SPECIES: Scientific [common]	***Listera convallarioides* [Broad-leaved twayblade]**
Forest:	Bridger-Teton National Forest
Forest Reviewer:	**R.Lehman, K. Clause, Trevor Bloom**
Date of Review:	**5/6/20; 4/3/21; 3/27/25**
Forest concurrence (or recommendation if new) for inclusion of species on list of potential SCC: (Enter Yes or No)	**No**

FOREST REVIEW RESULTS:

1. The Forest concurs or recommends the species for inclusion on the list of potential SCC:
   Yes___ No_X__

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 ___X____

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.)	Habitat	Source of Information[1]
7/18/1999	Unknown	Wyoming, Lincoln County: Salt River Range: Salt River Drainage: along Cedar Creek 3/4 mi E (above) the canyon mouth, ca 5.3 air mi NE of Thayne; ca 17.3 air mi N of Afton. 42.9742° N, 110.9243° W	Growing in moist mossy area under Engelmann spruce around a spring with *Pyrola asarifolia, Platanthera hyperborea, Goodyera oblongifolia*, and *Parnassia fimbriata*. Phenology: flowering. Elev. 6800 ft.	Orval C. Harrison, #735. (Rocky Mountain Herbarium 2020; SEINet 2020; WYNDD GIS 2020)

6/8/1999	Unknown	Wyoming, Teton County: Teton Range: Bridger-Teton National Forest: Jackson Hole Mountain Resort at bottom of Crags Ski Run, ca 10 air mi NNW of Jackson. 43.6052° N, 110.8354° W; uncertainty 1 mi.	Dark, wet humus and clay at edge of aspen/conifer stand with *Veronica americana* and *Corallorrhiza maculata*. Phenology: flowering. Elev. 6820 ft.	Charmaine Delmatier, #8011. with Heidi Gansen and Amy Taylor (Rocky Mountain Herbarium 2020; SEINet 2020; WYNDD GIS 2020)

[1]The Consortium of Pacific Northwest Herbaria was also searched, and no additional occurrences were found (Consortium of Pacific Northwest Herbaria 2020).

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

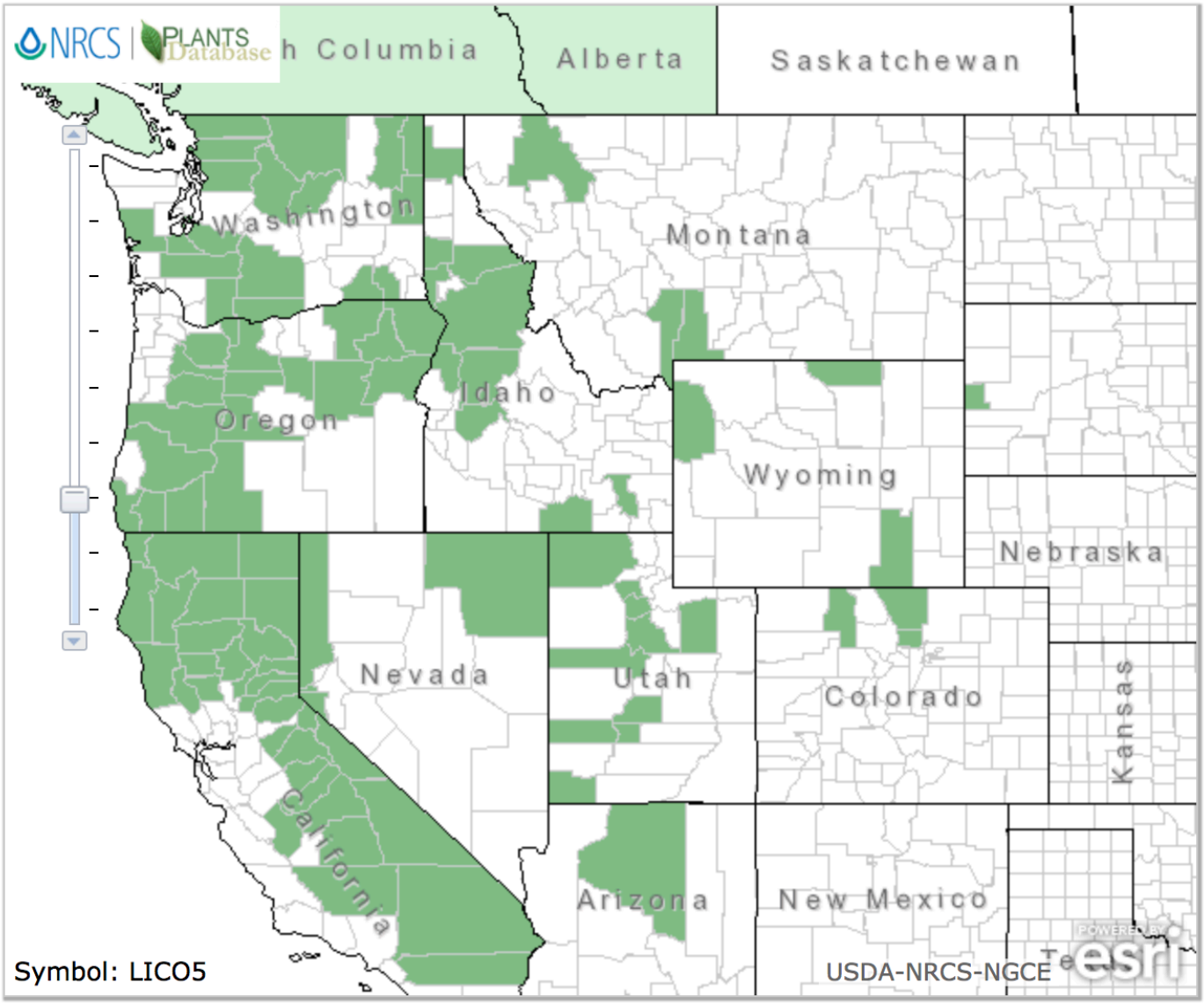
c. For species with known occurrences on the Forest predating 1990, does the weight of evidence suggest the species still occurs in the plan area?

