

SPECIES: Scientific [common]	<i>Carex luzulina var. atropurpurea</i> [Black and purple sedge]
Forest:	Bridger-Teton National Forest
Forest Reviewer:	Jessica Irwin; Rose Lehman
Date of Review:	5/15/20; 1/13/21
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 _____

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 Description	Source of Information
7/26/1963	"Occasional"	U.S.A., Wyoming. 2 miles above Palmer Lake on Doubletop Mountain Trail. 309090.989175, 438236.469919.	Sedge meadow.	Mont E. Lewis #996 EO #1 (WYNDD GIS 2019)
7/31/1990	Unknown	U.S.A., Wyoming, Sublette County: West Slope Wind River Range: 0.5 mi N of Summit Lake, ca 20 air mi NNE of Pinedale. 43.1439° N, 109.7424° W	Wetlands adjacent to small ponds. (# 4973). Occurs with <i>Kalmia microphylla</i> , <i>Trollius laxus</i> . Elev. 10362 ft. In flower and fruit.	Walter Fertig, 4973; EO #5 (Rocky Mountain Herbarium 2020; SEINet 2020; WYNDD GIS 2020)

7/26/1991	Unknown	U.S.A., Wyoming, Sublette County: West Slope Wind River Range: West slope of Mount 11747, ca 0.25 mi due W of North Fork Peak, 0.25 mi E of Hat Pass, ca 18 air mi ENE of Pinedale. 42.9603° N, 109.5156° W	Subalpine rocky meadow on western flank of mountain. Bordering subalpine marsh, but soil drier; mesic but not saturated. Elev. 10600-11740 ft.	Walter Fertig, 10342; EO #7 (Rocky Mountain Herbarium 2020; SEINet 2020; WYNDD GIS 2019)
8/21/1991	Unknown	U.S.A., Wyoming, Sublette County: West Slope Wind River Range: Rainbow Lake; ca 24.5 air mi E of Pinedale. 42.89083° N, 109.39806° W; uncertainty 1 mi.	Grassy clearing in narrow basin at southwest corner of lake. Occurs with <i>Salix glauca</i> var. <i>villosa</i> . Elev. 10370-10520 ft. Phenology: flowering & fruiting.	Walter Fertig, 11982; EO #8 (Rocky Mountain Herbarium 2020; SEINet 2020; WYNDD GIS 2019)
7/19/1991	Unknown	U.S.A., Wyoming, Sublette County: West Slope Wind River Range: Black Joe Creek Canyon; ca 36 air mi E of Pinedale. 42.74417° N, 109.17917° W; uncertainty 1 mi.	Wet, boulder-strewn open banks of creek. Elev. 9800-10000 ft. Phenology: fruiting.	Walter Fertig, 9794; EO #6 (Rocky Mountain Herbarium 2020; SEINet 2020; WYNDD GIS 2019)
8/5/1994	Unknown	U.S.A., Wyoming, Teton County: Gros Ventre Area: northeast flank of Steamboat Peak and NW 0.5 air mi, 6-7 miles west of Granite Hot Springs and 1 mile west of the county line. 43.3853° N, 110.3127° W	Alpine meadows of limestone/calcareous substrate. Elev. 10200-10400 ft. Phenology: fruiting.	Ronald L. Hartman, 49296; EO #10 (Rocky Mountain Herbarium 2020; SEINet 2020; WYNDD GIS 2019)
8/2/1994	Unknown	U.S.A., Wyoming, Sublette County: Gros Ventre Area: 1-1.5 air mi S and SW of Red Hills. 43.3424° N, 110.2343° W; uncertainty 2 mi.	Lakeside and meadows. Elev. 9800-10500 ft. Phenology: fruiting.	Ronald L. Hartman, 49135 with Tom Cramer (Rocky Mountain Herbarium 2020; SEINet 2020)

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?

