

**2018 Gifford Pinchot and Okanogan-Wenatchee
National Forest - Bumble Bee Surveys**



Bombus occidentalis and *Mimulus lewisii*. Photo by Janell Shaw

US Forest Service
Interagency Special Status Sensitive Species Program

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Introduction

Bumblebees are an important pollinator, and several species are thought to be in peril. Widespread surveys have been conducted in the western United States to identify species of concern. *Bombus occidentalis* was added to the Region 6 Sensitive Species list in 2015; *Bombus suckleyi* was added to the list in 2019. *Bombus franklini* and *Bombus morrisoni* are Region 6 listed Sensitive Species in Oregon. Recent bumblebee surveys (2017) in the Columbia River Gorge and the Olympic National Forest, detected only one population of *Bombus occidentalis*, found on the Olympic Peninsula.

Project Team

Brad Krieckhaus, Darci Pankratz, Deedee Soto, Janell Shah, Jennifer DeShong, Jennifer Marsh, Joe McLeod, Keegan O'Neill, Ken Meyer, Neil Chartier, Sandy Burks, Sarah Windsor, Veronica Vaca. Special thanks to Rich Hatfield for training our crew. Also thanks to Candace Fallon and Rich Hatfield of the Xerces Society for extensive help with identifications from our photographs. We also recruited a group of high-school students from the White Pass Discovery Team to help catch bees on two of our early surveys, and they were outstanding.

Objectives and Project Area

This 2018 project was proposed to increase our understanding of bumblebee populations on the Gifford Pinchot National Forest and the neighboring Naches District of the Okanogan-Wenatchee National Forest. Survey sites were chosen in widely dispersed meadows across the project area. The intent was to document all bumblebee species encountered in each survey location. We were also looking at potential threats to bumblebee habitat, such as meadow encroachment by conifers or invasive species. Rare plant species were also a survey interest. Finally, sensitive species such as *B. occidentalis* or *B. suckleyi*, were of particular interest. Including both Forests in the project allowed us to sample both the wet and dry sides of the Cascade Range.

Methods

Prior to beginning a survey, we walked throughout the survey area and identified the plants being visited by pollinators, and made sure everyone knew the plant names. After catching a bee, we recorded the plant name on the holding vial, or placed an identifying flower in with the bee. On cool mornings we waited for bumblebee activity to pick up before starting.

We used the survey protocol taught to us by Rich Hatfield from The Xerces Society. An area of approximately 1 hectare is chosen for the survey and 90 minutes of survey time is spent within that area. With two or more surveyors, the 90 minutes is divided among them. A minute of survey time is added for every bee caught, to account for the time spent transferring the bee to a vial. If two surveyors each catch 15 bees during their 45 minute survey time, an additional 30 minutes is added to the total survey time. After transfer to a vial, the bees are put in a cooler and covered with ice to slow them. This procedure allows them to be photographed with little

movement before release. Using a camera with a microscope function, and a photo stacking function, allowed us to take better quality photos. Having a timekeeper/photographer/data taker in addition to the bee catchers was important, especially when many bees were captured. We asked Xerces to help verify many of our field identifications, and found that we were all making mistakes with identification in the field. Having good quality photos, and getting ID corrections or verifications from Xerces, gave us much more confidence in our survey results. Our survey data was entered on field forms provided by Xerces, and our survey results were entered on a spreadsheet form provided by Xerces.

After a survey, we cleaned and bleached the bee vials, as recommended by Rich Hatfield, to reduce the chance of spreading diseases.

Results

At least 10 species of bumblebee were captured on the Gifford Pinchot National Forest. Nineteen bees were not named due to uncertainty in the field and poor photographs of the subject. *Bombus occidentalis* was among the more frequently captured bees. No *B. suckleyi* were found. Two of the species were only captured and identified once at one site. All of the bees found are considered common for the area. Although *B. occidentalis* is considered rare and declining throughout much of its range, it still may be locally common. (Bumble Bees of the Western United States)

Table 1. Bumblebee species found in Gifford Pinchot National Forest, the numbers detected, and the number of sites each species was detected in 2018.

