SPECIES: Scientific [common]	*Euphydryas gillettii* [Gillett's checkerspot]
Forest:	Bridger-Teton National Forest
Forest Reviewer:	Randall Griebel
Date of Review:	1/13/2020
Forest concurrence (or recommendation if new) for inclusion of species on list of potential SCC: (Enter Yes or No)	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
Historical	Unknown	Exact location unknown: Teton County, Wyoming	Lotts and Naberhaus (2017)
Historical	Unknown	Exact location unknown: Sublette County, Wyoming	Lotts and Naberhaus (2017)
Historical	Unknown	Not on BTNF: Yellowstone National Park County, Wyoming, United States	Lotts and Naberhaus (2017)
Historical	Unknown	Exact location unknown: Lincoln County, Wyoming	Lotts and Naberhaus (2017)
Historical	Unknown	Exact location unknown: Fremont County, Wyoming	Lotts and Naberhaus (2017)
Historical	Unknown	Exact location unknown: Park County, Wyoming	Lotts and Naberhaus (2017)
Historical	Unknown	Exact location unknown: Uinta County, Wyoming	Lotts and Naberhaus (2017)

1931	Unknown	Exact location unknown: Teton County, Wyoming	Lotts and Naberhaus (2017)
1931	Unknown	Exact location unknown: Teton County, Wyoming	Lotts and Naberhaus (2017)
1938	Unknown	Exact location unknown: Teton County, Wyoming	Lotts and Naberhaus (2017)
1948	Unknown	Exact location unknown: Park County, Wyoming	Lotts and Naberhaus (2017)
1953	2 collections (preserved specimen)	Bridger-Teton National Forest, Pinedale Ranger District, Clear creek, E. of Green River lake	GBIF (2019)
1954	1 collection (preserved specimen)	Bridger-Teton National Forest, Pinedale Ranger District, Clear creek, E. of Green River lake	GBIF (2019)
1969	Unknown	Exact location unknown: Teton County, Wyoming	Lotts and Naberhaus (2017)
1974	1 collection (preserved specimen)	Bridger-Teton National Forest, Jackson Ranger District, Granite Creek; 2012 m elevation	GBIF (2019)
1978	4 collection (preserved specimen)	Bridger-Teton National Forest, Jackson Ranger District, Granite Creek; 2134 m elevation	GBIF (2019)
1978	2 collections (preserved specimen)	Bridger-Teton National Forest, Jackson Ranger District, Granite Creek; 2042 m elevation	GBIF (2019)
Unknown	Unknown	Exact location unknown: Fremont County, Wyoming	Lotts and Naberhaus (2017)
1993	15 collections (preserved specimen)	Bridger-Teton National Forest, Greys River Ranger District, Alpine; 1859 m elevation	GBIF (2019)
2004	Unknown	Not on BTNF: Yellowstone National Park County, Wyoming	Lotts and Naberhaus (2017)
2007	Unknown	Exact location unknown: Park County, Wyoming	Lotts and Naberhaus (2017)
2015	Unknown	Bridger-Teton National Forest, Pinedale Ranger District	GBIF (2019)
2016	Unknown	Bridger-Teton National Forest, Blackrock Ranger District	GBIF (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 ___ No___ Unknown _X_

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?