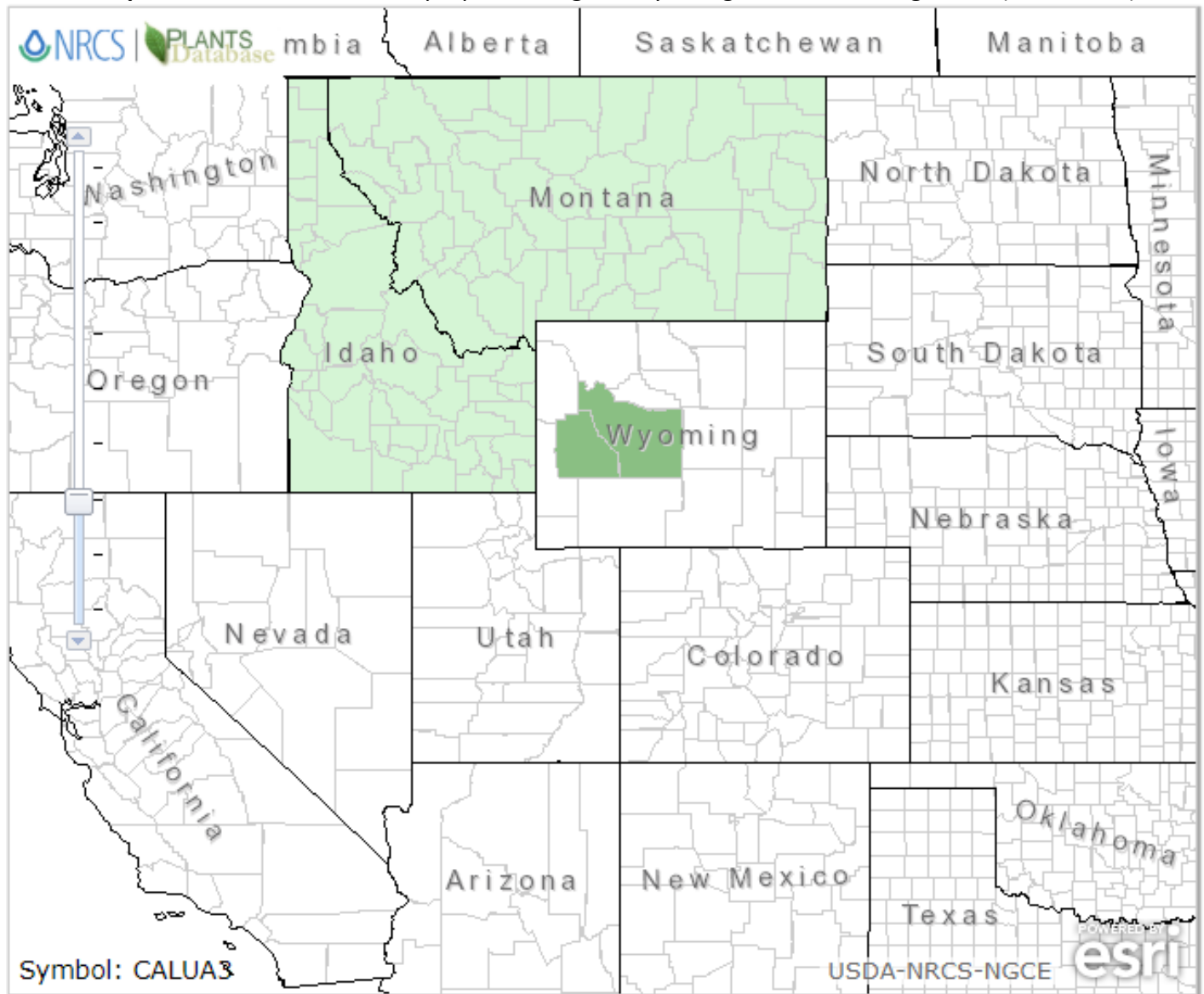
Yes___ No___

Provide explanation for determination

N/A—Occurrences have been documented since 1990.

If determination is no, stop assessment

Map 1, *Carex luzulina* var. *atropurpurea* range in Wyoming and surrounding states (NRCS 2020).