Yes___ No___

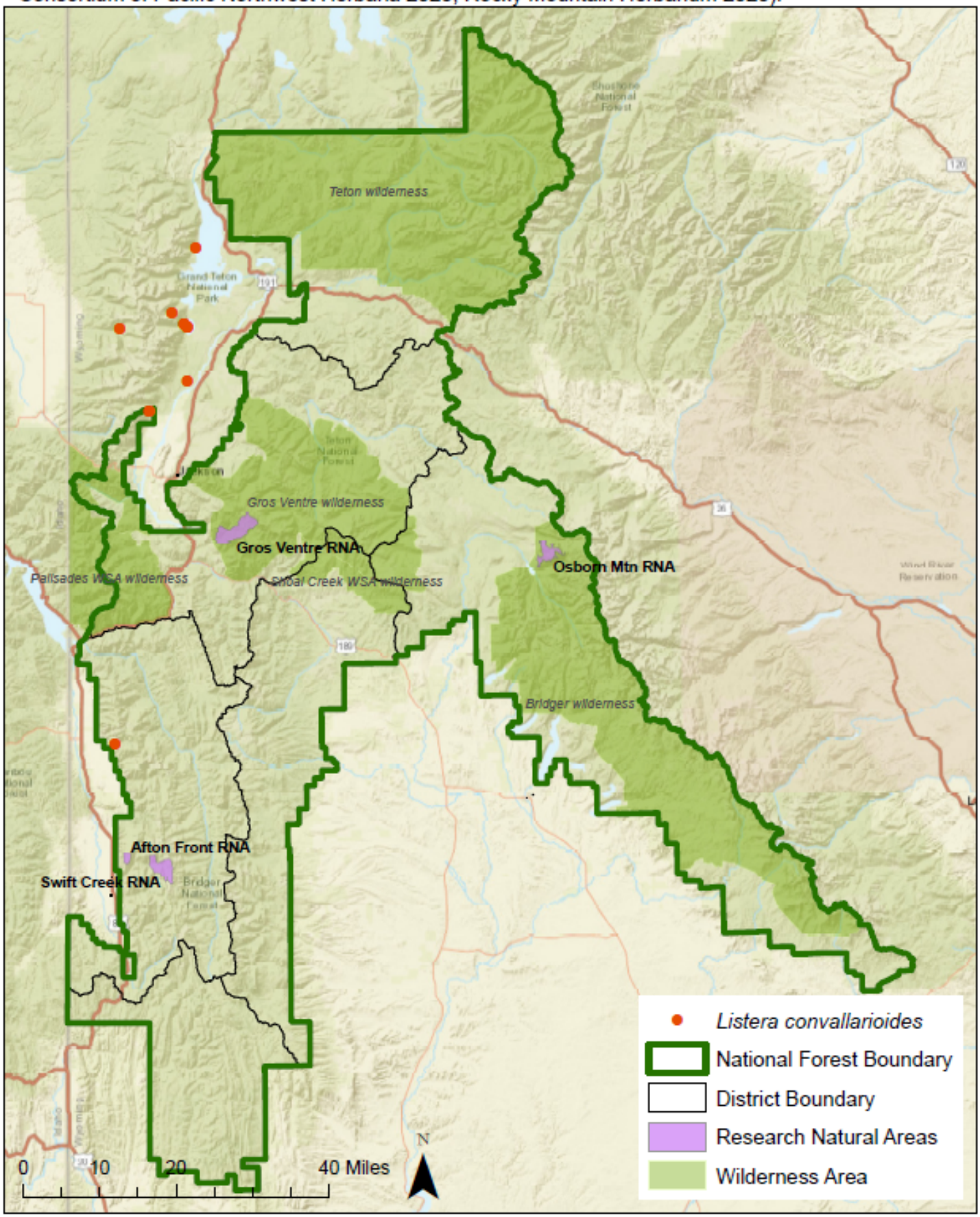
N/A—occurrences have been documented since 1990.

