

<b>SPECIES: Scientific [common]</b>	<i>Bombus occidentalis</i> [Western Bumble Bee]
<b>Forest:</b>	Bridger-Teton National Forest
<b>Forest Reviewer:</b>	Randall Griebel, James Wilder
<b>Date of Review:</b>	1/10/2020; updated 4/17/2025
<b>Forest concurrence (or recommendation if new) for inclusion of species on list of potential SCC: (Enter Yes or No)</b>	YES

**FOREST REVIEW RESULTS:**

1. The Forest concurs or recommends the species for inclusion on the list of potential SCC:  
Yes X No \_\_\_
2. Rationale for not concurring is based on (check all that apply):  
Species is not native to the plan area \_\_\_\_\_  
Species is not known to occur in the plan area \_\_\_\_\_  
Species persistence in the plan area is not of substantial concern \_\_\_\_\_

**FOREST REVIEW INFORMATION:**

1. Is the Species Native to the Plan Area? Yes X No \_\_\_  
  
If no, provide explanation and stop assessment.
2. Is the Species Known to Occur within the Planning Area? Yes X No \_\_\_  
  
If no, stop assessment.

**Table 1.** All Known Occurrences, Years, and Frequency within the Planning Area

Year Observed	Number of Individuals	Location of Observations (USFS District, Town, River, Road Intersection, HUC etc.)	Source of Information
1953	2 collections (Preserved specimen)	Bridger-Teton National Forest, Blackrock Ranger District, 18 mi E of Moran	GBIF (2019)
1964	1 collection (Preserved specimen)	Bridger-Teton National Forest, Jackson Ranger District, 13 mi. NE of Jackson	GBIF (2019)
1965	1 collection (Preserved specimen)	Bridger-Teton National Forest, Pinedale Ranger District Elk Heart Park Road, 13 mi. NE Pinedale	GBIF (2019)
1966	3 collections (Preserved specimen)	Bridger-Teton National Forest, Jackson Ranger District, 7 mi. S of Jackson	GBIF (2019)

1966	3 collections (Preserved specimen)	Bridger-Teton National Forest, Jackson Ranger District, 7 mi. S of Jackson	GBIF (2019)
1966	22 collections (Preserved specimen)	Bridger-Teton National Forest, Jackson Ranger District, Hoback Astoria Hot Springs], 15 mi S of Jackson	GBIF (2019)
1966	28 collections (Preserved specimen)	Bridger-Teton National Forest, Jackson Ranger District, 17 mi S of Jackson	GBIF (2019)
1966	19 collections (Preserved specimen)	Bridger-Teton National Forest, Jackson Ranger District, 15 mi S of Jackson, 1828 m elevation	GBIF (2019)
1966	28 collections (Preserved specimen)	Bridger-Teton National Forest, Jackson Ranger District, 17 mi S of Jackson, 1828 m elevation	GBIF (2019)
1966	3 collections (Preserved specimen)	Bridger-Teton National Forest, Jackson Ranger District, 17 mi S of Jackson, 1828 m elevation	GBIF (2019)
Unknown	Unknown	More occurrences within or in the vicinity of the Forest with unspecified locations/years – see Maps 2, 3	GBIF (2019)
Historical–recent (post-1990)	Multiple collections (100s)	Bridger-Teton National Forest, Blackrock Ranger District, specific locations variable	GBIF (2019)
2018	1	Teton County, WY	iNaturalist (2019)

a. Are all Species Occurrences Only Accidental or Transient?

Yes \_\_\_ No X

If yes, document source for determination and stop assessment.

b. For species with known occurrences on the Forest since 1990, based on the number of observations and/or year of last observation, can the species be presumed to be established or becoming established in the plan area?

Yes X No \_\_\_

If no, provide explanation and stop assessment

c. For species with known occurrences on the Forest predating 1990, does the weight of evidence suggest the species still occurs in the plan area?

