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Lolo National Forest Evaluations and Rationale for Identifying Species of Conservation Concern

Animals

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Summary

Species of conservation concern are native species known to occur in the plan area that are not recognized under the Endangered Species Act, but for which there is substantial concern for the species' long-term persistence within the plan area. The 2012 planning rule requires the regional forester to identify species of conservation concern (SCC) for the Lolo National Forest's revised land management plan (36 CFR 219.6 (b)(5)), and provide rationale for why species were or were not identified as SCC (Forest Service Handbook 1909.12 Section 21.22a). This document demonstrates how these requirements are being met.

An outline of the process to identify species of conservation concern is found in Forest Service Handbook directives (FSH 1909.12 Section 12.52 and FSH 1909.12 Section 21.22a), and more specific direction for the Lolo National Forest is found on the Northern Region's SCC webpage. A brief summary of the process follows in the paragraph below.

Using Forest Service and Montana Natural Heritage Program data, a master list was compiled of species with observation records in the plan area that met a conservation category specified in the Northern Region's SCC identification process. Each species was evaluated to determine whether the best available scientific information indicated substantial concern about the species' capability to persist over the long-term in the plan area. Substantial concern was generally demonstrated by some combination of significant threats to the species or its habitats, declines in population or habitat abundance and distribution, or other unique factors about the species' ecology, life history, or distribution that may affect resilience to environmental perturbation and thereby persistence within the plan area. The information may come from a variety of sources, including Federal and State agencies, literature, local information on occurrence and population status, subbasin analyses, broad-scale assessments, and information available from local species experts and other organizations.

The species evaluations in this document build upon the evaluations of potential SCC provided in the Lolo National Forest's draft assessment that was issued in June 2023. There, 99 animal species were considered for potential SCC status, of which 60 warranted in-depth evaluations based on the species of conservation concern identification process. Here, following public review of the draft assessment, a total of 116 animals are considered, of which 78 warranted an in-depth evaluation. This includes 3 amphibians, 20 birds, 2 fish, 24 insects, 13 mammals, 14 mollusks, and 2 reptiles. Based on the best available scientific information, 6 animal species are identified as species of conservation concern:

- Bighorn sheep (*Ovis canadensis*)
- Fisher (*Pekania pennanti*)
- Harlequin Duck (*Histrionicus histrionicus*)
- Idaho Giant Salamander (*Dicamptodon aterrimus*)
- Mountain Goat (*Oreamnos americanus*)
- Western Pearlshell (*Margaritifera falcata*)

The regional forester's rationale for these determinations are provided in the remaining sections of this document. The list of species of conservation concern is subject to modification during the planning process, based on best available scientific information.

1. Introduction

Land management plans approved under the 2012 planning rule must provide the ecological conditions necessary for long-term persistence of species of conservation concern (SCC), within the authority of the Forest Service and the inherent capability of the land. The 2012 Planning Rule (36 CFR 219) defines SCC as "a species, other than a federally recognized threatened, endangered, proposed or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area" (36 CFR 219.9). The regional forester is responsible for identifying SCC, typically during the planning process.

Outlined direction for identifying SCC is included in the Forest Service handbook (FSH) for land management planning (i.e., the planning directives) at FSH 1909.12, chapter 10, section 12.52 and at chapter 20, section 21.22a. More specific direction for applying the process to the Lolo National Forest is found on the Northern Region's SCC page. A summary is provided below.

The first step in the process of identifying SCC for development of the Lolo National Forest's revised land management plan was to evaluate and identify potential SCC (PSCC). That step was completed during the Lolo National Forest's assessment phase, and serves as the precursor to this document, which represents the regional forester's rationale for the species identified and not identified as SCC. Updates in this document stem primarily from public comment to the Lolo's draft assessment. The same criteria are used for identifying PSCC and SCC, but the regional forester may update the SCC list and supporting documentation at any point during or after the planning process, based on the best available scientific information.

To begin determining which species to consider for SCC status, spatial observation records were obtained from the Montana Natural Heritage Program for all species documented to occur within the plan area. The Montana Natural Heritage Program, which is part of the international NatureServe network, manages statewide occurrence records and other information about species and their habitats. The Forest Service, other agencies, and the public all contribute observation records to the Montana Natural Heritage Program repository, making the database the most comprehensive, reliable, and up-to-date source of documented species occurrences in Montana.

Species observed within the plan area were considered for SCC evaluation if they met any of the following conservation categories.

1. NatureServe global (G) or infraspecific taxon (T) ranks of 1 or 2.
2. NatureServe G3 for plants and vertebrates. Invertebrate species with a G3 rank were not routinely evaluated due to a general lack of reliable characteristics for field identification and scientific information on the distribution, abundance, habitat use, trends, relevant threats, and life history characteristics for the individual species. Species with a higher ranking (e.g., G4, G5) were not routinely evaluated because they are reasonably secure at the global level; concern at the plan level is identified in category 9. This approach is consistent with FSH 1909.12 chapter 10, section 12.52d.
3. Montana Natural Heritage Program state (S) ranks of 1 or 2. Rankings are assigned by Montana Natural Heritage Program but are also reflected in the Montana Species of Concern list by Montana Fish Wildlife and Parks and Montana Natural Heritage Program. Species with a higher ranking (e.g., S3, S4, S5) were generally not considered because they indicate relatively secure conservation status

at the statewide level; concern at the plan level is identified in category 9. This approach is consistent with FSH 1909.12 chapter 10, section 12.52d.

4. Delisted (removed) from the Endangered Species Act list within the last five years or delisted and still monitored by the regulatory agency.
5. State of Montana, or federally recognized Tribes, threatened or endangered designations.
6. Positive "90-day findings" made by the US Fish and Wildlife Service in response to federal listing petitions.
7. Regional forester's sensitive species for the plan area and any adjoining national forest.
8. SCC or potential SCC on any adjoining national forest.
9. Local conservation concern due to potentially significant threats to populations or habitats, declining trends in populations or habitat, restricted ranges or habitats, or low population numbers.

Species identified as occupying the plan area, and fitting at least one of the identified conservation categories, were then evaluated to determine if the species met the necessary criteria for identification as a SCC (FSH 1909.12, chapter 10, section12.52c).

The criteria for identifying SCC include:

1. The species is native and documented as established or becoming established in the plan area. Species were not considered as established in the plan area if:
    a. Documented occurrences within the plan area were limited to accidental or transient observations, or the plan area was well outside the current established range of the species.
    b. Documented occurrences within the plan area were limited to historical records with no subsequent observations within the last forty years. This approach is consistent with the best available scientific information provided by NatureServe on when past observations are sufficient to conclude a species remains established in a location.
    c. Suspected occurrences within the plan area were too imprecise or vague to determine whether the observation occurred within the plan area. Imprecise records most commonly originate from historical documentation that provided only broad reference to location.
2. The best available scientific information must indicate substantial concern about the species' capability to persist over the long term in the plan area.
    a. In general, substantial concern was best demonstrated by a decreasing population (abundance or distribution), decreasing habitat availability or suitability, or significant threats. Other potential factors considered included geographic distribution, reproductive potential, dispersal capabilities, and other demographic and life history characteristics that may influence long-term persistence in the plan area.
    b. Rarity alone was not typically considered a substantial concern unless there were other prominent circumstances leading to concern for long-term persistence of the species within the plan area.
3. If there was insufficient scientific information available to conclude that there is substantial concern about a species' capability to persist in the plan area over the long-term, or if the species was secure in the plan area, the species was not identified as a SCC. Rationale for not identifying a species as a SCC included:

a. The species was deemed secure within the plan area and the best available scientific information concerning trends in populations, habitats, and threats did not suggest substantial concern about continued long-term persistence within the plan area.

b. Available scientific information was insufficient to conclude if there was a substantial concern about the species' likelihood to persist in the plan area. Insufficient scientific information included having limited inventory data resulting from low survey effort, lack of effective detection methods, or, in the case of purported population declines, lack of reasonably consistent monitoring methods among trend monitoring periods.

2. Birds

2.1 American Goshawk (*Accipiter atricapillus*)

Conservation Categories

G5/S3 (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in the plan area. Within Bird Conservation Region 10, which includes the plan area, there are an estimated 14,000 individuals, nearly 8 percent of the global population (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021) (Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 10/2023).

With a distribution that includes much of North America north of Mexico. In Montana breeding populations of the species are widespread throughout most of the forested mountains of the state with dozens of documented sightings of the species spread across the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area.

Habitat description

The species tends to occupy ponderosa pine, Douglas-fir, and aspen stands with larger trees and moderate canopy closer, with nests located in areas of high canopy closure, suggesting a preference for a mosaic of stand structures (Squires and Kennedy 2006, Reynolds et al. 1992, Squires and Reynolds 1997, Clough 2000).

Habitat trend in the plan area

There are no specific habitat trends for the species within the plan area, but habitat conditions that could support the species are widespread throughout the plan area as reflected by the distribution of the species (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Relevant life history traits and other information

None

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

Habitat loss is likely the primary threat to populations of the species ((Crocker-Bedford 1990, Crocker-Bedford 2003). Like many large raptors, the species is susceptible to bioaccumulation of environmental contaminants that may affect the survival of adults and young (Barnes et al. 2019, Shore and Taggart 2019, González-Rubio et al. 2021, Chen and Hale 2010).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

There are no unique threats to the species within the plan area. The species is globally secure and regularly documented and well distributed within the plan area.

Best available scientific information

Barnes, J.G., Doney, G.E., Yates, M.A., Seegar, W.S., and Gerstenberger, S.L. 2019. A broadscale assessment of mercury contamination in peregrine falcons across the northern latitudes of North America. Journal of Raptor Research 53 (1): 1-13 pp. https://doi.org/10.3356/JRR-18-0003

Chen, D., and Hale, R.C. 2010. A global review of polybrominated diphenyl ether flame retardant contamination in birds. Environment International 36 (7): 800-11 pp.

Clough, L.T. 2000. Nesting habitat selection and productivity of northern goshawks in west-central Montana. M.S. Master's thesis. Wildlife Biology, School of Forestry, University of Montana, Missoula, MT. 87 p.

Crocker-Bedford, C. 2003. Habitat Effects on Northerm Goshawks.

