

FINAL REPORT

Franklin's Bumble Bee Inventory in the Southern Cascades of Oregon

10/4/2006

Prepared for:

The Bureau of Land Management
Medford, Oregon

By
Bryson H. Code & Stephen L. Haney
BLM Biological Technicians
(Wildlife)

Project Leads:

George Arnold
Wildlife Biologist
Medford District - BLM
541-618-2320

¹. Bryson H. Code
Biological Technician
(Wildlife)
Medford District - BLM
541-618-2415

¹. Present address: Wildlife Biologist - Bureau of Land Management, Battle Mountain Field Office., Tonopah, Nevada.

ABSTRACT

*The leading causes of invertebrate endangerment include habitat destruction, displacement by introduced species, alteration of habitat by chemical pollutants (such as pesticides), and hybridization with other species (Black et al., 2001). Franklin's bumble bee has the most restricted range of any bumble bee in the world (Thorp, 2005). It is known from Douglas, Jackson and Josephine counties in Oregon and Siskiyou and Trinity counties in California (Thorp, 2005). The major threats to these bumble bees are exotic diseases introduced via trafficking in commercial bumble bee queens and nests for greenhouse pollination of tomatoes, habitat loss due to urban development, agricultural conversion, and extensive use of pesticides (Thorp, 2005). Since little is known of the distribution of the Franklin's Bumble bee (*Bombus franklini*) in the southern Cascade Mountains, this systematic presence/absence survey for this species was conducted to give us much needed baseline data on its range, distribution and habitat associations within the BLM lands of the Ashland Resource area.*

INTRODUCTION

Invertebrates eclipse all other forms of life on Earth, not only in sheer numbers, diversity, and biomass, but also in their importance to functioning ecosystems (Black et al. 2001). Invertebrates perform vital services such as pollination (Black et al. 2001). One indicator of the low emphasis on invertebrates is the lack of invertebrates included in both worldwide and U.S. endangered species programs (Black et al. 2001). The causes of invertebrate endangerment are similar to many other animals (Black et al. 2001). The leading causes of invertebrate endangerment include habitat destruction, displacement by introduced species, alteration of habitat by chemical pollutants (such as pesticides), and hybridization with other species (Black et al. 2001).

Franklin's bumble bee has the most restricted range of any bumble bee in the world (Thorp 2005). Its entire distribution can be covered by an oval of about 190 miles north to south and 70 miles east to west (Thorp 2005). It is recorded from the Umpqua and Rogue River Valleys of Oregon and from Northern California, this suggests its restriction to the Klamath mountain region of southern Oregon and northern California, 122° to 124° west longitude and 40°58' to 43°30' north latitude (Thorp 2005). It is known from Douglas, Jackson, and Josephine counties in Oregon and Siskiyou and Trinity counties in California (Thorp 2005). Elevations of localities where it has been found range from 540 feet in the north to above 7,800 feet in the south of its historic range (Thorp 2005). Most of these sites have not become unsuitable habitat as evidenced by the constant abundance of other bumble bee species (Thorp 2005). There has been a precipitous decline in numbers and localities of *B. franklini* occurrence since 1998 (Thorp 2005). The major threats to these bumble bees are exotic diseases introduced via trafficking in commercial bumble bee queens and nests for greenhouse pollination of tomatoes, habitat loss due to urban development, agricultural conversion, and extensive use of pesticides (Thorp et al. 2005).

It is likely that the Nosema outbreak in the commercial bee pollination facilities in North America reported in 1998 is one major cause responsible for the severe declines seen in *B. franklini* and *B. occidentalis* since that time from central California to southern British Columbia (Thorp et al. 2005). The current status of these bumble bees is not known in detail (Thorp et al. 2005). What data exists indicate that they have gone into steep decline over a short period (Thorp et al. 2005). For *B. franklini*, intensive and extensive surveys have been undertaken by Robbin Thorp (University of California at Davis) between 1998 and 2004 (Thorp et al. 2005). No *B. franklini* were

FRANKLIN'S BUMBLE BEE INVENTORY IN THE SOUTHERN CASCADES OF OREGON

observed during surveys in 2004 and it is possible that *Franklin's Bumble bee* has become extinct (Thorp et al. 2005).

Despite evidence of decline, *B. franklini* has no legal protection under the U.S. Endangered Species Act and neither Oregon nor California allows listing of insects under their respective state endangered species statutes (Thorp et al. 2005). It is currently considered to be a "Species of Concern" or a "Special Status Species" by U.S. Fish and Wildlife Service, Bureau of Land Management, Oregon Department of Fish and Wildlife, and California Department of Fish and Game, categories that give it no effective protection (Thorp et al. 2005). *Bombus franklini* habitat should be protected (Thorp et al. 2005).

