

# 2014 Western Bumble Bee Surveys

## Deschutes National Forest

March 2015

Laurie Turner, Forest Wildlife Biologist



### Introduction

The western bumblebee (*Bombus occidentalis*) was widespread and common throughout the western United States and western Canada before 1998 (Xerces Society 2009). The former range included most western states and Canadian provinces. Since 1998 populations have declined drastically throughout parts of its former range. It has been documented that viable populations still exist east of the Cascades, however only two known locations have been documented on the Deschutes National Forest in the recent years (Xerces Society records). The Xerces Society considers this species one of the most imperiled species in Oregon (Sarina Jepsen, pers. comm.) as it has declined up to approximately 70-100% in many portions of its range (NatureServe 2011).

Bumblebees are integral wild pollinators within native plant communities. They are thought to be generalist pollinators of a wide variety of flowering plants and crops, however, individual bumblebees do show high fidelity to particular flowers within a bloom period (Hatfield et al. 2012). Habitats with a greater diversity of plants can be expected to have higher bumblebee

species diversity than less diverse communities. This species will travel a great distance to forage – from ½ mile (Hatfield et al. 2012) up to a mile (NatureServe 2011). Given these wide habitat parameters and potential foraging distances, it is difficult to determine potential habitat on the forest without having more specific information on their preferences.

Prior to 2014, there were two known recent (2011) records of *Bombus occidentalis* on or near the Deschutes NF – Sparks Lake and the Sunriver area. No surveys had been conducted to determine the extent of this species occurrence on forest. Due to their rapid decline throughout the known range, few historic occurrences, and the extent of threats, it was imperative to survey for and protect known sites and habitat.

In 2014, the Deschutes National Forest received \$15,400 from the Interagency Special Status / Sensitive Species Program (ISSSSP) to host a training session and conduct surveys in potential habitat across the forest. The July 16<sup>th</sup> training session taught by Rich Hatfield, conservation biologist with The Xerces Society. Twenty-nine people attended, 13 of who were from the Deschutes National Forest. Objectives of the project were as follows:

1. Increase the number of known species occurrences. Surveys may increase the number of known sites and distribution.
2. Document other pollinator species occurrences, particularly other *Bombus* species. Surveys will record all species encountered and begin to build a more comprehensive species list for the forest.
3. Better understand potential habitat. Surveys will aid in identifying where this species occurs and what habitats it may be focused on.
4. Better assess potential threats. Information from surveys on known locations and habitats can inform potential threats of management or other actions on this species.

## **Survey Methods**

Two types of surveys were designed and conducted to focus on foraging habitat during the summer (July through September) – meadow walk-throughs and roadside surveys. Conducting surveys during this time period reduced the potential for collecting queens.

The first survey method included walk-throughs in meadows, riparian areas, fens, and forested habitat. Walk-through surveys were concentrated in areas with floral resources. Surveyors slowly walked transects through these areas and netted any bumblebees observed. Bees were transferred to vials with lids for species identification. When able, photos were taken to provide additional documentation. Each location was recorded with a GPS point and flower information was documented. Botanists assisted in documenting floral resources at each known site in order to begin to determine if there are any floral associations.

The second method included roadside, trail, and powerline right-of-way surveys. Roadside surveys were concentrated in recent (within the last 1-15 years) wildfire areas. Transects were set up to sample areas with potential floral resources (e.g., fireweed, ceanothus, lupine, etc.). Surveyors walked the roads and trails and netted any bees observed. Methods outlined above for the meadow surveys were the same for this survey type as well.

## Survey Results for 2014

Ten *Bombus* species were identified through the surveys. These include *B. bifarius*, *B. flavifrons*, *B. insularis*, *B. vosnesenskii*, *B. vandykei*, *B. mixtus*, *B. flavidus*, *B. centralis*, *B. occidentalis*, and *B. fervidus*. Surveys were conducted between July 10, 2014 and September 23, 2014 with most *B. occidentalis* being found in mid to late August. Approximately 615 acres were surveyed for a total of 123 hours. See Table 1 for a complete listing of the survey results for the Deschutes National Forest.

Surveys resulted in four new *B. occidentalis* locations on forest. Table 1 displays the survey sites, survey dates, number of bees found, and floral resources recorded.

Table 1. Survey Results for *B. occidentalis* sites on the Deschutes National Forest.

