced cooler until they were transplanted during the following two days. Transplanting was done along a 10 m long transect to permit a precise resampling of the bulbils, as well as to accommodate other portions of the monitoring protocol in the future. Transplanting largely followed methods outlined by Kim Pierson in her earlier Tobias' saxifrage research project (Pierson 1999).

The reintroduction transects were subjectively selected based on the appearance of suitable-looking habitat within the perimeter of the extirpated occurrence. Two reintroduction sites were selected, one with two, the other with one transplant transect. Rebar stakes were hammered into the ground to mark both the beginning and end points of the transects. Transect locations were mapped (Appendix 2), GPS coordinates recorded (Appendix 3), and "Transect Location Forms" (Appendix 4) completed to help relocate transects in the future. Sampling information concerning the three transplant transects has also been summarized (Appendix 5).

Bulbils were planted at three microplots along each transect. The location of each microplot was subjectively chosen to coincide with points along the transect where rocks would not, or only minimally, impede planting the bulbils. With this constraint, up to 36 bulbils could be planted at each microplot, for a total of up to 108 transplants/transect. A 0.5 m x 0.5 m plexi-glass planting board with holes at 10 cm intervals was used as a template to plant the bulbils. The template was numbered 1-36, with #1 in the top left corner, and #36 in the lower right hand corner to allow individual bulbil tracking. The planting board was aligned by placing the center of the board over the designated meter mark along the transect tape. The bulbils were planted under approximately 0.5 to 1 cm of soil to lessen their chance of being lost due to strong winds or water run-off. By overlaying the template along the transect in 2002, it should be possible to precisely relocate the point and determine the fate of the bulbils planted in 2001. This process can be repeated in future years as well.

In addition to transplanting bulbils, plant community and photopoint portions of the monitoring protocol were completed for the reintroduction transects in 2001. Other transect microplot information was not collected, however. Reintroducing bulbils may continue for several years. I envision future monitoring at North Fork Pearl Creek to be identical to the other occurrences if the transplanting experiment proves successful.

RESULTS

Tobias' saxifrage census monitoring

Transects were established and baseline monitoring data collected between July 16 and July 26, 2001. Transects were sampled at four of the five extant occurrences, as I was unable to visit the Beaverdam Peak South (003) site. A total of over 3,850 Tobias' saxifrage plants were tallied at the 13 transects in 2001. This number is approximate because of the way plants in each stage class were assigned to one of four abundance class categories. It represents the collective minimum number of plants tallied along the transects. Several patterns can be discerned from the census data. Rosette plants were the most common life stage at all but one transect in 2001. They were at least twice as abundant as either of the other life stages along most transects. Of the two reproductive stage classes, plants with bulbils and no flowers were usually more numerous than plants with both bulbils and flowers.

The total number of plants/transect varied from a low of 5, to a high of over 560, and averaged approximately 295 plants. The average number of bulbils/reproductive plant varied from a low of 1 at one of the Fisher Creek Saddle transects to a high of 19.2 at two transects, one at East of Duck Lake, the other at Fisher Creek Saddle. Field data sheets with the 2001 monitoring data are in Appendix 6. Census tally information for each transect is given in Table 1.

Table 1 . Tobias' saxifrage census monitoring data for 2001.

Transect	# of plants	Stage classes			Avg. # bulbils
		rosettes (ca%)	bulbils/no flowers (ca%)	bulbils/flowers (ca%)	
Fisher Creek Saddle					
001-1	342+	233+ (68)	109 (32)	0	13.8
001-2	161+	80+ (50)	68+ (42)	13 (8)	19.2
001-3	320+	217+ (68)	100+ (31)	3 (1)	4.2
001-4	26	24 (92)	2 (8)	0	2.2
001-5	5	1 (20)	4 (80)	0	1.0
East of Duck Lake					
004-1	357+	299+ (84)	5 (1)	53 (15)	19.2
Slab Butte					
005-1	536+	297+ (55)	158+ (30)	81 (15)	15.0
005-2	513+	330+ (64)	112+ (22)	71 (14)	12.2
Granite Mountain					
006-1	564+	402+ (71)	150+ (27)	12 (2)	12.4
006-2	289+	220+ (76)	65 (23)	4 (1)	see 006-1
006-3	278+	219+ (79)	51 (18)	8 (3)	14.2
006-4	15	11 (73)	4 (27)	0	see 006-3
006-5	421+	268+ (64)	118+ (28)	35 (8)	17.2

Ground disturbance and weed monitoring

Disturbance factors that are part of the monitoring protocol were present at eight of the thirteen transects. However, disturbance factors were limited to three or fewer microplots/transect in all but one case. The most common ground disturbance was from imprints of unknown or unclear origin and occurred at five transects. Imprints were suspected to be from native ungulates at two transects, and from cattle at the two lower Granite Mountain trail transects. Portions of the Granite Mountain occurrence are located along a popular recreation trail and minor associated ground disturbance was tallied at two transects in this area. The other Tobias' saxifrage occurrences probably receive little or no recreational activity. Alpine knotweed was tallied at only four transects despite its presence in all but one vegetation plot, where it often had the highest cover of any forb species. No noxious or other target weed species were observed along any of the transects in 2001. In addition, no ground disturbance/imprints could be positively attributed to cattle or sheep at the time the transects were sampled in July. However, the lower Granite Mountain monitoring site was heavily trampled by cattle in early September when I returned to collect bulbils for the reintroduction part of the project. In addition, sheep prints were abundant throughout the North Fork Pearl Creek occurrence area, including places where I transplanted the bulbils. A summary of disturbance factors encountered at each transect is given in Table 2.

The distance to the nearest road, trail, and fire zones was estimated for each transect. More than half the transects are located in areas that burned during the 1994 wildfire season. All the transects are located more than 100 m from the nearest road and most greater than 100 m from the nearest trail. Table 3 details this information.

Table 2. Presence/absence of disturbance factors at Tobias' saxifrage monitoring transects in 2001. X = present in at least one transect microplot.