<i>Scientific Name</i>	Common Name	# Bees (n =186)	# Sites (n = 9)
<i>Bombus melanopygus</i>	Black tail bumble bee	35	7
<i>Bombus bifarius</i>	Two form bumble bee	34	6
<i>Bombus sitkensis</i>	Sitka bumble bee	32	4
<i>Bombus occidentalis</i>	Western bumble bee	29	6
<i>Bombus mixtus</i>	Fuzzy-horned bumble bee	13	5
<i>Bombus flavidus</i>	Fernald cuckoo bumble bee	11	3
<i>Bombus flavifrons</i>	Yellow head bumble bee	6	4
<i>Bombus vosnesenskii</i>	Vosnesensky bumble bee	5	2
<i>Bombus insularis</i>	Indiscriminate cuckoo bumble bee	1	1
<i>Bombus fervidus</i>	Yellow bumble bee	1	1
<i>Bombus. sp.</i>	Unknown bumble bees	19	5

Nine bumblebee species were captured in the Okanogan-Wenatchee National Forest. *Bombus occidentalis* was captured at two of the four survey sites, but was not among the frequently captured bees. No *B. suckleyi* were found. Four of the bee species were only captured once,

and only at one site. *Bombus appositus*, was among this group, and it was only found on the Okanogan-Wenatchee Forest. *Bombus flavidus*, while having a large range in the western United States, is considered uncommon.

Table 2. Bumblebee species found in Naches District, Okanogan-Wenatchee National Forest, the numbers detected, and the number of sites each species was detected in 2018.

<i>Scientific Name</i>	Common Name	# Bees (n =96)	# Sites (n = 4)
<i>Bombus melanopygus</i>	Black tail bumble Bee	42	3
<i>Bombus bifarius</i>	Two form bumble bee	33	4
<i>Bombus appositus</i>	White-shouldered bumble bee	10	1
<i>Bombus sitkensis</i>	Sitka bumble bee	1	1
<i>Bombus mixtus</i>	Fuzzy-horned bumble bee	5	3
<i>Bombus occidentalis</i>	Western bumble Bee	3	2
<i>Bombus flavifrons</i>	Yellow head bumble bee	1	1
<i>Bombus flavidus</i>	Fernald cuckoo bumble bee	1	1
<i>Bombus insularis</i>	Indiscriminate cuckoo bumble bee	1	1

Table 3. Number of bumblebees and number of species detected at each survey site, Gifford Pinchot and Okanogan-Wenatchee National Forest.

Gifford Pinchot Survey Sites	# Bees	# Species
Dark Meadow	12	4
Babyshoe Pass	15	6
Lupine Meadow	18	5
Beljica Meadow	60	5
Gotchen Meadow	8	3
Cispus Basin	30	3
Snow Grass Flat	14	3
Squaw Butte Meadow	14	6
Placid Lake	15	4
Total	186	10
Okanogan-Wenatchee Survey Sites	# Bees	# Species
Bethel Hill Road	25	7
Chinook Pass	15	3
Sheep Lake	27	3
Twin Sisters	29	4
Total	96	9

Discussion

These bumble bee surveys from 2018 give us a good basic census of which species are still relatively common on our Forests. All but a couple of bumblebee species thought to be common in our area, were found in 2018. Some of those species were only detected by one survey. Additional surveys will help determine if some of our native bumblebee species are declining on the Gifford Pinchot and Okanogan National Forests. Since the range and numbers of *Bombus occidentalis* are known to be in decline over a large traditional range, it was good to find at least 8 known sites where they are still present on our forests. So far they have only been found at middle to higher elevations, and often near a water body. But we have not completed low elevation surveys for comparison, and meadow habitat on the National Forest is typically found at higher elevation.

We attempted to document the plant species on which each bumblebee was captured. For the most part we were able to document this information. As more surveys are completed, this might yield some insight into what plant species are most utilized throughout the active season.

Loss of meadow habitat is a problem on the Gifford Pinchot. Fire suppression in combination with a wetter, less fire prone climate, has caused a loss of early seral habitat, and some meadows continue to shrink from a steady encroachment of shrub and tree cover into meadow habitats. Conifer removal from meadows has been practiced for at least 20 years in Gifford Pinchot meadows, to restore habitat for Mardon Skipper butterfly populations. This practice may be necessary to protect habitat for bumblebees also. In at least two of our survey meadows (Lupine and Beljica) we observed conifer encroachment.

Invasive species pose a threat to meadow habitat, especially near roads, but also near ponds or lakes, where Canada thistle populations often occur. An invasive hawkweed species was observed along the road near Dark and Babyshoe Meadows. While some invasive species may benefit bumblebees, the net effect for wildlife is negative. Invasive grass species such as reed canary grass, cheat grass, ventenata, and others are certainly bad for bumblebee habitat.