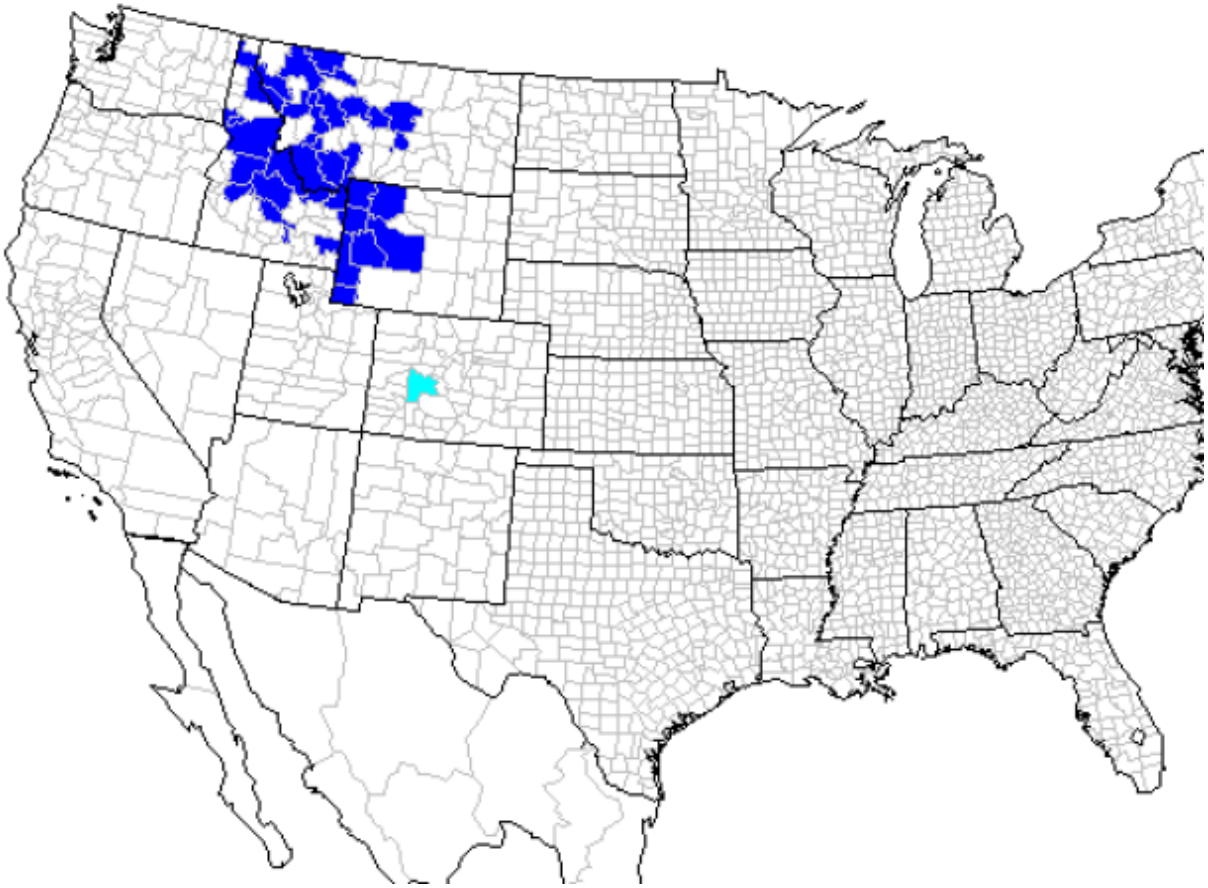
Yes _X_ No___

Provide explanation for determination

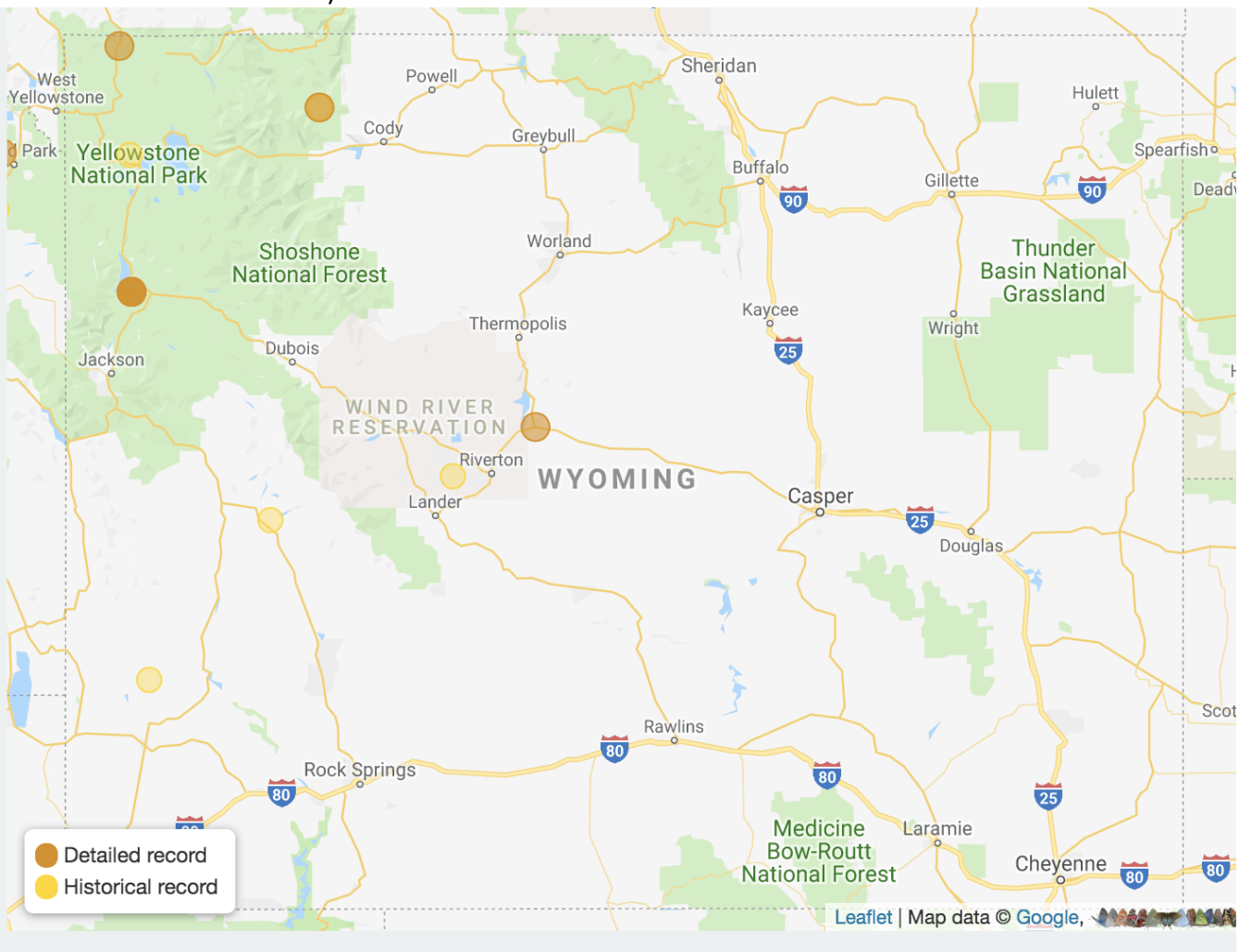
N/A–Occurrences have been documented since 1990.