District	Survey Site	Survey Date	Number Found	Floral Resources	Comments
BFR	FS Rd 390, Todd Lake Campground	7/29/2014	2	Delphinium spp.	Moderate Elevation, Dry Meadow
SIS	Canyon Creek Meadow	8/19/2014	3	Pink Heather, Aleutian Heather, Monkeyflower, Aster spp., Lupine spp.	High Elevation, Moist Meadow
BFR	Riparian habitat along Fall Creek adjacent to Green Lakes TH	8/25/2014	1	Arrowleaf groundsel, Goldenrod, Purple Aster, Pearly Everlasting	Moderate Elevation, Wet Area
BFR	Todd Lake lower meadow near parking lot	8/26/2014	5-15	Purple Aster, Delphinium spp.	Moderate Elevation, Moist Meadow

BFR=Bend-Fort Rock Ranger District, SIS=Sisters Ranger District

Currently, there is not a large enough sample size to infer habitat/floral preferences. Many sites surveyed were similar to those where *B. occidentalis* was found but yielded no target species. This could be attributed to several factors – survey date, surveyor experience, not enough time spent at each site, floral resource abundance/diversity, or that *B. occidentalis* just isn't present. More surveys are needed to build a larger sample size to begin to determine habitat quality.



*Bombus occidentalis* in capture jar.



*Bombus occidentalis* on flowers of *Anaphalis margaritacea*.

See Figures 1 and 2 of positive locations of *Bombus occidentalis* on the Deschutes National Forest. These occur on the Bend Ft. Rock and Sisters Ranger Districts.

### **Potential Threats**

No threats were identified with this survey effort. The number of known sites is not large enough to determine threats at this time.

### **Future Recommendations**

Additional surveys are needed across the forest to begin to identify habitat preferences, habitat quality, and potential threats, as well as, protect known sites. In addition, phenology timelines could be added to the information recorded. A small number of sites will need to be re-surveyed as the floral resources had already bloomed and went to seed before surveys were conducted. It is unknown if these areas could be important early season habitats. Additional surveys could help determine this.

### **Literature Cited**

Hatfield, R., S. Jepsen, E. Mader, S.H. Black, and M. Shepard. 2012. Conserving Bumble Bees. Guidelines for Creating and Managing Habitat for America's Declining Pollinators. 32 pp. Portland, OR: The Xerces Society for Invertebrate Conservation.

NatureServe. 2011. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. Accessed March 26, 2011.

Updated 3/1/2017 to remove the three *Bombus suckleyi* records per communication and photo examination by Rich Hatfield from The Xerces Society.

Figure 1. Positive *Bombus occidentalis* locations on the Bend Ft. Rock Ranger District, Deschutes NF.