Crocker-Bedford, D.C. 1990. Goshawk reproduction and forest management. Wildlife Society Bulletin 18: 262-269 pp.

González-Rubio, S., Ballesteros-Gómez, A., Asimakopoulos, A.G., and Jaspers, V.L.B. 2021. A review on contaminants of emerging concern in European raptors (2002−2020). Science of The Total Environment 760: 1-20 pp. https://doi.org/10.1016/j.scitotenv.2020.143337

Panjabi, A.O., Easton, W.E., Blancher, P.J., Shaw, A.E., Andres, B.A., Beardmore, C.J., Camfield, A.F., Demarest, D.W., Dettmers, R., Gahbauer, M.A., Keller, R.H., Rosenberg, K.V., and Will, T. 2021. Avian conservation assessment database handbook, Version 2021, Partners in Flight Technical Series No. 8.2. May 2021. Brighten, CO. Bird Conservancy of the Rockies. Brighten, CO. 83 p. https://pif.birdconservancy.org/acad.handbook.pdf

Reynolds, R.T., Graham, R.T., and Reiser, H.M. 1992. Management recommendations for the northern goshawk in the southwestern United States. Fort Collins, CO. U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 90 p. https://www.fs.fed.us/rm/pubs_rm/rm_gtr217.pdf

Shore, R.F., and Taggart, M.A. 2019. Population-level impacts of chemical contaminants on apex avian species. Current Opinion in Environmental Science & Health 11: 65-70 pp. https://doi.org/10.1016/j.coesh.2019.06.007

Squires, J.R., and Kennedy, P.L. 2006. Northern goshawk ecology: An assessment of current knowledge and information needs for conservation and management. Studies in Avian Biology 31: 8-62 pp. https://www.fs.fed.us/rm/pubs_journals/2006/rmrs_2006_squires_j001.pdf

Squires, J.R., and Reynolds, R.T. 1997. Northern goshawk (*Accipiter gentilis*). In Poole, A. and Gill, F., eds., The Birds of North America, No. 298. Washington, DC: The Academy of Natural Sciences, The American Ornithologists' Union. 43 p.

Stanton, J.C., Blancher, P., Rosenberg, K.V., Panjabi, A.O., and Thogmartin, W.E. 2019. Estimating uncertainty of North American landbird population sizes. Avian Conservation and Ecology 14 (1) https://www.ace-eco.org/vol14/iss1/art4/

Will, T., Stanton, J.C., Rosenberg, K.V., Panjabi, A.O., Camfield, A.F., Shaw, A.E., Thogmartin, W.E., and Blancher, P.J. 2020. Handbook to the Partners in Flight, Population Estimates Database, Version 3.1. PIF technical Series No 7.1. Bird Conservancy of the Rockies. Brighton CO. 40 p. https://pif.birdconservancy.org/popest.handbook.pdf

2.2 Bald Eagle (*Haliaeetus leucocephalus*)

Conservation Categories

G5/S4, Regional Forester Sensitive Species (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable abundance estimates for the species (Thompson 2004) are not known to be on-going within the plan area. Distribution and trend trajectories suggest breeding populations in Montana are likely approaching capacity (Montana Natural Heritage Program, mtnhp.org, 04/2022) (Montana Bald Eagle Working Group 2016, 2010, 1994, 1986).

With a range that includes most of North America, the species is found throughout Montana. The species is widely distributed throughout the plan area usually associated with large lakes, reservoirs, and rivers (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Population trend in the plan area

There are no known specific population trends for the species in the plan area; however, since the 1980s the species has steadily increased across North America (Eakle et al. 2015, Zimmerman et al. 2022), Montana, and the plan area (Montana Bald Eagle Working Group 2016, 2010, 1994, 1986).

Habitat description

The species is primarily associated with large lakes, reservoirs, and rivers. Nests are in tall, large-diameter trees near large waterbodies in areas with available food resources, and generally do not occur in areas of high human disturbance (Montana Natural Heritage Program, mtnhp.org, 04/2022) (Montana Bald Eagle Working Group 2016, 2010, 1994, 1986).

Habitat trend in the plan area

No specific habitat trends are known within the plan area, but habitat availability is likely stable as there are several waterbodies with the localized habitat conditions conducive to supporting the species as indicated by the current distribution of nests (Montana Bald Eagle Working Group 2016). Unoccupied habitat within the plan area is increasingly rare, but this trend reflects population increases not decreasing habitat availability (Montana Bald Eagle Working Group 2016, 2010, 1994, 1986). The ecological conditions within and around suitable waterbodies are likely either stable or improving due to improvements in riparian and aquatic ecosystem management within the plan area (Roper et al. 2019, Roper et al. 2018).

Relevant life history traits and other information

Within Montana there are two distinct populations, resident individuals that breed and winter in Montana, and migrants that winter in Montana but breed in more northerly locations (Montana Bald Eagle Working Group 2016, 2010, 1994, 1986). Individuals are long lived (McClelland et al. 2006) and do not breed until 5 to 6 years of age. Parents construct a large platform nest that is often reused year-after-year, although adults may not breed every year. Clutches of 1-3 eggs are laid from March to April. Adults share incubation duties, which last for five weeks. In Montana, nest success is high (75-80 percent), resulting in 1.3-1.5 young per nest (Montana Bald Eagle Working Group 2016).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The species is sensitive to human activity around nests (Richardson and Miller 1997, Steidl and Anthony 2000), but will nest in human dominated landscapes (Goulet et al. 2021) and may even habituate to humans (Guinn 2013). Like many large raptors, the species is susceptible to bioaccumulation of environmental contaminants that may affect the survival of adults and young (Buck et al. 2005, Russell and Franson 2014, Warner et al. 2014, Guo et al. 2018, Dykstra et al. 2019, Hanley et al. 2022). Individuals are also susceptible to collisions with infrastructure (Russell and Franson 2014) such as power poles and lines (Mojica et al. 2022, Mojica et al. 2020) or windmills (Pagel et al. 2013, New et al. 2021).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

Continued population increases (rpi-project.org, 05/2022), suggest that population recovery is sustainable nationally (Zimmerman et al. 2022), within Montana (Montana Bald Eagle Working Group 2016, 2010, 1994, 1986), and thus within the plan area. Although individuals may face threats that could reduce survival and reproduction, the substantial rate of population increase can sustain moderate negative impacts to demography (Zimmerman et al. 2022). Moreover, the species is highly mobile, allowing for high rates of connectivity between local populations that can support larger regional source-sink dynamics.

Best available scientific information

Buck, J.A., Anthony, R.G., Schuler, C.A., Isaacs, F.B., and Tillitt, D.E. 2005. Changes in productivity and contaminants in bald eagles nesting along the lower Columbia River, USA. Environmental Toxicology and Chemistry 24 (7): 1779-1792 pp. https://doi.org/10.1897/03-621.1

Dykstra, C.R., Route, W.T., Williams, K.A., Meyer, M.W., and Key, R.L. 2019. Trends and patterns of PCB, DDE, and mercury contamination in bald eagle nestlings in the upper Midwest. Journal of Great Lakes Research 45 (2): 252-262 pp. https://doi.org/10.1016/j.jglr.2019.01.010

Eakle, W.L., Bond, L., Fuller, M.R., Fischer, R.A., and Steenhof, K. 2015. Wintering bald eagle count trends in the conterminous United States, 1986-2010. Journal of Raptor Research 49 (3): 259-268 pp. 10.3356/JRR-14-86.1

Goulet, R., Bird, D.M., and Hancock, D. 2021. Aspects of the Ecology of Urban-Nesting Bald Eagles (Haliaeetus leucocephalus) in South-Coastal British Columbia. Journal of Raptor Research 55 (1): 65-78 pp. https://doi.org/10.3356/0892-1016-55.1.65

Guinn, J.E. 2013. Generational habituation and current bald eagle populations. Human-Wildlife Interactions 7 (1): 69-76 pp. https://www.jstor.org/stable/24874118

Guo, J., Simon, K., Romanak, K., Bowerman, W., and Venier, M. 2018. Accumulation of flame retardants in paired eggs and plasma of bald eagles. Environmental pollution 237: 499-507 pp. https://doi.org/10.1016/j.envpol.2018.02.056

Hanley, B.J., Dhondt, A.A., Forzán, M.J., Bunting, E.M., Pokras, M.A., Hynes, K.P., Dominguez-Villegas, E., and Schuler, K.L. 2022. Environmental lead reduces the resilience of bald eagle populations. The Journal of Wildlife Management 86 (2): e22177 p. https://doi.org/10.1002/jwmg.22177

McClelland, B.R., McClelland, P.T., and McFadzen, M.E. 2006. Longevity of Bald Eagles from autumn concentrations in Glacier National Park, Montana, and assessment of wing-marker durability. Journal of Raptor Research 40 (2): 151-155 pp. https://doi.org/10.3356/0892-1016(2006)40[151:LOBEFA]2.0.CO;2

Mojica, E.K., Eccleston, D.T., and Harness, R.E. 2022. Importance of power pole selection when retrofitting for eagle compensatory mitigation. Journal of Fish and Wildlife Management 13 (1): 286-294 pp. https://doi.org/10.3996/JFWM-21-045

Mojica, E.K., Rocca, C.E., Luzenski, J., Harness, R.E., Cummings, J.L., Schievert, J., Austin, D.D., and Landon, M.A. 2020. Collision avoidance by wintering Bald Eagles crossing a transmission line. Journal of raptor research 54 (2): 147-153 pp. 10.3356/0892-1016-54.2.147

Montana Bald Eagle Working Group. 1986. Montana bald eagle management plan. Billings, MT. U.S. Department of the Interior, Bureau of Land Management, Montana State Office.

Montana Bald Eagle Working Group. 1994. Mantana bald eagle management plan, 2nd edition. Billings, MT

Montana Bald Eagle Working Group. 2010. Montana bald eagle management guidelines: An addendum to Montana Bald Eagle Management Plan, 1994. Hammond, Christopher A. M., ed. Helena, MT. 13 p. http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CB4QFjAA&url=http%3A%2F%2Ffwp.mt.gov%2FfwpDoc.html%3Fid%3D44181&ei=IiCGVP6xDMPvoATX3oDYAQ&usg=AFQjCNHwrFUlJtBGJYlhUdV9Yy8mRF8A5g

Montana Bald Eagle Working Group. 2016. Montana bald eagle nesting populations and nest monitoring, 1980-2014 Final Report. Helena, MT. Montana Fish, Wildlife & Parks. 28 p.

