SPECIES: Scientific [common]	*Ericameria discoidea var. linearis* or ***Ericameria linearis**** [narrowleaf goldenbush]
Forest:	Bridger-Teton National Forest
Forest Reviewer:	J.Irwin & R.Lehman
Date of Review:	5/7/20; 01/13/21
Forest concurrence (or recommendation if new) for inclusion of species on list of potential SCC: (Enter Yes or No)	No

***Current accepted name in Flora of North America and recognized by WYNDD**
(http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250066525; Heidel 2018)

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[1]
8/13/1995	Unknown. Plants densely matted	BTNF. Jackson Ranger District. Adjacent to Cottonwood Creek trail on west bank of Cottonwood Creek, ca 0.3 miles north of confluence with Sohare Creek. 280685.608636, 493867.20574	Dry brownish clay soil in *Artemisia cana* community on level terrace above current floodplain of creek. Cover typically low in occupied microsites. Absent from bare, disturbed soil of pocket gopher mounds. Surrounding area appears to	Hartman EO #5 (WYNDD 2019)

			have been burned. In flower and fruit.	
8/25/1990	Unknown	BTNF. Jackson Ranger District. North side of Purdy Creek, ca 0.75 miles north of confluence with South Fork Fish Creek.	Whitish clay flat on point of ridge; cushion plant and bunchgrass community in openings in *Artemisia tridentata* grassland.	Nelson EO # 6 (WYNDD 2019)
8/25/1990 and 8/14/1995	12 plants observed in small patch.	BTNF. Jackson Ranger District. North bank of South Fork Fish Creek ca 0.8 miles east of confluence with North Fork. 284759.188018, 489421.980285	Flood plains. Occurs with *Antennaria umbrinella, Castilleja flava*.	Hartman (1990) Fertig (1995) EO #6 (WYNDD 2019)
8/14/1995	Unknown	BTNF. Jackson Ranger District. Along Purdy Creek. 288484.816062, 490752.908596	Whitish clay slope.	Nelson EO # 6 (WYNDD 2019)
8/14/1995	37 plants in 25-50 square feet. Mix of age classes and sizes.	BTNF. Jackson Ranger District. South bank of North Fork Fish Creek, ca 0.75 miles northeast of confluence with Deer Creek.	Edge of *Pinus contorta* woods and *Artemisia tridentata* var. *vaseyana* dry meadow on terrace above creek on fine clay-sandy soil with little to no gravel and abundant needle duff.	Fertig (1995) EO #6 (WYNDD 2019)
8/14/1995	33 clusters observed in an ca 50 square feet.	BTNF. Jackson Ranger District. South bank of North Fork Fish Creek, ca 0.75 miles northeast of confluence with Deer Creek.	Edge of *Pinus contorta* woods and *Artemisia tridentata* var. *vaseyana* dry meadow on terrace above creek on fine clay-sandy soil with little to no gravel and abundant needle duff. Occurs with *Rosa sayi, Stipa nelsonii, Bromus carinatus, Campanula rotundifolia, Astragalus alpinus*.	Fertig (1995) EO #6 (WYNDD 2019)
8/11/1995	86 plants observed in ca 1 acre, estimated 200-300 and second collection ca 2000-3000 plants in 2-3 acres.	BTNF. Jackson Ranger District. Along north bank of South Fork Fish Creek between Devils Basin and Little Devils Basin creeks	Habitat atypical in having high cover of trees and shrubs and second collection in gaps between sagebrush on clayey soil. Mostly in flower and fruit, while those in shadier sites tend to have a higher percentage of plants in bud and few to none in fruit. Elevation approximately 7,800 feet.	Fertig EO #7 (WYNDD 2019)
8/23/1990	Unknown	BTNF. Jackson Ranger District. Ca 0.3 mile up	Sagebrush knolls and semi-barren clay flats.	Nelson (1990) EO #7 (WYNDD 2019)

