

2016 Western Bumble Bee Surveys: Rogue River-Siskiyou National Forest



Bombus occidentalis found on Mt. Ashland (photo credit: Bonnie Allison)

Sheila M. Colyer
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Species Status:

Bombus occidentalis (Western Bumble bee) G2G3, S1S2
R6 Regional Forester's Sensitive Species (USFS)
Oregon State Director's Sensitive Species (BLM)
State of Oregon – NA
ORBIC List 2

District Contacts:

Bonnie Allison
Zoned Wildlife Biologist, Siskiyou Mountains Ranger District and Wild Rivers Ranger District

Racheal Vaughn
Wildlife Biologist, Powers Ranger District and Gold Beach Ranger District

Sheila Colyer
Wildlife Biologist, High Cascades Ranger District

Abstract

The Rogue River-Siskiyou National Forest conducted surveys for Western bumble bee (*Bombus occidentalis*) during the 2016 field season at 15 sites across the Forest. Surveys were primarily concentrated on historic locations, in meadow habitat and open roadside. One location of *Bombus occidentalis* was observed on Mt. Ashland (Siskiyou Mountains Ranger District). In addition, 14 total *Bombus* species were observed across all sites. Additional surveys for the Forest are recommended primarily focused on more historic locations.

Introduction

Bombus occidentalis (hereafter *B. occidentalis*) was historically widely 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 generalist forager and native pollinator, this species and many other *Bombus* species play an integral role in the health of natural ecosystems and production of agricultural crops (Cameron 2011).

In the past decade *B.occidentalis* has suffered a substantial decline of 50% from its historic range (Hatfield et al. 2015). Although previously widely distributed, *B. occidentalis* has undergone a decline in relative abundance of 75% and average decline of 40.32% based on relative abundance, range, and persistence (Jepson et al. 2014, Hatfield et al. 2014). The species was very common in Oregon, but is now restricted to high elevation sites (Jepson et al. 2014, Hatfield et al. 2015). It's projected that the species will near extirpation in 60-70 years if population decline trends continue (Hatfield et al. 2015).

The decline of *B. occidentalis* is speculated to be largely due to a fungal pathogen, *Nosema bombi*, which is hypothesized to have been introduced from Europe in the early 1990s via development of commercial bumble bee colonies (Cameron et al. 2011). Although Cameron et al. (2016) found that *Nosema bombi* was already present in the United States before commercial colony trade, rearing and export of *B.occidentalis* is possibly causing its apparent local extinction in the western states. Individuals were not detected in any surveys from 2003-2007 and in very low numbers from 2008-2015 (Hatfield et al. 2015).

In 2015, Rogue River-Siskiyou National Forest conducted surveys on 5 Ranger Districts ranging from the southern Oregon coast east to the Cascades Range. This was a joint effort with the Umpqua National Forest, Willamette National Forest, and Roseburg District BLM. *B. occidentalis* were not detected on the Rogue River-Siskiyou NF. The lack of detection was suspected to be attributed to the hot, dry conditions and advanced floral phenology (Mitchell et al. 2015). In 2016, the Rogue River-Siskiyou NF and Ashland Resource Area BLM conducted additional surveys for *B. occidentalis* with the objectives to detect presence of *B.occidentalis*; record presence of all native bumble bee species; and document habitat characteristics and plant species used by bumble bees.

Methodology

This survey effort included 15 different survey sites on 5 ranger districts on the Rogue River-Siskiyou NF: Powers RD, Gold Beach RD, Wild Rivers RD, Siskiyou Mountains RD, and High Cascades RD (Figure 1). The survey sites were based on historic sightings of *B.occidentalis* derived from the NRIS database (Figure 1). Additional locations were chosen at the discretion of the local wildlife biologist, which was based habitat characteristics primarily meadow habitat or open roadside. Surveyors used a general guideline of 1 hour per 10 acres of survey time, but was not required.

Presence of any bumble bee species was documented and site information was collected including: acreage, aspect, elevation, plant phenology, and any other noteworthy habitat characteristics or site disturbance. Bumble bee species that were not readily identified in the field had photo vouchers taken of them and were sent to Xerces Society specialists for identification.