New, L., Simonis, J.L., Otto, M.C., Bjerre, E., Runge, M.C., and Millsap, B. 2021. Adaptive management to improve eagle conservation at terrestrial wind facilities. Conservation Science and Practice 3 (8): 1-14 pp. https://doi.org/10.1111/csp2.449

Pagel, J.E., Kritz, K.J., Millsap, B.A., Murphy, R.K., Kershner, E.L., and Covington, S. 2013. Bald eagle and golden eagle mortalities at wind energy facilities in the contiguous United States. Journal of Raptor Research 47 (3): 311-315 pp. https://doi.org/10.3356/JRR-12-00019.1

Richardson, C.T., and Miller, C.K. 1997. Recommendations for protecting raptors from human disturbance: A review. Wildlife Society Bulletin 25 (3): 634-639 pp.

Roper, B.B., Capurso, J.M., Paroz, Y., and Young, M.K. 2018. Conservation of aquatic biodiversity in the context of multiple-use management on National Forest System lands. Fisheries 43 (9): 396-405 pp.

Roper, B.B., Saunders, W.C., and Ojala, J.V. 2019. Did changes in western federal land management policies improve salmonid habitat in streams on public lands within the Interior Columbia River Basin? Environmental Monitoring and Assessment 191 (9): 574 p.

Russell, R.E., and Franson, J.C. 2014. Causes of mortality in eagles submitted to the National Wildlife Health Center 1975–2013. Wildlife Society Bulletin 38 (4): 697-704 pp. https://doi.org/10.1002/wsb.469

Steidl, R.J., and Anthony, R.G. 2000. Experimental effects of human activity on breeding bald eagles. Ecological Applications 10 (1): 258-268 pp. https://doi.org/10.1890/1051-0761(2000)010[0258:EEOHAB]2.0.CO;2

Thompson, W.L. 2004. Sampling rare or elusive species: concepts, designs, and techniques for estimating population parameters. Washington D.C.: Island Press. 447 p.

Warner, S.E., Britton, E.E., Becker, D.N., and Coffey, M.J. 2014. Bald eagle lead exposure in the Upper Midwest. Journal of Fish and Wildlife Management 5 (2): 208-216 pp. 10.3996/032013-JFWM-029

Zimmerman, G.S., Millsap, B.A., Abadi, F., Gedir, J.V., Kendall, W.L., and Sauer, J.R. 2022. Estimating allowable take for an increasing bald eagle population in the United States. The Journal of Wildlife Management 86 (2): 1-26 pp. 10.1002/jwmg.22158

2.3 Black-backed Woodpecker (*Picoides arcticus*)

Conservation Categories

G3/S2B4, Regional Forester Sensitive Species (Montana Natural Heritage Program, mtnhp.org, 6/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in the plan area; however, within Bird Conservation Region 10, which includes the plan area, there are an estimated 33,000-150,000 individuals, roughly 4 percent of the continental population (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021) (Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 6/2022). In general, the species occurs at low densities even within preferred habitat (Tremblay et al. 2020). Across the northern Rocky Mountains, the species averages 0.02 individuals/ha, and within uncut, recently burned coniferous stands within the plan area densities were estimated at 0.375 individuals/ha (Harris 1982).

The species is broadly distributed across the boreal forests of Alaska and Canada with populations extending south into northern New England, the upper Great Lake, the Northern Rockies, and south along the Sierra Range into California. In Montana, the species is limited to the western portion of the state, with greater than one hundred confirmed observations occurring across much of the plan area.

Population trend in the plan area

There are no known specific population trends for the species within the plan area. Within Bird Conservation Region 10, long-term trend data suggests a stable population (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021) (Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 6/2022). More recent surveys by the Integrated Monitoring in Bird Conservation Regions effort suggests that from 2010 to 2020 black-backed woodpecker populations increased in Bird Conservation Region 10 but shows no changes within the plan area.

In general, the species is difficult to monitor (Baumgardt et al. 2014), limiting inference about local populations; however, throughout North America populations appear stable (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021) (Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 6/2022).

Habitat description

The species occupies a variety of coniferous forest types (Tremblay et al. 2020). In general the species is more common in areas with abundant snags (Hutto 2008, Nappi and Drapeau 2009, Tremblay et al. 2020), such as locations experiencing outbreaks of insects or disease, but the highest density occur in locations recently (<10 years post fire) burned by moderate to severe fire (Hutto 1995, Caton 1996, Hitchcox 1996, Murphy and Lehnhausen 1998, Saab and Dudley 1998, Hejl et al. 2000, Hutto et al. 2020, Russell et al. 2007, Bonnot et al. 2009, Matseur et al. 2018, Tingley et al. 2020). Even among burned forests there is considerable variation in habitat suitability depending on tree composition, tree age prior to fire, time since fire, fire size, fire intensity, and patch dynamics (Smucker et al. 2005, Hutto and

Patterson 2016, Hutto et al. 2020, Latif et al. 2016, Latif et al. 2018, Stillman et al. 2019, Nappi and Drapeau 2009, White et al. 2019, Campos et al. 2020).

Habitat trend in the plan area

No specific habitat trends are known within the plan area, but areas of burned coniferous forest are common and a greater expanse of area has burned in the last 30 years than in the prior 30 years (see Lolo National Forest Draft Assessment for further details). Given national and regional trends in wildlife fire frequency (Dennison et al. 2014), suitable habitat conditions for the species are likely to remain readily available. Habitat modeling for snag-dependent species suggests that habitat is improving in parts of the plan area (Yeats and Haufler 2020), likely due to recent large fires in those area. However, there is considerable variation in habitat suitability depending on the habitat preferences of the specific species (Yeats and Haufler 2020), which may limit interpretation for the suitability of habitat for black-backed woodpecker (Latif et al. 2016).

Relevant life history traits and other information

Not a true migrant, the species periodically exhibits irruptions outside their resident range in response to changing resource availability and population density (Tremblay et al. 2020). Little is known about adult survival rates within the species, although survival may be higher in burned areas (Rota et al. 2014). Black-backed woodpeckers tend to nest in low to moderately decayed nest trees in stands with high snag density (Bonnot et al. 2009, Saab et al. 2009, Seavy et al. 2012, Tremblay, Ibarzabal, et al. 2015), although it is unclear the extent to which nest site selection conveys fitness advantages (Stillman et al. 2019). Clutches of 2-6 eggs are laid from April to June (Dudley and Saab 2003), with both parents sharing incubation duties (Tremblay et al. 2020). Nest success for black-backed woodpecker is usually high (70-80 percent) but can vary considerable among years and habitat conditions (Bonnot et al. 2008, Stillman et al. 2019, Tremblay, Ibarzabal, et al. 2015, Rota et al. 2014). Within unburned stands, black-backed woodpecker may benefit from strategic forest management that increases disturbance near suitable nesting habitat (Craig et al. 2019), but the benefit of traditional forest management may not be as significant as natural sources of disturbance (Rota et al. 2014).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The primary threat to the species across its distribution is the loss and degradation of habitat due to changes in fire regimes and the pre- and post-burn management of forests (Tremblay et al. 2020). Within recently burned forests, the species is sensitive to forest management that reduces snag density (Hutto 2006, 2008, Hutto et al. 2020, Saab and Dudley 1998, Saab et al. 2007, 2009, Saab et al. 2011), although strategic management can minimize the potential negative effects of salvage logging (Latif et al. 2018, Tarbill et al. 2018). Within unburned stands, reductions in tree density may reduce post-burn habitat suitability for the species, as pre-fire tree density and canopy cover are good predictors of post-fire occupancy (Russell et al. 2007, Hutto 2008, Saab et al. 2009, Latif et al. 2013, Campos et al. 2020). More broadly, reductions in unburned mature forest may also negatively affect the species, as older forest may provide better habitat both pre- (Craig et al. 2019, Tremblay et al. 2014, Tremblay, Savard, et al. 2015) and post-burn (Nappi and Drapeau 2009, 2011).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

Populations of the species in Bird Conservation Region 10 are among the most secure populations throughout the species distribution (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021)(Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 6/2022) and populations appear stable within the plan area. The species is highly mobile and capable of quickly colonizing suitable habitat. Wildfire trends in and around the plan area appear sufficient to provide the available habitat necessary for the species. Strategic forest management of recent burns (Latif et al. 2018) and continued proactive management of suitable snags can ensure the stability of the population within the plan area.

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2.4 Calliope Hummingbird (*Selasphorus calliope*)

Conservation Categories

G5/S5B (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in the plan area. Within Bird Conservation Region 10, which includes the plan area, there are an estimated 2.8 million individuals, nearly 63 percent of the global population, making the region of particular importance to the conservation of the species (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021) (Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 10/2023).

The species is migratory with overwintering populations in southern Mexico and breeding populations from southern California north into southern British Columbia and western Albert and east to central Wyoming (Calder and Calder 2020). In Montana the species is limited to the western mountain ranges with dozens of documented sightings of the species spread across the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Population trend in the plan area

There are no known population trend estimates for the species within the plan area, but the species is regularly document in the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023). More broadly the species has not shown substantial changes in abundance in either the short- or long-term (English et al. 2021).

Habitat description

During the breeding season the species occupies montane coniferous forests, generally in early seral stages, but may also occupy riparian forest (Calder and Calder 2020).

Habitat trend in the plan area

There are no specific habitat trends for the species within the plan area, but habitat conditions that could support the species are widespread throughout the plan area as reflected by the distribution of the species (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Relevant life history traits and other information

The species is the smallest North American breeding bird.

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 10/2023), there are no additional known unique threats to the species within the plan area. The primary threats to the species across its distribution are likely those common to most hummingbird species including habitat loss, degradation, and fragmentation; invasive species; pollution; and climate change (reviewed in Leimberger et al. 2022).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

There are no unique threats to the species within the plan area. The species is regularly documented and well distributed within the plan area, has a stable population throughout the species distribution (English et al. 2021) and is considered secure globally and within Montana (NatureServe, natureserve.org, 10/2023).

