

# **Field Inventory of Habitat and Potential Occurrence of Western Bumble Bee on the Fremont-Winema National Forest**



Western bumble bee

Photo by Rich Hatfield

## **Report of Findings for 2015 – 2016 Surveys**

October 2017

SPECIES LIST AND RANKS:

*Bombus occidentalis* (western bumble bee)  
R6 Regional Forester's Sensitive Species (USFS)  
Global Status – G2G3  
National Status – N2N3  
Oregon Status – S1S2  
Orbic List Rank – 2

BLM/FS FIELD UNIT(S):

Fremont-Winema National Forest  
Winema - Chemult, Chiloquin, Klamath Falls Ranger Districts; Fremont - Bly, Lakeview,  
Paisley, and Silver Lake Ranger Districts

PROJECT LEAD(S):

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Jeannette Wilson – Eastside Botanist



*B. bifarius* queen – Cold Spring Photo by Cheran Cavanaugh

## Summary

In 2015 and 2016, bumble bee surveys were conducted on the Fremont-Winema National Forest in south-central Oregon with western bumble bee (*Bombus occidentalis*) as the target species. The Fremont-Winema National Forest is within the East Cascades-Modoc Plateau Ecoregion and includes habitats from the moist mixed conifer of the eastern Cascade crest to high desert sage-steppe habitats, with a mix of everything in between. A wide variety of habitat types across a spectrum of elevations were surveyed, and many *Bombus* species were found, though none of the identified bumble bees were western bumble bee.

## Introduction

*Bombus occidentalis* was historically broadly distributed across the west coast of North America from Alaska to central California, east through Alberta and western South Dakota, and south to Arizona and New Mexico (Williams *et al.* 2014). A range wide analysis including more than 73,000 records of eight bumble bee species suggests that *B. occidentalis* has undergone a 28% range decline between recent (2007-2009) and historic (1900-1999) time periods (Cameron *et al.* 2011a). A separate, unpublished analysis comparing the current (2002-2012) and historic (1805-2001) ranges of *B. occidentalis* (using a database of more than 200,000 records of 43 species of North American bumble bees developed by Williams *et al.* 2014 suggests that this species has declined from 50% of its historic range; the southern subspecies (which is currently being described by C. Sheffield) has been lost from 62% of its historic range (Hatfield *et al.*, unpublished data). The relative abundance of *B. occidentalis* has declined by 75% (Hatfield *et al.*, unpublished data). Declines were found to be most significant at the edges of this species' range (Hatfield *et al.*, unpublished data). In Oregon and Washington, *B. occidentalis* populations are currently largely restricted to high elevation sites (Xerces Society 2012), and the species is no longer found in the western portions of either state where it was once common (Cameron *et al.* 2011a).

Given the relatively recent range contraction for this species, it is unknown what the current "Documented" status is for many of the Forest Service field units throughout the Region with documented occurrences of *B. occidentalis*, as many of the documented sites are considered historic.

The main cause of population decline in distribution and abundance of *B. occidentalis* is thought to be the result of an introduction of nonnative fungal and protozoan parasites to North American bumble bees via the commercial bumble bee industry (Evans *et al.* 2008). While exotic disease organisms may be the main cause of widespread losses of western bumble bee, loss of habitat, habitat fragmentation, insecticide use, invasive plants and insects, air pollution, and climate change may also be playing a role in the decline of this species (Evans *et al.* 2008).

Bumble bees are excellent pollinators of many crops and wild flowers, and for some flora are more efficient pollinators than honey bees (Evans *et al.* 2008). While a flowering plant may receive visits from dozens of different insects, only a few may actually be helping the plant by pollinating it. Although western bumble bee is a generalist pollinator like most bumble bee species, some of the known food plants are: *Ceanothus*, *Centaurea*, *Chrysothamnus*, *Cirsium*, *Geranium*, *Grindellia*, *Lupinus*, *Melilotus*, *Monardella*, *Rubus*, *Solidago*, and *Trifolium* (Williams *et al.* 2014).

## Methods

Before beginning surveys, biologists and technicians attended the Xerces Society bumble bee workshop in Bend, Oregon. Both wildlife and botany personnel attended the workshop in 2014 and 2015. The workshop was invaluable in helping identify species in the field and was very informative. Participants learned about bumble bee life history, morphology, key diagnostic characteristics, and methods for collecting specimens. Links to helpful resources were also provided, including a very useful flow chart for ID of bumble bees of the Pacific Northwest. In 2016 most survey personnel were not on Forest in time to attend the workshop. Instead an in-house workshop was given, which included providing much of the same information from the Xerces workshop as well as spending several hours in the field capturing and identifying bumble bees.



*B. centralis* – Powerline Rd. Photo by Theresa Tillson

Most of the historic records date back to the 1930's, with a few from the late 50's, one from the 90's, and three observations of western bumble bee from the same location in 2007 – 2009. The elevation of these sites ranged from 3900' to 8000', with most sites being located in the 4000' – 5000' range. The highest elevation range belongs to three sites in the vicinity of Drake Peak in the Warner Mountain area of the Lakeview District. To date, the site on Drake Peak is the only documented occurrence of western bumble bee on the Fremont side of the Forest. On the Winema side, 5 sites are located on the Klamath Falls Ranger District, 3 on the Chiloquin Ranger District, and 1 on the Chemult Ranger District. The sites located in the Lake of the Woods area of the Klamath Falls Ranger District are the only sites to have documented western bumble bee multiple times since the original specimens were documented in the 1930's.