If determination is no, stop assessment

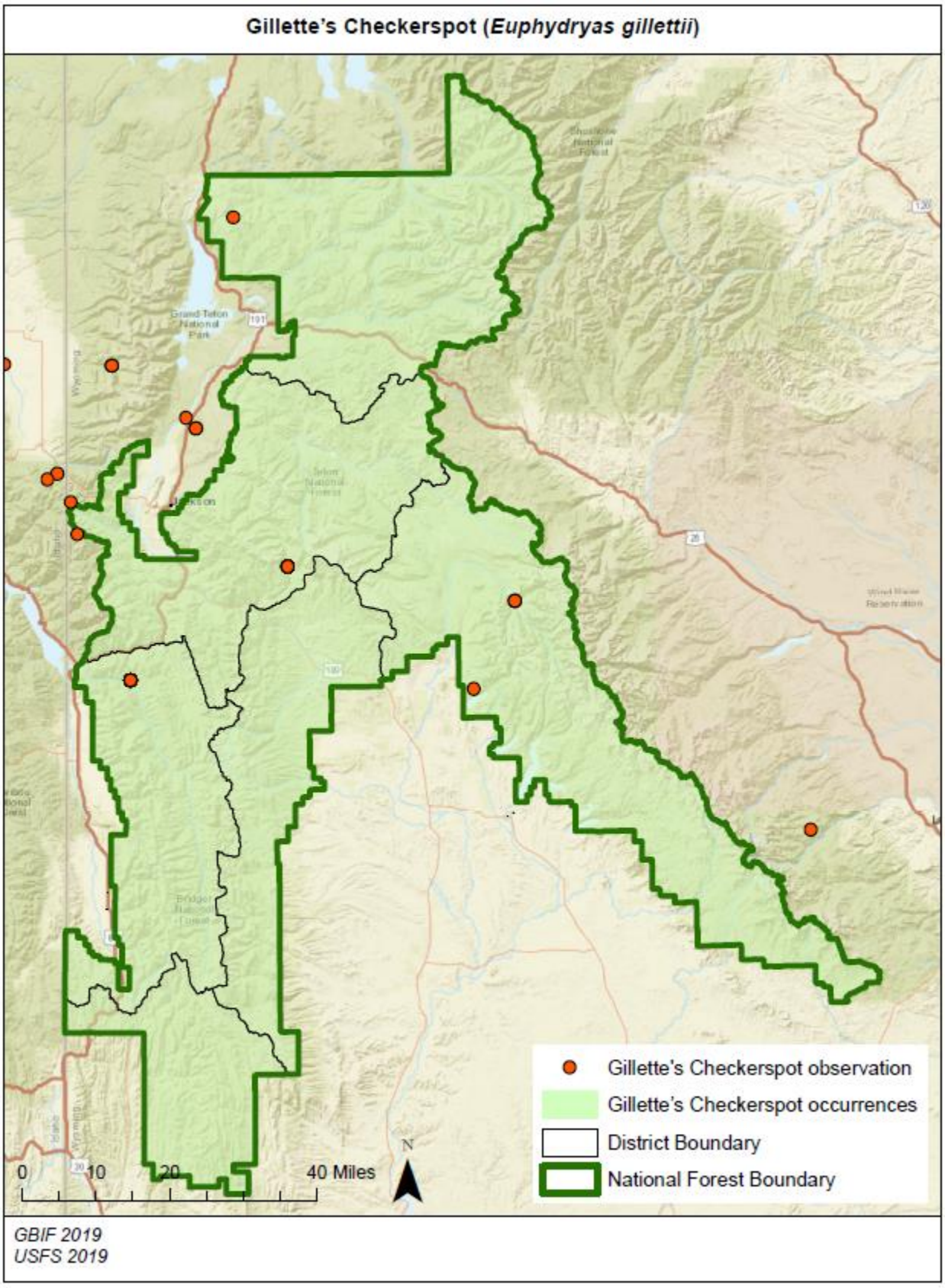
d. **Map 1**. Distribution of Gillette's Checkerspot (*Euphydryas gillettii*) in the United States (Vaughan and Shepherd 2005).