Best available scientific information

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2.5 Cassin's Finch (*Haemorhous cassinii*)

Conservation Categories

G5/S3 (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in the plan area. Within Bird Conservation Region 10, which includes the plan area, there are an estimated 1.2 million individuals, nearly 38 percent of the global population (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021) (Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 10/2023).

The species is migratory with some populations overwintering in central Mexico and breeding populations occurring central British Columbia south to southern California and east to western New Mexico. In Montana the species is widespread throughout most of the forested mountains of the state with dozens of documented sightings of the species spread across the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Population trend in the plan area

The Montana the population of the species is relatively stable (Sauer et al. 2020, https://www.sciencebase.gov/catalog/, 10/2023). There are no known population trend estimates for the species within the plan area, but the species is regularly document within the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Habitat description

The species is something of a forest generalist occupying a variety of forest types and successional stages (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Habitat trend in the plan area

There are no specific habitat trends for the species within the plan area, but modelled suitable habitat is extremely abundant and broadly distributed throughout the plan area (Montana Natural Heritage Program 2022).

Relevant life history traits and other information

The species is both an altitudinal and latitudinal migrant, but populations may not exhibit migration at all (Hahn 2020).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 10/2023), there are no additional known unique threats to the species within the plan area. The primary threats to the species across its distribution are likely those common to most hummingbird species including habitat loss, degradation, and fragmentation; invasive species; pollution; and climate change (reviewed in Leimberger et al. 2022).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

The species is regularly documented and well distributed within the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023) and there are no unique threats to the species within the plan area. The species is globally secure with stable populations in Montana (Sauer et al. 2020, https://www.sciencebase.gov/catalog/, 10/2023).

Best available scientific information

Hahn, T.P. 2020. Cassin's Finch (Haemorhous cassinii), version 1.0. In Poole, A.F. and Gill, F.B., eds., Birds of the World. Ithaca, NY: Cornell Lab of Ornithology. https://doi.org/10.2173/bow.casfin.01

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2.6 Clark's Nutcracker (*Nucifraga columbiana*)

Conservation Categories

G5/S3, Species of Conservation Concern on a neighboring Forest (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in the plan area. Within Bird Conservation Region 10, which includes the plan area, there are an estimated 74,000-160,000 individuals, nearly 40 percent of the continental population, making the region of particular importance to the conservation of the (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021) (Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 4/2022).

In general, the species remains common where it occurs (Schaming and Sutherland 2020), with a range along the Rocky Mountains from British Columbia to New Mexico, and extending across into Arizona, Utah, Nevada and California. Confined to western and southwestern Montana, there are hundreds of documented observations of the species across the entirety of the plan area (Montana Natural Heritage Program, mtnhp.org, 05/2022).

Population trend in the plan area

There are no known population trend estimates for the species within the plan area. From 2010 to 2020 Clark's nutcracker populations declined in Bird Conservation Region 10 (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021) (Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 4/2022). In Montana, the Breeding Bird Survey trends between 1966 and 2018 (https://www.pwrc.usgs.gov/bbs/, 06/2022), also shows a slight decline, which is consistent with trends across the species range (Schaming 2015).

Habitat description

The species is usually found in open coniferous habitats, predominately whitebark, limber, and ponderosa pine forests (Tomback 2020)(Montana Natural Heritage Program, mtnhp.org, 05/2022). Populations exhibit facultative migration, associating with specific stand types at different times of year, usually when and where cone crops are most abundant (Lorenz and Sullivan 2009, Ray et al. 2020, Williams et al. 2020).

Habitat trend in the plan area

Populations of whitebark pine have shown precipitous and widespread declines (Schwandt et al. 2010), including in western Montana (Keane and Arno 1993). White pine blister rust (McDonald and Hoff 2001, McKinney and Tomback 2007, Geils et al. 2010), insect outbreaks (Shanahan et al. 2016, Gibson et al. 2008, Logan et al. 2010), climate change (Keane et al. 2017, Pansing and Tomback 2019), and forest management (Keane 2018, Keane et al. 2020) all have the potential to affect the distribution, abundance, and productivity of whitebark pine within the plan area. In some areas of the species range, more than 90 percent of cone bearing whitebark pine trees have died due to a combination of disease and insect outbreaks (Gibson et al. 2008, Logan et al. 2010), with likely implications of nutcracker populations

(Barringer et al. 2012, McKinney et al. 2009, McKinney and Tomback 2007, Tomback and Kendall 2001, Ray et al. 2020). Long-term declines, coupled with continuing threats, led to whitebark pine being proposed as a threatened species, under the Endangered Species Act (U.S. Department of the Interior 2020).

Relevant life history traits and other information

Clark's nutcrackers are facultative migrants that may travel hundreds of miles to reach available food resources (Lorenz and Sullivan 2009, Ray et al. 2020, Williams et al. 2020). A long-lived species, Clark's nutcrackers lay a single clutch each year, usually of 3 eggs (Tomback 2020), but may not breed in years with inadequate food resources (Schaming 2015). In Montana, breeding begins in March or April, likely to ensure offspring are well developed before seed caching begins in the fall (Tomback 2020). The incubation period is 18 days, with both parents sharing in incubation and nestling provisioning (Tomback 2020).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The primary threat to the species is associated with changes in the abundance and distribution of food resources (Barringer et al. 2012, Mosher et al. 2019, McKinney et al. 2009, Ray et al. 2020, Schaming and Sutherland 2020). Recreation and other sources of human disturbance are not known to negatively affect the species (Walker and Marzluff 2015, Tomback 2020).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

Populations appear stable within the plan area, where the species is regularly documented. Within the plan area suitable habitat remains common and widespread. The species is highly mobile, allowing for high rates of connectivity between local populations that can support larger regional source-sink dynamics. Therefore, despite declining trends nationally, habitat within the plan area is likely to remain sufficiently abundant and well-distributed to ensure long-term persistence of the species.

Best available scientific information

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2.7 Common Loon (*Gavia immer*)

Conservation Categories

G5/S3B, Regional Forester Sensitive Species (Montana Natural Heritage Program, mtnhp.org, 06/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in the plan area, but the species is regularly monitored where it occurs. In Montana the breeding population is estimated at 75 pairs, the largest in the western United States (Evers et al. 2015). Most suitable habitat in Montana is occupied, including suitable habitat within the plan area, suggesting that the breeding population is at carrying capacity (Hammond 2009). The global population of common loons exceeds 250,000 breeding pairs (Paruk et al. 2021).

The species breeds across much of Canada and Alaska, as well as the upper Midwest, New England, and the Northern Rockies, with populations wintering along the coastlines of North America and northern Europe. In Montana, breeding is limited to the western extent of the state, and in the plan area the species is rare and highly restricted to large lakes, most of which are in the Clearwater and Blackfoot River valleys (Montana Natural Heritage Program, mtnhp.org, 06/2022).

Population trend in the plan area

There are no known specific population trends for the species in the plan area, but within Bird Conservation Region 10, which includes the plan area, populations trends are relatively stable (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021)(Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 6/2022). Populations in Montana have been monitored since the 1980s, and are stable (Hammond et al. 2012) or have slightly increased since 1996 (Evers et al. 2015).

Breeding populations of the species have increased in the contiguous United States since the mid to late 1900s and continue to show population growth and expansion (Paruk et al. 2021); however, cryptic population declines may be occurring due to declines in the non-breeding population (Piper et al. 2020).

Habitat description

The species prefers to breed on islands in large, clear lakes with abundant fish populations, numerous islands, and complex shorelines (Hammond et al. 2012, Newbrey et al. 2005, Field and Gehring 2015, Paruk et al. 2021). During migration, habitat choice is more diverse, including rivers and reservoirs in Montana (Evers et al. 2015).

Habitat trend in the plan area

No specific habitat trends are known within the plan area. Suitable habitat is limited but is likely stable as there are several waterbodies with the localized habitat conditions conducive to supporting the species. The ecological conditions within suitable waterbodies are likely either stable or improving due to improvements in riparian and aquatic ecosystem management within the plan area (Roper et al. 2018, Roper et al. 2019).

Relevant life history traits and other information

There are two distinct populations of the species within Montana, a breeding population and a migratory population that passes through the state (Evers et al. 2015). Both populations appear to overwinter in the Pacific Ocean (Hammond 2009). Adult survival is high (Mitro et al. 2008, Piper et al. 2020) and individuals are relatively long-lived (Paruk et al. 2021). The species exhibits delayed breeding, till roughly 6 years of age. Clutches of 1-3 egg are laid from May to June, with both parents sharing incubation duties for roughly 28 days (Paruk et al. 2021). Adults show considerable breeding site fidelity, and they are territorial, which regulates breeding population size and establishment of new territories (Paruk et al. 2021). Juveniles have limited dispersal from natal areas, limiting colonization of unoccupied habitat (Paruk et al. 2021).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The species is sensitive to human activity during the breeding season (Kelly 1992, Paugh 2006, Spilman et al. 2014), but the effects may be site specific depending on other environmental conditions (Field and Gehring 2015, Bianchini et al. 2020). Occupied habitat within the plan area provide important recreation areas for motorized and non-motorized watercraft. Like many species of waterbirds, the species is susceptible to environmental contaminants such as mercury (Bianchini et al. 2020, Burgess et al. 2005, Burgess and Meyer 2008, Kenow et al. 2019) and lead (Sidor et al. 2003, Grade et al. 2018, Grade et al. 2019). The species may also be susceptible to the management of water level fluctuations during the breeding season (Windels et al. 2013); however, occupied waterbodies within the plan area are not regulated by dams.

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

Most suitable habitat in Montana is occupied, including locations within the plan area, suggesting that the breeding population is at carrying capacity (Hammond 2009). Breeding populations in Montana (Hammond et al. 2012, Evers et al. 2015) and Bird Conservation Region 10 (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021)(Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 6/2022) are stable. Individuals may face threats that could reduce survival and reproduction, but Montana Fish, Wildlife, and Parks; the USFS and other partners actively work to educate people and reduce negative impacts (Hammond 2009) (https://montanaloons.org/, visited 06/01/22), including within the plan area.