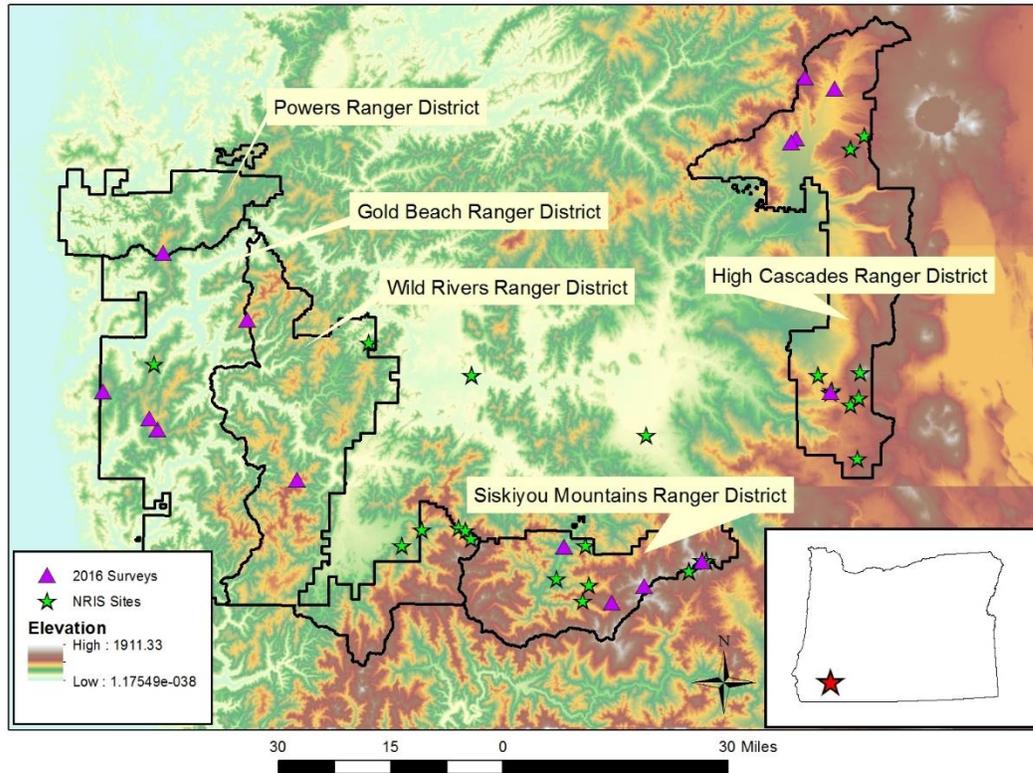


Figure 1. Map of 2016 *B.occidentalis* survey locations and NRIS observations.

Results

Surveys were conducted across approximately 250 acres starting as early as 17-May 2016 to 23-August 2016 and resulted in the documentation of 14 different *Bombus* species (Appendix A). *B.occidentalis* was recorded at one site on Mt. Ashland on 19-July 2016.

The Mt. Ashland survey site is high elevation meadow and the general location is where the last known *Bombus franklini* was documented by Dr. Robbin Thorp. This survey was a 2-day effort coordinated by US Fish and Wildlife Service and included roughly 40 surveyors for two 8-hour days. Two *B.occidentalis* were documented and verified on site by Dr. Robbin Thorp. One individual was specifically documented on *Orthocarpus cuspidatus*. Other documented use by *B.occidentalis* on Mt. Ashland included visits primarily to *Lupinus* spp.

Other floral species observed during surveys with documented bumble bee use included a wide variety of forb and shrub species. Approximately, 30 species of plants were recorded at the 15 survey sites (Appendix A).

Bombus suckleyi was potentially observed at two sites on High Cascades RD, but photo vouchers were not available and therefore, not verified.



Figure 2. Location on Mt. Ashland where *B.occidentalis* was documented during surveys (19-July 2016).



Figure 3. *Orthocarpus cuspidatus* on Mt.Ashland. *B.occidentalis* observed using.

Training

Although not affiliated with the 2016 survey funding, the wildlife biologists on the Rogue River-Siskiyou NF each attended different bumble bee trainings during the field season to facilitate and improve survey efforts. One training was hosted by Siskiyou Field Institute in Selma, OR on 06/10/2016 and 06/11/2016. A training and field survey was held in Medford for BLM and Forest Service employees, which was organized by Steve Godwin on 06/13/2016 and 06/14/2016. And a multiagency survey organized by USFWS was held on Mt. Ashland on 07/19/2016 and 07/20/2016. All of these trainings were led and facilitated by Dr. Robbin Thorp.