The second focus for survey on Forest was to expand the search for western bumble bee outside of historic sites. In our original proposal and project design, 15 locations were chosen to be surveyed based on GIS imagery showing meadow areas most likely to have floral resources (Figure 1). After surveying several of these sites in 2015 only to find they often lacked floral resources to attract pollinators, we shifted our methods in 2016 to follow the recommendation of Cameron *et al.* (2011) for locating sites opportunistically based on presence of floral resources (Figure 2). Several sites surveyed on the Chiloquin Ranger District

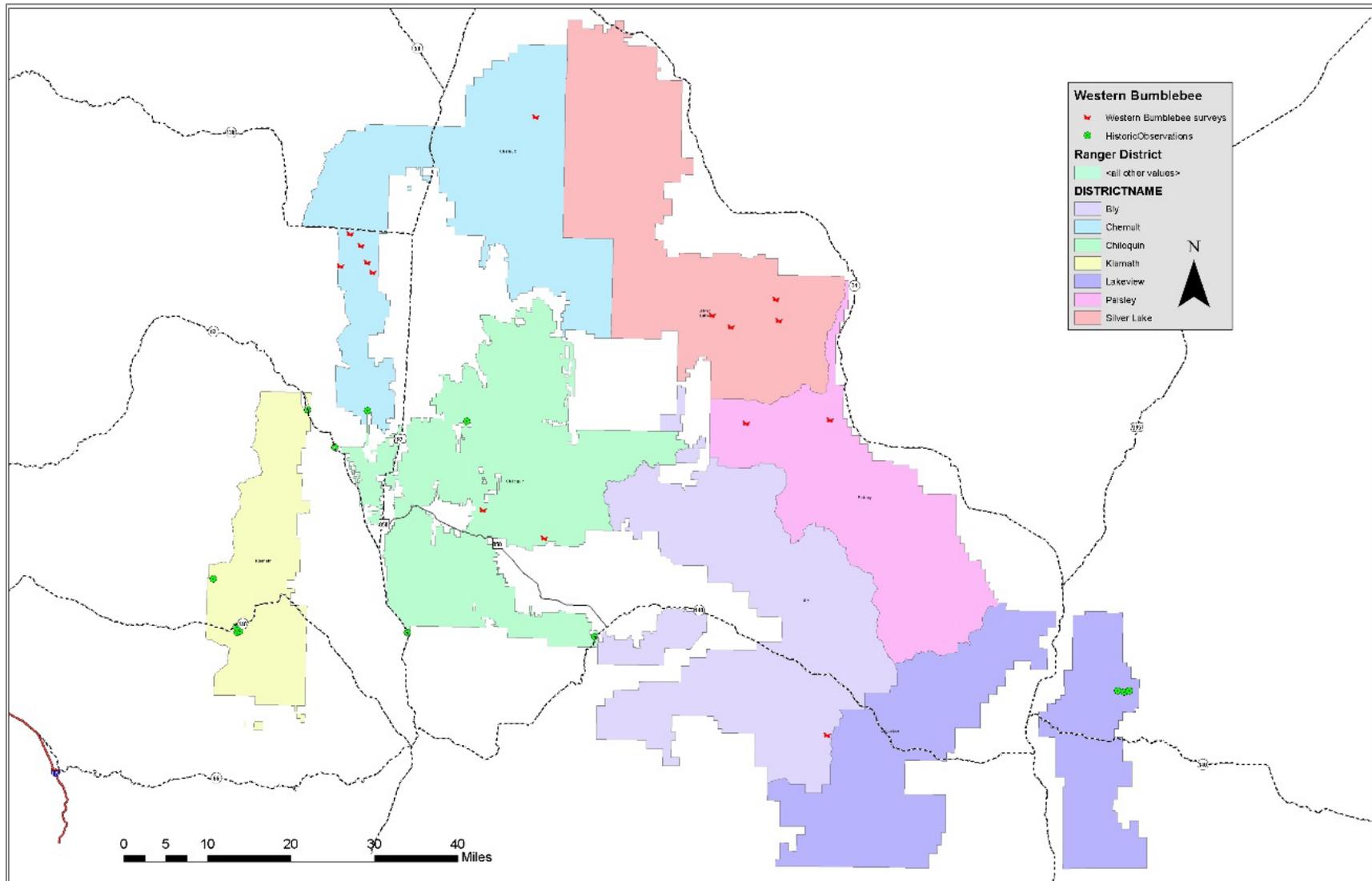
Survey efforts on the Fremont-Winema National Forest had two primary areas of focus. The first was to survey for western bumble bee at 10 historic sites across the Forest documented in the NRIS Wildlife database where western bumble bee had been detected between the years 1930 to 2009 (Figure 1). While our original project proposal stated there were 20 historic sites, half are either in the same area or vicinity of other sites and for reporting purposes will be referred to as one site.

were at the recommendation of Botanist Faith Wilkins for having an abundance of floral resources.