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2.8 Evening Grosbeak (*Coccothraustes vespertinus*)

Conservation Categories

G5/S3 (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in the plan area. Within Bird Conservation Region 10, which includes the plan area, there are an estimated 740,000 individuals, nearly 20 percent of the global population (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021) (Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 10/2023).

The species is migratory, ranging in the winter across much of the contiguous United States. Breeding populations are largely limited to the boreal forests of the northern Midwest and across Canada and extending south into the northern Rocky Mountains and the western mountains of Washington, Oregon and northern California (Byers and Gillihan 2020). In Montana the species is widespread throughout most of the forested mountains of the state with dozens of documented sightings of the species spread across the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Population trend in the plan area

There are no known population trend estimates for the species within the plan area, but the species is regularly document within the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023). Throughout the species range, populations are generally thought to be in decline (Robinson et al. 2022, Ralston et al. 2015), including in Montana (Sauer et al. 2020, https://www.sciencebase.gov/catalog/, 10/2023).

Habitat description

The species tends to occupy mixed spruce-fir forests but can occur in a variety of forest types (Byers and Gillihan 2020).

Habitat trend in the plan area

There are no specific habitat trends for the species within the plan area, but habitat conditions that could support the species are widespread throughout the plan area as reflected by the distribution of the species (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Relevant life history traits and other information

None

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 10/2023), there are no additional known unique threats to the species within the plan area.

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

There are no unique to the species within the plan area. The species is thought to be in decline across its range (Ralston et al. 2015, Robinson et al. 2022), but the cause is unknown (Bonter and Harvey 2008). The species is regularly documented and well distributed within the plan area, and is globally secure, although it may be at risk within Montana (NatureServe, natureserve.org, 10/2023).

Best available scientific information

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2.9 Flammulated Owl (*Psiloscops flammeoulus*)

Conservation Categories

G4/S3B, Regional Forester Sensitive Species (Montana Natural Heritage Program, mtnhp.org, 06/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in the plan area. Within Bird Conservation Region 10, which includes the plan area, there are an estimated 6,600 individuals. The species is not detected by standard survey methods (Barnes and Belthoff 2008, Groves et al. 1997, Linkhart and McCallum 2020); therefore, there is substantial uncertainty in population estimates, as indicated by 95 percent confidence intervals that range from zero to 20,000 individuals within Bird Conservation Region 10 (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021)(Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 6/2022). In general, the species occurs at low densities (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021, Linkhart and McCallum 2020) often estimated at less than 0.5 males per 40 hectares (Atkinson and Atkinson 1990, Groves et al. 1997, Barnes 2007), but may be locally abundant and clustered around preferred habitat (Groves et al. 1997, Wright et al. 1997, Walsh and Hudiburg 2019).

A migratory species, the species breeding distribution extends from southern British Columbia and throughout most of the western United States, where the species is among the most common raptors of the montane pine forests (McCallum 1994, Linkhart and McCallum 2020). Montana represents the northeast extent of the species range (Linkhart and McCallum 2020), but documented observations are common and widely distributed throughout the entire plan area (Montana Natural Heritage Program, mtnhp.org, 06/2022). Within the plan area, occupancy was 15 percent (Smucker et al. 2008), which is lower than some locations (Groves et al. 1997), but not atypical of Idaho and Montana (Smucker et al. 2008, Scholer et al. 2014).

Population trend in the plan area

There are no known specific population trends for the species in the plan area. Within Bird Conservation Region 10, which includes the plan area, the challenges associated with surveying led to significant uncertainty in trend data (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021)(Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 6/2022); however, the species is regularly detected in appropriate habitat within the plan area (Montana Natural Heritage Program, mtnhp.org, 06/2022).

Habitat description

Flammulated owls are found primarily in low to mid-elevation montane forests, usually of a ponderosa pine and Douglas fir forests mosaic, composed of larger trees, numerous snags and low to moderate canopy cover (Linkhart and Reynolds 1997, Linkhart et al. 1998, Seidensticker et al. 2013, Wright et al. 1997, Scholer et al. 2014, Chiaverini et al. 2021, Linkhart and McCallum 2020), which is likely maintained by regular low severity fire (Yanco and Linkhart 2018). The species tends to associate with south and east facing aspects and ridge tops that support the variable tree density mosaic they prefer (Chiaverini et al. 2021, Barnes 2007, Linkhart and McCallum 2020).

Habitat trend in the plan area

No specific habitat trends are known within the plan area. Following a century of fire suppression, logging, and grazing, stands of dry coniferous xeric forests are more likely to lack the spatial variability and microhabitat conditions that flammulated owls may prefer and instead tend to be characterized by homogenous, dense stands of relatively small-diameter trees, that no longer support historic ecological processes (Cooper 1960, Covington and Moore 1994, Allen et al. 2002, Noss et al. 2006, Churchill et al. 2013). Despite changes in dry forest systems, suitable habitat remains abundant and widely distributed in Idaho, western Montana, and the plan area (Chiaverini et al. 2021, Walsh and Hudiburg 2019).

Relevant life history traits and other information

The species is a long distant migrant with known wintering grounds in central Mexico (Linkhart et al. 2016). Despite high breeding site fidelity (Linkhart and Reynolds 2007, Reynolds and Linkhart 1987, Seidensticker et al. 2013), flammulated owls have considerable gene flow among populations (Arsenault et al. 2005, Mika 2010) suggesting large-scale population connectivity. Individuals are moderately long-lived, with substantial variation in annual survival rates among breeding populations and between males and females (Linkhart and McCallum 2020). Secondary cavity nesters that rely on cavities of larger woodpeckers (Scholer et al. 2018), nest are generally located in larger snags (Seidensticker et al. 2013, Wright et al. 1997, Bunnell 2013). Adults may begin breeding at 2 years of age, with clutches of 2-3 eggs, among the smallest of clutch size for owls, laid from May to June. Only females participating in incubation duties, which lasts for 21-24 days, and nest success is high (>80 percent) (Linkhart and McCallum 2020).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The primary threat to the species across its distribution is the loss and degradation of habitat (Linkhart and McCallum 2020), particularly the loss of large snags (Bull et al. 1990, Bunnell 2013). Moreover, the low annual rate of reproduction makes the species more susceptible to incremental losses of suitable habitat (Linkhart and McCallum 2020).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

Suitable habitat within the plan area and the surrounding areas is widely available (Chiaverini et al. 2021, Walsh and Hudiburg 2019). Historic forest management likely reduced the current and future availability of large snags (Bull et al. 1990) and altered historic fire regimes (Yanco and Linkhart 2018) likely negatively affecting habitat suitability. However, adaptive forest management focused on forest resiliency may improve habitat conditions and improve conditions under projected climate change (Walsh and

Hudiburg 2021), particularly when done at landscape scales (Scholer et al. 2014). There are no population trends for the species, but the species is regularly detected within the plan area and given the dispersal capability of the species, the presence of suitable habitat would suggest that the species will remain well represented in the plan area.

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2.10 Great Gray Owl (*Strix nebulosa*)

Conservation Categories

G5/S3 (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004) are not known to be on-going. Within Bird Conservation Region 10, which includes the plan area, there are an estimated 1,700 individuals, but there is substantial uncertainty in the population estimates, as indicated by 95 percent confidence intervals that range from zero to 4,800 individuals (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021)(Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 6/2022).

The species has a Holarctic distribution. In North America the species is found from California north through the Rocky Mountains and throughout the boreal region of Canada and Alaska (Bull and Duncan 2020). In Montana, the distribution is limited to the western forests, including dozens of documented locations spread across various locations within the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Population trend in the plan area

There are no known specific population trends for the species in the plan area.

Habitat description

The species is generally associated with stands of mature boreal or coniferous forest interspersed with opening that allow for hunting (Bull and Duncan 2020). In Montana the species is documented using more open drier forest types (Montana Natural Heritage Program, mtnhp.org, 10/2023). The species tends to use large snags and other trees for nesting, but also nests of other raptors (Wu et al. 2015).

Habitat trend in the plan area

No specific habitat trends are known within the plan area. The species, although relatively rare, tends to associate such that relatively small areas of forested land may support multiple breeding pairs while other locations support none, creating a clumped distribution across the landscape (Bull and Duncan 2020). This tendency to have a clumped distribution may reflect the close associate between suitable breeding sites and suitable habitat for primary food resources (Riper et al. 2013), that may ultimately limit habitat availability (Keane et al. 2011).

Relevant life history traits and other information

None

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 10/2023), there are no known unique threats to the species within the plan area.

The species is likely sensitive to forest management actions that reduce the distribution and abundance of large trees and snags that are preferred as nesting structures (Bull and Duncan 2020). In general, the species is secretive and sensitive to human activity, including recreation, that may lead to changes in behavior or habitat use (Wildman 1992, Jepsen et al. 2011, van Riper et al. 2013, Gura 2023).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

There is insufficient information on the distribution and abundance of the species or suitable habitat for the species within the plan area.

Best available scientific information

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2.11 Harlequin Duck (*Histrionicus histrionicus)*

Conservation Categories

G4/S2, Regional Forester Sensitive Species (Montana Natural Heritage Program, mtnhp.org, 06/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in the plan area, and surveys designed to provide reliable abundance estimates for the species (Thompson 2004) are not known to be on-going. The Montana population is likely fewer than 250 breeding pairs (Cassirer et al. 1996) as the state supports a low breeding densities of 0.05 to 0.91 breeding pairs per stream kilometer in suitable habitats (Reichel and Genter 1996). Within the plan area breeding records are limited, with documented breeding occurring along fewer than 10 streams, and only three streams in the last twenty-five years (Montana Natural Heritage Program, mtnhp.org, 06/2022).

Population trend in the plan area

There are no known population trends for the species in Montana or the plan area. Globally, the species' distribution has contracted (Robertson and Goudie 2020), including in the Rocky Mountains (Cassirer et al. 1996) suggesting populations are likely lower than historic populations. Estimates of recruitment in western populations further suggest that populations may be declining (Smith et al. 2001, Rodway et al. 2003), although there is considerable annual variation (Rodway et al. 2015).