		Devils Basin Creek from mouth.		
8/11/1995	Ca 50-100 plants observed. Locally abundant	BTNF. Jackson Ranger District. Ca 0.3 mile up Devils Basin Creek from mouth.	Sagebrush knolls and semi-barren clay flats. Occurs with *Galium boreale, Anemone multifida.*	Fertig (1995) EO #7 (WYNDD 2019)
8/11/1995	621 flowering observed in one colony. Total population estimated at 1500	BTNF. Pinedale Ranger District. South Fork Fish Creek, Teton County, Wyoming	On barren clay flats on terrace above South Fork Fish Creek. Plants tend to form broad mats and are usually clustered.	Fertig EO #16 (Fertig 1996).
8/13/1995	26 plants along both sides of road in 2 acres. All relatively large and sprawling. Large individual rosettes may actually represent several smaller and clustered plants.	BTNF. Jackson Ranger District. Terrace ca 0.15 miles north of Cottonwood Creek, adjacent to Cottonwood Creek Road (Forest Service Road 30410) just after junction with Fish Creek Road (Forest Service Road 30411), ca 3.5 air miles southeast of Upper Slide Lake.	*Artemisia tridentata* var. *vaseyana-Chrysothamnus nauseosus-Elymus lanceolatus* community on sandy-clay soils with surface layer of river cobbles and gravel on old floodplain terrace and barrow pits. Most numerous on dry flats with low vegetative cover.	Fertig EO #17 (WYNDD 2019)
8/1/1998	20-30 plants.	BTNF. Pinedale Ranger District. West bank of the Green River, north of Lower Green River Lake, along the trail immediately before the Green River Lake bridge, ca 0.3 miles east of the Green River Lakes Campground.	*Artemisia cana*/*Purshia tridentata* meadow on rocky clay terrace on riverbank at edge of *Pinus contorta* woods. Occurs with *Artemisia frigida, Poa secunda*.	Fertig and Welp EO #19 (WYNDD 2019)

[1]The Consortium of Pacific Northwest Herbaria (2020) data portal, Rocky Mountain Herbarium Specimen Database (2020), and SEINet data portal (2020) were also searched, and no additional occurrences on the Bridger-Teton National Forest were found.

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?