STUDY AREA

The project area was the Ashland Resource area, Medford District of the Bureau of Land Management (BLM). Remote sensing, photo/map interpretation, and local biologist knowledge was used to locate habitat areas. Habitat include plentiful pollen and nectar resources, abandoned rodent burrows in which to nest and proximity to water sources (lakes, rivers, streams, seeps) for prolongation of flowering season plant food sources (Thorp et al. 2005). Habitats were screen for access and field crew safety, such that areas that were unlikely to be readily accessed or safely surveyed were omitted from the sampling pool.

METHODS

The flight season of *B. franklini* varies between, but generally occurs from mid-spring through early fall (Thorp, 2005). Sixteen suspected optimal sites, totaling 600 acres, were surveyed a minimum of 2 times each for a minimum of 1 person hour(s) per 2.5 acres, using visual encounter survey methods. Individual bees that could not be identified using the field identification tool (figure 1), were physically collected for future observation by other surveyors and/or Robbin Thorp. Data analysis included location, time of day and habitat description, species composition, slope, aspect and elevation.

RESULTS

No *B. franklini* were found at any of the sixteen survey sites throughout the study area.

DISCUSSION

Though no *B. franklini* were found at the designated sites within this study area, on August 9th, 2006, Robbin Thorp located a *B. franklini* worker at T40s-R1e-S20 near Mount Ashland (Figure 2). The individual was seen on (*Eriogonum umbellatum*), sulphur flowered buckwheat. This plant is present throughout the Ashland resource area and made up some of the plant life present at several sites surveyed in this study. In terms of rare or endangered plants, some studies have shown bumble bee populations to be critical in the maintenance of these

FRANKLIN'S BUMBLE BEE INVENTORY IN THE SOUTHERN CASCADES OF OREGON

plant populations (Kearns, Thomson, 2001). Literature on the forage requirements of nest-founding queens of the more rare species within the genus *Bombus* is unknown (Goulson, 2003). The area where *B. franklini* was found is managed by the United States Forest Service (USFS) and vegetation information from this site has been documented. Because the Franklin's bumble bee has the most restricted range of any bumble bee in the world combined with the fact that most of the historic sites have not become unsuitable habitat as evidenced by the constant abundance of other bumble bee species, the aforementioned vegetation information taken from the Mount Ashland site could be used to further investigate the likelihood of more sites where this species may exist.

Table I list the species and locations of several genera of *Bombus* found throughout the study. It can be seen that *B. vosnesenskii* was found at twice as many sites throughout the study area than all other species in the genus. *B. edwardsii* and *B. vandykeii* were the second most commonly found. The following, *B. mixtus*, *B. appositus*, *B. melanopygus*, *B. occidentalis*, *B. californicus*, *B. flavipunctus* and *B. bifarius* were the least commonly found, respectively. It should be noted that both *B. vosnesenskii* and *B. edwardsii* can both sustain continuous flight in ambient temperature ranging from 2 to 35 °C (Goulson, 2003). Though ambient temperature was not taken for non-target species, early summer surveys were conducted when morning temperatures were lower. This fact may be the cause for the increased frequency for these species.

RECOMMENDATIONS

The vegetation information taken from the Mount Ashland site could be used for future presence/absence surveys when investigating other locations where this species of bumble bee may be found. Propagation efforts to increase its numbers should also take place. This could include nest box placement at the Mount Ashland site as well as other sites which share similar site attributes.