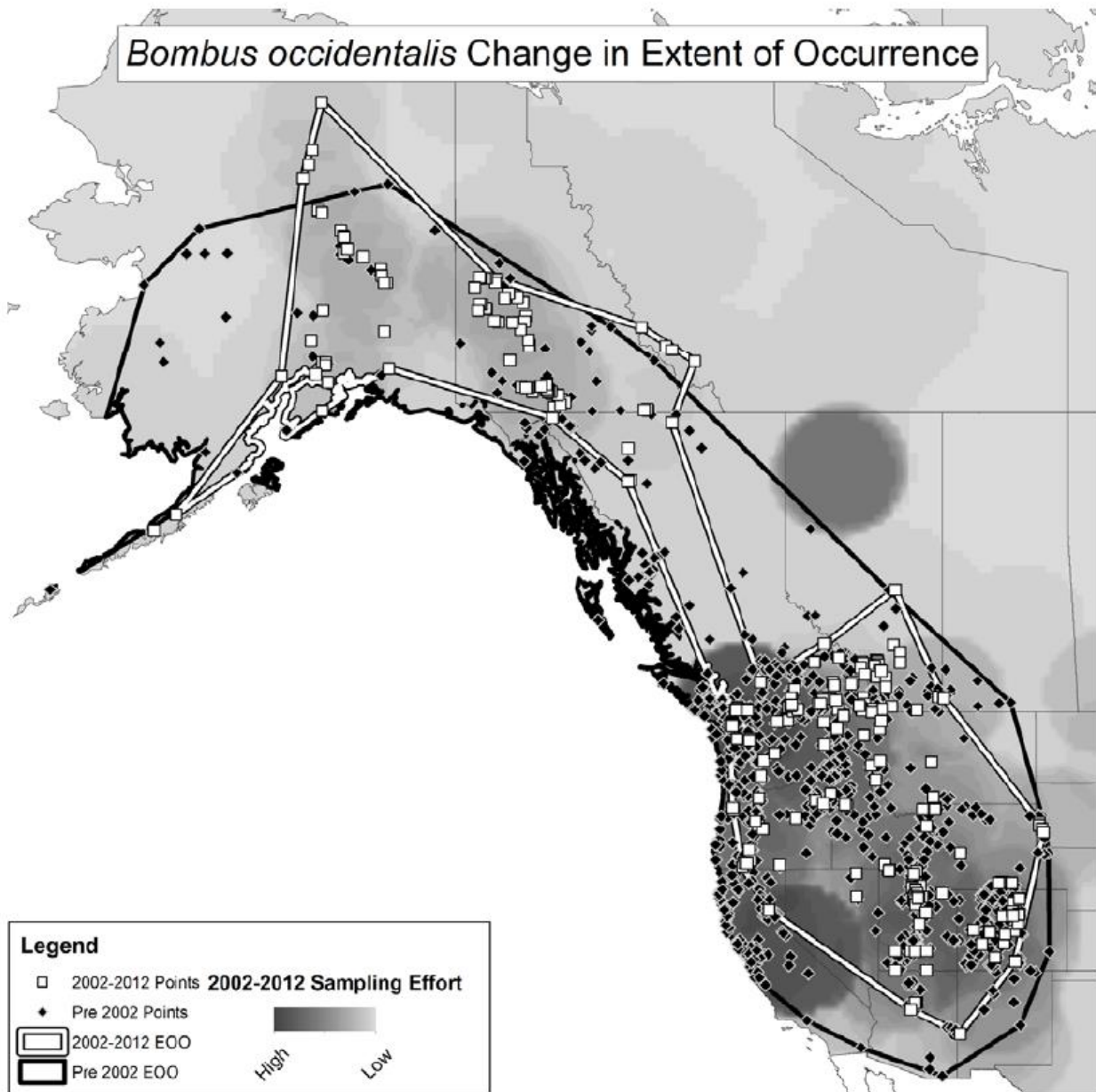
Yes \_\_\_ No \_\_\_

Provide explanation for determination

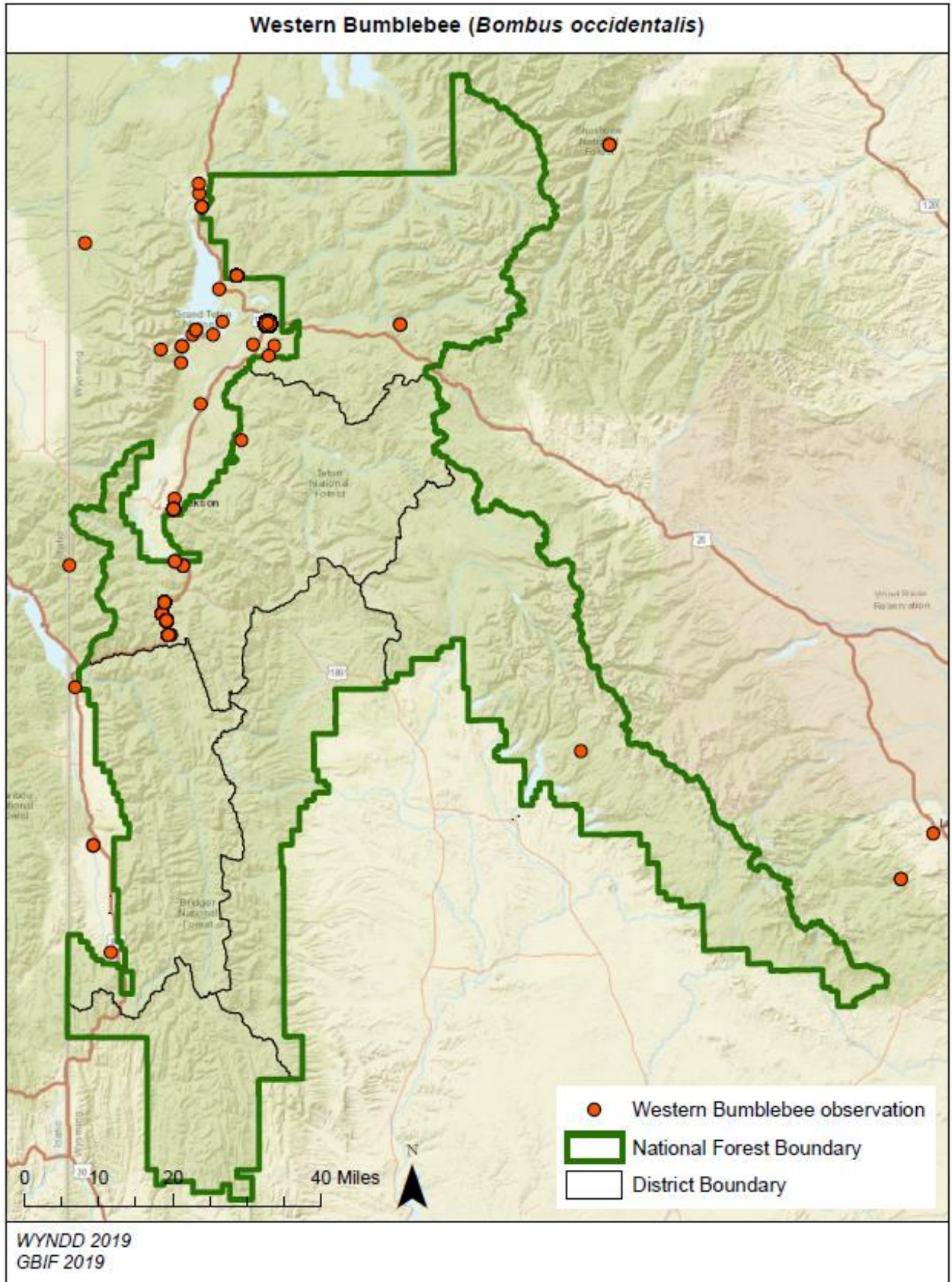
**N/A—Occurrences have been documented since 1990**

If determination is no, stop assessment

d. **Map 1.** The historic and current distribution of *Bombus occidentalis* in the western United States and Canada (Hatfield et al. 2015).