Habitat description

The species generally breed along rocky, clear, fast-flowing (1-7 percent gradient) rivers and streams that are often braided or multi-channeled and include a wide riparian vegetative zone (Reichel and Genter 1996, Kuchel 1977, Wallen and Groves 1989, Cassirer et al. 1996, Cassirer and Groves 1991, 1994, Robertson and Goudie 2020). Individuals select for streams with abundant prey (Rodway 1998) and may be less likely to occupy streams with high fish density due to competition for prey (LeBourdais et al. 2009). During brood rearing, habitat selection may favor ensuring safety from predation over food availability (MacCallum et al. 2016).

Habitat trend in the plan area

No specific habitat trends are known within the plan area, but there are several waterbodies with the localized habitat conditions conducive to supporting the species, including formally occupied streams. The ecological conditions within and around suitable habitat are likely either stable or improving due to improvements in riparian and aquatic ecosystem management within the plan area (Roper et al. 2019, Roper et al. 2018).

Relevant life history traits and other information

Western populations are managed as a game species; however, in Montana and other inland states, the species is rarely present during the waterfowl season. The species is primarily found in Montana during the spring and summer and spends the fall and winter with populations from throughout the Pacific Northwest along the Pacific coastline from Southeast Alaska to Washington (MacCallum et al. 2022, Bate et al. 2017). Males depart Montana soon after breeding, leaving females to tend eggs and young. Adult survival is high, and individuals relatively long-lived (Wiggins 2005, Robertson and Goudie 2020), but like many sea ducks, male survival tends to be higher than females (Cooke et al. 2000) due to high mortality during incubation (Bond et al. 2009). Females begin breeding at 2 years of age, but have limited success until they are five years or older (Hendricks and Reichel 1998). Clutches of 5-6 egg are laid from May to June (Kuchel 1977, Diamond and Finnegan 1993), with females incubating eggs for roughly 28 days (Robertson and Goudie 2020). Females show high natal site fidelity (Hendricks and Reichel 1998) and subsequent breeding site fidelity to the same stream year over year (Reichel and Genter 1996).

Relevant threats to populations occupying the plan area

The known extent of the species within the plan area presents a unique threat to the species. The breeding population within the plan area is highly localized in two geographic locations. Small, highly localized populations are more susceptible to extirpation from stochastic events because a single event is more likely to exceed the spatial extent of the population (Smith and Almeida 2020). Of particular concern within the plan area would be the growing risk of high-intensity fires (Reinhardt et al. 2008, Stephens et al. 2012), that are increasing resulting in high-intensity burns within riparian habitat (Halofsky and Hibbs 2008, Dwire et al. 2016) that may exceed historical fire intensity (Van de Water and North 2010). High-intensity fires within riparian areas may alter riparian vegetation, sedimentation, channel morphology, and hydroperiod all of which may affect habitat suitability for breeding harlequin ducks (Hansen et al. 2019, Robertson and Goudie 2020) and there by population persistence within the plan area.

In addition to specific concerns over the population distribution within the plan area, there are several more generalized threats across the species range (NatureServe, natureserve.org, 01/2023). The species is sensitive to human disturbance (Cassirer and Groves 1991, Chatwin et al. 2013, Robertson and Goudie 2020), but will occupy areas with relatively high human use (Hansen 2014). Like other waterbirds the species is susceptible to environmental contaminants, particularly as it relates to oil spills on wintering grounds (Esler et al. 2002, Harwell et al. 2012) but also to other contaminates such as mercury (Savoy et al. 2017). The species is also sensitive to riparian habitat degradation and conditions that increase stream sedimentation (Robertson and Goudie 2020), possibly including fire. A potential emerging threat at breeding grounds, including in the plan area, is changes in streamflow dynamics associated with ongoing climate change (Hansen et al. 2019).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

Yes

Rational for determination

Within the plan area the distribution of the species has contracted as the number of streams with known breeding populations is currently limited to three, including two that are in the same drainage. Assessing occupancy for the species is challenging (Wiggins 2005), but recent sampling has not identified any new breeding locations within the plan area. The combination of a numerically small populations with a limited distribution within the plan area creates a credible risk to the localized extirpation of the species.

Moreover, compared to most duck species, the species exhibits a life history strategy that is particularly slow to recover from habitat degradation or loss, or other stochastic events that may affect local demography (Wiggins 2005).

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2.12 Lewis's Woodpecker (*Melanerpes lewis*)

Conservation Categories

G3/S2B (Montana Natural Heritage Program, mtnhp.org, 06/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in the plan area; however, historic burns within the plan area supported roughly 4 adults/km^2, while adjacent riverine floodplains supported 13 adults/km^2 (Blake et al. 2021). Within Bird Conservation Region 10, which includes the plan area, there are an estimated 4,800-28,000 individuals, roughly 20 percent of the continental population (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021)(Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 6/2022).

Distributed throughout the western United States, with northern populations from British Columbia south to Nevada and Wyoming migrating to the southern portion of the species range. In Montana, the species occurs primarily in the southern and western portions of the state. The species is widely distributed throughout the plan area, primarily in association with larger rivers or former burns (Blake et al. 2021)(Montana Natural Heritage Program, mtnhp.org, 06/2022).

Population trend in the plan area

Within the plan area, and Bird Conservation Region 10 more generally, populations appeared to increase from 2010 to 2020, but this trend differs from longer term trends that show declines within Bird Conservation Region 10 (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021)(Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 6/2022). In Montana the Breeding Bird Survey (BBS) trend between 1966 and 2018 suggests populations are stable, although there is considerable variation in productivity among habitat types in Montana (Blake et al. 2021), and there are examples of historic population declines in the state (Weydemeyer 1975).

In contrast to Montana, across other portions of the species' range there are observed populations declines (Sauer et al. 2011, Sauer et al. 2013) (Vierling et al. 2020).

Habitat description

The species occupies a variety of forest types, including aspen (Newlon and Saab 2011), but is most often associated with cottonwood floodplain and burned-conifer forests (Hutto et al. 2020, Saab and Vierling 2001, Vierling 1997, Zhu et al. 2012, Blake et al. 2021, Steel et al. 2022, Vierling et al. 2020). Suitability of burned forests varies by tree composition, tree age prior to fire, time since fire, fire size, fire intensity, and geography (Linder and Anderson 1998, Saab and Dudley 1998, Gentry and Vierling 2007, Vierling et al. 2009, Vierling et al. 2020). Breeding usually occurs in open canopy forests with brushy understory and abundant insects (Linder and Anderson 1998, Saab and Dudley 1998).

Habitat trend in the plan area

The distribution of the species corresponds to the distribution of ponderosa pine, which has declined substantially (Saab and Vierling 2001, Vierling 1997, 1998). Areas of burned coniferous forest are common within the plan area, and given national and regional trends in the wildlife fire frequency (Dennison et al. 2014), may be expected to continue be readily available. Habitat modeling for snag-dependent species suggests that habitat is improving in parts of the plan area (Yeats and Haufler 2020), likely due to recent large fires. However, there is considerable variation in habitat suitability depending on the relative availability of different size classes of snags (Yeats and Haufler 2020), which may limit interpretation for the suitability of habitat for the species (Latif et al. 2016). The species is often associated with large, crown-burned ponderosa pine stands (Saab et al. 2007), which may be less common than it was historically (Everett et al. 1994). The availability of suitable riparian habitat within the plan area is limited, because most suitable riparian forestland in western Montana is privately owned (Blake et al. 2021). Throughout the western United States, urban and suburban development, invasive species, dams, irrigation, logging, grazing and croplands have all reduced the availability and quality of riparian forests (Stromberg 1993), with subsequent consequences for many western land bird populations (DeSante and George 1994, Gardali et al. 2006).

Relevant life history traits and other information

The Montana population is migratory, departing the breeding grounds in August or September (Vierling et al. 2020). Nothing is known about adult survival rates (Blake et al. 2021, Vierling et al. 2020). Parents use old cavities excavated by other species or natural cavities, generally in softwood trees or burned conifers (Abele et al. 2004, Vierling et al. 2020), and may often reuse the same cavity (Saab et al. 2004). Clutches of 6-7 eggs are laid from May to June (Blake et al. 2021), with both parents sharing incubation duties for roughly two weeks (Vierling et al. 2020). Nests fledge roughly 30 days after hatching (Dudley and Saab 2003). Nest success is usually high (70-80 percent; (Newlon and Saab 2011, Gentry and Vierling 2007, Blake et al. 2021), but may differ considerably based on habitat type, burn age, and locality (Blake et al. 2021, Gentry and Vierling 2007, Saab and Vierling 2001, Vierling et al. 2009, Macfarland et al. 2019, Vierling et al. 2020).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The primary threat to the species is the loss and degradation of habitat, both upland and riparian (Abele et al. 2004, Vierling et al. 2020), which may be exacerbated by climate change (Walsh et al. 2019). Proper management of unburned and post-burned forest can improve habitat conditions, but only when large snags are retained (Abele et al. 2004, Saab et al. 2007, Macfarland et al. 2019, Vogeler et al. 2016, Blake et al. 2021, Cross et al. 2021, Vierling et al. 2020) or additional actions are taken to increase cavity availability (Kook and Moodie 2008).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

The species has shown considerable long-term declines, including in Bird Conservation Region 10, which includes the plan area, (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021)(Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 6/2022); however, more recent surveys suggests that the decline has stabilized within Bird Conservation Region 10. This change in trend data is supported by demographic data that suggests populations in and around the plan area are productive enough to maintain the current population (Blake et al. 2021). Future fires along with forest management that reduces tree density in dry forest types and restores large-tree, early seral habitat is likely to increase the availability of suitable habitat.

Best available scientific information

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2.13 Long-eared Owl (*Asio otus*)

Conservation Categories

G5/S5 (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004) are not known to be on-going. Within Bird Conservation Region 10, which includes the plan area, there are an estimated 4,700 individuals, but there is substantial uncertainty in the population estimates, as indicated by 95 percent confidence intervals that range from zero to 16,000 individuals (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021)(Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 6/2022).

The species has a Holarctic distribution. In North America the species is found throughout much of Cananda and the Continental United States including all of Montana (NatureServe, natureserve.org, 10/2023). The species is known from fewer than five records within the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Population trend in the plan area

There are no known specific population trends for the species in the plan area.