Transect	Disturbance factors				
	Recreation disturbance	Sheep/Cattle disturbance	Unknown/other disturbance	<i>Polygonum phytolaccaefolium</i>	Weeds
Fisher Creek Saddle					
001-1			X		
001-2				X	
001-3			X		
001-4					
001-5					
East of Duck Lake					
004-1					
Slab Butte					
005-1					
005-2					
Granite Mountain					
006-1			X	X	
006-2			X		
006-3	X			X	
006-4	X			X	
006-5			X		

Table 3. Distance to the nearest road, trail, and fire zone for Tobias' saxifrage monitoring transects.

Transect	Nearest road	Nearest trail	Nearest fire zone
Fisher Creek Saddle			
001-1	>100 m	>100 m	<10 m
001-2	>100 m	>100 m	<10 m
001-3	>100 m	>100 m	10-100 m
001-4	>100 m	>100 m	10-100 m
001-5	>100 m	>100 m	10-100 m
East of Duck Lake			
004-1	>100 m	>100 m	<10 m
Slab Butte			
005-1	>100 m	>100 m	>100 m
005-2	>100 m	>100 m	>100 m
Granite Mountain			
006-1	>100 m	<10 m	<10 m
006-2	>100 m	<10 m	<10 m
006-3	>100 m	<10 m	>100 m
006-4	>100 m	<10 m	>100 m
006-5	>100 m	>100 m	>100 m

Plant community information

Plant community information was collected at all transect areas, although only one plot was sampled in cases where two transects were in close proximity to one another. In addition, a separate vegetation plot should be established at transect 005-2 in the future. This resulted in a total of nine plant community plots being sampled for the 13 monitoring transects. The vegetation at most transect sites was characterized by scattered conifers, patches of low shrubs, and a diverse mix of graminoid and forb species. Forbs dominated the vegetation cover at most plots, while rock and bare soil typically accounted for most of the ground cover. The amount of moss ground cover varied from trace to high.

A total of 85 vascular plant species were tallied for the nine plots - four tree, seven shrub, 18 graminoid, and 56 forb species. Subalpine fir (*Abies lasiocarpa*) was present in all but one vegetation plot, but no one shrub species occurred in more than four of the plots. The number of graminoids varied from three to nine species/plot. Parry's rush (*Juncus parryi*) was often the most abundant, and the only graminoid encountered in all plots. Variant bentgrass (*Agrostis variabilis*) and slender bluegrass (*Poa gracillima*) were the two other graminoids with high constancy values. Forb diversity was consistently high, ranging between 16 and 33 species/plot. Other than Tobias' saxifrage, thick-stemmed aster (*Aster integrifolius*) and threeleaf lewisia (*Lewisia triphylla*) were the only forbs tallied in all nine plots. Alpine knotweed occurred in all but one plot and was often the most abundant forb present. Overall, 14 (25%) forb species occurred in more than half of the plots, compared to 18 (32%) species encountered in only one plot. No non-native species were observed in the plots. Table 4 summarizes the plant community plot data by transect. It lists the cover class values for species in the plots, as well as overall constancy values. Copies of the completed 2001 plant community forms are in Appendix 7. Plant nomenclature follows Hitchcock and Cronquist (1973).

Table 4. Vegetation plot data for Tobias' saxifrage monitoring stations in 2001. Cover values are explained in the text.

	Transect									Constancy
	001-1	001-2	001-3&4	001-5	004-1	005-1	006-1&2	006-3&4	006-5	
Trees										
<i>Abies lasiocarpa</i>	10	10	20	10	3	3	20			80
<i>Picea engelmannii</i>			3		1		3			30
<i>Pinus albicaulis</i>		1	1	3				1		40
<i>Pinus contorta</i>							1			10
Shrubs										
<i>Lonicera utahensis</i>			1		1					20
<i>Phyllodoce empetriformis</i>	10		3	20						
<i>Ribes montigenum</i>				1	1	1				30
<i>Sambucus cerulea</i>		1								10
<i>Sorbus scopulina</i>			1							10
<i>Spiraea densiflora</i>					10	20	1	3		40
<i>Vaccinium scoparium</i>	3		10	10						30

	001-1	001-2	001-3	001-5	004-1	005-1	006-1&2	006-3&4	006-5	Constancy
Graminoids										
<i>Agrostis thurberiana</i> (?)							1			10
<i>Agrostis variabilis</i>	1	1	1		1	1	3		1	80
<i>Calamagrostis</i> sp.							3			10
<i>Carex scopularum</i> (?)			1							10
<i>Carex microptera</i>		1			1	1	3		1	50
<i>Carex pachystachya</i>							3			10
<i>Carex rossii</i>	1	1	1							30
<i>Danthonia intermedia</i>					1					10
<i>Deschampsia cespitosa</i>		1					1	3	10	40
<i>Elymus glaucus</i>		1			3	1				30
<i>Juncus parryi</i>	3	10	3	3	3	20	1	10	10	100
<i>Luzula hitchcockii</i>	10		3	1			10			40
<i>Melica bulbosa</i>									1	10
<i>Oryzopsis exigua</i>			1	1						20
<i>Poa gracillima</i>	1	1	1	1	1	1		1	1	90
<i>Sitanion hystrix</i>									1	10
<i>Stipa occidentalis</i>							1			10
<i>Trisetum spicatum</i>	1	1			1	1				40
Forbs										
<i>Achillea millefolium</i>									1	10
<i>Anaphalis margaritacea</i>		1					10	3		30
<i>Antennaria alpina</i>			1	1	1				1	40
<i>Antennaria lanata</i>	3	1	3	3		1		1	1	80
<i>Arabis</i> sp.									1	10
<i>Arenaria aculeata</i>		1	1	3		1		1	1	70
<i>Arnica latifolia</i>	1	1	1		1					40
<i>Aster foliaceus</i>								1	1	20
<i>Aster integrifolius</i>	3	1	3	1	3	1	3	1	1	100
<i>Calochortus eurycarpus</i>									1	10
<i>Castilleja miniata</i>		1			3			1	1	40
<i>Cheilanthes gracillima</i>						1			1	20
<i>Chionophylla tweedyi</i>			1							10
<i>Collinsia parviflora</i>		1								10
<i>Cryptogramma crispera</i>		1			1	1		1	1	50
<i>Cymopterus glauca</i>								1		10
<i>Cysopteris fragilis</i>					1					10
<i>Delphinium nuttallianum</i>					1				1	20
<i>Dodecatheon jeffreyi</i>	10		3	3						30
<i>Epilobium alpinum</i>	1									10
<i>Epilobium angustifolium</i>	3	3	1	1	1					40
<i>Epilobium minutum</i>									1	10
<i>Erigeron alpigenus</i>				1						10