Map 2. Occurrences of Gillette's Checkerspot (Euphydryas gillettii) in Wyoming (Lotts and Naberhaus 2017).



e. **Map 3.** Occurrences of Gillette's Checkerspot (*Euphydryas gillettii*) on or near the Bridger-Teton National Forest.



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	**G3—Vulnerable** *At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.*
NatureServe State Status	**SNR—Unranked** *State rank not yet assessed.*
WYNDD	No Special Status
USDA Forest Service	No Special Status
UDI FWS	No Special Status
WY BLM	No Special Status
Xerces Red List Status	**Vulnerable** *At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.*

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

Criteria	Rationale
Distribution on the Bridger-Teton National Forest	*Euphydryas gillettii* is known from localized areas in in the central and northern Rocky Mountains, ranging from western Wyoming through Montana and Idaho to southwestern Alberta (Williams 2012). Populations are typically widely scattered, isolated, and small (Vaughan and Shepherd 2005; NatureServe 2019). Occurrences of *E. gillettii* have been recorded in multiple areas and ranger districts throughout the Forest as well as surrounding areas (Table 1, Map 3). Many of these occurrences are historic, but at least five have been recorded on the Forest since 1990 (Table 1, Map 3). Suitable habitat for the species, i.e., moist mountainous areas, is present across the Forest, though the distribution of both the species and habitat is likely isolated and scattered.
Abundance on the Bridger-Teton National Forest	*Euphydryas gillettii* is rare throughout its range (Vaughan and Shepherd 2005). Although there is no abundance data for Bridger-Teton, the species is also likely rare on the Forest.
Population Trend on the Bridger-Teton National Forest	No surveys *E. gillettii* population trend surveys have been conducted on BTNF. Rangewide surveys showed that 7 of 14 populations in the central and northern Rocky Mountains were extirpated between 1982-1984 and 2002-2006, including 2 of the largest known populations in the 1980s (Williams 2012). Given the lack of population trend data for the BTNF, there is not enough information to assess this criterion.
Habitat Trend on the Bridger-Teton National Forest	*Euphydryas gillettii* inhabits a variety of damp habitats in mountains, including open, moist conifer forests, moist meadows, and streamsides. Larval hostplants include twinberry honeysuckle (*Lonicera involucrata*), common snowberry (*Symphoricarpos albus*), and American alpinespeedwell (*Veronica wormskjoldii*) (Vaughan and Shepherd 2005). Habitat is sometimes unstable and prone to disturbance by grazing (Vaughan and Shepherd 2005). Open rangelands exist throughout BTNF and likely overlap *E. gillettii* habitat (USFS 2017). While adherence to rangeland management plans have likely limited overgrazing, habitat alterations have probably occurred to some extent as habitat cannot be considered protected if grazing is occurring . Alpine communities on the BTNF may be affected by climate change effects. Warming effects may change the distribution and establishment of alpine species such as *E. gillettii*. 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 (IAP) 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). Warming temperatures are likely to cause decreasing snowpack, which will affect the composition and distribution of alpine ecosystems. It is also likely to cause major changes in alpine plant communities (Halofsky,