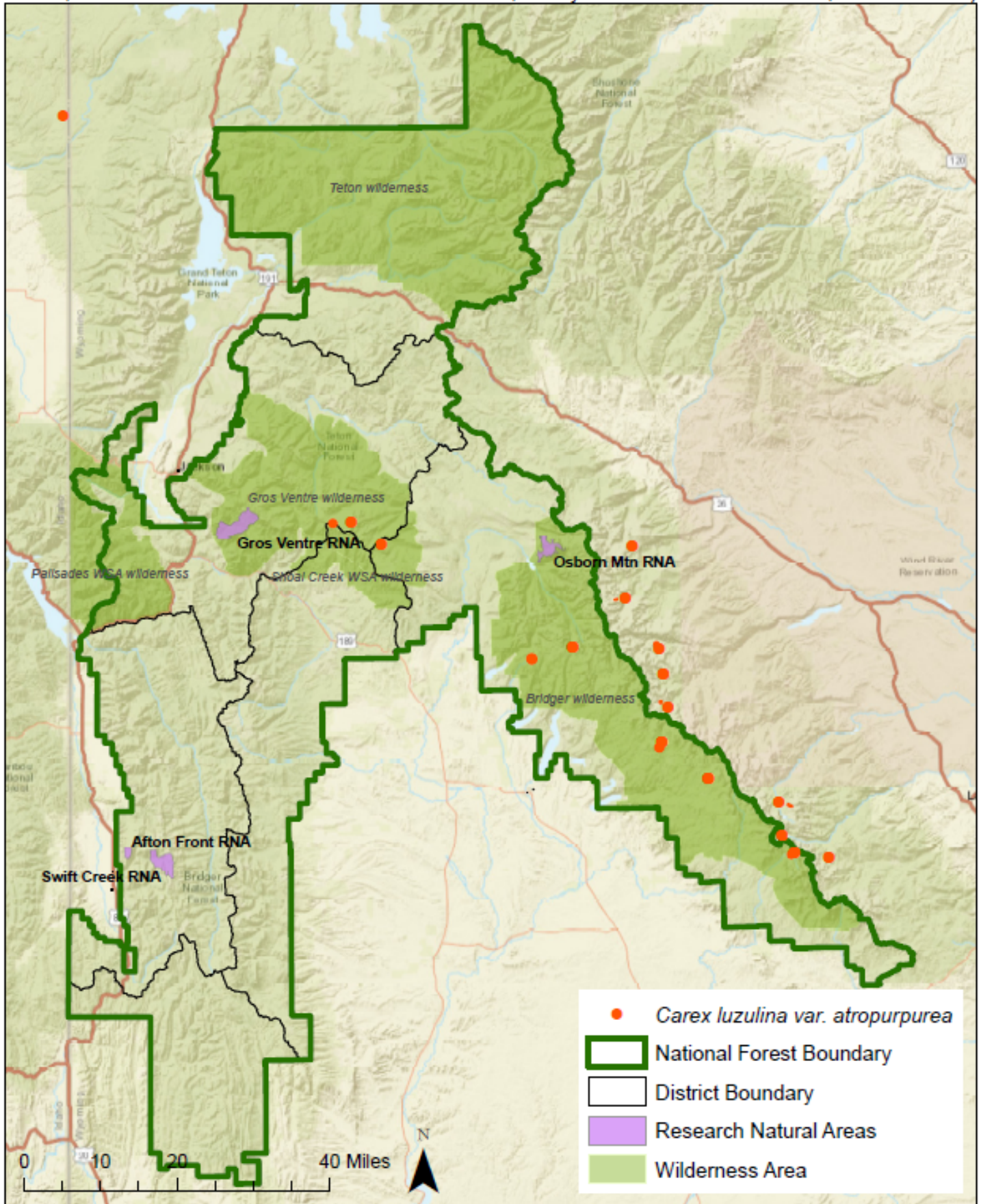


- | | | | |
|---|---|---|--|
| <input checked="" type="checkbox"/> Native | <input type="checkbox"/> Introduced | <input type="checkbox"/> Both | <input type="checkbox"/> Absent/Unreported |
| <input type="checkbox"/> Native, No County Data | <input type="checkbox"/> Introduced, No County Data | <input type="checkbox"/> Both, No County Data | |

Native Status:

- L48
 AK
 HI
 PR
 VI
 NAV
 CAN
 GL
 SPM
 NA

Map 2. *C. luzulina* var. *atropurpurea* occurrences in Bridger-Teton National Forest vicinity (SEINet 2020; Consortium of Pacific Northwest Herbaria 2020; Rocky Mountain Herbarium 2020, WYNDD 2019).



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	<p>G5T3— Secure/Apparently Secure</p> <p>G5 – <i>Common; widespread and abundant.</i></p> <p>T3 – <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>
NatureServe State Status	<p>S2— Imperiled</p> <p><i>At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.</i></p>
WYNDD	<p>Plant Species of Concern</p> <p><i>Species vulnerable to extirpation at the global or state level due to:</i></p> <ul style="list-style-type: none"> <i>a. their rarity (e.g., restricted distribution, small population size, low population density)</i> <i>b. inherent vulnerability (e.g., specialized habitat requirements, restrictive life history)</i> <i>c. threats (e.g., significant loss of habitat, sensitivity to disturbances)</i> <p>(Wyoming Natural Diversity Database - Species of Concern)</p>
USDA Forest Service	<p>Region 4: Sensitive Species</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"> <i>a. Significant current or predicted downward trends in population numbers or density.</i> <i>b. Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.</i> <p>(FSM 2670.5 – Threatened, Endangered & Sensitive Species)</p>
USDOI FWS	Not listed
USDOI BLM	Not listed
IUCN	Not listed