	001-1	001-2	001-3	001-5	004-1	005-1	006-1&2	006-3&4	006-5	Constancy
<i>Eriogonum flavum</i>									3	10
<i>Eriogonum pyrolifolium</i>									1	10
<i>Erythronium grandiflorum</i>	1	1	1	1	1	1	1	1		90
<i>Galium bifolium</i>									1	10
<i>Gentiana calycosa</i>				1						10
<i>Hieracium albertinum</i>									1	10
<i>Hieracium gracile</i>		1	1	1		1	1			50
<i>Hypericum formosum</i>		10		1	3	1			10	50
<i>Lewisia triphylla</i>	1	3	1	1	1	1	3	3	3	100
<i>Ligusticum canbyi</i>	3	3		1	10		3	1	3	80
<i>Lupinus argenteus</i>		1			3	3	3			40
<i>Lupinus caudatus</i>								3	3	20
<i>Mimulus breweri</i>									1	10
<i>Pedicularis bracteosa</i>	1		1	1						30
<i>Pedicularis racemosa</i>			1	1			1			30
<i>Penstemon globosa</i>					10				10	20
<i>Perideridia bolanderi</i>									3	10
<i>Polemonium pulcherrimum</i>	1	3	1		1	1	1			70
<i>Polygonum bistortoides</i>	1	1	1	1	1	1		1	1	90
<i>Polygonum kelloggii</i>	1				1		1	1	1	50
<i>Polygonum minimum</i>						1			1	20
<i>Polygonum phytolaccaefolium</i>		30	1	1	10	10	1	10	10	90
<i>Potentilla flabellifolia</i>	1						3			20
<i>Saxifraga bryophora tobiasiae</i>	1	1	1	1	1	1	10	1	1	100
<i>Sedum lanceolatum</i>					1			1	1	30
<i>Sedum roseum</i>					1					10
<i>Senecio crassulus</i>			1			1		1	1	40
<i>Senecio integerrimus</i>	1	3		1	1		1		1	70
<i>Senecio triangularis</i>							1			10
<i>Suksdorfia ranunculifolia</i>					3				1	20
<i>Valeriana sitchensis</i>		1			3					20
<i>Veratrum californicum</i>					1		1			20
<i>Xerophyllum tenax</i>			3	3						20

Photo points

Photo point photographs provide a visual, time-lapse record of the vegetation and other habitat conditions for each monitoring transect. Photos taken in 2001 serve as the baseline from which to compare and evaluate future photographs. Over time, the photographs may be useful to document events and impacts related to wildfire, weed invasion, livestock use, recreational use, or other disturbances. They can also serve to document successional changes and site stability. Photos should be retaken whenever the transects are resampled. Photos from 2001 were labeled, organized in a binder, and

given to the Payette NF as part of this report. The photograph negatives are on file at the CDC office in Boise.

Reintroduction of Tobias' saxifrage at North Fork Pearl Creek

Most of the Tobias' saxifrage plants at the lower Granite Mountain source population were trampled by livestock prior to my visit in early September. The trampling disturbance resulted in most bulbils being knocked to the ground and made unavailable for collection. As a result, I was forced to change my original plan to use only large-sized bulbils for the transplant/reintroduction experiment, as suggested by Kim Pierson (Sawtooth NF, pers. comm.). Because of their limited availability, only about 25% of the transplanted bulbils were large (>0.5 cm diameter) in size. The rest were small/tiny in size and of more questionable viability.

A total of 313 bulbils were planted at the three transplant transects - 100 at transect #1, 105 at transect #2, and 108 at transect #3. Ground disturbance factors were not measured at the transplant transects in 2001, but should be included in future monitoring. Vegetation plot data was collected, although plant identification to the species level was limited by the poor condition and senescing phenology of many taxa by early September. Several species observed at the transplant transects were not observed at the other Tobias' saxifrage occurrences, including red sandspurry (*Spergularia rubra*), a low-growing, introduced annual. Table 5 summarizes the plant community plot data for the transplant transects. Copies of the completed 2001 plant community forms are included in Appendix 7.

The original mapping of Tobias' saxifrage at North Fork Pearl Creek proved inadequate to determine the precise location of the original, pre-1994 wildfire colonies. As a result, the three transplant transects occur near, but probably do not precisely overlap the original colony sites. We plan to resample the transects in 2002, assess the initial success of the reintroduction, and establish additional transplant stations and/or augment the original transplant sites.

DISCUSSION

One of our objectives in 2001 was to assess the restoration of degraded sites at the Fisher Creek Saddle and Granite Mountain occurrences. Impacts related to seasonal livestock use and passage at Fisher Creek Saddle seem to be more or less limited to the vicinity of the topographic saddle, an area that likely supported little if any Tobias' saxifrage in the past. The limited amount of habitat degradation in areas supporting Tobias' saxifrage at this occurrence seem to be related to the 1994 wildfires and/or natural erosion processes. Restoration options appear to be limited and probably unwarranted. Cattle trampling and recreational use of the Granite Mountain trail may be having an adverse effect on Tobias' saxifrage and its habitat at the lower Granite Mountain subpopulation. Cattle use within the subpopulation may typically be intensive, but of short duration and involve only a few animals. This is suggested by the many cow prints, but few cow droppings observed at the site in September 2001. The lack of footprints, horse prints, or vehicle tread marks in the subpopulation suggests that most recreationists stay on the trail in the vicinity of Tobias' saxifrage. Maintenance that prevents the trail width from expanding into the immediately adjacent subpopulation may

Table 5. Vegetation plot data for North Fork Pearl Creek reintroduction transects in 2001. Cover values are explained in the text.