References

- ISSSSP 2019. Interagency Special Status/Sensitive Species Program – Sensitive Species List. <https://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/> (accessed March, 2019)
- Hatfield, R, Jepsen S, Black, S. 2017. Bumble Bee Surveys in the Columbia River Gorge National Scenic Area of Oregon and Washington. The Xerces Society.
- Holtrup, K, Howell, B. 2017. Olympic National Forest Bumblebee Surveys 2017-2018, Interim Report. US Forest Service.
- Koch, J, Strange, J. 2013. Bumble Bees of the Western United States.

Table 4. Survey results for the Gifford Pinchot National Forest in 2018.

Gifford Pinchot National Forest Survey Results		
Cowlitz Valley Ranger District		
Location	Species	Count
Dark Meadow - 4000 ft. 46.274, -121.608 2018 - July 10	<i>B. melanopygus</i>	4
	<i>B. flavifrons</i>	1
	<i>B. occidentalis</i>	1
	<i>B. mixtus</i>	1
	<i>B. sp.</i>	5
Babyshoe Pass - 4350 ft. 46.269, -121.604 2018 - July 10	<i>B. bifarius</i>	6
	<i>B. melanopygus</i>	3
	<i>B. sitkensis</i>	3
	<i>B. mixtus</i>	1
	<i>B. occidentalis</i>	1
	<i>B. insularis</i>	1
Lupine Meadow - 4400 ft. 46.3108, -121.5313 2018 - July 12	<i>B. occidentalis</i>	7
	<i>B. mixtus</i>	6
	<i>B. flavidus</i>	2
	<i>B. bifarius</i>	1
	<i>B. sitkensis</i>	1
	<i>B. sp.</i>	1
Beljica Meadow - 4470 ft. 46.7914, -121.9428 2018 - July 30	<i>B. sitkensis</i>	18
	<i>B. melanopygus</i>	17
	<i>B. flavidus</i>	7
	<i>B. occidentalis</i>	6
	<i>B. flavifrons</i>	2
	<i>B. sp.</i>	10
Cispus Basin - 6295 ft. 46.4930, -121.4446 2018 - August 6	<i>B. bifarius</i>	15
	<i>B. occidentalis</i>	13
	<i>B. melanopygus</i>	2
Snow Grass Flat - 5760 ft. 46.4927, -121.4698 2018 - August 7	<i>B. melanopygus</i>	7
	<i>B. bifarius</i>	5
	<i>B. flavifrons</i>	1
	<i>B. sp.</i>	1
Mount Adams Ranger District		
Location	Species	Count
Gotchen Cabin Meadow - 3645 ft. 46.089, -121.485 2018 - July 30	<i>B. bifarius</i>	3
	<i>B. mixtus</i>	2
	<i>B. melanopygus</i>	1
	<i>B. sp.</i>	2

Gifford Pinchot National Forest Survey Results		
Location	Species	Count
Squaw Butte Trail - 3300 ft. 46.0882, -121.8326 2018 - August 8	<i>B. bifarius</i>	4
	<i>B. vosnesenskii</i>	3
	<i>B. mixtus</i>	3
	<i>B. flavifrons</i>	2
	<i>B. fervidus</i>	1
	<i>B. occidentalis</i>	1
Placid Lake - 4000 ft. 46.044, -121.816 2018 - August 29	<i>B. sitkensis</i>	10
	<i>B. vosnesenskii</i>	2
	<i>B. flavidus</i>	2
	<i>B. melanopygus</i>	1

Table 5. 2019 Incidental Observations

Location	Species	District/Observer
Midway Meadows	<i>B. occidentalis</i>	Cowlitz Valley/ Tom Kogut
Midway Meadows	<i>B. nevadensis</i> (confirmed by Rich Hatfield)	Cowlitz Valley/ Tom Kogut
Muddy Meadows	<i>B. occidentalis</i>	Cowlitz Valley/ Tom Kogut

Table 6. Survey results for the Okanogan-Wenatchee National Forest in 2018.