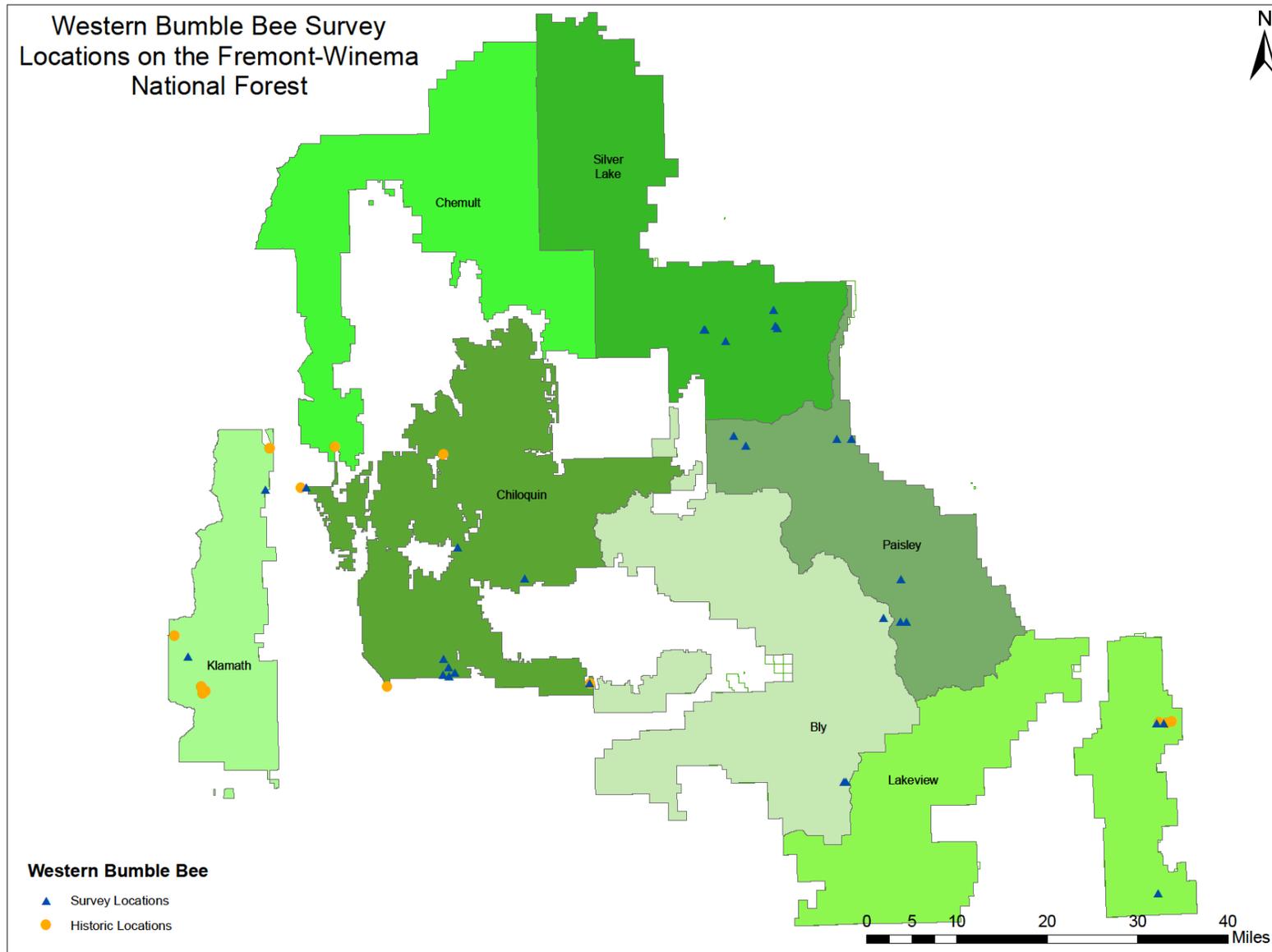


*B. vosnesenskii* on rabbit brush. Photo by Cheran Cavanaugh

**Figure 1:** Location of historical western bumble bee sites and proposed survey locations on the Fremont-Winema National Forest.



**Figure 2:** 2015 - 2016 Survey Locations for Western Bumble Bee on the Fremont-Winema National Forest.



Survey protocol at both historic and new survey sites was to conduct approximately 1 hour of survey effort in an area of suitable habitat. Two people searching independently for 30 minutes, or 3 people searching independently for 20 minutes was counted as 1 hour of survey effort. If after 1 hour of survey effort, no western bumble bees were located, a second hour was conducted, often spanning outward from the original survey area. Some areas may have received more than 2 hours of survey effort, especially the Deep Creek site where we did our field day from the training workshop in 2016 and spent approximately 2 hours with over 10 people collecting bumble bees.

Of the 10 historic locations, 2 were not surveyed. One due to the necessity of a hike of several miles to the site, the other was missed during the 2016 survey window and was surveyed in 2017. Surveys were conducted between late July and late August, when colonies are at their peak as far as number of workers in the field. As original site locations are very old, surveyors expanded out from the historical location in search of areas with floral resources, but often found there either weren't any in the vicinity, or they had already finished flowering.