	Transect	
	002-1 & 2	002-3
Trees		
<i>Abies lasiocarpa</i>		1
<i>Picea engelmannii</i>		3
<i>Pinus albicaulis</i>	10	
<i>Pinus contorta</i>	3	
Graminoids		
<i>Carex hoodii</i>	3	1
<i>Carex microptera</i>	1	
<i>Sitanion hystrix</i>	1	
<i>Stipa lettermannii</i>	10	10
Unknown graminoid species	3	3
Forbs		
<i>Anaphalis margaritacea</i>		1
<i>Arabis</i> sp.	1	
<i>Arenaria aculeata</i>	1	
<i>Aster</i> sp.		1
<i>Eriogonum</i> sp.	1	
<i>Gayophytum diffusum</i>	3	
<i>Hypericum formosum</i>		3
<i>Lupinus</i> sp.		1
<i>Navarretia</i> sp.	1	
<i>Penstemon</i> sp.		1
<i>Polemonium pulcherrimum</i>	1	
<i>Polygonum phytolaccaefolium</i>	10	20
<i>Polygonum</i> sp. (annual)	3	1
<i>Potentilla</i> sp.		1
<i>Spergularia rubra</i>	10	1
<i>Veratrum californicum</i>		1

be necessary in the future. Trail maintenance crews should take the necessary and easy precautions needed to ensure their work does not adversely impact the subpopulation.

To capture annual cattle disturbance impacts at the lower Granite Mountain subpopulation it may be necessary to sample this transect twice, in late summer, as well as mid-summer when all the transects get sampled. This is because cattle do not use the occurrence area until later in the season. I also suggest that bulbils collected for transplanting be classified in size categories (e.g., <0.2 mm, 0.2-0.5 mm, and >0.5 mm). this classification will allow an evaluation of different survival rates, if any, for the various size classes. This information can help increase the efficiency of any future reintroduction efforts.

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.
- Hitchcock, C.L., and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle WA. 730 p.
- Moseley, R.K. 1989. Field investigation of *Saxifrage bryophora* var. *tobiasae* (Tobias' saxifrage) a Region 4 Sensitive species on the Payette National Forest, with notes on *Campanula scabrella* (rough bellflower). Unpublished report prepared for the Payette National Forest by the Idaho Department of Fish and Game, Conservation Data Center, Boise, ID. 13 p., plus appendices.
- Moseley, R.K. 1996. Effects of the Blackwell and Corral fires on populations of the rare endemic, *Saxifrage bryophora* var. *tobiasae*, Payette National Forest. Unpublished report prepared for the Payette National Forest by the Idaho Department of Fish and Game, Conservation Data Center, Boise, ID. 7 p.
- Pierson, K. 1999. The reproductive biology and edaphic characteristics of a rare, gynodioecious saxifrage: *Saxifrage bryophora* var. *tobiasae* (Saxifragaceae). M.S. thesis, Utah State University, Logan, UT. 145 p.

Appendix 1

Element Occurrence Records for Tobias' saxifrage.

TOBIAS' SAXIFRAGE
Occurrence Number: 001

Survey Site Name: FISHER CREEK SADDLE

County: Valley; Idaho

USGS quadrangle: BLACK TIP

Latitude: 450925N Longitude: 1160710W

TOWNRANGE:	SECTION:	MERIDIAN:	TRSNOTE:
021N003E	16	BO	S2
021N003E	17	BO	S2, S2S2N2
021N003E	20	BO	NW4
021N003E	22	BO	N2NW4

Location: Approximately 19 air miles north of McCall, along ridges at the head of Fisher Creek, both east and west of Fisher Creek Saddle. Forest Service Road #281 provides access to the saddle. The occurrence extends along ca 2 plus miles of the ridge complex.

Survey Date: 1995-08-15

First Observed: 1977

Last Observed: 2001-07-26

EORANK: A

EORANK Comments: Large and more or less undisturbed.

Population Data: 1977-1978: No data. Collected by Packard and Tobias. 1989: Many small populations scattered along slope. Greater than 10,000 individuals, 50% mature (with bulbils), 40% immature rosettes, few with flowers. Also one small population on cirque headwall in upper Cougar Creek. Area surveyed by Bob Moseley, Barbara Ertter, and Chris Davidson. 1995: Area surveyed by Moseley, Kim Pierson, and Nellie Tobias, finding four large discontinuous populations. Occurrence lies in the center of the 1994 Corral Fire area. The westernmost population was unburned due to the rocky habitat. The population west of Fisher Creek Saddle had only widely scattered spot fires that were localized due to discontinuous fuels, leaving the *Saxifraga* largely unaffected. The open forest occupied by *Saxifraga* immediately SE of the saddle thoroughly burned, but population densities do not appear to be affected by increased erosion. The west half of the easternmost population thoroughly burned but *Saxifraga* densities appear unaffected, while the eastern half had only spot fires and the habitat was largely unaffected. 2001: In the past, many 1000's of genets were observed in the subpopulations west of Fisher Creek Saddle. The westernmost subpopulation was not visited in 2001, and fewer than 1000 plants were observed in the western subpopulation closer to the saddle. Some of the microhabitats that had many genets in the past, had few or no plants in 2001. Both subpopulations located east of the saddle comprised of scattered small microsites supporting a few (<100) to many (500 or more) saxifrage plants, totaling an estimated 2000-3000 genets. Most of the area within the occurrence polygons is unoccupied by the saxifrage and many suitable-looking microhabitats did not have plants in 2001. Majority of plants were rosettes; reproductive plants common in the eastern subpopulation, although most plants with bulbils and no flowers; bulbil and flower production was very scant at the western subpopulation. Observations by Michael Mancuso, CDC; Kim Pierson, Sawtooth NF; and Alma Hanson, Payette NF.