**Map 2.** Occurrences of *Bombus occidentalis* in the Bridger-Teton National Forest vicinity.



3. Is There Substantial Concern for the Species' Capability to persist Over the Long-term in the Plan Area Based on Best Available Scientific Information?

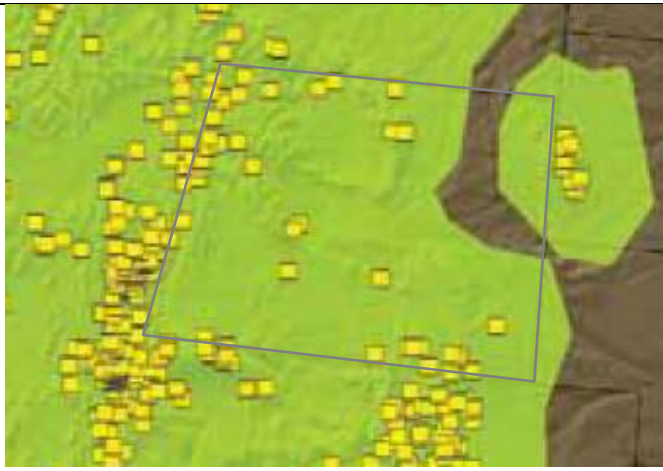
**Table 2.** Status summary based on existing conservation assessments

Entity	Status/Rank (include definition)
<b>NatureServe Global Status</b>	<p><b>G4— Apparently Secure</b></p> <p><i>Uncommon but not rare; some cause for long-term concern due to declines or other factors.</i></p>
<b>NatureServe State Status</b>	<p><b>S3—Vulnerable</b></p> <p><i>At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.</i></p>
<b>WYNDD</b>	No Special Status
<b>USDA Forest Service</b>	<p><b>Region 2: Sensitive Species</b></p> <p><i>Those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by</i></p> <ul style="list-style-type: none"> <li><i>a. Significant current or predicted downward trends in population numbers or density.</i></li> <li><i>b. Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.</i></li> </ul> <p>(FSM 2670.5 – Threatened, Endangered &amp; Sensitive Species)</p>
<b>USDI FWS</b>	<p><b>Under Review</b></p> <p><i>A petition to list the species as threatened or endangered and critical habitat be designated for this species under the Act was submitted in 2015, and the USFWS published it's 90-day finding to initiate a status review in 2016 (USFWS 2016).</i></p>
<b>WY BLM</b>	No Special Status
<b>Xerces Red List Status</b>	<p><b>Imperiled</b></p> <p><i>At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.</i></p>