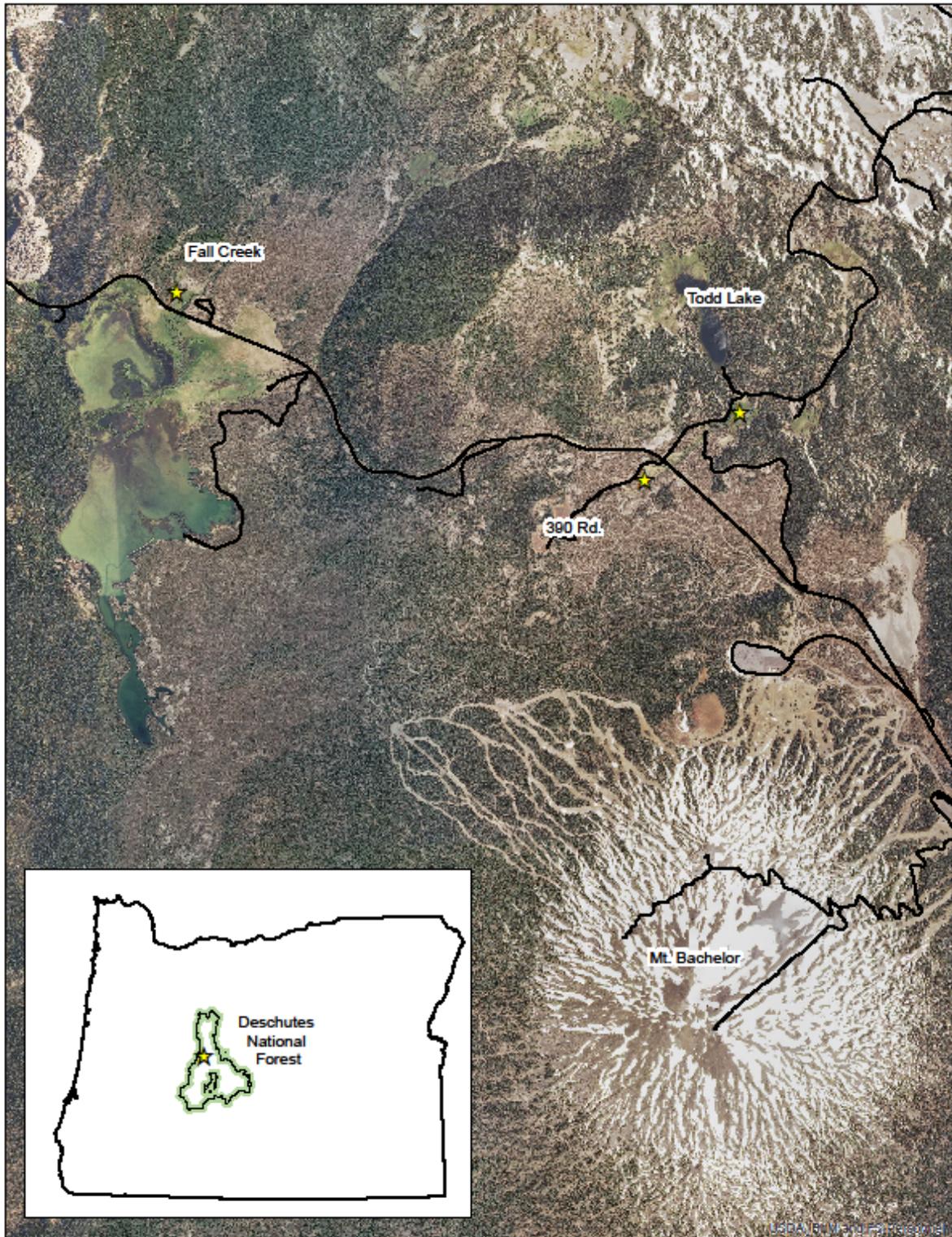
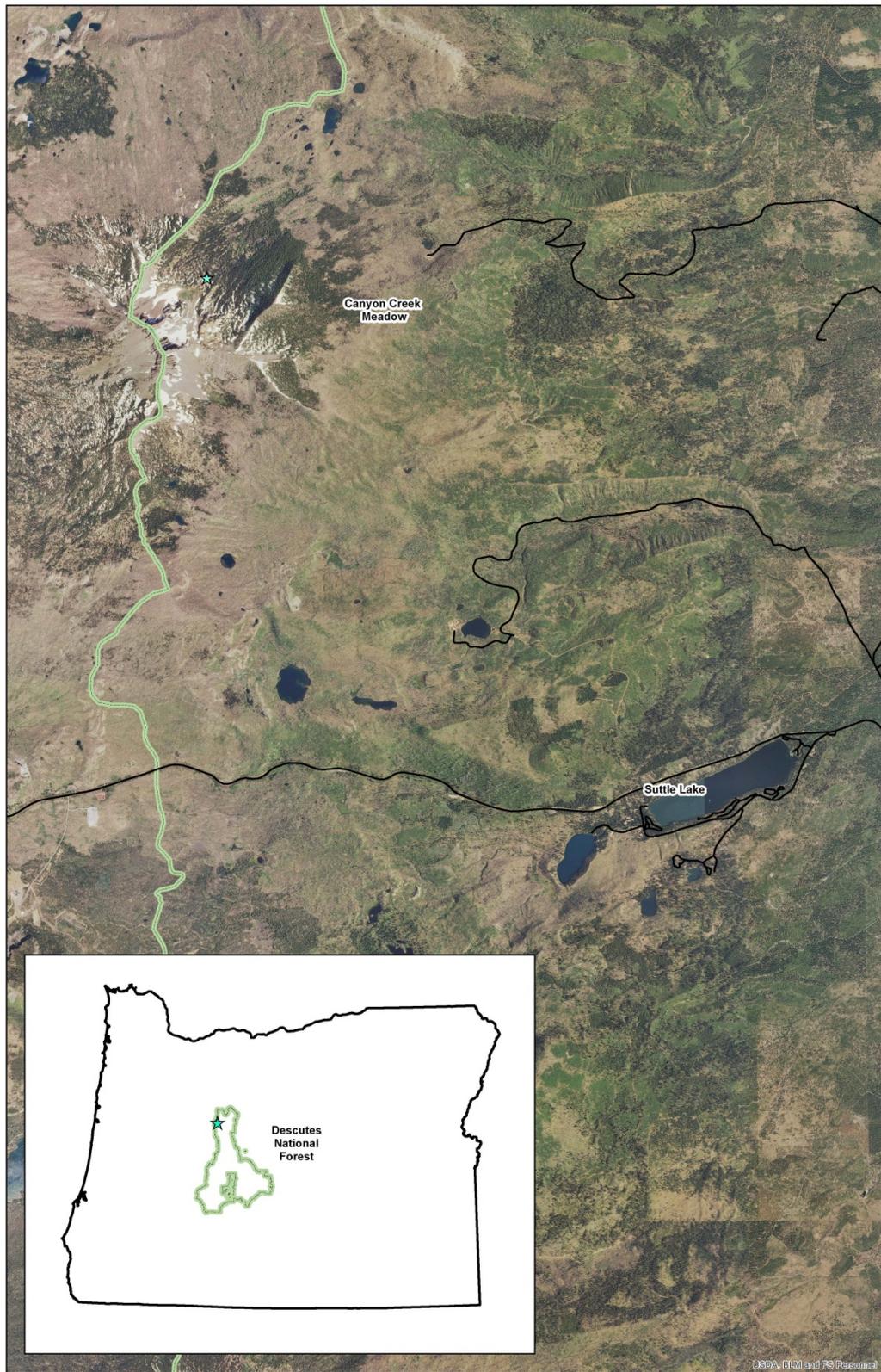