Discussion

The 2016 survey efforts detected a single location of *B.occidentalis*, which was the same location as one of the historic records reported in NRIS. Additional survey efforts are recommended for the Rogue River-Siskiyou NF. It would be beneficial for future surveys to focus on the historic *B.occidentalis* locations and to revisit the same location multiple times within the same field season to increase the probability of detection. Analysis of habitat use and floral species preference by *B.occidentalis* cannot be determined by the current survey efforts and data collection, but are also recommended.

Appendix A. *Bombus occidentalis* 2016 survey result summary table for Rogue River-Siskiyou National Forest.

Site	District*	Date	Location Name	Legal	Acres	Elevation (ft)	Bombus species observed	Plant Species Observed
1	GBRD	6/21/2016	Windy Valley Meadow	T37S R12W Sec 38	5	2800	<i>Bombus caliginosus</i> , <i>Bombus melanopygus</i>	<i>Cerastium arvense</i> , <i>Prunella vulgaris</i>
2	GBRD	8/2/2016	Snowcamp Meadow	T37S R12W Sec 25	30	1050	<i>Bombus caliginosus</i> , <i>Bombus vosnesenskii</i> <i>Bombus bifarius</i> <i>Bombus insularis</i> <i>Bombus flavidus</i> <i>Bombus</i> <i>sitkensis</i>	<i>Rubeckia</i> spp., <i>Toxicoscordion venenosum</i> , <i>Arnica</i> spp., <i>Rununculus</i> spp., <i>Darlingtonia californica</i> , <i>Castilleja elata</i> , <i>Parnassia palustris</i> , <i>Aster</i> spp., <i>Eriogonum</i> spp.
3	GBRD	8/8/2016	Signal Buttes Meadow Complex	T37S R13W Sec 6	50	3000	<i>Bombus caliginosus</i> <i>Bombus vosnesenskii</i>	<i>Grindelia nana</i> , <i>Gentiana affinis</i> , <i>Hackelia</i> spp. , <i>Catilleja</i> spp., <i>Aquilegia formosa</i>
4	GBRD	8/18/2016	Sugarloaf	T35S R10W Sec 7	8	4400	<i>Bombus caliginosus</i> <i>Bombus vosnesenskii</i> <i>Bombus insularis</i>	<i>Sambucus</i> spp., <i>Arctostaphylos</i> spp., <i>Frangula californica</i> , <i>Chrysothamnus</i> spp., <i>Ribes</i> spp., <i>Rosa gymnocarpa</i> , <i>Rubus leucodermis</i> , <i>Rubus parviflorus</i> , <i>Chamerion angustifolium</i> , <i>Rubeckia</i> spp.
5	PRD	8/23/2016	Iron Mountain Botanical Area	T33S R12W Sec 33	1	3500	<i>Bombus caliginosus</i> <i>Bombus vosnesenskii</i>	<i>Frangula californica</i> , <i>Holodiscus bicolor</i> , <i>Arctostaphylos</i> spp., <i>Darlingtonia californica</i> , <i>Camassia</i> spp., <i>Parnassia palustris</i> , <i>Rubeckia</i> spp.
6	HCRD	6/30/2016	Hershberger Meadow	T29S, R3E, Section 27	6	5700	<i>Bombus suckleyi</i> * <i>Bombus bifarius</i> <i>Bombus</i> <i>vosnesenskii</i> <i>Bombus</i> <i>melanopygus</i>	<i>Agastache urticifolia</i> , <i>Lupinus</i> spp., <i>Cynoglossum occidentale</i> , <i>Orthocarpus cuspidatus</i> , <i>Rubeckia</i> spp., <i>Penstemon anguineus</i> , <i>Dodecatheon</i> spp.
7	HCRD	8/1/2016	Willow Prairie	T36S, R4E, Section 30, 31	38	4700	<i>Bombus bifarius</i> <i>Bombus</i> <i>mixtus</i> <i>Bombus</i> <i>suckleyi</i> *, <i>Bombus</i> <i>flavidus</i> <i>Bombus</i> <i>vosnesenskii</i>	<i>Castilleja</i> spp., <i>Achillea millefolium</i> , <i>Holodiscus discolor</i>