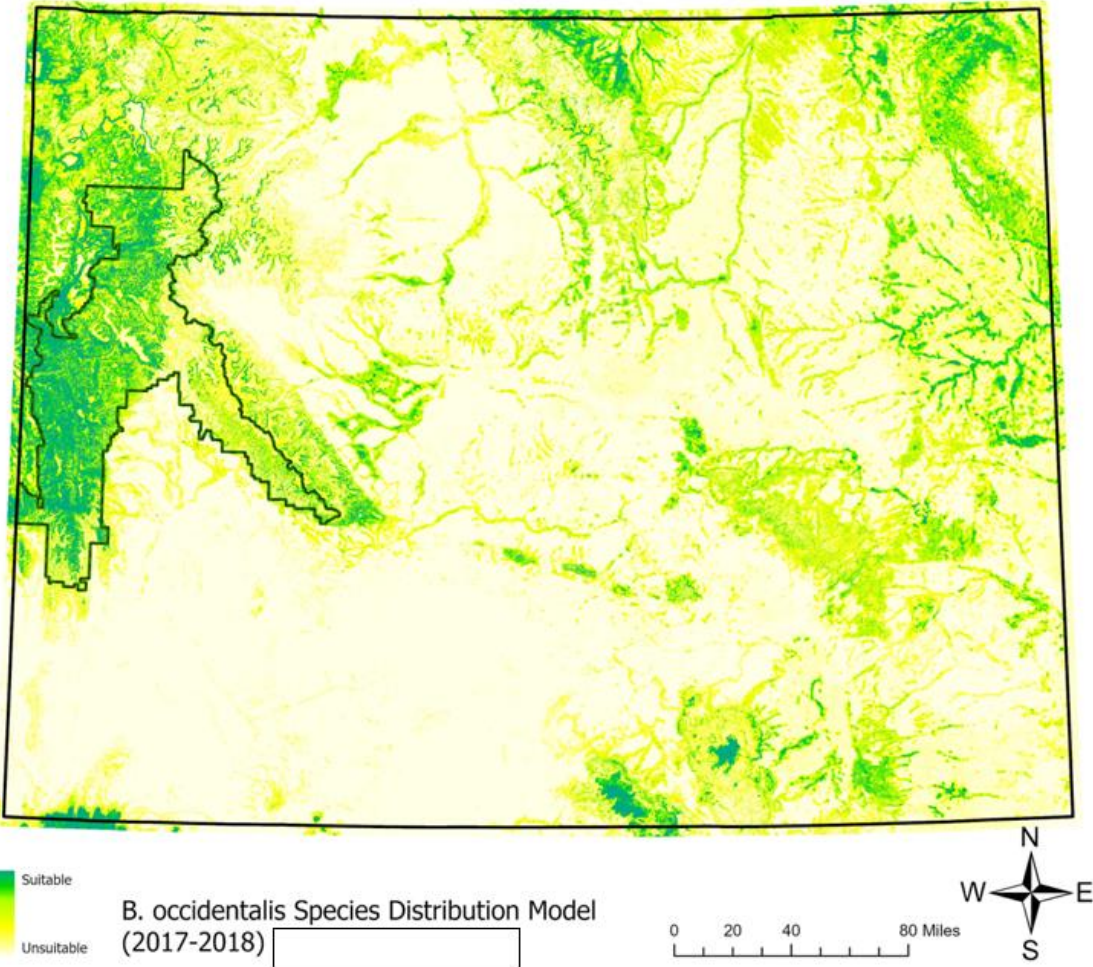


**Table 3.** Status summary based on best available scientific information.

Criteria	Rationale
Distribution on the Bridger-Teton National Forest	<p><i>Bombus occidentalis</i> is currently understood to include two subspecies, <i>B. o. mckayi</i> and <i>B. o. occidentalis</i> (NatureServe 2019). The full range of the species extends along the West Coast and Mountain West of North America, from Arizona, New Mexico and Mediterranean California, north through the Pacific Northwest and Tundra/Taiga region to Alaska. Eastward, the distribution stretches to the northwestern Great Plains and southern Saskatchewan (Hatfield et al 2015; NatureServe 2019).</p> <p>The species' range covers most of Wyoming, including the BTNF, and multiple occurrences have been documented in and around the Forest (Map 2 and Figure 1; GBIF 2019, Koch et al. 2012). Occurrences have been documented within multiple ranger districts, indicating the species is broadly distributed across the Forest.</p> <p>Wyoming provides a novel environment lacking some of the factors thought to drive <i>B. occidentalis</i> population declines, including crops that tend to be pollinated by managed bee colonies, extensive pesticide application and widespread urban development; however, climate change could negatively affect this bumble bee. Areas predicted to be highly suitable for <i>B. occidentalis</i> in Wyoming declined by 5% based on species distribution models constructed from historic (1910-2010) and current (2017-2018) observations; a small decrease compared to declines in the western portion of their range. Predicted habitat suitability in Wyoming increased the most in foothill areas (Figure 2; Tronstad et al. 2025). Tronstad et al. (2025) observed a potential range shift to lower elevations. The increase in suitable habitat in the foothills may be correlated with floral resources. As <i>B. occidentalis</i> is nearly extirpated in large portions of its former range, Wyoming populations may become a stronghold for the species as a whole. Much of the western Bridger-Teton National Forest appears to be suitable western bumblebee habitat (Figure 2).</p>



**Figure 1.** Distribution of *B. occidentalis* in and around Wyoming. Points represent bumble bee collections within the past 100 years, and green polygon is generalized range (Koch et al. 2012).