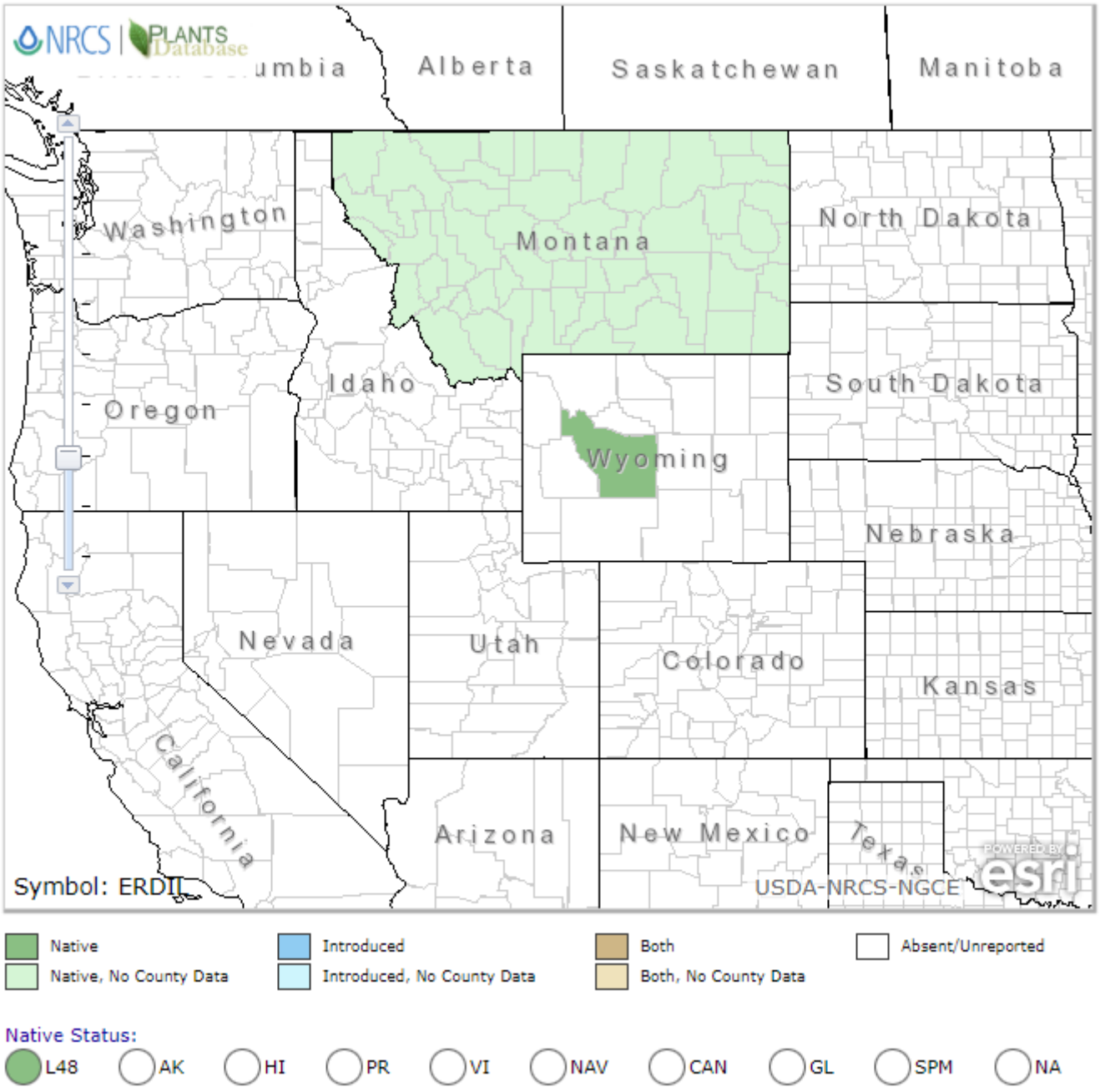
Yes___ No___

Provide explanation for determination

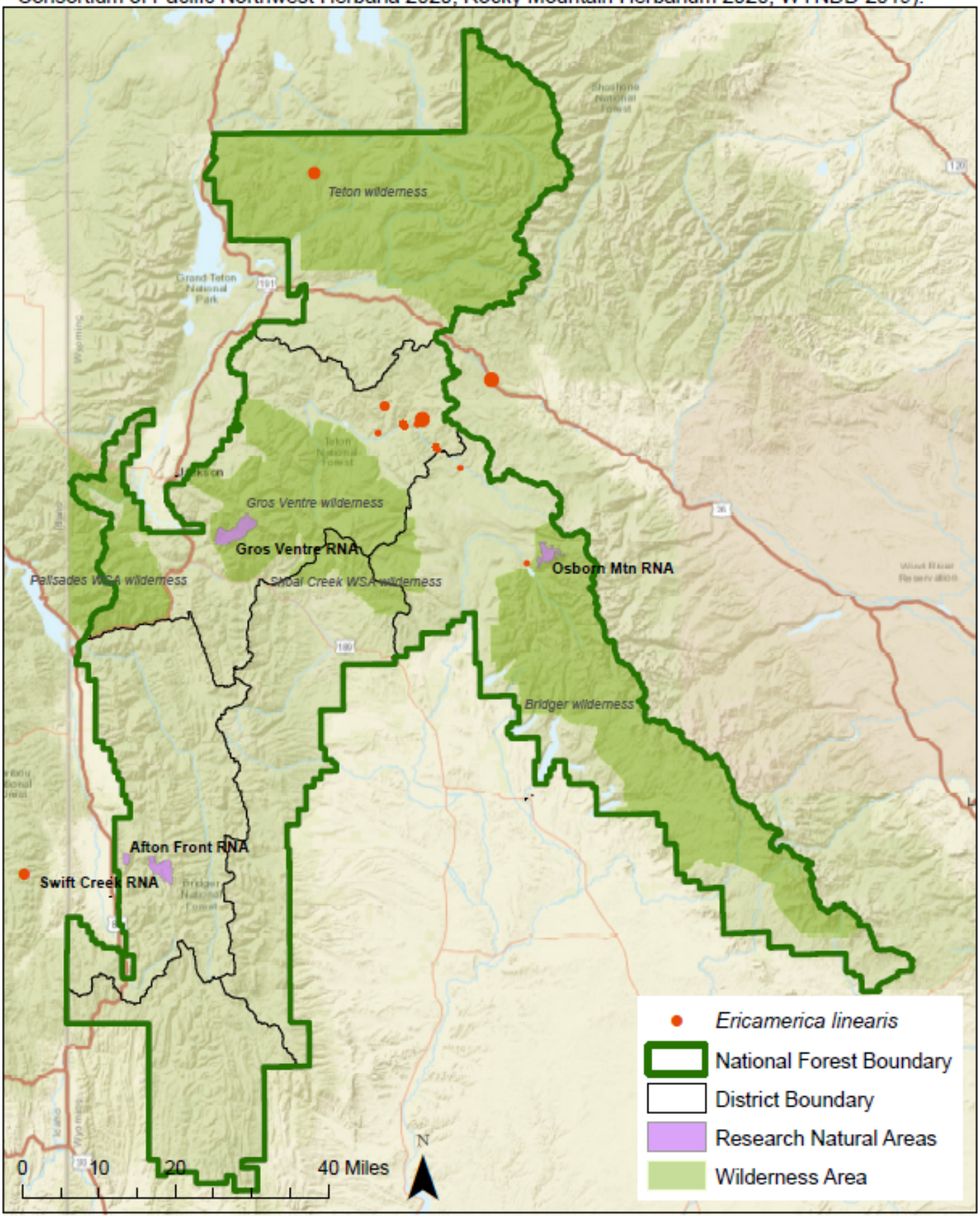
N/A–Occurrences have been documented since 1990.