Habitat Description: Scattered gravelly ledges, pocket gopher mounds, and run-off channels on E, S, W, and NW-facing aspects; upper to lower slope positions. Granite substrate. Open *Abies lasiocarpa* and *Pinus albicaulis* woodland habitats, with relatively high herb and small shrub cover in most places. The *Saxifraga* occurring in open microhabitats with high bare ground cover. Associated with *Lewisia triphylla*, *Polygonum austiniiae*, and *P. phytolaccaefolium*.

Minimum Elevation: 7500 feet

Maximum Elevation: 8400 feet

Size: 180 AC

Land Owner/Manager: PAYETTE NATIONAL FOREST
MCCALL RANGER DISTRICT
NEW MEADOWS RANGER DISTRICT
BRUIN MOUNTAIN RNA

Ownership Comments: Payette NF, McCall RD and New Meadows RD.

Comments: In collaboration with the Payette NF, the CDC established five monitoring transects within the occurrence in 2001.

Protection Comments: A very small portion of the population due W of Fisher Saddle is within Bruin Mountain RNA. Sheep graze the area but don't appear to threaten the population. Increased erosion as a result of fire could be a threat.

Management Comments:

Specimens:

N. Tobias s.n. (NY, CAS).

P. Packard 78-251 (ID).

P. Packard and N. Tobias 78-281 (CIC).

P. Packard and N. Tobias 78-237 (CIC).

C. Wellner 1622 (ID).

B. Ertter 7775 (UC).

B. Ertter 8745 (UC).

TOBIAS' SAXIFRAGE
Occurrence Number: 002

Survey Site Name: NORTH FORK PEARL CREEK

County: Valley

USGS quadrangle: BOX LAKE

Latitude: 450522N Longitude: 1155842W

TOWNRANGE:	SECTION:	MERIDIAN:	TRSNOTE:
020N004E	08	BO	NE4NE4, NE4SE4
020N004E	09	BO	N2N2

Location: About 14 miles NE of McCall. Headwaters of the North Fork of Pearl Creek, ca 0.5 air miles N of Pearl Lake. Access is via Forest Service Road #432 to the trailhead of FS Trail #109.

Survey Date: 1996-08-27 First Observed: 1988 Last Observed: 1989-07-25

EORANK: X

EORANK Comments: Apparently extirpated by the 1994 Blackwell Fire and subsequent increased erosion.

Population Data: 1988-1989: Ca 200 genets, all vegetative; occurs in 4 very small subpopulations. Area surveyed by Bob Moseley, Idaho CDC. 1995: Area surveyed by Kim Pierson and others, Payette NF, in July without success. Area surveyed again in August by Moseley and Pierson without finding any plants. All four populations discovered in 1988 and 1989 are within the 1994 Blackwell Fire. The area was severely burned with almost complete mortality of trees and highly altered soils due to heat. It is speculated that the small ledges and channels occupied by the plants were inundated by the obviously high sediment loads being carried by snowmelt and rain as overland flow. 1996: Visited by Moseley on August 27. Still no sign of *Saxifraga*. 2001: No *Saxifraga* found during searches by Michael Mancuso, CDC, in early September.

Habitat Description: Dry; mid-slope; W-aspect and flat; 0-15% slope; full sun to partial shade; gravelly ledges and in ephemeral snow runoff channels. *Abies lasiocarpa* and *Pinus albicaulis* woodland with *Lewisia triphylla*, *Polygonum austinae*, *P. phytolaccaefolium*, and *Lupinus caudatus*.

Minimum Elevation: 7400 feet

Maximum Elevation: 7850 feet

Size: 1 AC

Land Owner/Manager: PAYETTE NATIONAL FOREST, MCCALL RANGER DISTRICT

Ownership Comments: Payette NF, McCall RD.

Comments: Area should be surveyed periodically over the next several years to determine if the species persisted, but was not visible in 1995. 2001: *Saxifraga* bulbils collected at Granite Mountain were transplanted along three transects in the general occurrence area; with plans to monitor this reintroduction experiment in future years.

Protection Comments: Sheep grazing in the area probably does not threaten occurrence. 2001: Sheep grazing disturbances locally heavy in general occurrence area. Approximately 1500 sheep were in or near the occurrence area in September 2001.

Management Comments:

Specimens: B. Ertter 7819 (UC).

TOBIAS' SAXIFRAGE
Occurrence Number: 003

Survey Site Name: BEAVERDAM PEAK SOUTH

County: Valley

USGS quadrangle: BOX LAKE

Latitude: 450044N Longitude: 1155812W

TOWNRANGE:	SECTION:	MERIDIAN:	TRSNOTE:
019N004E	04	BO	SW4NE4, NW4SE4, SE4SE4

Location: On the E slope of 2 unnamed peaks S of Beaverdam Peak; ca 10 air miles NE of McCall, ca 0.5 mile SE of Box Lake.

Survey Date: 1995-08-16 First Observed: 1989-07-27 Last Observed: 1995-08-16

EORANK: A

EORANK Comments: Undisturbed and isolated.

Population Data: 1989: Ca 1500 genets, 10% in leaf, 80% in bud, 10% in flower; few flowers present; several subpopulations scattered on ledges. Area surveyed by Bob Moseley, Idaho CDC. 1995: Occurrence is within the perimeter of the 1994 Blackwell Fire but habitat in the vicinity of the populations did not burn as it was protected by discontinuous fuel and bedrock slabs. Forests below the populations were severely burned. Observations by Moseley.

Habitat Description: N, E, and NE aspects; granitic ledges within *Abies lasiocarpa* forests; thin, gravelly soil over bedrock. Associated with *Lewisia triphylla*, *Polygonum phytolaccaefolium*, *Juncus parryi*, and *Spiraea densiflora*.