Bumble bees were collected using a vacuum or net and bees were chilled in a cooler to be measured, photographed, and identified. Once surveyors became more familiar with identifying more common local species, they were no longer required to photograph them. Specimens not readily identifiable in the field or by later study of the photo vouchers were sent to the Xerces Society for species identification. The following was documented for each survey location: GPS coordinate, elevation, floral resources, general habitat photos, species identification, and voucher photos.

Left – Volunteer Michelle Dillon collects a bumble bee for identification. Photo by John Lee Walker.



Crew surveying for bumble bees near the headwaters of Fish Creek – Lakeview Ranger District

Photo by Cheran Cavanaugh



*B. appositus* utilizing non-native plants adjacent to a grazed meadow. Though many of our more abundant thistles are not native, thistles provide a high reward with very little energy expenditure required for foraging. Photo by Cheran Cavanaugh

## Results

In total, 13 *Bombus* species were documented across the Fremont-Winema National Forest. Species composition varied from site to site and from district to district. Even though a variety of bumble bee species were identified, no *Bombus occidentalis* specimens were encountered at any of the survey locations. Species encountered at both historical and new survey sites are located in Tables 1 and 2. Locations varied dramatically in plant species composition and floral use by bumble bees. While some locations featured a wide variety of flowering plants (Table 4), bumble bees were only seen foraging on a few specific plants (Table 3). Due to dry winters and hot summers in 2015 and 2016, many historic sites either displayed no floral resources, or had already flowered by late July when most surveys took place. In several cases, surveys took place at almost the exact same time the original site was recorded, but no flowers were found blooming. Plant species bumble bees were foraging on are listed with locations in Tables 1 and 2. While meadows on the Forest may provide good early season forage for queens establishing nests, by mid to late summer they tend to be dominated by grasses or grazed and found to have few if any floral resources when colonies are at their peak. Habitats where bumble bees were found include: meadow edges, dry meadows, shrublands, openings in dry pine and mixed conifer forest, seasonally moist areas, and riparian habitats. Table 4 provides a list of vegetative species found within survey areas, as well as plants seen being used by bumble bees during incidental observations throughout the season.

Bumble bee specimens unable to be identified by local survey crews were sent to the Xerces Society for species identification. Over 40 bumble bees were unable to be identified by survey crews and were sent to Xerces for photo voucher identification. Many of the unknown specimens turned out to be cuckoo bees (*B. insularis* and *B. flavidus*), but there were still 5 specimens not identifiable due to lack of distinguishing characteristics in photos. Two unidentified specimens were not photographed and will remain unknown. We have 5 specimens still waiting to be sent in for identification, leaving us with 23 unidentified bumble bees out of 324 documented. We will update the species section of this report when the identifications come back from Xerces.

**Table 1** – Survey results of historic western bumble bee sites on the Fremont-Winema National Forest

Site Name	Date of Historic Observation	Elevation	Survey Date	Foraging Plants	Species Found (Number)
Chemult Ranger District					
Boundary Butte	8/17/1930	5400	7/19/2016		no flowering plants or bumble bees in vicinity
Chiloquin Ranger District					
Cliney Flat	7/10/1957	4450	8/25/2016	rabbit brush	<i>B. vosnesenskii</i> (1)
Hagelstein Park	8/30/1958	4200	7/19/2016		no flowering plants or bumble bees in vicinity
Klamath Falls Ranger District					
East Entrance of Crater Lake NP	8/14/1930, 8/29/1930	4400	8/14/2016		scattered riparian flowers, no bumble bees
Fort Klamath (Wood River Day Use Area)	8/31/1930	3900	7/19/2016	spirea	<i>B. bifarius</i> (6), <i>B. vosnesenskii</i> (1), Unknown (1 <sup>1</sup> ). <sup>1</sup> sent to xerces for photo ID, unable to identify species.
Lake of the Woods	7/18/1930, 7/20/1930, 8/30/1958	5000	7/20/2016		no flowering plants or bumble bees
Lake of the Woods Meadow	7/10/2007, 7/23/2008, 7/14/2009	5000	7/20/2016		no flowering plants or bumble bees
Lakeview Ranger District					
Drake Peak	7/26/1930, 8/16/1935	8000	7/21/2015, 8/29/2016	rabbit brush	<i>B. centralis</i> (2), <i>B. californicus</i> (1)

**Table 2** – Survey results for surveys conducted in areas with no previously recorded observations of western bumble bee. Species are listed by relative abundance at each survey site.