Site	District	Date	Location Name	Legal	Acres	Elevation (ft)	Bombus species observed	Plant Species Observed
8	HCRD	7/8/2016	Upper Rogue River & Wizard Creek	T30S R4E Section 5, 6	10	4000	<i>Bombus melanopygus</i> , <i>Bombus bifarius</i> , <i>Bombus appositus</i>	<i>Eriophyllum lanatum</i> , <i>Achillea millefolium</i> , <i>Mertensia bella</i> , <i>Castilleja</i> spp., <i>Holodiscus discolor</i>
9	HCRD	7/14/2016	Knob Hill	T31S R3E Section 5	25	3800	<i>Bombus bifarius</i> , <i>Bombus mixtus</i>	<i>Asclepia fascicularis</i> , <i>Brodiaea elegans</i> , <i>Achillea millefolium</i>
10	HCRD	7/13/2016	Woodruff Meadow	T31S R3E Section 8	50	3200	<i>Bombus vosnesenskii</i>	<i>Lotus corniculatus</i> , <i>Achillea millefolium</i>
11	WRRD	5/16/2016	Perk's Pasture	T38N R10W Section 24	1.5	4500	<i>Bombus vosnesenskii</i> , <i>Bombus bifaris</i> , <i>Bombus insularis</i>	<i>Lupinus</i> spp.
12	WRRD	7/15/2016	Fiddler Mountain	T38S R9W Section 28, 29	3	4100	<i>Bombus caliginosus</i> , <i>Bombus vosnesenskii</i> , <i>Bombus bifaris</i> , <i>Bombus insularis</i>	<i>Eriogonum</i> spp., <i>Rubus</i> spp.
13	SMRD	5/17/2016	Placer Flat	T40S R3E Section 8	1	500	<i>Bombus vosnesenskii</i> <i>Bombus bifaris</i>	<i>Lupinus</i> spp., <i>Orthocarpus cuspidatus</i>
14	SMRD	7/18/2016 7/19/2016	Mt. Ashland	T40S R1E Section 19,20, 21	18	4100	<i>Bombus occidentalis</i> <i>Bombus appositus</i> , <i>Bombus vandykei</i> , <i>Bombus vosnesenskii</i> <i>Bombus flavifrons</i> <i>Bombus bifaris</i>	<i>Lupinus</i> spp., <i>Orthocarpus cuspidatus</i>
15	SMRD	7/30/2016	Jackson Gap	T41S R2W Section 1	3	6080	<i>Bombus vosnesenskii</i> <i>Bombus bifaris</i> , <i>Bombus insularis</i>	<i>Lupinus</i> spp., <i>Monardella villosa</i> , <i>Eriogonum umbellatum</i> , <i>Orthocarpus cuspidatus</i>

GBRD = Gold Beach Ranger District; HCRD = High Cascades Ranger District; PRD = Powers Ranger District; WRRD = Wild Rivers Ranger District;

SMRD = Siskiyou Mountains Ranger District

**Bombus suckleyi* was potentially observed, but photo vouchers are not available to verify.

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References

Cameron, S. A., J. D. Lozier, J. P. Strange, J. B. Koch, N. Cordes, L. F. Solter, and T. L. Griswold. 2011. Patterns of widespread decline in North American bumble bees. *Proceedings of the National Academy of Sciences* 108:662–667.

Cameron, S.A., H.C. Lim, J.D. Lozier, M.A. Duennes, and R. Thorp. 2016. Test of the invasive pathogen hypothesis of bumble bee decline in North America. *Proceedings of the National Academy of Sciences*. Vol. 113 No. 16: 4386-4391.

Jepsen, S. and S. Foltz Jordan. 2013. *Bombus occidentalis* Species Fact Sheet. Prepared by the Xerces Society for Interagency Special Status / Sensitive Species Program (ISSSSP). Portland, Oregon.

Hatfield, R, S. Colla, S. Jepsen, L. Richardson, R. Thorp, and S. Foltz Jordan. 2014. Draft IUCN Assessments for North American *Bombus* spp. for the North American IUCN Bumble Bee Specialist Group. The Xerces Society for Invertebrate Conservation, www.xerces.org, Portland, OR.

Hatfield, R., Jepsen, S., Thorp, R., Richardson, L., Colla, S. & Foltz Jordan, S. 2015. *Bombus occidentalis*. The IUCN Red List of Threatened Species 2015.

Mitchell, C. 2015. 2015 SW Oregon Integrated Western Bumble Bee Survey Project Summary Report of Findings. <http://www.fs.fed.us/r6/sfpnw/issssp/inventories/reports.shtml>

Williams, P.H., Thorp, R.W., Richardson, L.L. and Colla, S.R., 2014. *Bumble bees of North America: an identification guide*. Princeton University Press.