FRANKLIN'S BUMBLE BEE INVENTORY IN THE SOUTHERN CASCADES OF OREGON

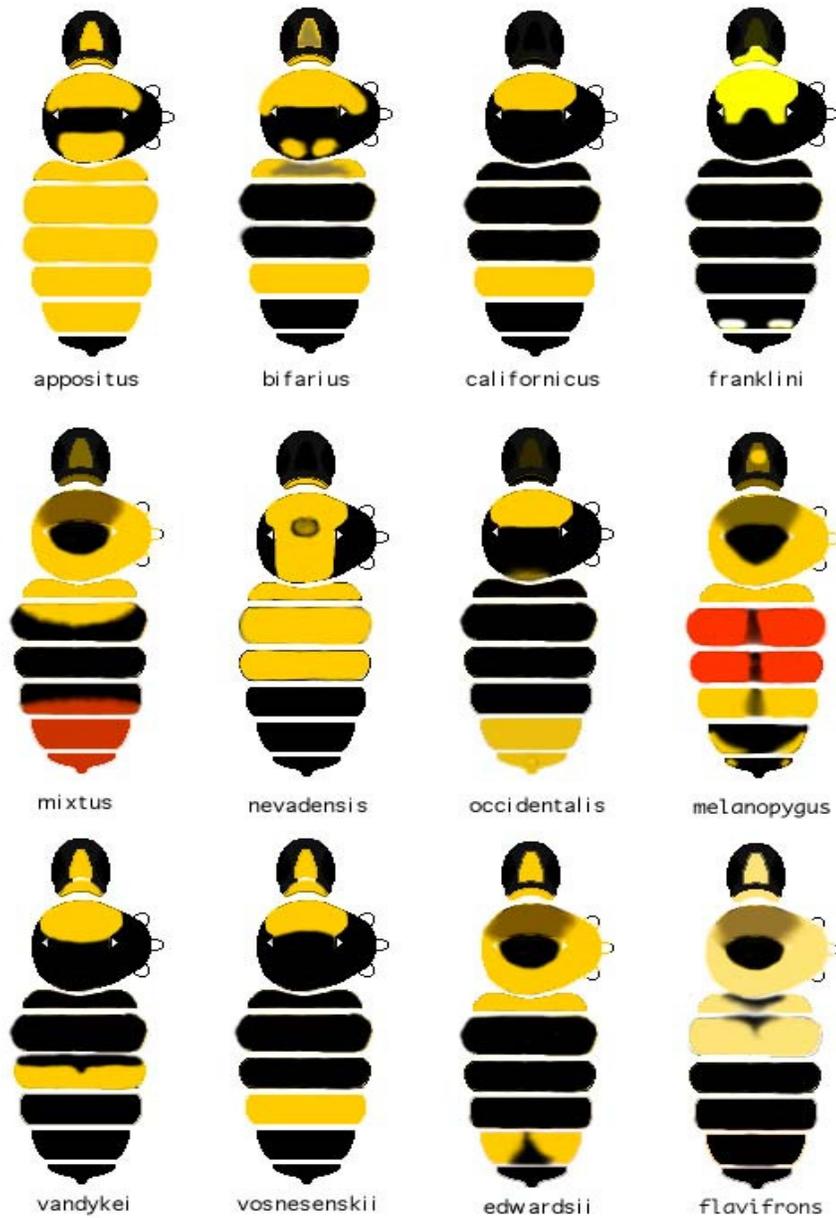
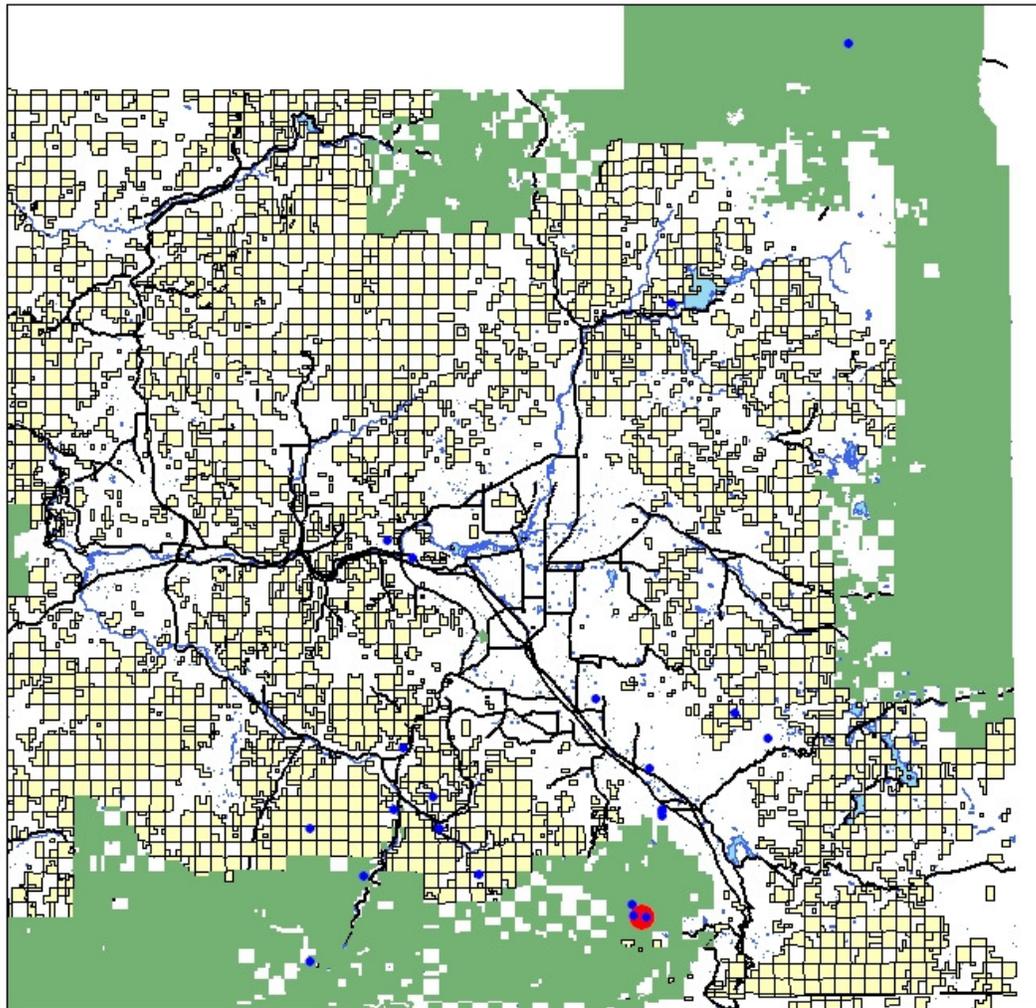


