

EFFECTS OF THE 1994 BLACKWELL AND CORRAL FIRES
ON POPULATIONS OF THE RARE ENDEMIC,
SAXIFRAGA BRYOPHORA VAR. *TOBIASIAE*,
PAYETTE NATIONAL FOREST

by

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ABSTRACT

Saxifraga bryophora var. *tobiasiae* (Tobias' saxifrage) is endemic to the mountains north of McCall, Idaho, where it is known from five populations, all on the Payette National Forest. Four of the populations occur within the perimeters of the Corral and Blackwell fires, which burned during August through October 1994. To determine the effects of these fires on Tobias' saxifrage populations and habitat, I resurveyed the populations using maps and data that I collected during the original status survey in 1989. I found that habitat containing three populations actually burned, while one was in an unburned portion of the Blackwell Fire. Preliminary assessments in made 1995 indicate that two of the burned populations were probably not greatly affected because of the low burn intensity or spotty burn pattern of the fires. One population, North Fork Pearl Creek, was not found in 1995, and may be extirpated. A combination of the plant's life history characteristics and the severe intensity of the burn and subsequent erosion may have contributed to its disappearance from the site. The North Fork Pearl Creek population should be revisited in 1996 to determine if it was extirpated or if more than one year of post-fire recovery of the habitat is needed.

TABLE OF CONTENTS

ABSTRACT	i
TABLE OF CONTENTS	ii
LIST OF FIGURES	ii
INTRODUCTION	1
LIFE HISTORY AND HABITAT OF TOBIAS' SAXIFRAGE	1
RESULTS OF 1989 SURVEY	2
RESULTS OF 1995 SURVEY	2
CONCLUSIONS AND RECOMMENDATIONS	6
REFERENCES	7

LIST OF FIGURES

Figure 1.	Overview of the distribution of <i>Saxifraga bryophora</i> var. <i>tobiasiae</i>	3
Figure 2.	Location of new population discovered in 1995. Portion of the 1963 7.5' Brundage Mountain USGS quadrangle	4

INTRODUCTION

Saxifraga bryophora var. *tobiasiae* (Tobias' saxifrage) is endemic to the western Salmon River Mountains north of McCall, Idaho. All five known populations occur in the Payette River drainage on public land managed by the Payette National Forest. Prior to description of the variety endemic to Idaho in 1981, *Saxifraga bryophora* was thought to be endemic to the Sierra Nevada in California (Grimes and Packard 1981). I conducted a status inventory for Tobias' saxifrage in 1989 and found that its distribution consisted of five populations (Moseley 1989), although two populations were later found to be more or less continuous.

Several large fires burned on the Payette National Forest during August through October 1994, two of which burned a majority of the range of Tobias' saxifrage; the Blackwell Fire burned populations east of the North Fork Payette River, while the Corral Fire burned populations west of the North Fork. To determine the effects of these fires on Tobias' saxifrage populations and habitat, I resurveyed the populations using maps and data I collected during the original status survey in 1989.

LIFE HISTORY AND HABITAT OF TOBIAS' SAXIFRAGE

Because of the possible implications of an uncommon life history on its ability to withstand the effects of severe fires (discussed later), I will briefly review the life history strategy and habitat of Tobias' saxifrage. Kim Pierson, a graduate student at Utah State University, is currently conducting an intensive study of its population biology and reproductive ecology. Her work will better elucidate Tobias' saxifrage life history and be an important component in the post-fire conservation and management of Tobias' saxifrage.

Tobias' saxifrage is a diminutive annual with a small basal rosette of leaves and an inflorescence with one main stem (rarely two or three) that has several lateral branches. Most years, the main stem is terminated by a prominent white flower, as is an occasional lateral branch. In 1995, however, the extremely cool spring and early summer weather prevented nearly all plants from developing any flowers prior to senescence (Kim Pierson, personal communication, 1995). Most flowers in the inflorescence have been evolutionarily modified into bulbils, essentially small rosettes of leaves and a small root that, when mature, drop to the ground and take root, beginning the annual life cycle over again. Mature plants produced many bulbils in 1995. It appears, then, that Tobias' saxifrage places nearly all of its energy into asexual propagation through bulbils rather than sexual reproduction by seeds.