Figure 2. Positive *Bombus occidentalis* locations on the Sisters Ranger District, Deschutes NF.



**Table 2. Bumble Bee Survey Results for the Deschutes National Forest – 2014.**

District	Survey Site	Date Surveyed	Observers	Survey Time (hrs)	Acres Surveyed	Species and # Observed	Floral Resources
CRE	Powerline Botrychium	7/10/14	M. Russell	4.5	2	B. vosnesenskii – 5	Eriophyllum lanatum, Penstemon cinicola, Eriogonum umbellatum, Achillea millefolium, Verbascum thapus, Horkelia fusca
CRE	Crescent Fen	7/17/14	M.Russell, C. Veverka	4.5	3	B. bifarius – 1	Lupinus polyphyllus, Castilleja miniatum, Polemonium
CRE	Scotty Big Boy Fen	7/21/14	M. Russell	3.5	1	B. bifarius – 1 B. flavidus – 1	Mimulus guttatus, Nuphar polysepalum, Tolfeidia glutinosa, Kalmia latifolia, Lupinus polyphyllus, Planthera dilatata, Polygonum bistortoides, Hypericum formosum, Aconitum columbianum
CRE	Royce Fire	7/22/14	M.Russell	5.5	2.5	B. bifarius – 7 B. flavidus – 1 B. insularis – 1 B. vosnesenskii - 1	Aconitum columbianum, Castilleja miniatum, Hypericum formosum, Sidalcea oregano, Spirea douglasii, Lupinus polyphyllus, Geranium oreganum, Arnica chamisonis, Heuchera

District	Survey Site	Date Surveyed	Observers	Survey Time (hrs)	Acres Surveyed	Species and # Observed	Floral Resources
							micrantha, Cirsium scoparium, Agoseris auruniticum, Lupinus lepidus
CRE	Davis Fire (north FR 4640)	7/24/14	M.Russell	1.5	1	B. insularis – 1 B. bifarius - 2	Achillea millefolium, Hypericum perforatum, Erigeron filifolius, Lupinus lepidus, Spirea douglasii, Chamerion angustifolium, Lotus purshiana, Mimulus nana, Solidago canadensis, Trifolium repens, Penstemon cinicola
CRE	Davis Fire (south FR 4640)	7/24/14	M.Russell	1.25	0.5	B. bifarius – 1 B. centralis – 1	Achillea millefolium, Lupinus lepidus, Castilleja miniatum, Hypericum perforatum, Erigeron filifolius, Horkelia fusca, Taraxicum officinalis, Spiranthes romanzoffia, Solidago Canadensis, Plantago major, Mimulus alsinoides, Trifolium repens, Penstemon cinicola, Taraxacum officinale