Sources: WYNDD 2020a; 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	<i>Carex luzulina</i> var. <i>atropurpurea</i> is known from seven occurrences on the Bridger-Teton National Forest, six of which were discovered after 1990. Occurrences are primarily in the lower–western portion of the Forest, on subalpine meadows and wetlands (Table 1, Map 2).
Distribution outside the Bridger-Teton National Forest	<i>Carex luzulina</i> var. <i>atropurpurea</i> is a regional endemic of eastern Idaho, southwestern Montana, and western Wyoming (MNHP 2020). In Wyoming, it is known from the Wind River and Gros Ventre ranges in Fremont, Sublette, and Teton counties (Mills and Fertig 2000; WYNDD 2020b).
Abundance on the Bridger-Teton National Forest	The size of individual populations is unknown (Mills and Fertig 2000; WYNDD 2020b); therefore, abundance on the Bridger-Teton National Forest cannot be assessed due to lack of data.
Population Trend on the Bridger-Teton National Forest	Population trends are unknown (Mills and Fertig 2000; WYNDD 2020b); therefore, trends on the Bridger-Teton National Forest cannot be assessed due to lack of data.
Habitat Trend on the Bridger-Teton National Forest	<p>This species inhabits subalpine moist rocky sedge or willow-dominated meadows along streamsides and ponds at 10,000 to 10,600 ft (Mills and Fertig 2000; MNHP 2020; WYNDD 2020b). Because alpine vegetation and barren rock mainly occur in designated wilderness, roadless, or remote areas where human interference disturbance is minimal, alpine communities are considered to be relatively stable.</p> <p>To analyze trends in occupied habitat, aerial imagery and a USFS GIS database of invasive plant populations, historical wildfires, trails, roads, Wilderness Areas, and Research Natural Areas was assessed at each contemporary occurrence on the Forest (USFS GIS 2019, Google Earth Pro 2020).</p> <ul style="list-style-type: none"> • Hartman #49296: Within Gros Ventre wilderness area; not within livestock grazing allotment or perimeter of major fire event; further than 1 mile from mapped non-native plant invasions and roads and trails • Hartman #49135: Within Gros Ventre wilderness area; not within perimeter of major fire event; within 1 mile of non-motorized trail, but no motorized roads or trails in vicinity; further than 1 mile from mapped non-native plant invasions • Lewis #996: Within Bridger wilderness area; within 1 mile of non-motorized trail, but no motorized

Criteria	Rationale
	<p>roads or trails in vicinity; not within RMU or perimeter of major fire event; further than 1 mile from mapped non-native plant invasions</p> <ul style="list-style-type: none"> • Fertig #4973: Within Bridger wilderness area; within 1 mile of non-motorized trail, but no motorized roads or trails in vicinity; not within RMU or perimeter of major fire event; further than 1 mile from mapped non-native plant invasions • Fertig #10342: Within Bridger wilderness area; within 1 mile of non-motorized trail, but no motorized roads or trails in vicinity; within RMU; near or within the perimeter of 1988 Fayette Fire; further than 1 mile from mapped non-native plant invasions • Fertig #11982: Within Bridger wilderness area; within 1 mile of non-motorized trail, but no motorized roads or trails in vicinity; within RMU; further than 1 mile from mapped non-native plant invasions • Fertig #9794: Within Bridger wilderness area; within 1 mile of non-motorized trail, but no motorized roads or trails in vicinity; within RMU; further than 1 mile from mapped non-native plant invasions <p>The above analysis indicates habitat for <i>D. paysonii</i> has likely experienced low to moderate levels of impacts from natural and anthropogenic disturbances. Climate change will likely contribute to further habitat alterations as described below.</p>
<p>Threats to the Species and its Habitat on the Bridger-Teton National Forest</p>	<p>Potential threats include grazing (most likely by sheep) and habitat disturbance (Mills and Fertig 2000). As indicated under the habitat assessment above, all known occurrences are found in designated Wilderness areas, indicating that threats from human disturbances are low.</p> <p>However, alpine communities are possibly the ecosystems in the region that are most at risk from the effects of climate change because of their shrinking habitat. According to Intermountain Adaptation Partnership assessments, alpine communities have a high sensitivity to climate change, a low adaptive capacity, and very high vulnerability to climate change (Halofsky, et al. 2018). Climate change is expected to cause increasingly warmer and wetter conditions, with worsening summer drought, and alpine areas may transition from snow-dominated to rain-dominated. An extended growing season is projected to occur in the alpine which can result in interspecific competition for resources, changes in plant community composition and displacement of rare plant populations where they currently occupy specific niches (Halofsky et al. 2018).</p> <p>Alpine systems are dependent on snowfields and gradual snowmelt to maintain moisture for vegetation. Warming temperatures, increased drought, and changes in the depth and persistence of snowpack, surface water flow, and timing of peak runoff are projected to greatly affect alpine habitat in the Intermountain Region (Halofsky et al. 2018). The composition and distribution of alpine ecosystems will be affected by decreasing snowpack. For high-elevation vegetation, climate change may affect seed germination and survival</p>