If determination is no, stop assessment

Map 1, *Ericameria discoidea var. linearis* in Wyoming and surrounding states (NRCS 2020).



Map 2, *E. linearis* 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	**G4/G5—Apparently Secure/ Secure** *Uncommon but not rare; some cause for long-term concern due to declines or other factors.* *Common; widespread and abundant.*
NatureServe State Status	**S2—Imperiled** *At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.*
WYNDD	**Plant Species of Concern** *Species vulnerable to extirpation at the global or state level due to:* *a. their rarity (e.g., restricted distribution, small population size, low population density)* *b. inherent vulnerability (e.g., specialized habitat requirements, restrictive life history)* *c. threats (e.g., significant loss of habitat, sensitivity to disturbances)* (Wyoming Natural Diversity Database - Species of Concern)
USDA Forest Service	**Region 4 Sensitive** *Those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by* *a. Significant current or predicted downward trends in population numbers or density.* *b. Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.* (FSM 2670.5 – Threatened, Endangered & Sensitive Species)
USDOI FWS	Not listed
USDOI BLM	Not listed
IUCN	Not listed

Sources: WYNDD 2020; 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	There are likely six extant element occurrence populations in BTNF (Table 1 and Map 2). Most are located in the Jackson Ranger District in the central area of the national forest. One historic (1928) occurrence was identified in the Teton Wilderness but has not been relocated since first discovery.
Distribution outside the Bridger-Teton National Forest	Regional endemic of southwest Montana and northwest Wyoming. In Wyoming, known from the southern Absaroka and northern Wind River Ranges, Overthrust Belt and Yellowstone Plateau (Fremont, Park, Sublette, and Teton counties). Known from 23 occurrences in Wyoming (WYNDD 2020). Occurs in Yellowstone National Park and on lands managed by Shoshone National Forests and the BLM Kemmerer Field Office (WYNDD 2020). Surveys in 1995 focused on streamside terrace and badlands habitats in the Gros Ventre River, Fish Creek, Blackrock Creek, and Spread Creek drainages on BTNF. Some potential habitat was also investigated along the Green River in conjunction with a status survey for another BTNF Sensitive plant. No populations were located along the main stem of the Gros Ventre and Green rivers nor along Spread and Black Rock creeks (Fertig 1996).
Abundance on the Bridger-Teton National Forest	Census data are lacking for most occurrences, but those populations that have been surveyed are usually very small in number and area. Populations in the Gros Ventre River drainage typically contain 12-2000 individuals in areas of 0.5-10 acres (WYNDD 2020, Fertig 2000).
Population Trend on the Bridger-Teton National Forest	Apparently stable or possibly benefiting from low levels of recreation disturbance, although trend data are lacking for most occurrences (WYNDD 2020).
Habitat Trend on the Bridger-Teton National Forest	In dry open, usually rocky or sandy places in montane sagebrush grasslands, on talus and scree, in subalpine meadows and alpine fellfields, and on gravel bars along streams. Wyoming populations are mainly on semi-barren whitish clay flats and steep slopes including clay-rich or cobblestone terraces above large streams, also on sandy-gravel bars and shores and stream terraces at the ecotone of sagebrush and *Pinus contorta* stands, with *Artemisia cana*, *A. tridentata* var. *vaseyana, Chrysothamnus viscidiflorus*, and *Poa secunda* (WYNDD 2020, Fertig 2000). is usually absent from adjacent sites with high shrub or tree cover, suggesting that it is unable to become established or persist in sites with high competition for light and space. Occasionally, however, small colonies can be found in semi-shaded ecotonal areas between sagebrush and lodgepole pine