If determination is no, stop assessment

Map 1, *Listera convallarioides* range in Wyoming and surrounding states (NRCS 2020).



Map 2, *L. convallarioides* occurrences in Bridger-Teton National Forest vicinity (SEINet 2020; Consortium of Pacific Northwest Herbaria 2020; Rocky Mountain Herbarium 2020).



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)
NatureServe Global Status	**G5—Secure** *At very low risk of extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.*
NatureServe State Status	**S2S3 – Imperiled to Vulnerable** *At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors; At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors*.
WYNDD	**N/A** **G5/S2S3** *Not a Species of Concern* (Wyoming Natural Diversity Database)
USDA Forest Service	Not listed
USDOI FWS	Not listed
USDOI BLM	Not listed
IUCN	Not listed

Sources: WYNDD 2025; Heidel 2018; USDA Forest Service Regions 2 and 4 Sensitive Species Lists; NatureServe 2020

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

Criteria	Rationale
Distribution on the Bridger-Teton National Forest	*Listera convallarioides* is known from two recent (1999) occurrences on the Bridger-Teton National Forest. Both occurrences are in the central–west portion of the Forest, within moist, forested areas (Table 1, Map 2). Because only two occurrences are known, populations and habitat appears to be few and isolated on the Forest.
Distribution outside the Bridger-Teton National Forest	In eastern North America, *L. convallarioides* ranges from Newfoundland to southern Quebec, southern Ontario, and northeastern Minnesota, south to the northern sections of Wisconsin, Michigan, New York, Vermont, and Maine. In western North America, it ranges from southern British Columbia south to the high elevations of California, Arizona, Neveda, Utah, and Colorado. It is disjunct to South Dakota and scattered

Criteria	Rationale
	locations in northern British Columbia and the Aleutians (NatureServe 2020). The species is widespread across northern part of continent, extending southward only at high elevations (FNA 2020). In Wyoming, it is known from 15 occurrence in the Big Horn, Laramie, Medicine Bow, Seminoe and Teton Ranges, the Sierra Madre and Jackson Hole (Albany, Carbon, Converse, Sheridan, and Teton counties) (WYNDD 2020).
Abundance on the Bridger-Teton National Forest	*Listera convallarioides* can be locally abundant, even where it is uncommon. Large colonies of several hundred plants are not uncommon, forming dense groundcover (USFS 2002). In Wyoming, one occurrence consisted of populations of several hundred individuals near Story in 1985; however, census data are lacking for most other populations (WYNDD 2020). Due to lack of data, abundance on the Bridger-Teton National Forest cannot be assessed.
Population Trend on the Bridger-Teton National Forest	Overall, this species appears to be secure within its primary range (NatureServe 2020). However, population trends in Wyoming, including on the Bridger-Teton National Forest, are unknown (Heidel 2018; WYNDD 2020) due to lack of data.
Habitat Trend on the Bridger-Teton National Forest	*Listera convallarioides* most often grows in circumneutral to somewhat acidic muck in forest seeps and northern white cedar swamps in the eastern part of its range. Some populations grow in moist sand along streams under cedars. In mountainous regions of western North America, it can be found growing with moss and grasses, in damp, often shady spots (USFS 2002). Wyoming populations are along stream banks, lake margins, and moist, shaded areas in *Picea*, *Populus,* and *Pinus contorta* forests and in *Alnus* thickets (WYNDD 2020) at 6400–9000 ft (Markow and Fertig 2000). It is associated with the Riparian, Conifer-transition vegetation group. Riparian and wetland habitats on the Forest are generally protected from anthropogenic disturbances through forest management direction and water regulations, although some riparian and wetland systems in the Intermountain Region have been altered from historical conditions domestic livestock grazing, road construction, and nonnative species (Halofsky et al. 2018). Effects from these activities include changes in stream morphology, discharge, and water availability to riparian ecosystems. To analyze trends in habitat, aerial imagery and a USFS GIS database of existing grazing allotments, invasive plant populations, historical wildfires, trails, roads, Wilderness Areas, and Research Natural Areas (RNAs) was assessed at each occurrence (USFS GIS 2019, Google Earth Pro 2019). Neither occurrence is within a designated wilderness area or research natural area, indicating habitat is not protected from anthropogenic and forest management activities. Harrison #735 is approximately 1 mi from a road and from the Star Valley Ranch housing development. Although The occurrence is on a forested hill side, that may not be commonly visited, its proximity to