Site Name	Survey Date	Elev. (feet)	Foraging plants	Species Found (Number)
<b>Bly Ranger District</b>				
Pit Lake	8/23/2016	6000	rabbit brush	<i>B. vosnesenskii</i> (5), <i>B. bifarius</i> (1)
<b>Chiloquin Ranger District</b>				
9718 near water trough	8/1/2016	5800	nettle leaf mint, coyote mint	<i>B. vosnesenskii</i> (23), <i>B. fervidus</i> (2), <i>B. insularis</i> (1), Unkown (1 <sup>1</sup> )
720 Rd Near Swan Lake Point	8/1/2016	6300	nettle leaf mint, coyote mint, scarlet gilia	<i>B. vosnesenskii</i> (26), <i>B. bifarius</i> (1), Unknown (1 <sup>1</sup> ).
9718 Rd Past Swan Lake Point	8/3/2016	6200	coyote mint, scarlet gilia	<i>B. vosnesenskii</i> (21), <i>B. bifarius</i> (1)
740 Rd Communication Tower	8/3/2016	6600	coyote mint, scarlet gilia	<i>B. vosnesenskii</i> (27)
9718 Rd near Yawhee Plateau	8/15/2016	6000	coyote mint, scarlet gilia	<i>B. vosnesenskii</i> (7), <i>B. insularis</i> (7), <i>B. bifarius</i> (2), <i>B. fervidus</i> (1), Unknown (9 <sup>1</sup> )
720 Rd Near Swan Lake Point	8/16/2016	6300	nettle leaf mint, coyote mint, scarlet gilia	<i>B. vosnesenskii</i> (26), <i>B. bifarius</i> (1), Unknown (1 <sup>1</sup> ).
6520/Lone Pine RD	8/23/2016	4700	rabbit brush	<i>B. vosnesenskii</i> (12)
350 Rd	8/24/2016	4900	rabbit brush	<i>B. vosnesenskii</i> (14)
<b>Klamath Falls Ranger District</b>				
Bull Swamp	7/20/2016	5400	american bistort	<i>B. bifarius</i> (6), <i>B. mixtus</i> (9), Unknown (3 <sup>1</sup> ).
7 mile guard station	8/4/2016	3800	spirea	<i>B. bifarius</i> (6), <i>B. mixtus</i> (4), <i>B. vosnesenskii</i> (3), <i>B. flavidus</i> (1)
<b>Lakeview Ranger District</b>				
Dismal Creek	7/13/2016	6300	nettle leaf mint	<i>B. vosnesenskii</i> (3), <i>B. bifarius</i> (3), <i>B. rufocinctus</i> (2), <i>B. centralis</i> (2), <i>B. californicus</i> (2), <i>B. appositus</i> (2), <i>B. nevadensis</i> (2)
West of Bull Prairie 021/022 junction meadow	7/22/2015	6400	bull thistle	<i>B. vosnesenskii</i> (1), <i>B. californicus</i> (1), <i>B. bifarius</i> (1)
Dent 151 Landing	7/23/2015	5700	bull thistle	<i>B. californicus</i> (6), <i>B. vosnesenskii</i> (4).

Site Name	Survey Date	Elev. (feet)	Foraging plants	Species Found (Number)
<b>Paisley Ranger District</b>				
Sycan Marsh	7/22/2015	5000	rabbit brush, musk thistle, spirea	<i>B. huntii</i> (1), <i>B. centralis</i> (1), Unknown (2 <sup>2</sup> ).
Govt Harvey Pass	7/22/2015	5100	musk thistle	<i>B. vosnesenskii</i> (2)
Squirrel Spring	7/22/2015	6200	NA	no bees found
28 Rd Private Elder Creek	8/29/2016	5600	rabbit brush	Unknown (1 <sup>3</sup> ).
Dairy Creek Beaver Dam	8/30/2016	5300	musk thistle, spirea, golden rod	<i>B. insularis</i> (4)
Dead Horse Creek Campground	8/30/2016	5400	musk thistle, goldenrod, spirea	<i>B. californicus</i> (15), <i>B. vosnesenskii</i> (3), <i>B. bifarius</i> (1), <i>B. centralis</i> (1), Unknown (1 <sup>2</sup> ).
Dairy Creek Culvert	8/30/2016	5800	musk thistle, rabbit brush	<i>B. vosnesenskii</i> (5), <i>B. centralis</i> (4), <i>B. bifarius</i> (2), <i>B. vandykei</i> (3 <sup>4</sup> ), unknown (2 <sup>2/3</sup> ).
<b>Silver Lake Ranger District</b>				
Grassy Lake	7/21/2015	5700	no flowering plants	none found
Thompson Reservoir	7/22/2015	5100	no flowering plants	none found
Louse Lake	7/22/2015	5200	no flowering plants	none found
Thompson Reservoir	7/23/2015	5000	rabbit brush	<i>B. vosnesenskii</i> (2), <i>B. mixtus</i> (1), <i>B. bifarius</i> (1)
Thompson Reservoir	7/23/2015	5000	no bees at historic location, but nearby	none found
Grassy Lake	7/23/2015	5900	rabbit brush, musk thistle, bull thistle, goldenbush	<i>B. vosnesenskii</i> (1), <i>B. huntii</i> (1), <i>B. bifarius</i> (1), <i>B. insularis</i> (1)
Powerline Road	7/23/2015	5900	rabbit brush, musk thistle, goldenbush	<i>B. vosnesenskii</i> (1), <i>B. huntii</i> (1), <i>B. centralis</i> (1), <i>B. insularis</i> (1), Unknown (1 <sup>3</sup> ).
<sup>1</sup> sent to Xerces for photo ID but unable to be identified. <sup>2</sup> sent in to Xerces for photo voucher ID. Results still pending. <sup>3</sup> no photo provided for identification. <sup>4</sup> not confident in <i>B. vandykei</i> ID, but no photos to confirm species identification. In other locations specimens identified in the field as <i>B. vandykei</i> were found to be <i>B. vosnesenskii</i> males.				