Tobias' saxifrage occurs in openings in subalpine forest communities, classified as the *Vaccinium globulare* phase of the *Abies lasiocarpa/Xerophyllum tenax* habitat type (Steele *et al.* 1981). It was rarely seen beneath the forest canopy. Within this community, it occurs in microhabitats characterized by considerable amounts of exposed bare soil and substrate instability. The cause of the instability has two sources: earth cores created by pocket gopher activity and meltwater

runoff channels between bedrock or areas stabilized by perennial vegetation. It generally occurs in the flat-to-gently sloping portions of the meltwater channels. It does not occur in the steeper sections of the channels, where the substrate is continually being subjected to downslope movement, nor in gravelly depressions where ephemeral ponding occurs (Moseley 1989). Elevations of known populations range between 7400 and 8400 feet.

RESULTS OF 1989 SURVEY

Prior to 1989, two populations had been discovered opportunistically: the type locality at Fisher Creek Saddle, discovered in 1978, and another in the North Fork of Pearl Creek, discovered in 1988. My systematic inventory of potential habitat in the Payette River drainage in 1989 located only three additional populations (Moseley 1989). Two populations delimited in 1989, Fisher Creek Saddle East and Fisher Creek Saddle West, were later found to be connected by intermediate subpopulations and are now treated as one. Of the four populations, three were very small, consisting of only a few hundred widely scattered plants, while the Fisher Creek Saddle population consisted of many thousands.

RESULTS OF 1995 SURVEY

During August 15-17, 1995, I used my original 1989 field maps and data to relocate all Tobias' saxifrage populations and make a preliminary assessment of the effects of the 1994 fires on its habitat and population viability. I found that habitat containing three of the four populations were within the burn perimeters. I also discovered one new population on the ridge between Slab Butte and Fisher Creek Saddle. This tiny population was also within an area that burned. See Figure 1 for the general distribution of Tobias' saxifrage and Figure 2 for the location of the new population discovered in 1995. In summary, the Slab Butte (005) population was outside the burn perimeter; habitat of the Beaverdam South (003) and East of Duck Lake (004) populations was unaffected due to the open, non-forest vegetation; the Fisher Creek Saddle (001) area generally had a spotty burn due to the open, park-like stands of subalpine fir and whitebark pine and appeared largely unaffected; and the North Fork Pearl Creek (002) population was apparently extirpated due to the severe nature of the burn in that area and subsequent high levels of sediments deposited in its habitat.

Below is a synopsis of the five populations of Tobias' saxifrage and observations concerning the impact of the 1994 fires on its habitat and populations (each population is identified with a three-digit code used by the Idaho Conservation Data Center):

Figure 1. Overview of the distribution of *Saxifraga bryophora* var. *tobiasiae*.

Figure 2. Location of new population discovered in 1995. Portion of the 1963 7.5' Brundage Mountain USGS quadrangle.

001 Fisher Creek Saddle

- a. *Location:*
- b. *Area:* ca. 200 acres
- c. *Number of Plants - 1989:* many thousands
- d. *Number of Plants - 1995:* many thousands
- e. *Fire:* Corral
- f. *Fire Effects on Habitat:* Because of the open nature of the forest in the Fisher Creek Saddle area, the fire was very spotty. While most trees growing in dense stands were killed, open-growing and non-forest stands appeared to be burned less intensely. Erosion did not appear to be severe within the population.
- g. *Fire Effects on Population:* Most of this large population occurs in non-forest openings and, consequently, does not appear to have been affected by the burn. Portions of the population within denser forest stands that were burned by high-intensity fire appeared vigorous.