District	Survey Site	Date Surveyed	Observers	Survey Time (hrs)	Acres Surveyed	Species and # Observed	Floral Resources
CRE	Davis Fire (East Davis CG Road)	7/24/14	M.Russell	2.5	2	B. insularis – 1 B. bifarius – 5 B. vosnesenskii - 1	Geum triflorum, Potentilla gracilis, Polemonium sp., Hypericum formosum, Mimulus gutatus, Lupinus polyphyllus, Solidago canadensis, Castilleja miniatum, Aster campestris, Verbascum Thapsus, Cicuta douglasii, Phacelia hastata, Potentilla glandulosa, Sidalcia oregana, Penstemon cinicola
CRE	Rosary Lakes Trail	9/2/14	C. Rosterolla, D. Link, B. Koell, B. Creagan	8	4	B. flavifrons - 1	Aster spp.
CRE	Rosary Lakes Trail	9/3/14	D. Link, B. Koell, B. Creagan	8	5	None	
CRE	Nip and Tuck Lake Trail	9/4/14	D. Link, B. Koell	6	6	None	
CRE	Midnight Lake Trail	9/15/14	C. Rosterolla, D. Link, B. Koell, M. Mulanax, T. Granum	6.5	9	None	
CRE	Yoran Lake Trail	9/16/14	C. Rosterolla, D. Link, B. Koell, M. Mulanax	7	12	None	
CRE	Trapper Creek Trail	9/17/14	D. Link, B. Koell, M. Mulanax	3.5	2.5	None	

District	Survey Site	Date Surveyed	Observers	Survey Time (hrs)	Acres Surveyed	Species and # Observed	Floral Resources
CRE	Maiden Lake Trail	9/18/14	D. Link, B. Koell, M. Mulanax	6	7	None	
CRE	Hemlock Creek	9/23/14	D. Link, M. Mulanax	0.5	0.4	None	
BFR	Todd Lake	7/18/14	L.Turner, E.Rybak, K.Cushman, P.Miller	3.25	10	B. fervidus – 1 B. bifarius – 1 B. vosnesenskii – 1	Indian paintbrush, larkspur, clover, Elephant's Head, Cornflower, Shooting Star, Saxifrage, Bog Blueberry, Marsh Marigold
BFR	McKay Crossing CG Trail	7/19/14	E.Rybak	2	4	None	Limited floral resources – Scarlet Gilia, Indian Paintbrush, Yarrow
BFR	Meadow north of Sparks Lake adjacent to Fall Creek	7/31/14	S. Borchert	2.75	25	None	Indian paintbrush, Penstemon spp., White orchid, Agoseris sp., Lupine, Yellow monkey flower, Yellow aster, Purple aster, Shooting star, Elephant's head, Yarrow, Cinquefoil, Clover
BFR	Meadow next to obsidian flow across from Devils Lake	8/6/14	S. Borchert	2	10	None	Aster sp. (yellow), Yarrow, Purple aster
BFR	Meadows adjacent and east of Cow Camp near Crane Prairie Reservoir	8/6/14	S. Borchert	3	10	B. bifarius - 2	Fireweed, Penstemon sp., Clover, Buttercup sp., Purple Aster