Criteria	Rationale
	 <p data-bbox="743 1130 1220 1192"><b>B. occidentalis Species Distribution Model (2017-2018)</b></p> <p data-bbox="604 1105 709 1192">Suitable Unsuitable</p> <p data-bbox="1289 1154 1577 1192">0 20 40 80 Miles</p> <p data-bbox="1577 1062 1711 1192">N W E S</p> <p data-bbox="533 1279 1724 1312"><b>Figure 2. <i>B. occidentalis</i> species distribution model, 2017-2018 (from Tronstad et al. 2025).</b></p>
Abundance on the Bridger-Teton National Forest	The species was formerly common throughout much of its range, but due to sharp declines since the late 1990s, particularly in central California, Oregon, Washington and southern British Columbia (Hatfield et al 2015), the current relative abundance of the overall species <i>B. occidentalis</i> is 72% lower than its historical average relative

Criteria	Rationale
	abundance (NatureServe 2019). Where the species remains detectable, it is inferred to occur at lower abundances than it did historically (Hatfield et al. 2015). Nevertheless, many occurrences have been documented on the Forest, indicating that <i>B. occidentalis</i> may be low–moderately common on the BTNF.
Population Trend on the Bridger-Teton National Forest	Overall, the species has declined dramatically in parts of its historic range, sometimes to the point of local extirpation. The decline has occurred over much of its range, especially from southern British Columbia to California (NatureServe 2019; Hatfield et al. 2015). Although population trends on the BTNF have not been monitored, it is plausible that they are declining here as well.
Habitat Trend on the Bridger-Teton National Forest	<p>Bumble bees inhabit a wide variety of natural, agricultural, urban, and rural habitats, although species richness tends to peak in flower-rich meadows of forests and subalpine zones (Jepsen 2014). Nests are typically built in underground cavities such as old rodent nests and in open west-southwest slopes bordered by trees (Hatfield et al. 2015). Bumble bees are generalist foragers that forage on a wide variety of flowering plants (Xerces 2019).</p> <p>Vegetation mapping in Teton County, where several <i>B. occidentalis</i> occurrences have been documented, indicate approximately 57 acres of Montane Mesic Forb Herbaceous Vegetation, which may classify as the subalpine meadows favored by bumble bees, with an additional 23,100 acres of Forests and Woodlands (Cogan and Johnson 2014). Given the generalized nature of <i>B. occidentalis</i> habitat usage, there is likely abundant habitat available throughout the BTNF with variable trends.</p> <p>Climate change may lead to future alterations habitat for pollinators, such as <i>B. occidentalis</i>. Changes in temperature and precipitation may lead to greater variability in forb flowering, which could create an asynchronistic effect with native pollinator emergence (Warziniacket al. in Halofsky et al. 2018; Miller-Struttman et al. 2015), leading to decreased reproduction in native plants. The value of pollinators in natural systems is difficult to quantify (NRC 2007), but as pollinators are critical for successful reproduction and seed set for approximately 85% of flowering species globally (Hatfield et al. 2012), this asynchronistic effect may have profound implications.</p>
Threats to the Species and its Habitat on the Bridger-Teton National Forest	Populations declines have been associated with higher prevalence of the microsporidian <i>Nosema bombi</i> and reduced genetic diversity (Cameron et al. 2011a), and temporal connection between <i>N. bombi</i> epizootics in commercial <i>Bombus</i> stocks and increases in wild populations suggests a substantial risk of pathogen transmission with domestication. (NatureServe 2019). Since <i>B. occidentalis</i> has recently undergone a dramatic decline in range and relative abundance, reduced genetic diversity and other genetic factors make this species especially vulnerable to extinction, and may lead to increased pathogen susceptibility (Jepsen 2014). Insecticides and herbicides also pose serious threats to bumble bees. Neonicotinoids, a class of systemic insecticides whose