Minimum Elevation: 7600 feet

Maximum Elevation: 8000 feet

Size:

Land Owner/Manager: PAYETTE NATIONAL FOREST, MCCALL RANGER DISTRICT

Ownership Comments: Payette NF, McCall RD.

Comments: Additional populations may be discovered in the Beaverdam Peak - Box Lake area on the divide between NFK Lake Fork and the NFK Payette River.

Protection Comments:

Management Comments:

Specimens: Moseley 1563 (ID); Ertter 8790 (UC).

TOBIAS' SAXIFRAGE
Occurrence Number: 004

Survey Site Name: EAST OF DUCK LAKE

County: Valley
BRUNDAGE MTN.

USGS quadrangle:

Latitude: 450642N Longitude: 1160830W

TOWNRANGE:	SECTION:	MERIDIAN:	TRSNOTE:
021N003E	31	BO	center SW4

Location: About 18 miles NNW of McCall. East of the divide between Corral and Fisher creeks, ca 0.5 air miles east of Duck Lake. About 0.5 air miles west of FS Road 281 and 1.3 air miles north of Slab Butte.

Survey Date: 1995-08-17 First Observed:1995-08-17 Last Observed: 2001-07-20

EORANK: B
EORANK Comments: Small, but undisturbed and vigorous.

Population Data: 1995: Ca 250 genets, 90% vegetative and 10% in flower. Population age class structure is unknown. Population is small and local but appears vigorous. Observation on a cursory survey by Bob Moseley, Idaho CDC. 2001: An estimated 5,000 genets, perhaps more, in groupings scattered over ca 1 acre; variable density, but locally common. Majority of plants were rosettes, but also many individuals with flowers and/or bulbils; some plants with multiple flowers.

Habitat Description: Bare soil among boulders, ledges, and in run-off channels on moderately steep NE-facing subalpine slope. Slope dominated by herbaceous vegetation with scattered conifers. *Polygonum phytolaccaefolium*, *Penstemon globosus*, *Hypericum formosum*, *Lupinus argenteus*, and *Spiraea densiflora* are common community associates. Severely burned *Abies lasiocarpa* forests occurs below and to a lesser degree above the population. Population is within the 1994 Corral Fire area, ca 0.75 mile N of its southern perimeter. Immediate area around population was largely unaffected except for some of the conifers, probably because of discontinuous fuels.

Minimum Elevation: 7400 feet Maximum Elevation: Size: 1 ACRE

Land Owner/Manager: PAYETTE NATIONAL FOREST, MCCALL RANGER DISTRICT

Ownership Comments: Payette NF, McCall RD.

Comments: In collaboration with the Payette NF, the CDC established a monitoring transect within this occurrence in 2001.

Protection Comments: Undisturbed area. 2001: Undisturbed except for 1994 wildfire.

Management Comments:

Specimens: Michael Mancuso #2200 (ID)

TOBIAS' SAXIFRAGE
Occurrence Number: 005

Survey Site Name: SLAB BUTTE

County: Valley
BRUNDAGE MTN.

USGS quadrangle:

Latitude: 450537N Longitude: 1160814W

TOWNRANGE:	SECTION:	MERIDIAN:	TRSNOTE:
020N003E	06	BO	SE4SW4
020N003E	07	BO	NW4NE4

Location: About 17 air miles NNW of McCall and about 1 mile east of Goose Lake. East-facing slopes below Slab Butte; around small unnamed lake and continuing north for about 0.3 mile.

Survey Date: 2001-07-19 First Observed: 989-07-28 Last Observed: 2001-07-19

EORANK: A

EORANK Comments: Several groupings totaling 1000's of plants; many robust individuals; largely undisturbed.

Population Data: 1989: Ca 250 genets in 2 small populations; no flowers seen. Area surveyed by Bob Moseley, Idaho CDC. 1995: Moseley located 2 additional small populations N and S of those found in 1989. 2001: Two new colony areas discovered; occurrence comprised of at least 6 colony areas clustered around Slab Butte Lake and ranging in size from ca 0.1 to over 0.5 acre and containing several 100 to several 1000 genets. Total of over 10,000 genets; rosettes are most common life stage class, but many plants with flowers and/or bulbils; plants with multiple flowers and red fruits also observed. Observations by Michael Mancuso, CDC; Kirsten Severud, IDF&G volunteer; and Alma Hanson, Payette NF.

Habitat Description: Ledges, concave chutes, narrow strips of water runout areas, and openings amongst boulders and slabs of exposed bedrock. Gravelly, granitic, shallow soil; in deeper soil and duff in one area. Open light to partial shade of conifers. NE-and E-facing aspects; gently sloping to moderately steep areas; occasionally where more or less flat. Associated with *Lewisia triphylla* and *Polygonum austiniiae*; while *Spiraea densiflora*, *Juncus parryi*, *Polygonum phytolaccaefolium*, and *Aster integrifolius* are common community associates. Occurrence is ca 0.5 mile south of the burn perimeter of the 1994 Corral Fire.

Minimum Elevation: 7550 feet Maximum Elevation: 7640 feet Size: 3 ACRES

Land Owner/Manager: PAYETTE NATIONAL FOREST, MCCALL RANGER DISTRICT

Ownership Comments: Payette NF, McCall RD.

Comments: Unsurveyed potential habitat occurs to north and south of occurrence. Additional inventories may reveal more small subpopulations in the general area. In collaboration with the Payette NF, the CDC established two monitoring transects at this occurrence in 2001.

Protection Comments:

Management Comments:

Specimens: Michael Mancuso #2199 (ID)

TOBIAS' SAXIFRAGE
Occurrence Number: 006

Survey Site Name: GRANITE MOUNTAIN

County: Adams

USGS quadrangle: BRUNDAGE MTN.