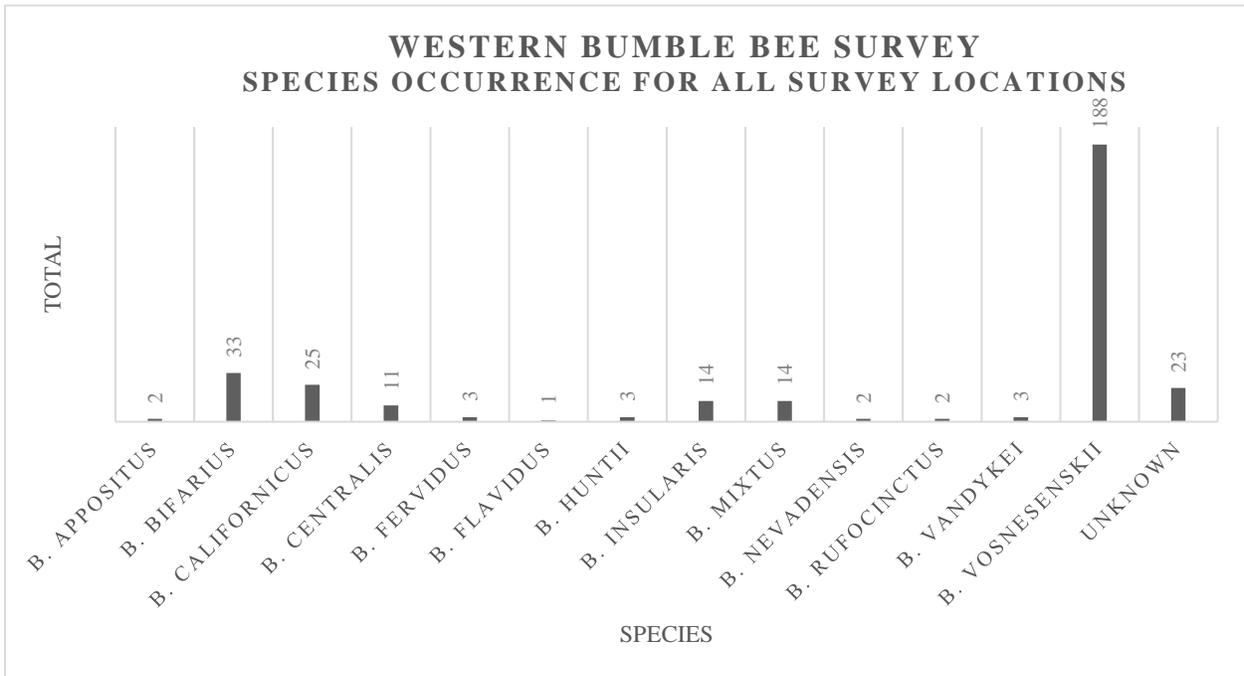


*B. huntii* queen on Muscari in Lakeview, OR

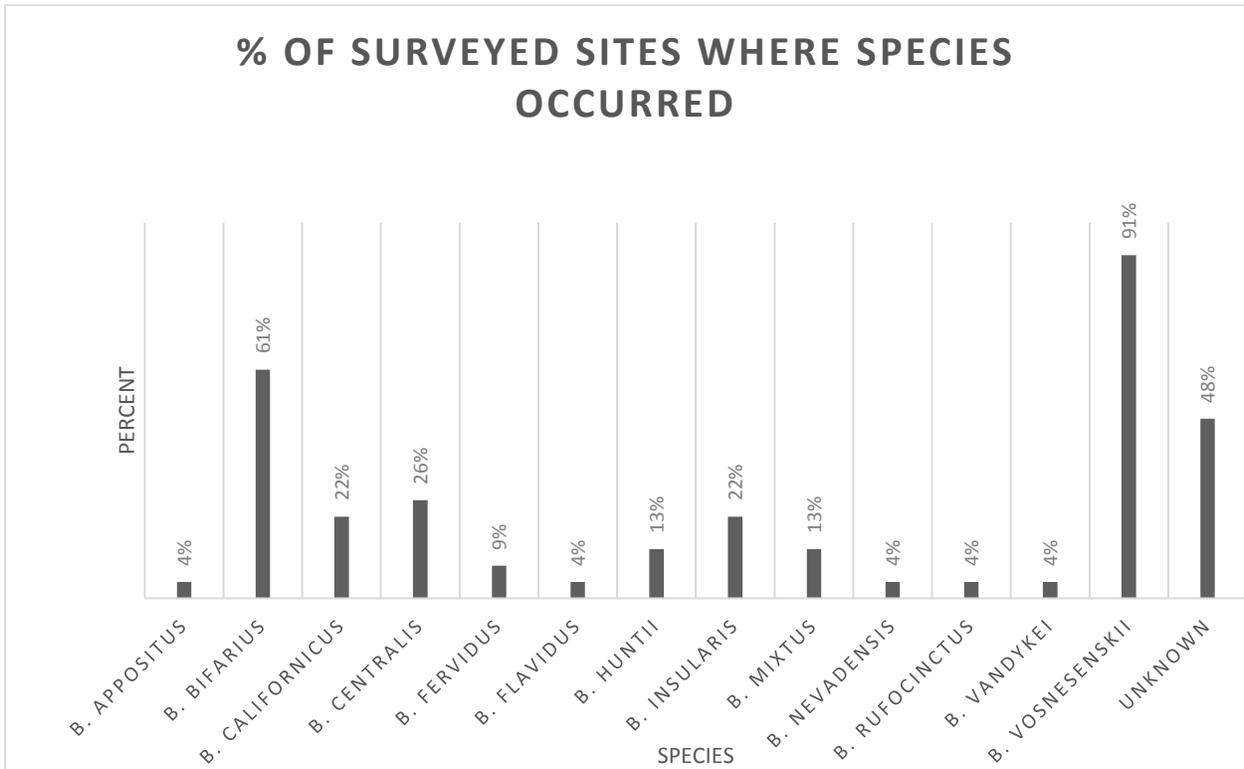
Photo by Cheran Cavanaugh

Figure 3 summarizes *Bombus* species occurrence for sites where bumble bees were found. Between survey efforts in 2015 and 2016, 36 sites were surveyed with bumble bees found at 26 sites. The most commonly encountered species were *B. vosnesenskii* and *B. bifarius*, occurring at 91 and 61 percent of sites respectively. Almost a quarter of sites surveyed with bumble bees had cuckoo bees, primarily *B. insularis*, but *B. flavidus* was also found (Figure 4).

**Figure 3.**



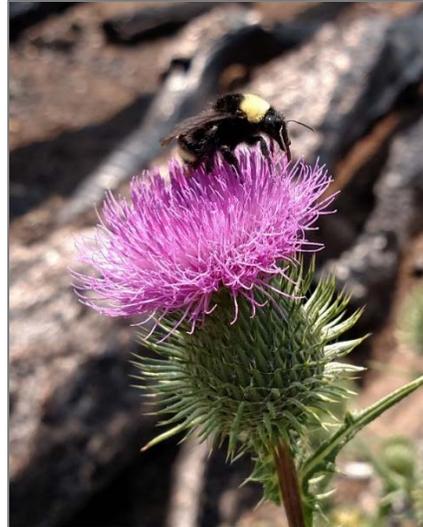
**Figure 4.**





*B. bifarius* – Grassy Lake

Photo by Theresa Tillson



*B. californicus* queen Photo by Cheran Cavanaugh

**Table 3.** Flower species used by foraging bumble bees in survey areas

<b>Common Name</b>	<b><i>Scientific Name</i></b>
Nettle leaf mint	<i>Agastache urticifolia</i>
Musk Thistle	<i>Cardus nutans</i>
Rubber Rabbit Brush	<i>Chrysothamnus nauseosus</i>
Green Rabbit Brush	<i>Chrysothamnus viscidiflora</i>
Bull Thistle	<i>Cirsium vulgare</i>
Goldenbush	<i>Ericameria bloomeri</i>
Goldenrod	<i>Euthamia occidentalis</i>
Scarlet Gilia	<i>Ipomopsis aggregata</i>
Coyote Mint	<i>Monardella odoratissima</i>
American Bistort	<i>Polygonum bistortoides</i>
Spirea	<i>Spirea douglasii</i>

**Table 4.** Floral species present in Fremont-Winema National Forest survey sites as well as floral species seen during incidental bumble bee sightings outside of survey areas. Due to the timing of the visits to survey sites this is not a complete list of species, but an inventory of all plants identifiable at the time of survey.