District	Survey Site	Date Surveyed	Observers	Survey Time (hrs)	Acres Surveyed	Species and # Observed	Floral Resources
BFR	Riparian habitat along Fall Creek adjacent to Green Lakes TH	8/25/14	S. Borchert	1	2	B. occidentalis - 1	Arrowleaf groundsel, Goldenrod, Purple Aster, Pearly Everlasting
BFR	Dry lake bed meadow ½ mile upstream of Fall Creek from Green Lakes TH	8/25/14	S. Borchert	4	10	B. mixtus - 2	Western Monkshood, Goldenrod, Yellow aster sp., Purple aster
BFR	Cow Meadow	8/25/14	Dunham, Gardunia, Crossland, Jeffrey, Manon	6	80	None	Purple aster, Penstemon species, Buttercup spp.
BFR	Happy Valley Meadows	8/26/14	Dunham, Gardunia, Crossland, Jeffrey, Manon	6	32	None	Purple aster
BFR	Todd Lake Upper Meadow	8/26/14	Dunham, Gardunia, Crossland	1.5	60	None	Purple aster, Delphinium spp.
BFR	Todd Lake lower meadow near parking lot	8/26/14	Dunham, Gardunia, Crossland	1.5	12	B. occidentalis – 5-15	Purple aster, Delphinium spp.
BFR	LEX project area – approx. 8 miles of roadside	9/16/14	S. Borchert	5.5	3	B. vosnesenkii – 1 B. fervidus – 7 B. mixtus - 5	Yarrow, Haplopappus spp. (Rabbitbush), Lupine
BFR	FR 45, Milepost 3	7/29/14	K. Cushman, P. Miller	.25	.2	None	Lupine, Penstemon
BFR	Todd Lake, northern shores and slopes	7/29/14	K. Cushman, P. Miller	1.5	10	B. unknown – 3	Salix, Aster, Castilleja, Delphinium bicolor, Dodecatheon, Habenaria, Lupinus, Mimulus, Pedicularis, Ranunculus, Senecio, Spraguea, Viola

District	Survey Site	Date Surveyed	Observers	Survey Time (hrs)	Acres Surveyed	Species and # Observed	Floral Resources
BFR	FS Road 390, Todd Lake CG	7/29/14	K. Cushman, P. Miller	1.25	3	B. bifarius – 1 B. vosnesenskii – 1 B. occidentalis – 2	Delphinium spp.
BFR	Dilman Meadow	7/31/14	K. Cushman, P. Miller	1	2	None	Floral species had already bloomed – Polymonium, Castilleja, Lupinus, and Mimulus
BFR	Wickiup Pit	7/31/14	K. Cushman, P. Miller	1	1	None	Lupinus, Lepidus, Aster, Achillea millefolium, Spraguea umbellata, Penstemon spp.
BFR	Odell Creek, 300 meters south of East Davis CG	7/31/14	K. Cushman, P. Miller	1.75	2	B. bifarius – 1	Habenaria/Platanthera, Aster, Sidalcea, Castilleja, Achillea millefolium, Trifolium, Delphinium, Lupinus, Solidago
SIS	1220 Road – B&B Fire Area – Roadside Survey	8/1/14	Nadja Schmidt, Emily Weidner	1	16	B. bifarius – 3 B. flavifrons – 2 B. insularis – 2 B. spp - 1	St. Johnswart, Bull Thistle
SIS	1220 Road – B&B Fire Area – Roadside Survey	8/21/14	Nadja Schmidt, Emily Weidner	1	15	B. insularis – 3 B. vosnesenskii – 1	Bull Thistle
SIS	1230 Road, B&B Fire Area Roadside Survey	8/26/14	Nadja Schmidt, Emily Weidner	1	5	B. insularis – 2 B. vandykei – 5 B. vosnesenskii – 1	Aster spp., Varileaf phacelia, Bull Thistle, Common Yarrow, Spirea spp.
SIS	1514 Road – Pole Creek Fire Area Roadside Survey	7/30/14	Nadja Schmidt, Emily Weidner	1	10	B. bifarius – 2 B. flavifrons – 1 B. vandykei – 2	Bull Thistle, Fireweed

District	Survey Site	Date Surveyed	Observers	Survey Time (hrs)	Acres Surveyed	Species and # Observed	Floral Resources
SIS	Trout Creek Swamp	7/30/14	Nadja Schmidt, Emily Weidner	.5	3.5	None	
SIS	Twin Meadows	7/30/14	Nadja Schmidt, Emily Weidner	.5	3.5	B. bifarius – 1	Mimulus spp.
SIS	Indian Ford Meadow	7/30/14	Nadja Schmidt, Emily Weidner	.5	3.5	None	
SIS	Glaze Meadow	7/30/14	Nadja Schmidt, Emily Weidner	.5	3.5	None	
SIS	Canyon Creek Meadow	8/19/14	Nadja Schmidt, Emily Weidner	2	230	B. bifarius – 4 B. flavifrons – 3 B. occidentalis – 3 B. vandykei – 2 B. vosnesenskii – 5	Pink Heather, Aleutian Heather, Monkeyflower, Aster spp., Lupine spp.
<b>TOTAL</b>				<b>123.5</b>	<b>614.6</b>		