Figure 1. Identification tool for several species of *Bombus* genera. (Courtesy of Pete Schroeder, Southern Oregon University)

Figure 2. Current (2006) and historic *B. franklini* locations



0 5 10 20 30 40 Miles

1:635,266

Legend

- Historic BOFR locations
- 2006 BOFR locations

LAND_OWNERSHIP JURISCODE

- BL
- FS
- Arterial
- LAKES



Map created by S. Haney
Medford District-BLM
Ashland Resource Area

FRANKLIN'S BUMBLE BEE INVENTORY IN THE SOUTHERN CASCADES OF OREGON

Table I. Inventory of *Bombus* genera and locations taken during 2006 *B. franklini* surveys.

	BOVO	BOED	BOVA	BOME	BUMI	BOAP	BOBI	BOCA	BOFL	BOOC
Baldy Mountain (e)	*									
Buck Prairie (e)	*		*						*	
Cinna-Boaz	*	*								*
Conde Creek (e)	*	*	*	*	*		*	*		
Dead Indian (e)	*	*			*				*	*
Demming Gulch	*					*				*
Grizzly Rim (e)	*	*	*		*	*		*		
Hobart Peak (e)	*	*	*	*	*					
Hoxie Creek (e)	*					*		*	*	
Kenny Meadows	*	*	*			*	*			
Lick Gulch						*				
North Chinquapin (e)	*									
Poole Hill (e)	*				*					
Second Water Gulch	*				*					
Tallowbox	*		*		*					
West Chinquapin (e)	*	*	*							
West Glades (e)	*	*	*	*						
	BOVO	BOED	BOVA	BOME	BUMI	BOAP	BOBI	BOCA	BOFL	BOOC
Total occurrences/site	16/17	8/17	8/17	3/17	7/17	5/17	2/17	3/17	3/17	3/17

(e)=eastside of resource area

LITERATURE CITED

Black, S.H., M. Shepard and M.M. Allen (2001). Endangered Invertebrates: the case for greater attention to invertebrate conservation, *Endangered Species Update*. Vol. 18 No. 2. 2002, pp. 42-50.

Goulson, D. 2003. *Bumblebees: Behaviour and Ecology*. Oxford University Press., New York.

Kearns, C.A. and James D. Thomson, 2001. *The Natural History of Bumblebees: A Sourcebook for Investigations*. The University Press of Colorado, Boulder, CO.

Russell, K.N., H. Ikard, and S. Droege (2004). The potential conservation value of un-mowed power lined strips for native bees. *Biological Conservation*. Pp. 1-16.

Thorp, R.W. 2005. Species Profile: *Bombus franklini*. In Shepard, M.D., D.M. Vaughan and S.H. Black (Eds). *Red List of Pollinator Insects of North America*. CD-ROM Version 1 (May, 2005). Portland, Or: The Xerces Society for Invertebrate Conservation.

Thorp, R.W. and M.D. Shepard, 2005. Profile: Subgenus *Bombus*. In Shepard, M.D., D.M. Vaughan and S.H. Black (Eds). *Red List Pollinator Insects of North America*. CD-ROM Version 1 (May 2005). Portland, Or: The Xerces Society for Invertebrate Conservation.

ACKNOWLEDGEMENTS

Robbin Thorp – Species identification, natural history and field techniques

Sean Mohren – Map creation