Criteria	Rationale
	et al. 2018), which may affect pollination opportunities for species such as *E. gillettii*. 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-Struttmannet 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.
Threats to the Species and its Habitat on the Bridger-Teton National Forest	The biggest threat to *E. gillettii* is grazing by native ungulates and livestock, which can cause trampling of adults, larva, and eggs as well as nectar sources and larval host plants. Populations are isolated and susceptible to extirpation by any kind of temporary habitat disruptions. Excessive grazing in one season could destroy a colony (Vaughan and Shepherd 2005; NatureServe 2019). Rangelands form a major component of ecosystems in the Bridger-Teton National Forest, and there are open rangelands throughout the Forest, which likely overlap *E. gillettii* habitat (USFS 2017). While adherence to rangeland management plans will limit the chance of overgrazing, there is potential for impacts to *E. gillettii* and its habitat to occur. Climate change may also pose a threat to pollinators, including *E. gillettii* and its habitat (see above). The extirpation of populations in the central and northern Rocky Mountains was attributed to conspicuous changes in vegetation, due to the drying of meadow habitat (Williams 2012). Overall, *E. gillettii* is likely moderately to highly vulnerable to threats due to its rarity and isolated distribution. The nature of some threats, such as isolated populations and climate change, are beyond Forest control.
Date: August 29, 2019 Reviewer: Lindsay Chipman	

Summary and Recommendations

The Gillette's Checkerspot (*Euphydryas gillettii*) is found in localized areas in the central and northern Rocky Mountains and has experienced dramatic declines over the past 30 years. Rangewide surveys showed that 7 of 14 populations in the central and northern Rocky Mountains were extirpated between 1982-1984 and 2002-2006, including 2 of the largest known populations in the 1980s. Although there is no population data for the Bridger-Teton, the species is likely rare and experiencing similar declines. The Gillette's Checkerspot inhabits a variety of damp habitats in mountains, including open, moist conifer forests, moist meadows, and streamsides. Habitat is sometimes unstable and prone to disturbance. Major threats to Gillette's Checkerspot habitat on the Forest include potential overgrazing, invasion of noxious weeds, and global climate change. Based on its low abundance, declining populations, vulnerabilities related to its habitat requirements, there is substantial concern for the capability of the Gillette's Checkerspot 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 13, 2020).

References

GBIF (Global Biodiversity Information Facility). 2019. GBIF Occurrence Download https://doi.org/10.15468/dl.v5dhmr. Accessed on August 27, 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.

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.

Lotts, K. and T. Naberhaus, coordinators. 2017. Butterflies and Moths of North America. Gillette's Checkerspot Euphydryas gillettii (Barnes, 1897). Available at: https://www.butterfliesandmoths.org/species/Euphydryas-gillettii. Accessed on August 8, 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 http://explorer.natureserve.org. (Accessed: August 29, 2019).

Vaughan, D. M., and M. D. Shepherd. 2005. Species Profile: *Euphydryas gillettii*. In Shepherd, M. D., D. M. Vaughan, and S. H. Black (Eds). Red List of Pollinator Insects of North America. CD-ROM Version 1 (May 2005). Portland, OR: The Xerces Society for Invertebrate Conservation. Available at: https://xerces.org/wp-content/uploads/2008/09/euphydryas_gillettii1.pdf. Accessed on August 14, 2019.

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. 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.

Williams, E.H. 2012. Population loss and gain in the rare butterfly *Euphydryas gillettii* (Nymphalidae). Journal of the Lepidopterists Society 66(3): 147-155.

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