002 North Fork Pearl Creek

- a. *Location:*
- b. *Area:* ca. 1 acre
- c. *Number of Plants - 1989:* ca. 200
- d. *Number of Plants - 1995:* None
- e. *Fire:* Blackwell
- f. *Fire Effects on Habitat:* This population, consisting of four tiny subpopulations, occurred in small openings within the densest forest stands of all known populations. The entire population area was intensely burned. All trees were killed, there was high mortality of perennial ground cover, and erosion is severe.
- g. *Fire Effects on Population:* No plants were observed at the four sites found in 1989. Several centimeters of sediments had recently been deposited in the meltwater-channel habitat of Tobias' saxifrage.

003 Beaverdam South

- a. *Location:*
- b. *Area:* ca. 10 acres
- c. *Number of Plants - 1989:* ca. 1500
- d. *Number of Plants - 1995:* Same
- e. *Fire:* Blackwell
- f. *Fire Effects on Habitat:* None. Although within the burn perimeter, this population occurs on ledges with few trees, surrounded by a lot of bedrock. The habitat did not burn.
- g. *Fire Effects on Population:* None

004 East of Duck Lake

- a. *Location:*
- b. *Area:* ca. 15 m²
- c. *Number of Plants - 1989:* Discovered in 1995
- d. *Number of Plants - 1995:* ca. 250
- e. *Fire:* Corral
- f. *Fire Effects on Habitat:* Population occurs in a large opening on a steep slope. Nearby forest stands burned intensely, but the herbaceous community, with discontinuous fuels, appeared to be little affected. Erosion was not severe.
- g. *Fire Effects on Population:* Apparently none.

005 Slab Butte

- a. *Location:*
- b. *Area:* ca. 1 acre
- c. *Number of Plants - 1989:* ca. 250
- d. *Number of Plants - 1995:* Same
- e. *Fire:* None. About 0.5 mile south of the Corral Fire perimeter.
- f. *Fire Effects on Habitat:* None
- g. *Fire Effects on Population:* None

CONCLUSIONS AND RECOMMENDATIONS

Tobias' saxifrage is one of the rarest plants in Idaho. The Idaho Native Plant Society has it on their highest priority list for globally rare species (G1) and it was recommended for candidate status at the 1996 Idaho Rare Plant Conference (Idaho Native Plant Society 1996).

The preliminary assessment I made in 1995 indicates that the North Fork Pearl Creek population is possibly extirpated. A combination of life history characteristics of the plant and the severe intensity of the burn and subsequent erosion may have contributed to its disappearance from the site. Tobias' saxifrage puts most of its energy into producing bulbils as a means of propagating, and these propagules may not be able to withstand burial by the high level of sedimentation taking place after the fire. Seeds, which presumably can germinate and grow after being buried, appear to be a minor component of the species reproductive strategy. Nothing is known about seed longevity and seed banking for this species.

The North Fork Pearl Creek population consisted of four, very small subpopulations in 1989. It is conceivable that these subpopulations were recently established or are remnants of older populations that were reduced by canopy closure of the forest. It is also conceivable that small, outlying populations, such as at North Fork Pearl Creek, are vulnerable to high-magnitude disturbances and regularly extirpated. Because so little is known about the reproductive ecology, seed biology, and seed banking ability of Tobias' saxifrage it is too soon to write this population

off. The site should be resurveyed in 1996 to determine if it was extirpated or if more than one year of post-fire recovery of the habitat is needed for the plants to become apparent above-ground.

In addition to monitoring the North Fork Pearl Creek population for signs of life, there is a considerable amount of suitable-appearing habitat that remains to be surveyed. Areas searched by me in 1989 are displayed on maps in Moseley (1989). Further searches should include the Granite Mountain-Hard Butte-Patrick Butte divide, Squaw Point-Bear Pete Mountain divide, and the Payette Crest, east of McCall. Sensitive plant clearances should be conducted for all projects that occur in suitable habitat in this region of the Forest.

Kim Pierson's research on the population biology and reproductive ecology of Tobias' saxifrage has great bearing on conservation planning and management of the species. This research should be adequately funded. Also, her plots should be made permanent for long-term monitoring of post-fire population and habitat conditions. If not already completed, ecological data should also be collected at these permanent monitoring sites that, at a minimum, characterize the species composition and structure of the habitat.

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