Latitude: 450544N Longitude: 1161127W

TOWNRANGE:	SECTION:	MERIDIAN:	TRSNOTE:
020N002E	03	BO	N2SE4SE4
020N002E	10	BO	SW4NE4NW4, NW4SE4NW4
020N002E	2	BO	NE4

Location: About 13 air miles NNW of McCall, about 1 mile west of Goose Lake; on the SE and E flanks of Granite Mountain.

Survey Date: 2001-07-23

First Observed: 1999

Last Observed: 2001-

07-23

EORANK: A

EORANK Comments: At least three subpopulations, one of which is relatively large and mostly undisturbed.

Population Data: 1999: An estimated 500+ individuals observed. Population vigor assessed as good. cursory survey by Alma Hanson and Hank Clouser, Payette NF. 2001: Three subpopulations - the lower trail area is less than 0.2 acre in size, but has several 1000 genets; the middle subpopulation (three tree area) is no more than 0.1 acre in size and has ca 300-500 genets; the upper subpopulation contains scattered groupings over several acres and several 1000 genets. Observations by Michael Mancuso, CDC; Kirsten Severud IDF&G volunteer; and Alma Hanson, Payette NF.

Habitat Description: The lower trail site is a small opening in an *Abies lasiocarpa*-dominated forest alongside the Granite Mountain trail. Burned snags surround the site, which itself did not burn in 1994. The opening is dominated by a diverse mix of forbs and graminoids; with gravelly soil and bedrock close to the surface; gentle to moderately steep NE-facing slope. The middle subpopulation is a moderately steep, NE-E-facing, rocky subalpine slope with a series of small rock outcrops and ledges and high cover of broken rock and exposed granite bedrock. The vegetation is dominated by a diverse forb-graminoid community, with scattered *Abies lasiocarpa* and *Pinus albicaulis*. The upper subpopulation occurs in open, rocky, E- to SE-facing subalpine area with granite bedrock at or near the surface. The vegetation is dominated by a diverse forb-graminoid community with scattered individual or small islands of *Abies lasiocarpa* and *Pinus albicaulis*. No evidence of recent fire.

Minimum Elevation: 7800 feet

Maximum Elevation: 7900 feet

Size: 10 AC

Land Owner/Manager: PAYETTE NATIONAL FOREST, NEW MEADOWS RANGER DISTRICT

Ownership Comments: Payette NF, New Meadows RD.

Comments: In collaboration with the Payette NF, the CDC established five monitoring transects within this occurrence in 2001.

Protection Comments: 2001: The Granite Mountain trail runs alongside two of the subpopulations. The lower trail area is used by hikers, motorcycles, ORVs, horses and maybe others, while the upper areas see little if any motorized use. Cattle use appears light at the upper two

subpopulation, but heavy trampling disturbance was observed in September at the lower trail subpopulation.

Management Comments:

Specimens:

Appendix 2

Map locations of Tobias' saxifrage monitoring and reintroduction transects.

Appendix 3

GPS coordinates for Tobias' saxifrage monitoring and reintroduction transects.

All coordinates are UTM 11T based on Map Datum = NAD 27 Central

001 Fisher Creek Saddle – Transect 1	0570403 E	5000254 N
001 Fisher Creek Saddle – Transect 2	0571062 E	5000241 N
001 Fisher Creek Saddle – Transect 3	0569502 E	5000808 N
001 Fisher Creek Saddle – Transect 4	0569500 E	5000835 N
001 Fisher Creek Saddle – Transect 5	0569561 E	5000787 N
002 North Fork Pearl Creek – Transect 1	0580455 E	4993165 N
002 North Fork Pearl Creek – Transect 2	0580453 E	4993152 N
002 North Fork Pearl Creek – Transect 3	0580606 E	4993260 N
004 East of Duck Lake – Transect 1	0567495 E	4995568 N
005 Slab Butte – Transect 1	0568174 E	4993107 N
005 Slab Butte – Transect 2	0568073 E	4993149 N
006 Granite Mountain – Transects 1&2	0565037 E	4994479 N
006 Granite Mountain – Transects 3&4	0563688 E	4993765 N
006 Granite Mountain – Transect 5	0563103 E	4993161 N

Appendix 4

Tobias' saxifrage transect location forms.

Appendix 5

Transect information for Tobias' saxifrage monitoring and reintroduction transects.

All compass readings were taken with declination set at 0° . Left- versus right-hand sides of the transect tape is determined by standing at the transect's starting point (the transect marker stake) and facing the end of the transect.

Tobias' saxifrage monitoring transects

001 Fisher Creek Saddle – Transect 1

Transect azimuth = 280°

Transect length = 12 m

Microplots sampled on left side of tape.

Microplots sampled at every meter mark starting at the 0 meter point – for a total of 13 microplots.

Marker stake is a piece of straight, red-painted rebar. The end of the transect marked by a tagged nail hammered into the ground at the 11 m mark (not 12 m because of presence of rock).

This transect is superimposed over one of Kim Pierson's original research plots. The monitoring marker stake is located approximately 4 m uphill of Kim's yellow-capped rebar stake.

001 Fisher Creek Saddle – Transect 2

Transect azimuth = 215°

Transect length = 8 m

Microplots sampled on left side of tape.

Microplots sampled every 0.5 meter mark starting at the 0 meter point – for a total of 17 microplots.

Marker stake is a piece of red-painted rebar. The end of the transect marked by a tagged nail hammered into the ground at the 8 m mark.

Microplots #7, 9, 14, 15, 16, 17 are largely rock.

001 Fisher Creek Saddle – Transect 3

Transect azimuth = 90°

Transect length = 10 m

Microplots sampled on left side of tape.

Microplots sampled every meter mark starting at the 1 meter point – for a total of 10 microplots.

Marker stake is a piece of red-painted “potato-digger” rebar. The end of the transect marked by a tagged nail hammered into the ground at the 10 m mark immediately adjacent to a rock about 0.5 m² in size.

This transect is superimposed over a microsite that Kim Pierson used for her Tobias’ saxifrage reproduction study. It was not one of her regular research transects, but is located less than 30 m south of her research plot #6.