Okanogan-Wenatchee National Forest Survey Results		
Naches Ranger District		
Location	Species	Count
Bethel Hill Road - 4960 ft. 46.696, -121.108 2018 - July 18	<i>B. appositus</i>	10
	<i>B. bifarius</i>	8
	<i>B. mixtus</i>	2
	<i>B. occidentalis</i>	2
	<i>B. flavifrons</i>	1
	<i>B. flavidus</i>	1
	<i>B. insularis</i>	1
Chinook Pass - 5345' 46.874, -121.517 2018 - July 31	<i>B. melanopygus</i>	9
	<i>B. bifarius</i>	5
	<i>B. sitkensis</i>	1
Sheep Lake - 5740 ft. 46.8944, -121.5032 2018 - August 7	<i>B. melanopygus</i>	24
	<i>B. mixtus</i>	2
	<i>B. bifarius</i>	1
Twin Sisters - 5280 ft. 46.727, -121.360 2018 - August 8	<i>B. bifarius</i>	4
	<i>B. vosnesenskii</i>	3
	<i>B. mixtus</i>	3
	<i>B. flavifrons</i>	2
	<i>B. fervidus</i>	1
	<i>B. occidentalis</i>	1

2018 Surveys, Gifford Pinchot NF

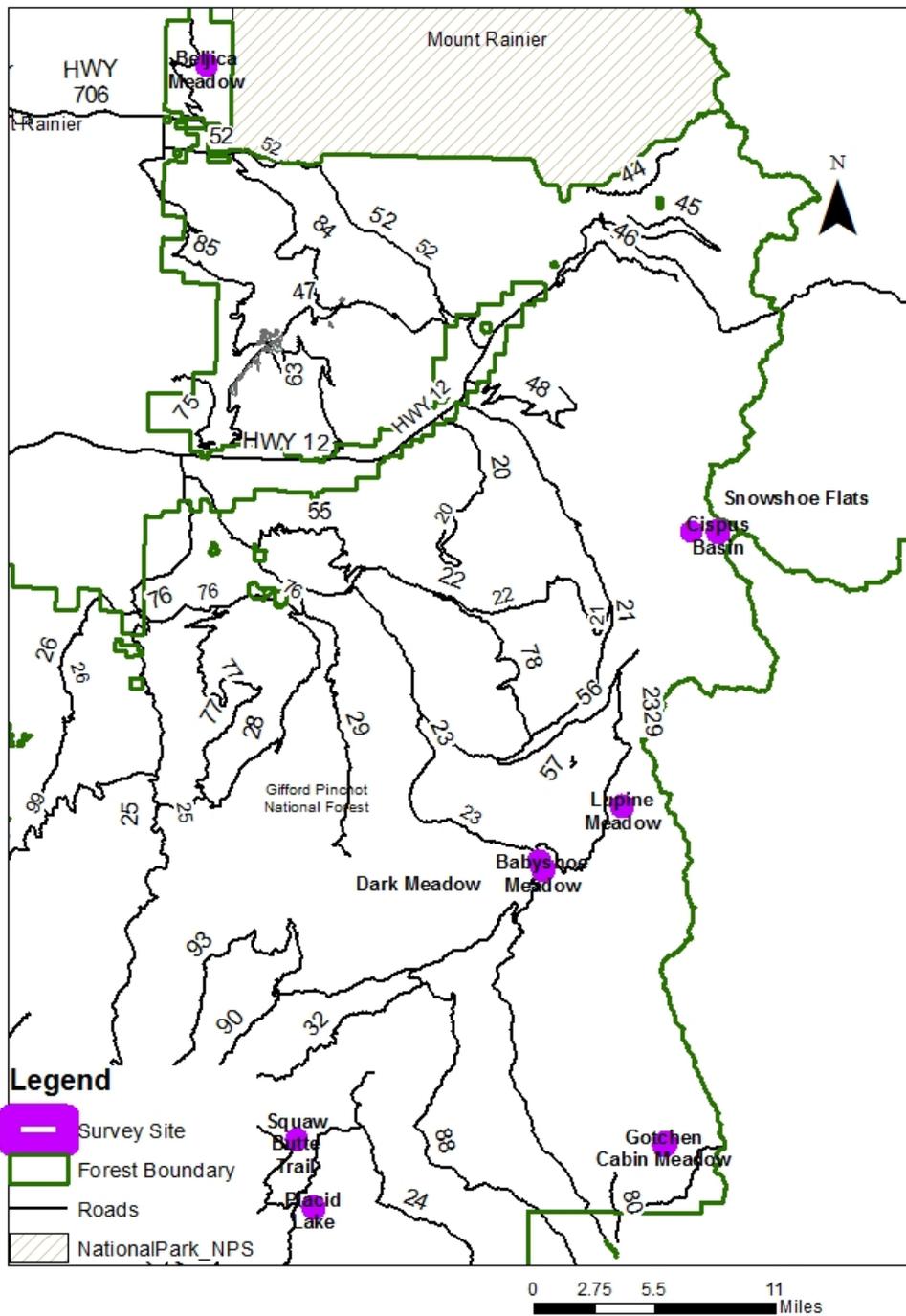


Figure 1. Survey areas on the Gifford Pinchot National Forest in 2018.