Criteria	Rationale
	communities (Fertig 1996).
Threats to the Species and its Habitat on the Bridger-Teton National Forest	Threats are likely low on BTNF. The species is not preferred browse for livestock. Some populations could be impacted by mineral exploration and development on erosive soils (Fertig 2000, WYNDD 2020). *Ericameria discoidea var. linearis* may be dependent on low-level disturbances for the creation or maintenance of suitable microhabitats. Several small colonies have been observed along trails or roadsides on BTNF, suggesting that the plants are capable of withstanding some disturbance (Fertig 1996). The construction of new roads and trails, however, should be discouraged in occupied habitat to prevent inadvertent loss of habitat. Water development projects involving flooding of streamside terrace habitat is a potential threat in the Gros Ventre River drainage (Fertig 1996). Climate change is likely a significant threat to forest and nonforest ecosystems of the Intermountain West. Projections for the Intermountain Adaptation Partnership region estimate that average annual minimum and maximum temperatures are likely to increase by 5 to 12 deg F, mean annual precipitation will remain the same or increase slightly, extreme events (e.g., drought and extreme precipitation events) will occur more frequently and be more severe, and greenhouse gas concentrations will continue to increase through the end of the 21st century. Increased minimum daily temperatures have resulted in longer frost-free periods. Projections vary by subregion, but even where precipitation is projected to increase slightly, higher temperatures are likely to increase effective drought and soil water deficit (Halofsky et al. 2018). Sagebrush steppe habitats are projected to experience an increased risk of wildfires and greater risk of invasive species invasion (which tend to become more frequent with wildfires outside of natural fire regimes in this habitat type), such as cheatgrass, halogeton, and Russian thistle (Halofsky et al. 2018). The invasion of cheatgrass can increase the fire-return intervals, further exasperating threats. Historical land management practices have often negatively impacted native sagebrush steppe communities, and alongside fire suppression policies, is thought to be a contributor to annual grass invasions and conifer encroachment. 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 (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-Struttmann 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.

Criteria	Rationale
	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). • Hartman EO #5: Adjacent to Cottonwood Creek trail. Within 1991 Dry Cottonwood fire burned area. Invasive *Carduss nutans* polygons mapped approximately 1 mile south. No other disturbances identified in the area. • Hartman (1990) and Fertig (1995) EO #6: Along South Fork Fish Creek trail. No other disturbances identified in the area. • Nelson EO # 6 : Along Purdy Basin trail. Location partially in 2006 Purdy Fire burn area. No other disturbances identified in the area. • Fertig EO #7: No disturbances identified in the area. • EO #17: On both sides of FS Road 30410, a dirt road suitable for passenger cars. No other disturbances identified in the area. • Fertig and Welp EO #19: Along trails and near a campground. Large *Cirsium arvense* polygon approximately 0.15 mile east. No allotment. No other disturbances identified in the area. Invasive plants have been identified as a major threat to the biological diversity and ecological integrity within and outside the BTNF. Invasive plants create many adverse environmental effects, including, but not limited to: displacement of native plants; reduction in functionality of habitat and forage for wildlife and livestock; threats to populations of threatened, endangered and sensitive species; alteration of physical and biological properties of soil, including productivity; changes to the intensity and frequency of fires; facilitation of further invasive species invasions; and loss of recreational opportunities (Halofsky et al. 2018). The presence of invasive plant species may be compounded by the presence of cattle which may create an environment more conducive to the establishment of invasive plant species (Halofsky et al. 2018). Although several occurrences have roads, trails, or occur within burned areas *Ericameria discoidea var. linearis* may benefit from low levels of disturbance. Therefore, the species is tolerant of human disturbances. Invasive species and reduction of early seral habitat due to succession may threaten populations.
Life history and demographic characteristics of the species	Narrowleaf goldenweed is a shrub with mostly creeping, white-woolly or glandular-hairy, leafy stems 15-40 cm long. Leaves are entire, linear, 1-3 cm long, 1-2.5 mm wide, and white woolly or greenish-glandular. Flower heads number one to a few per branch. Involucres are 8-15 mm high with glandular bracts arranged in a single row. Disk flowers are yellow and 8-11 mm long. Ray flowers are not present. Phenology is from late