Criteria	Rationale
	development and roads indicates habitat is likely experiencing anthropogenic impacts such as trampling. The population also occurs within a range management unit. Grazing can impact wetlands by altering water quality, trampling herbaceous vegetation, increasing bare ground, and facilitating noxious weed expansion in riparian areas. While adherence to rangeland management plans will limit the chance of overgrazing, there is potential for impacts to *L. convallarioides* and its habitat to occur. This occurrence is not within the perimeter of any large fire events nor near non-native plant invasions. Delmatier #8011 is within 0.3 mi of the Teton Village spur AA road, and appears to occur within the Teton Village ski area. This population and its habitat is likely experiencing anthropogenic impacts such as trampling from human presence, recreation, and motor vehicle use. This occurrence is within ~0.5 mi of several non-native plant invasions (*Artemisia absinthium* and *Carduus nutans*), and may potentially experience impacts such as habitat degradation and competition for resources. It is not within the perimeter of any large fire events. Riparian and wetland habitat may be threatened by climate change effects and disturbance or loss of wetland habitat. Changes in flow regimes, such as those from water diversions and dams, impact the amount, season, and timing of flows. This can substantially alter associated riparian and wetland species because of their dependence on fluvial geomorphic process, surface water, and groundwater. Floods are responsible for erosion, transport, and deposition of sediments, as well as the amounts and location of vegetation and debris. Many dominant riparian species, such as cottonwoods and willows, are pioneer species that depend on these events to provide bare, moist substrates necessary for seed germination and plant establishment (Halofsky et al. 2018). Mid-elevation riparian and wetland communities are rated as having a moderate to high sensitivity to climate change, moderate adaptive capacity, and moderate to high vulnerability (Halofsky et al. 2018). Mid-elevation riparian plant species may have the ability to move upward in elevation, but where resilience has been compromised by human uses, these systems may not be able to easily adjust to changes in their environment. Invasive species that already dominate many mid-elevation sites are likely to expand their dominance. As riparian areas become drier, upland species will continue to expand into these sites (Halofsky et al. 2018).
Threats to the Species and its Habitat on the Bridger-Teton National Forest	Timber harvesting, road building, and other human disturbance to habitat and hydrology are likely the most probable threats to *L. convallarioides* persistence (USFS 2002). It may also be threatened by overcollection, loss of moist forest habitat to logging, and impacts from recreation (Markow and Fertig 2000). *Listera convallarioides* is potentially threatened by recreation (WYNDD 2020), but riparian habitat and wetlands on National Forests are generally receive considerations and protections from anthropogenic

Criteria	Rationale
	disturbances through forest management direction and water regulations. These considerations and protections would avoid or minimize adverse effects to special status riparian and wetland plants, such as *L. convallarioides*, where they occur.
Life history and demographic characteristics of the species	*Listera convallarioides* is a perennial herb, mostly 10-35 cm tall, with the stems glandular-pubescent above the leaves and glabrous below. Stems bear a single pair of broadly ovate to nearly round, opposite leaves. The inflorescence is a terminal raceme with 5-25 (up to 35) flowers. Individual flowers are small and yellow-green, with sepals and petals strongly curved back. The lowest petal (lip) is strongly tapered towards the base and has ciliate margins and two rounded bumps (rather than teeth) near the base (FNA 2020; WYNDD 2020). Little is known specifically of *L. convallarioides* biology (USFS 2002). It flowers from June to August or September (USFS 2002, WYNDD 2020). Twayblades have a small nectary that attracts nonspecific small flying insects, and all have a common pollination mechanism. A nectary runs down the middle of the lip, and another lies at the base of the column. An insect that visits the flower touches trigger hairs on the column. A dab of glue squirts on the insect, and the pollinia are immediately dropped on the glue. The stigma is covered for about a day and then is exposed for pollination. This mechanism helps prevent self-pollination (USFS 2002).
Date: 3/18/20 Reviewer: L. Chipman Updated: K. Clause 3/27/25	