2018 Surveys – Naches Ranger District

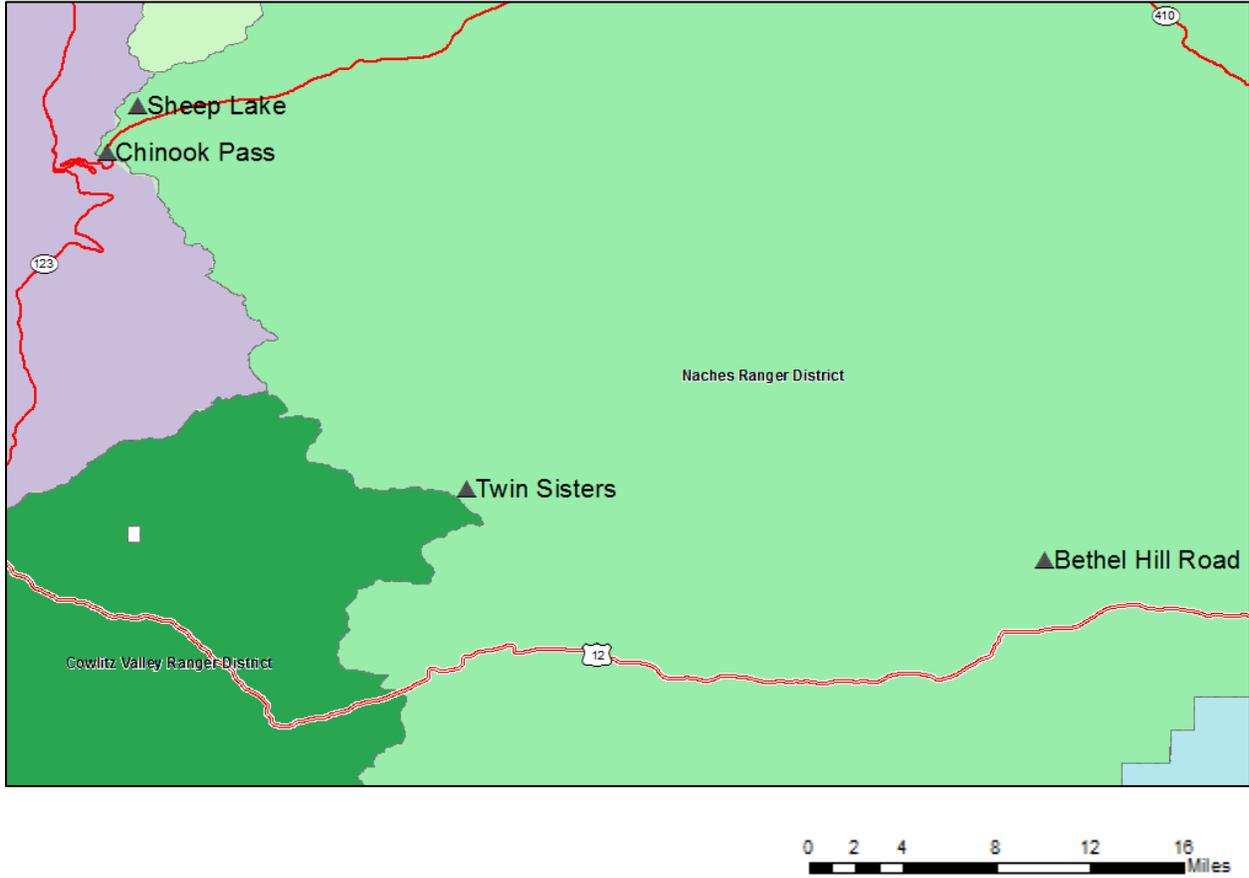


Figure 2. Survey areas on the Naches Ranger District, Okanogan-Wenatchee National Forest in 2018.