<i>Scientific Name</i>	<b>Common Name</b>	<b>Bee Observed</b>	<i>Scientific Name</i>	<b>Common Name</b>	<b>Bee Observed</b>
<i>Achillea millefolium</i>	Yarrow		<i>Geranium sp.</i>	Geranium	X <sup>1</sup>
<i>Aconitum columbianum</i>	Monkshood	X <sup>1</sup>	<i>Hieracium scouleri</i>	Western Hawkweed	X <sup>1</sup>
<i>Agastache urticifolia</i>	Nettle-leaf mint	X	<i>Hydrophyllum capitatum</i>	Waterleaf	X <sup>1</sup>
<i>Agoseris aurantiaca</i>	Orange Agoseris		<i>Ipomopsis aggregata</i>	Scarlet Gilia	X
<i>Allium sp.</i>	Onion		<i>Linum lewisii</i>	Western Blue Flax	X <sup>1</sup>
<i>Antennaria rosea</i>	Rosy Pussytoes		<i>Lotus sp.</i>	Vetch	X <sup>1</sup>
<i>Apiacea sp.</i>	Apiacea		<i>Lupinus sp.</i>	Lupine	X <sup>1</sup>
<i>Apocynum androsoemifolium</i>	Bitter Dogbane		<i>Madia glomerata</i>	Mountain Tarweed	
<i>Aquilegia formosa</i>	Red Columbine		<i>Mimulus sp.</i>	Monkeyflower	
<i>Arctostaphylos sp.</i>	Manzanita	X <sup>1</sup>	<i>Monardella odoratissima</i>	Coyote mint	X
<i>Artemisia arbuscula</i>	Low Sagebrush		<i>Paeonia brownii</i>	Western Peony	
<i>Aster sp.</i>	Asters		<i>Pedicularis sp.</i>	Elephant's Head	
<i>Calochortus macrocarpus</i>	Mariposa Lily		<i>Penstemon sp.</i>	Penstemon	X <sup>1</sup>
<i>Camassia quamash</i>	Common Camas		<i>Platanthera leucostachys</i>	Bog Orchid	
<i>Cardus nutans</i>	Musk Thistle	X	<i>polemonium sp.</i>	Polemonium	X <sup>1</sup>
<i>Castilleja and Orthocarpus sp.</i>	Owl Clover		<i>Polygonum bistortoides</i>	American Bistort	X
<i>Castilleja sp.</i>	Paintbrush		<i>Potentilla</i>	Cinquefoil	X <sup>1</sup>
<i>Ceanothus sp.</i>	Ceanothus	X <sup>1</sup>	<i>Prunella vulgaris</i>	Self-heal	
<i>Chrysothamnus nauseosus</i>	Rubber Rabbitbrush		<i>Ranunculus sp.</i>	Buttercup	
<i>Chrysothamnus viscidiflora</i>	Green Rabbitbrush	X	<i>Ribes sp.</i>	Currant	X <sup>1</sup>
<i>Cirsium cymosum</i>	Peregrine Thistle	X <sup>1</sup>	<i>Senecio integerrimus</i>	Tower Butterweed	X <sup>1</sup>
<i>Cirsium vulgare</i>	Bull Thistle	X	<i>Senecio triangularis</i>	Arrowleaf Groundsel	
<i>Clarkia sp.</i>	Clarkia		<i>Sidalcea oregana</i>	Checker Mallow	X <sup>1</sup>
<i>Colinsia parviflora</i>	Blue-eyed Mary		<i>Spirea douglasii</i>	Spirea	X
<i>Collomia sp.</i>	Collomia		<i>Tetradymia canescens</i>	Gray Horsebrush	X <sup>1</sup>

<i>Scientific Name</i>	<b>Common Name</b>	<b>Bee Observed</b>	<i>Scientific Name</i>	<b>Common Name</b>	<b>Bee Observed</b>
<i>Delphinium nuttallianum</i>	Larkspur		<i>Trifolium sp.</i>	Clover	X <sup>1</sup>
<i>Dodecatheon jeffreyi</i>	Sierra Shooting Star		<i>Tritelieia hyacinthina</i>	White Brodiaea	
<i>Epilobium angustifolium</i>	Fireweed	X <sup>1</sup>	<i>Veratrum californicum</i>	False Hellebore	
<i>Epilobium sp.</i>	Willowherb		<i>Verbascum thapsus</i>	Common Mullein	
<i>Eriogonum sp.</i>	Buckweat		<i>Viola sp.</i>	Violets	
<i>Euthamia occidentalis</i>	Western Goldenrod	X	<i>Wyethia mollis</i>	Wooly Mule's Ears	
<i>Fritillaria atropurpurea</i>	Chocolate Lily				

X<sup>1</sup> - flowering plants observed with bumble bees outside of survey units during incidental observations. Most incidental observations occurred outside of the survey season and were often of queens or new workers during the spring.

## Discussion

After surveying across 7 Ranger Districts of the combined Fremont and Winema National Forests, western bumble bee was not found at any historic locations or in new survey sites occupied by other *Bombus* species in 2015 and 2016. Considering western bumble bee was once one of the most common bumble bee species and widely distributed throughout the west, our survey results appear to support the suggestions by Hatfield that relative abundance of western bumble bee has declined 75% as well as Williams *et al.* that the species has declined from 50% of its historic range. Although western bumble bee was not detected in any of the 36 survey sites between 2015 – 2016, the survey effort was successful in several ways:

- A baseline of local bumble bee species occurrence and abundance has been documented on the Fremont-Winema National Forest. All survey sites and species are recorded in the NRIS wildlife database.
- Survey crews learned valuable bumble bee survey and identification skills.
- 2 years of funded survey allowed returning survey crew members to improve on their bumble bee species identification skills, as well as help train new surveyors.
- Survey crews learned to better recognize habitat where they are likely to find bumble bees as many of our shrublands provide more abundant floral resources for bumble bee colonies at their peak compared to local meadows.
- Survey crews learned a lot about photographing specimens. We all learned the most important lesson the hard way – you usually only get one chance to take photos, so make it count. Bumble bees often come out of their forced torpor and back into the air faster than you would think.
- Figuring out the best way to highlight all the key body parts for voucher photos is a-learn-as-you-go process.

- We were able to raise awareness about the importance of pollinators and bumble bees through conversations with member of the public encountered during our surveys. When folks see a group of full grown adults running around the woods with a funny looking kids toy (the bee vacuum), they tend to get curious and ask questions. It provided us with a great opportunity to talk about bumble bees.

The Fremont-Winema National Forest hopes to continue doing bumble bee surveys across the Forest in order to continue to raise awareness about the importance of pollinators, increase our knowledge about our local species, and hopefully find western bumble bee still persisting somewhere across the Forest.



*B. occidentalis* male – Cold Spring

Photo by Cheran Cavanaugh

Update: Survey crews found western bumble bee in 2 different locations on both the Fremont and Winema sides of the Forest in early to mid-September of the 2017 survey season. Details will be included in the 2017 survey report.

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