Habitat description

The species is generally associated with thick vegetation, such as hedgerows, riparian forests, or woodlots, in proximity to open grasslands and shrublands (Marks et al. 2020).

Habitat trend in the plan area

No specific habitat trends are known within the plan area.

Relevant life history traits and other information

None

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 10/2023), there are no known unique threats to the species within the plan area.

The species is sensitive to the loss of open and edge habitat types, including riparian forests (Bosakowski et al. 1989, Bloom 1994).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

There is insufficient information on the distribution and abundance of the species or suitable habitat for the species within the plan area.

Best available scientific information

Marks, J.S., Evans, D.L., and Holt, D.W. 2020. Long-eared Owl (Asio otus), version 1.0. In Poole, A.F., ed., Birds of the World. Ithaca, NY: Cornell Lab of Ornithology. https://doi.org/10.2173/bow.loeowl.01

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Stanton, J.C., Blancher, P., Rosenberg, K.V., Panjabi, A.O., and Thogmartin, W.E. 2019. Estimating uncertainty of North American landbird population sizes. Avian Conservation and Ecology 14 (1) https://www.ace-eco.org/vol14/iss1/art4/

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2.14 Olive-sided Flycatcher (*Contopus cooperi*)

Conservation Categories

G4/S4B (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in the plan area. Within Bird Conservation Region 10, which includes the plan area, there are an estimated 260,000 individuals, nearly 14 percent of the global population (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021) (Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 10/2023).

The species is migratory with some populations overwintering as far south as northern Bolivia. The breeding population is distributed from Alaska east throughout much of Canada and south through the mountain ranges of the western United States to Arizona and New Mexico (Altman and Sallabanks 2020). In Montana the species is widespread throughout most of the forested mountains of the state with dozens of documented sightings of the species spread across the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Population trend in the plan area

The Montana the population of the species is relatively stable (Sauer et al. 2020, https://www.sciencebase.gov/catalog/, 10/2023). There are no known population trend estimates for the species within the plan area, but the species is regularly document within the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Habitat description

Primarily occupies montane and northern coniferous forests, but is found at forest edges, both natural and anthropogenic (Altman and Sallabanks 2020).

Habitat trend in the plan area

There are no specific habitat trends for the species within the plan area, but habitat conditions that could support the species are widespread throughout the plan area as reflected by the distribution of the species (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Relevant life history traits and other information

None

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 10/2023), there are no additional known unique threats to the species within the plan area.

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

The species is regularly documented and well distributed within the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023) and there are no unique threats to the species within the plan area. The species is globally apparently secure with stable populations in Montana (Sauer et al. 2020, https://www.sciencebase.gov/catalog/, 10/2023).

Best available scientific information

Altman, B., and Sallabanks, R. 2020. Olive-sided Flycatcher (Contopus cooperi), version 1.0. In Hoyo, J. del, Sargatal, D, Christie, A. and de Juana, E., eds., Birds of the World. Ithaca, NY: Cornell Lab of Ornithology. https://doi.org/10.2173/bow.olsfly.01

Panjabi, A.O., Easton, W.E., Blancher, P.J., Shaw, A.E., Andres, B.A., Beardmore, C.J., Camfield, A.F., Demarest, D.W., Dettmers, R., Gahbauer, M.A., Keller, R.H., Rosenberg, K.V., and Will, T. 2021. Avian conservation assessment database handbook, Version 2021, Partners in Flight Technical Series No. 8.2. May 2021. Brighten, CO. Bird Conservancy of the Rockies. Brighten, CO. 83 p. https://pif.birdconservancy.org/acad.handbook.pdf

Stanton, J.C., Blancher, P., Rosenberg, K.V., Panjabi, A.O., and Thogmartin, W.E. 2019. Estimating uncertainty of North American landbird population sizes. Avian Conservation and Ecology 14 (1) https://www.ace-eco.org/vol14/iss1/art4/

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2.15 Peregrine Falcon (*Falco peregrinus*)

Conservation Categories

G5/S3, Regional Forester Sensitive Species (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable abundance estimates for the species (Thompson 2004) are not known to be on-going.

With a near worldwide distribution, the species is documented across Montana, although most breeding occurs in the western extent of the state. The species is widely distributed with dozens of documented occurrences and at least six eries in the plan area and several more directly adjacent, some of which with known occupancy for twenty or more years (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area. Since the mid-1970s, populations of peregrine falcon have steadily increased across North America (Hoffman and Smith 2003, Enderson et al. 1995), with the population in Montana increasing since the early 1990s (montanaperegrine.org, 05/2022).

Habitat description

A habitat generalist, during the breeding species the species is primarily associated with open habitats or locations near waterbodies, likely because of the abundance and accessibility of prey (Grebence and White 1989). Nests are generally located on large rock outcrops and cliffs (White et al. 2020), but peregrine will rarely nest in large snags (Campbell et al. 1977) and regularly nest on human infrastructure in towns and cities (Watts et al. 2015).

Habitat trend in the plan area

There are no known specific habitat trends for the species in Montana or the plan area. Given the apparent habitat flexibility of the species, habitat is generally not considered limiting (Holroyd and Bird 2012). Within the plan area there are numerous locations with the localized habitat conditions conducive to supporting nesting.

Relevant life history traits and other information

The species is migratory and demonstrates high breeding site fidelity, returning to the same eyrie each year (Tordoff and Redig 1997), usually in March or April (montanaperegrine.org, 05/2022). Individuals are long lived (15-20 years), with most individuals breeding at 1-2 years of age (Tordoff and Redig 1997). Females lay between 3-5 eggs, which both parents incubate for 33-35 days (White et al. 2020). In Montana, offspring fledge from mid-June through mid-July (montanaperegrine.org, 05/2022).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The species is sensitive to human activity around nests (Richardson and Miller 1997), but quite successful nests in human dominated landscapes (Gahbauer et al. 2015, Kettel et al. 2019). Like many large raptors, the species is susceptible to bioaccumulation of environmental contaminants that may affect the survival of adults and young (Barnes et al. 2019, Shore and Taggart 2019, González-Rubio et al. 2021, Chen and Hale 2010). The species is also susceptible to collisions with infrastructure (Katzner et al. 2012).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

Populations in the United States are largely stable or increasing (rpi-project.org, 05/2022), as they are in Montana (montanaperegrine.org, 05/2022). Although individuals do face threats that may reduce survival and reproduction, population trends are positive.

> *"Once nesting populations stabilize at carrying capacity, little active management should be needed, as Peregrine historically survived for centuries in face of both natural and human-caused losses" – White et al. (2020).*

Moreover, the species is highly mobile, allowing for high rates of connectivity between local populations that can support larger, regional source-sink dynamics.

Best available scientific information

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2.16 Pileated Woodpecker (*Dryocopus pileatus*)

Conservation Categories

G5/S3 (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in the plan area. Within Bird Conservation Region 10, which includes the plan area, there are an estimated 200,000 individuals, nearly 8 percent of the global population (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021) (Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 10/2023).

Distributed the southern forests of Canada and much of the eastern portion of the United States, in the west the species is found from California to Washington and east to Montana (Bull and Jackson 2020). In Montana the species is limited to the western mountain ranges with dozens of documented sightings of the species spread across the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Population trend in the plan area

There are no known population trend estimates for the species within the plan area, but the species is regularly document within the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023). Across the species range in the west, including in Montana, populations are thought to have increased or stabilized since the 1960s (Sauer et al. 2011).

Habitat description

The species is a cavity nesting resident of coniferous or deciduous forests, often old growth, that included scattered snags (>21 inches dbh) and downed wood (Bull and Jackson 1995, Kirk and Naylor 1996, Giese and Cuthbert 2003, Bull and Jackson 2011).

Habitat trend in the plan area

There are no specific habitat trends for the species within the plan area, but habitat conditions that could support the species are widespread throughout the plan area as reflected by the distribution of the species (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Relevant life history traits and other information

None

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 10/2023), there are no additional known unique threats to the species within the plan area. The primary threat to the species is likely associated with the loss of large snags and downed wood that the species uses for nesting, roosting, and foraging (Bull and Jackson 1995, Kirk and Naylor 1996, Giese and Cuthbert 2003, Bull and Jackson 2011).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

There are no unique threats to the species within the plan area. The species is globally secure, regularly documented and well distributed within the plan area, and appears to have stable or increasing populations in Montana (Sauer et al. 2011).

Best available scientific information

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2.17 Rufous Hummingbird (*Selasphorus rufus*)

Conservation Categories

G4/S4B (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in the plan area. Within Bird Conservation Region 10, which includes the plan area, there are an estimated 4.7 million individuals, nearly 22 percent of the global population (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021) (Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 10/2023).

The species is migratory with overwintering populations in southern Mexico and breeding populations from Oregon into Alaska and east to Montana (Healy and Calder 2020). In Montana the species is limited to the western mountain ranges with dozens of documented sightings of the species spread across the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Population trend in the plan area

There are no known population trend estimates for the species within the plan area, but the species is regularly document within the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023). More broadly the species has shown long-term declines since the 1970s which have continued to increase (English et al. 2021).

Habitat description

During the breeding season the species occupies montane coniferous forests, generally in mid- to late seral stages (Healy and Calder 2020).

Habitat trend in the plan area

There are no specific habitat trends for the species within the plan area, but habitat conditions that could support the species are widespread throughout the plan area as reflected by the distribution of the species (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Relevant life history traits and other information

None

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 10/2023), there are no additional known unique threats to the species within the plan area. The primary threats to the species across its distribution are likely those common to most hummingbird species including habitat loss, degradation, and fragmentation; invasive species; pollution; and climate change (reviewed in Leimberger et al. 2022).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

There are no unique threats to the species within the plan area. The species is regularly documented and well distributed within the plan area, and despite declining populations throughout the species distribution (English et al. 2021) is considered apparently secure globally and within Montana (NatureServe, natureserve.org, 10/2023).

Best available scientific information

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2.18 Trumpeter Swan (*Cygnus buccinator*)

Conservation Categories

G4/S3, Regional Forester Sensitive Species (Montana Natural Heritage Program, mtnhp.org, 06/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004) are not known to be on-going.