Summary and Recommendations
Species (Scientific and Common Name): *Listera convallarioides [Broad-leaved twayblade]*
L.convallarioides is listed as S2S3 (imperiled to vulnerable) in Wyoming and G5 (secure) globally. The species is widespread across northern part of continent, extending southward only at high elevations (FNA 2020). *L. convallarioides* is known from two recent (1999) occurrences on the Bridger-Teton National Forest. Both occurrences are in the central–west portion of the Forest, within moist, forested areas (Table 1, Map 2). Because only two occurrences are known, populations and habitat appear to be few and isolated on the Forest. Wyoming populations are along stream banks, lake margins, and moist, shaded areas in *Picea, Populus*, and *Pinus contorta* forests and in *Alnus* thickets (WYNDD 2020) at 6400–9000 ft (Markow and Fertig 2000). It is associated with the Riparian, Conifer-transition vegetation group. Although the forest has experienced substantial botanical exploration, it is likely that targeted surveys would reveal additional (though few) populations. No return visits or population size estimate has taken place and so an assessment of trend must address the potential risks to existing habitat. This analysis indicates that the two occurrences are potentially threatened by recreation activities such as trampling and motor vehicle use, grazing, and non-native invasive plant invasions (*Artemisia absinthium* and *Carduus nutans)*. However, WYNDD not longer considers this a species of concern. Given the lack of sufficient population status and trend data and globally secure populations indicating that BTNF populations are limited by potential habitat and provide low contribution to rankings, *Listera convallarioides* is not recommended as a SCC at this time.
Evaluator: Rose Lehman Date: 4/3/21; Updated: K. Clause, Trevor Bloom 3/27/25

References

Consortium of Pacific Northwest Herbaria. 2020. Specimen data search. Available at: http://pnwherbaria.org.

Fertig, W. 2000. Status of Plant Species of Special Concern in US Forest Service Region 4 in Wyoming. Prepared for the U.S. Forest Service, by the Wyoming Natural Diversity Database, University of Wyoming. Laramie, WY.

FNA (Flora of North America). 2000. *Listera Convallarioides* — Broad-Leaved Twayblade. FNA Vol. 26 Page 587, 588, 589, 590, 591. Available at: http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242101754.

Google Earth Pro, 2020.0 Aerial photo and mapping analysis. Software version 7.3.2.5776 (64-bit).

Halofsky, J.E., D.L. Peterson, J.J. Ho, N.L. Little, L.A. Joyce, editors. 2018. Climate change vulnerability and adaptation in the Intermountain Region. Gen. Tech. Rep. RMRS-GTR-xxx. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Heidel, B. 2018. Wyoming plant species of concern, March 2018. Wyoming Natural Diversity Database, Laramie, WY. Accompanied by Wyoming plant species of potential concern, with tables of additions and deletions.

Markow, S. and W. Fertig. 2000. State Species Abstract-Wyoming Natural Diversity Database- *Listera*

Convallarioides — Broad-Leaved Twayblade. Available at: http://www.uwyo.edu/wyndd/_files/docs/reports/speciesabstracts/listera_convallarioides.pdf.

NatureServe. 2020. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Internet website: http://explorer.natureserve.org.

Rocky Mountain Herbarium Specimen Database. 2020 University of Wyoming, Department of Botany. Laramie, WY. Internet website: http://rmh.uwyo.edu/data/search.php. Accessed on January 21, 2020.

SEINet. 2020. SEINet data portal. Available at: http://swbiodiversity.org/seinet/collections/index.php.

USDA, National Resources Conservation Service (NRCS). NRCS. 2020. The PLANTS Database. Available at http://plants.usda.gov. National Plant Data Team, Greensboro, NC 27401-4901 USA.

USFS (United States Forest Service). 2002. Conservation Assessment for Broad-Leaved Twayblade (*Listera Convallarioides*). USDA Forest Service, Eastern Region.

Wyoming Natural Diversity Database (WYNND). 2025. Wyoming Natural Diversity Database; Data Explorer. Laramie, WY: University of Wyoming.

WYNND 2020. *Listera Convallarioides* — Broad-Leaved Twayblade. Wyoming Field Guide. Laramie, WY: University of Wyoming, from http://fieldguide.wyndd.org.

WYNDD GIS 2019. GIS data of Wyoming Natural Diversity Database. Bridger Teton National Forest, U.S Forest Service. Department of Agriculture. Data received April 25, 2019.