Criteria	Rationale
	July to September (WYNDD 2020, Fertig 2000). Plants are typically found in dense clusters restricted to suitable microhabitats. Most colonies are extremely small in number and area. The affinity of this taxon for semi-barren floodplain terrace habitats suggests that it is an early to mid-seral species which may be replaced in habitats that become too crowded by shrubs over the course of succession (Fertig 1996). This taxon reproduces primarily by seed. Individual clumps may also spread vegetatively, occasionally forming nearly continuous mats over a small area. Large yellow jackets and medium sized brown moths were observed pollinating flowers in one roadside population on BTNF. The fruits have a feathery pappus of slender bristles that facilitates dispersal by the wind (Fertig 1996).
Date: March 31, 2020 Reviewer: Julie Remp	

Summary and Recommendations
Species (Scientific and Common Name): *Ericameria discoidea* var. *linearis / Ericameria linearis*
Both WYNDD and the Flora of North American have elevated the former *Ericameria discoidea* var. *linearis* to species level. Given this revision, *Ericameria linearis* is listed as S2 (imperiled) and G4/5 (apparently secure/secure) globally. It is a regional endemic of the greater Yellowstone area with 23 known Wyoming populations found in the southern Absaroka and northern Wind River Ranges, Overthrust Belt and the Yellowstone Plateau (WYNDD 2020). There are six element occurrences and one historic (1928) occurrences on the Bridger-Teton Forest. Except for the historic record located in the Teton Wilderness, all known populations cluster in the central area of the Jackson Ranger District. Across its range, plants occur in a variety of dry open, usually rocky or sandy places with little to no canopy cover. Populations on the Forest concentrate on semi-barren clay areas and in association with large streams; on cobblestone terraces and sandy-gravel bars. Vegetation most associated with *E. linearis* includes silver sage, rabbitbrush, Wyoming sage and lodgepole-sagebrush ecotones (WYNDD 2020, Fertig 2000). Threats are likely low on BTNF. Although several occurrences have roads, trails, or occur within burned areas, *E. linearis* may benefit from low levels of disturbance. In fact, Populations may be replaced in habitats that become too crowded by shrubs and trees over the course of succession (Fertig 1996). Current levels of grazing appear to be compatible and may help maintain habitat as the species is not preferred browse for livestock. Nevertheless, accelerated development or major changes in grazing use, road construction or minerals development, may have unforseen consequences (Fertig 1996). Surveys in 1995 found that while still restricted, this taxon is more widespread than previously thought. Much additional unsurveyed habitat exists in northern and western Wyoming. Given these considerations, it is recommended that *Ericameria linearis* not be included as a SCC.
Evaluator: Jessica Irwin & Rose Lehman Date: 05/20; 01/13/21

References

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

Ellstrand C. E., and Diane R. E. 1993. Population Genetic Consequences of Small Population Size: Implications for Plant Conservation. Annual Review of Ecology and Systematics. Vol. 24:217-242. Internet website: http://web.nateko.lu.se/courses/ngen03/Ellstrand-Elam-1993.pdf.

Google Earth Pro, 2020. Aerial photo and mapping analysis. Software version 7.3.2.5776 (64-bit).

Halofsky, Jessica E.; Peterson, David L.; Ho, Joanne J.; Little, Natalie, J.; Joyce, Linda A., eds. 2018. Climate change vulnerability and adaptation in the Intermountain Region. Gen. Tech. Rep. RMRS-GTR-375. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Part 1. pp. 1–197.

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.

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.

Heidel, B., M. Andersen and J. Handley. 2014. Evaluating potential threats to Wyoming Threatened, Endangered and Sensitive plants. Wyoming Natural Diversity Database, Laramie, WY.

IAP (Intermountain Adaptation Partnership). 2016. Intermountain Adaptation Partnership: Climate Vulnerability Assessment Summaries. http://www.adaptationpartners.org/iap/docs/Halofsky_etal_2018_inpressreader7.pdf

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.

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.

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.

Wyoming Natural Diversity Database (WYNND). 2020. Wyoming Natural Diversity Database; Data Explorer. Laramie, WY: University of Wyoming.

WYNND. 2020. *Ericameria discoidea var. linearis* – Narrowleaf goldenweed. Wyoming Field Guide. University of Wyoming. Available at: http://fieldguide.wyndd.org/