Criteria	Rationale
	<p>toxins are extraordinarily persistent and are expressed in the nectar and pollen of plants, exert both lethal and sublethal effects on bumble bees and are of particular concern (Jepsen 2014; NatureServe 2019).</p> <p>In addition to disease, this species is faced with numerous other stressors including habitat loss and alteration due to agricultural intensification, urban development, fire suppression and resulting conifer encroachment, grazing, logging and climate change. Modifications to bumble bee habitat from overgrazing by livestock can be particularly harmful to bumble bees by removing nectar sources, trampling nesting and overwintering sites, and disrupting rodent populations. Rangelands form a major component of ecosystems in the Bridger-Teton National Forest, and there are open rangelands throughout the Forest, which likely overlap <i>B. occidentalis</i> habitat (USFS 2017). While adherence to rangeland management plans will limit the chance of overgrazing, there is potential for impacts to <i>B. occidentalis</i> and habitat to occur.</p> <p>Indirect effects of logging (such as increased siltation in runoff) and recreation (such as off-road vehicle use) also have the potential to alter meadow ecosystems and disrupt <i>B. occidentalis</i> habitat (Jepsen 2014; NatureServe 2019). Monitoring on the BTNF from 2015–2018 indicated that timber harvests in the Rocky Mountain Subalpine-Montane Mesic Meadow (549 acres) biophysical setting (BPS) type was high relative to other BPS types (USFS 2019), which may indicate that the threat of logging is ongoing in habitats preferred <i>B. occidentalis</i>, though sustainable harvest levels as managed by the Forest would presumably prevent this.</p> <p>As discussed above, global climate change also poses a threat to bumble bees and may adversely affecting bumble bee life history, community interactions, and habitat structure. For example, in sub-alpine environments, the effects of a variable climate have caused changes in snowpack and summer precipitation, affecting the spatial and temporal distribution and abundance of several plant species that may be visited by bumble bees. More research is needed to understand the effects of climate change on bumble bee biology and distribution (Cameron et al. 2011b).</p> <p>The above information suggests there is a high level of threats to <i>B. occidentalis</i> and its habitat; although some threats may be minor if properly managed by the Forest (logging and grazing), other major threats (i.e., disease, reduced genetic diversity, climate change) are beyond Forest control.</p>
<p>Date: August 26, 2019</p> <p>Reviewer: Lindsay Chipman</p>	

**Summary and Recommendation**

The Western bumble bee (*Bombus occidentalis*) is widely distributed across western North America and has experienced dramatic declines in the past 20 years. The species wide distribution off the Forest increases the likelihood of recolonization along the borders of the Forest should it become extirpated. Although it has been only recorded in a few locations on the forest, available habitat is well distributed throughout the Bridger-Teton. The Western bumble bee has broad habitat specificity and is likely found in suitable habitat, areas with temporally stable and abundant floral resources, in a variety of vegetation types across the Forest. Habitat probably exists in patches on the Forest, but the species appears to be able to disperse several kilometers during nest establishment. Major threats to Western bumble bee habitat on the Forest include potential overgrazing, invasion of noxious weeds with low-reward flowers, and global climate change. High variability in reproductive success, low recorded numbers of reproduction, reduced genetic diversity, and competition with honey bees all increase the vulnerability of Western bumble bee populations. Infection by pathogens and parasites, presumably introduced by escaped bees from commercial colonies, appear to be a major driver of Western bumble bee declines. Based on its low abundance, declining populations, susceptibility to disease, and numerous vulnerabilities related to its habitat requirements, life history, and demographics, there is substantial concern for the capability of the western bumble bee to persist over the long-term on the Bridger-Teton National Forest and it is recommended as a Species of Conservation Concern.