001 Fisher Creek Saddle – Transect 4

Transect azimuth = 337⁰

Transect length = 10 m

Microplots sampled on right side of tape.

Microplots sampled every meter mark starting at the 1 meter point – for a total of 10 microplots.

Marker stake is a piece of red-painted “potato-digger” rebar. The end of the transect marked by a tagged nail hammered into the ground at the 11.1 m mark immediately adjacent to a rebar stake originally placed in the ground by Kim Pierson.

This transect is superimposed directly over Kim Pierson’s original research plot #6. Rebar stakes marking the start, middle, and end of her transect were all still in place. The monitoring marker stake was hammered into the ground directly adjacent to her start stake.

001 Fisher Creek Saddle – Transect 5

Transect azimuth = 85⁰

Transect length = 10 m

Microplots sampled on right side of tape.

Microplots sampled every meter mark starting at the 1 meter point – for a total of 10 microplots.

Marker stake is a piece of red-painted “potato-digger” rebar. The end of the transect marked by a tagged nail hammered into the ground at the 11 m mark immediately adjacent to a rebar stake originally placed in the ground by Kim Pierson.

This transect is superimposed directly over what I believe was Kim Pierson’s original research plot #11. Two rebar stakes from her plot were still in place. I placed our monitoring marker stake directly adjacent to her uphill (start?) stake.

004 East of Duck Lake – Transect 1

Transect azimuth = 326⁰

Transect length = 8 m

Microplots sampled on left side of tape.

Microplots sampled every 0.5 meter starting at the 1 meter point – for a total of 15 microplots.

Marker stake is a piece of orange-painted “potato-digger” rebar. The end of the transect marked by a tagged nail hammered into the ground at the 8 m mark.

Microplot #4 (at 2.5 m mark) is mostly rock.

005 Slab Butte – Transect 1

Transect azimuth = 64°

Transect length = 13 m

Microplots sampled on left side of tape.

Microplots sampled every meter mark starting at the 1 meter point – for a total of 13 microplots.

Marker stake is a piece of red-painted “potato-digger” rebar. The end of the transect marked by a tagged nail hammered into the ground at the 13 m mark.

Microplots #8 and 12 are mostly rock; microplot #10 is all granite bedrock.

005 Slab Butte – Transect 2

Transect azimuth = 33°

Transect length = 17 m

Microplots sampled on right side of tape.

Microplots sampled every meter mark starting at the 1 meter point – for a total of 17 microplots.

Marker stake is a piece of straight red-painted rebar. The end of the transect marked by a tagged nail hammered into the ground at the 17 m mark.

Microplot #4 is largely rock.

006 Granite Mountain – Transect 1 (lower trail site)

Transect azimuth = 335°

Transect length = 15 m

Microplots sampled on right side of tape.

Microplots sampled every meter mark starting at the 1 meter point – for a total of 15 microplots.

Marker stake is a piece of red-painted “potato-digger” rebar. The end of the transect marked by a tagged nail hammered into the ground at the 15 m mark.

006 Granite Mountain – Transect 2 (lower trail site)

Transect azimuth = 354°

Transect length = 15 m

Microplots sampled on left side of tape.

Microplots sampled every meter mark starting at the 1 meter point – for a total of 15 microplots.

This transect is referenced using the red-painted “potato-digger” rebar that marks the start of Transect #1. The start of Transect #2 is 10.2 m @ 153° from the marker stake and runs along the west edge of the Granite Mountain hiking trail. The end of the transect is unmarked because I did not want to leave a tagged nail along the edge of the trail.

006 Granite Mountain – Transect 3 (three tree site)

Transect azimuth = 64°

Transect length = 11 m

Microplots sampled on right side of tape.

Microplots sampled every 0.5 meter mark starting at the 0 meter point – for a total of 22 microplots.

Marker stake is a piece of red-painted “potato-digger” rebar. The end of the transect marked by a tagged nail hammered into the ground at the 10 m mark (not 11 m due to presence of rock).

The transect ends just upslope of the main Granite Mountain hiking trail. A small spur trail runs through microplots #13 and 14.

006 Granite Mountain – Transect 4 (three tree site)

Transect azimuth = 7°

Transect length = 11 m

Microplots sampled on right side of tape.

Microplots sampled every 0.5 meter mark starting at the 0 meter point – for a total of 22 microplots.

The starting point for this transect is the same red-painted “potato-digger” rebar stake that marks the start of the adjacent Transect #3. The transect ends just west of the main tread for the Granite Mountain hiking trail. A minor spur trail passes through microplots #16 and 17.

006 Granite Mountain – Transect 5 (below lookout site)

Transect azimuth = 109°

Transect length = 12 m

Microplots sampled on left side of tape.

Microplots sampled every meter mark starting at the 1 meter point – for a total of 12 microplots.

Tobias’ saxifrage reintroduction transects

002 North Fork Pearl Creek – Transect 1

Transect azimuth = 180°

Transect length = 10 m

Planting template centered over the 1.5 m, 4 m, and 6.7 m points along the transect.

No bulbils were planted in the #1, #2, and #8 planting holes at the 1.5 m template, and the #28, #29, #33, #34, and #35 holes at the 4 m template due to surface rocks blocking the planting surface.

002 North Fork Pearl Creek – Transect 2

Transect azimuth = 280°

Transect length = 10 m

Planting template centered over the 4 m, 6 m, and 8.7 m points along the transect.

The end (10 m) stake for Transect #1 serves as the starting point for this Transect #2.

No bulbils were planted in the #1 planting hole at the 4 m template, and the #1 and #19 holes at the 8.7 m template due to surface rocks blocking the planting surface.

002 North Fork Pearl Creek – Transect 3

Transect azimuth = 151°

Transect length = 10 m

Planting template centered over the 3 m, 5 m, and 9 m points along the transect.

Appendix 6

Tobias' saxifrage monitoring transect data sheets.

Appendix 7

Community Survey and Ocular Plant Species data sheets.