Criteria	Rationale
	<p>by modifying moisture availability and therefore result in reduced plant success. Specific effects will depend on vulnerability thresholds of the characteristic species and the rate and magnitude of changes over time. Reduced snowpack with warming is likely to cause major changes in alpine plant communities (Halofsky, et al. 2018).</p> <p>Some loss of alpine vegetation communities, especially mesic meadows, attributed to upslope migration of trees and shrubs may occur (Halofsky et al. 2018). Some, subalpine communities may have potential to migrate higher in elevation as a response to changing conditions, but this may be limited by underdeveloped soils at higher altitudes. Furthermore, the rate of climatic change in alpine communities may outpace the ability of species to shift their distribution (Ash et al. 2016; Dirnbock et al. 2011). Other communities may already exist at the highest elevations in the BTNF and, therefore, may have limited upward migration potential.</p> <p>Rare plant populations that may be small, isolated, tied to snowpack abundance and distribution timing changes of spring thaw and fall frost cycles, and/or have limited dispersal capacity, are highly vulnerable to impacts from environmental change including reductions in pollination (Ellstrand and Diane 1993, Halofsky et al. 2018). Changes in temperature and precipitation may lead to greater variability in forb flowering, which could create an asynchronistic effect with native pollinator emergence (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, 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>
Life history and demographic characteristics of the species	This is a perennial plant with clumped stems reaching 15-60 dm in height. Leaves are crowded near the base with flat blades that are 2-4 mm wide. The lower spikes are pistillate, 1-3 cm long, and are borne on erect stalks. Scales of the pistillate spikes are blackish or brownish-purple and pointed at the tip; the perigynia are pubescent with three stigmas and develop into three-sided achenes. The terminal spike is staminate, at least at the top. Flowering and fruiting occur from July to August (Mills and Fertig 2000; MNHP 2020; WYNDD 2020b).
Date: April 3, 2020 Reviewer: L. Chipman	

Summary and Recommendations

Species (Scientific and Common Name): *Carex luzulina* var. *atropurpurea* (black and purple sedge)

Carex luzulina var. *atropurpurea* is listed as S2 (imperiled) and G5T3 (secure/apparently secure) globally. It is regionally endemic to eastern Idaho, southwestern Montana, and western Wyoming (MNHP 2020). In Wyoming, it is known from the Wind River and Gros Ventre ranges, with seven occurrences in wilderness areas on the Bridger-Teton Forest. Plants grow in subalpine moist rocky sedge or willow-dominated meadows along streamsides and ponds at elevations above 10,000'.

Population trends cannot be assessed due to lack of data. Indeed, six occurrence reports are greater than 25 years old and the seventh dates to 1963. There are no reports of re-visitation and therefore conservation assessment must solely address habitat and potential threats. Potential threats include grazing (most likely by sheep) and recreational disturbance from wilderness hikers and livestock (Mills and Fertig 2000). Wildfire, roads and invasive plant reports are all absent from within one mile. Long term changes in weather patterns which alter snowpack and drought conditions are expected to have a pronounced effect on alpine/subalpine ecosystems and could negatively affect the ability *C. luzulina* var. *atropurpurea* to persist.

Despite potential threats and absence of data, plant populations may be considered more removed from anthropogenic disturbance due to their presence entirely on wilderness designated lands. Furthermore, wetlands receive considerations and protections from disturbances through forest management direction and water regulations. These considerations and protections would avoid or minimize adverse effects. Thus, it is therefore recommended that this taxon not be added as a SCC.

Evaluator: Jessica Irwin & Rose Lehman Date: 04/09/2020; 1/13/21

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