***Summary and Recommendation Provided by: R. Griebel (January 10, 2020).***

## References

- Cameron, S. A., J. D. Lozier, J. P. Strange, J. B. Koch, N. Cordes, L. F. Solter, and T. L. Griswold. 2011a. Patterns of widespread decline in North American bumble bees. *Proceedings of the National Academy of Sciences* 108:662–667.
- Cameron, S., S. Jepsen, E. Spevak, J. Strange, M. Vaughan, J. Engler, and O. Byers (eds.). 2011b. North American Bumble Bee Species Conservation Planning Workshop Final Report. IUCN/SSC Conservation Breeding Specialist Group: Apple Valley, MN.
- Cogan, D., and S. Johnson. 2013. Final Report: Vegetation and Non-vegetation Cover Type Mapping for Teton County. Jackson, Wyoming. Available online at: <http://www.tetonwyo.org/plan>.
- GBIF (Global Biodiversity Information Facility). GBIF Occurrence Download <https://doi.org/10.15468/dl.dsafvx>. August 26 2019.
- Hatfield, R., Jepsen, S., Mader, E., Black, S.H., Shepherd, M 2012. Conserving bumble bees: guidelines for creating and managing habitat for America’s declining pollinators. The Xerces Society for Invertebrate Conservation.
- Hatfield, R., Jepsen, S., Thorp, R., Richardson, L., Colla, S. & Foltz Jordan, S. 2015. *Bombus occidentalis*. The IUCN Red List of Threatened Species 2015: e.T44937492A46440201. Available at: <http://dx.doi.org/10.2305/IUCN.UK.2015-2.RLTS.T44937492A46440201.en>. Accessed on August 26, 2019.
- Koch, J. J. Strange, and P. Williams. 2012. Bumble Bees of the Western United States. U.S. Forest Service and the Pollinator Partnership. Available at: <http://www.fs.fed.us/wildflowers/pollinators/documents/BumbleBeeGuide2011.pdf>. Accessed on August 26, 2019.
- Jepsen, S. 2014. Species Fact Sheet - *Bombus occidentalis* Greene, 1858. Xerces Society for Invertebrate Conservation. Available at: <https://www.fs.fed.us/documents3/sfs-iihy-bombus-occidentalis-2014-02>. Accessed on August 26, 2019.
- Miller-Struttmann, N.E., Geib, J.C., Franklin, J.D., Kevan, P.G., Holdo, R.M., Ebert-May, D., Lynn, A.M., Kettenbach, J.A., Hedrick, E., Galen, C. 2015. Functional mismatch in a bumble bee pollination mutualism under climate change. *Science*, 349(6255): 1541-1544.
- NRC (National Research Council). 2007. Committee on the status of pollinators in North America. Status of pollinators in North America. Washington, DC: National Academies Press.
- NatureServe. 2019. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available at: <http://explorer.natureserve.org>. Accessed on August 26, 2019.
- Tronstad, L.M.; Bell, C.; Cook, K.; Dillon, M.E. 2025. Using Species Distribution Models to Assess the Status of the Declining Western Bumble Bee (Hymenoptera: Apidae: *Bombus occidentalis*) in Wyoming, USA. *Environments*, 12, 2. <https://doi.org/10.3390/environments12010002>
- USFWS. 2016. Endangered and Threatened Wildlife and Plants; 90-Day Findings on 29 Petitions. Federal Register, 81(51): 14058–14072.
- USFS. 2017. Intermountain Region Bridger-Teton National Forest Grazing Allotment Disposition Management Map. Available at: [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fseprd532173.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd532173.pdf). Accessed on August 26, 2019.

Warziniack, T.W., Elmer, M.J., Miller, C.J., Dante-Wood, S.K., Woodall, C.W., Nichols, M.C., Domke, G.M., Stockmann, K.D., Proctor, J.G., Borchers, A.M. 2018. Chapter 13: Effects of Climate Change on Ecosystem Services, pp. 835-890, In Halofsky, J. E., Peterson, D. L., Ho, J. J., Little, N. J., and Joyce, L. A., editors. Climate Change Vulnerability and Adaptation in the Intermountain Region. Gen. Tech. Rep. RMRS-GTR-xxx. U.S. Department of Agriculture, Forest.

Wyoming Natural Diversity Database. 2019. Wyoming Natural Diversity Database; Data Explorer. Laramie, WY: University of Wyoming.

Xerces (Xerces Society for Invertebrate Conservation). 2019. Bumble bees: western bumble bee (*Bombus occidentalis*). Available at: <https://xerces.org/western-bumble-bee/>. Accessed on August 26, 2019.