The species is widely distributed throughout northern North America, with breeding populations in the upper Midwest, Pacific Northwest, Alaska, and the western provinces of Canada. In Montana, breeding populations are limited to the western portion of the state, where the species is regularly documented. In the plan area, there is only a single documentation of breeding with most observations occurring during migration, on large rivers or lakes in the eastern extent of the plan area (Montana Natural Heritage Program, mtnhp.org, 06/2022). In 2015 the continental population, was estimated to exceed 63,000 individuals, including roughly 11,000 in the Rocky Mountain population (U.S. Department of the Interior 2017). The U.S. Rocky Mountain population, which is inclusive of the plan area, met its overall population objective in 2015 (U.S. Department of the Interior 2017).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area.

Since the 1968 the continental population has demonstrated a 6.6 percent annual increase, including a 6.5 percent annual increase in the Rocky Mountain population (Rees et al. 2019, U.S. Department of the Interior 2017). More locally, populations in the Mission Valley of western Montana have continued to grow since first being reintroduced in 1996 and have a high likelihood of persistence over the long-term (Becker and Aycrigg 2017).

Habitat description

The species breeds on a wide variety of marshes, ponds, lakes, and small rivers, but tends to be more productive if waterbodies are shallow, with irregular shorelines, and abundant and diverse aquatic vegetation (Mitchell and Eichholz 2020). The species uses similar habitat during the winter and is generally only limited by the distribution of ice (Mitchell and Eichholz 2020).

Habitat trend in the plan area

No specific habitat trends are known within the plan area, but suitable habitat is likely stable as there are several waterbodies with the localized habitat conditions conducive to supporting the species. The ecological conditions within suitable waterbodies are likely either stable or improving due to improvements in riparian and aquatic ecosystem management within the plan area (Roper et al. 2019, Roper et al. 2018).

Relevant life history traits and other information

Within Montana there are two distinct population, resident individuals that breed and winter in Montana, and migrants that winter in Montana but breed in more northerly locations (U.S. Department of the Interior 2017, Mitchell and Eichholz 2020). Adult survival is high (Varner and Eichholz 2012) and individuals relatively long-live (Mitchell and Eichholz 2020). Adults generally do not breed until 4 to 7 years of age. Clutches of 4-6 eggs are laid from April to May, with females incubating eggs for 32-37 days (Mitchell and Eichholz 2020).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The species is sensitive to human activity (Henson and Grant 1991, Schmidt et al. 2009), and susceptible to collisions with infrastructure such as power poles and lines (Blus et al. 1989, Manville 2005). Like many species of waterfowl, the species is susceptible to bioaccumulation of environmental contaminants, particularly lead (Blus et al. 1989, Blus 1994, Lagerquist et al. 1994, Degernes 2008); however, changes in riparian and aquatic ecosystem management have generally improved aquatic and riparian ecosystem conditions (Roper et al. 2019, Roper et al. 2018).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

Continued population increases suggests that population recovery is sustainable nationally as well as the Rocky Mountain population (Rees et al. 2019, U.S. Department of the Interior 2017) and thus within the plan area. The viability of the population in the Mission Valley (Becker and Aycrigg 2017) further suggests continued viability of the species within the plan area. Moreover, the species is highly mobile, allowing for high rates of connectivity between local populations that can support larger regional source-sink dynamics. Indeed, reestablished populations in the Mission and Blackfoot Valleys likely account for the presences of the species the plan area.

Best available scientific information

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Rees, E.C., Cao, L., Clausen, P., Coleman, J.T., Cornely, J., Einarsson, O., Ely, C.R., Kingsford, R.T., Ma, M., Mitchell, C.D., Nagy, S., Shimada, T., Snyder, J., Solovyeva, D.V., Tijsen, W., Vilina, Y.A., Wlodarczyk, R., and Brides, K. 2019. Conservation status of the world's swan populations, Cygnus sp. and Coscoroba sp.: a review of current trends and gaps in knowledge. Wildfowl 2019: 35-72 pp. https://www.researchgate.net/profile/Eileen-Rees/publication/337832073_Conservation_status_of_the_world's_swan_populations_Cygnus_sp_and_Coscoroba_sp_a_review_of_current_trends_and_gaps_in_knowledge/links/5dee2767a6fdcc2837122c80/Conservation-status-of-the-worlds-swan-populations-Cygnus-sp-and-Coscoroba-sp-a-review-of-current-trends-and-gaps-in-knowledge.pdf

Roper, B.B., Capurso, J.M., Paroz, Y., and Young, M.K. 2018. Conservation of aquatic biodiversity in the context of multiple-use management on National Forest System lands. Fisheries 43 (9): 396-405 pp.

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2.19 White-tailed Ptarmigan (*Lagopus leucurarumpeter*)

Conservation Categories

G5/S3 (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004, Martin et al. 2020) are not known to be on-going.

The species is widely distributed throughout western North America from Alaska south along the Rocky Mountains to New Mexico, but south of Canada the distribution is extremely disjunct (Martin et al. 2020). In Montana, documented observations are limited to the Mission Mountains and the mountain ranges of the Northern Continental Divide Ecosystem, including two observations in the far northeastern extent of the plan area (Montana Natural Heritage Program, mtnhp.org, 010/2023).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area.

Habitat description

In the summer the species typically occupies alpine areas at or above timberline, but moves down in elevation during the winter (Martin et al. 2020). The species is usually associated with willow and sedge vegetation communities (Martin et al. 2020).

Habitat trend in the plan area

No specific habitat trends are known within the plan area, but the habitats the species occupy are remote and generally unaffected by traditional sources of anthropogenic disturbance (Martin 2011).

Relevant life history traits and other information

Adult annual survival ranges from 35-70 percent (Martin et al. 2020), with lower survival rates in younger individuals (Sandercock et al. 2005). Clutches of 2-7 eggs are laid from late May to early June, with females incubating eggs for 22-25 days (Martin et al. 2020).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 10/2023), there are no known unique threats to the species within the plan area.

Changes in alpine habitat conditions, particularly disturbances that affect the distribution and abundance of willow, can have negative impacts on populations (Hoffman 2006). Most of the species' habitat within the plan area is confined to areas with limited human impacts from traditional habitat perturbations such as roads, timber management, or grazing. The primary threat to changing habitat conditions may be through climate change mediated effects to habitat (Martin 2011); however, climate change has had little demonstrated effect on local demography in other locations (Wann et al. 2014), but the effects are likely to be population specific (Wang et al. 2002, Zimmerman et al. 2021).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

There is insufficient information on the distribution and abundance of the species within the plan area as highlighted by only two observations in the last 40 years. The species is globally secure and the habitat where the species occurs within the plan area is isolated from most sources of anthropogenic perturbation (Martin 2011).

Best available scientific information

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2.20 Williamson's Sapsucker (*Sphyrapicus thyroideus*)

Conservation Categories

G5/S4B (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in the plan area. Within Bird Conservation Region 10, which includes the plan area, there are an estimated 100,000 individuals, roughly 35 percent of the global population (Stanton et al. 2019, Will et al. 2020, Panjabi et al. 2021)(Partners in Flight 2021 Avian Conservation Assessment Database, http://pif.birdconservancy.org/ACAD, 10/2023).

A migratory species, wintering populations extend into south-central Mexico, with breeding populations distributed from Arizona and New Mexico north into southern British Columbia (Gyug et al. 2023). In Montana, the species is present in the summer occurring throughout much of the western half of the state including dozens of observations spread across the plan area (Montana Natural Heritage Program, mtnhp.org, 010/2023).

Population trend in the plan area

The Montana population of the species is considered stable (Sauer et al. 2020, https://www.sciencebase.gov/catalog/, 10/2023). There are no known population trend estimates for the species within the plan area, but the species is regularly document within the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Habitat description

The species occupies mid- to high-elevation conifer and mixed-conifer such as western larch, Douglas fir, ponderosa pine, and pine-fir (Gyug et al. 2023). The species may use a variety of tree species for based on what is locally available but will often nest in trees with softer substrates to facilitate excavation (Gyug et al. 2023).

Habitat trend in the plan area

There are no specific habitat trends for the species within the plan area, but habitat conditions that could support the species are widespread throughout the plan area as reflected by the distribution of the species (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Relevant life history traits and other information

None.

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management Plan and FEIS?

No

Rational for determination

The species is regularly documented and well distributed within the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023) and there are no unique threats to the species within the plan area. The species is globally secure with stable populations in Montana (Sauer et al. 2020, https://www.sciencebase.gov/catalog/, 10/2023).

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3. Mammals

3.1 American Marten (*Martes americana*)

Conservation Categories

G5/S4 (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable abundance estimates for the species (Thompson 2004) are not known to be on-going. There are historic and on-going structured occupancy surveys for the species within the plan area and the larger region (Krohner et al. 2022, Golding et al. 2018, Yeats and Haufler 2020, Golding 2022).

The species is broadly distributed across Alaska and Canada south to the northern states of the Continental United States from Idaho to Maine (NatureServe, natureserve.org, 10/2023). In Montana the genera is limited to the mountain ranges in the western portion of the state, with dozens of observations documented throughout the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023) and known occupancy by the species (Lolo Meso-carnivore Report 2020, see planning record exhibit R22-003).

Population trend in the plan area

There are no known specific population trends for marten in Montana or the plan area, but the genera is regularly detected during meso-carnivore surveys (Krohner et al. 2022, Golding et al. 2018, Yeats and Haufler 2020, Golding 2022).

Habitat description

Marten occupy a variety of forest types (Clark et al. 1987), but are generally associated with forests with woody debris and large trees that provide resting, denning, and foraging opportunities (Buskirk et al. 1987, Buskirk and McDonald 1989, Buskirk et al. 1989, Cheveau et al. 2013). Marten occupy a variety of forest types (Clark et al. 1987), but are generally associated with forests with woody debris and large trees that provide resting, denning, and foraging opportunities (Buskirk et al. 1987, Buskirk and McDonald 1989, Buskirk et al. 1989, Cheveau et al. 2013, Wiebe et al. 2015). Riparian forests may play a key role as habitat for marten and a means of connectivity among marten populations, even in highly forested landscapes (Shirk et al. 2014).

Habitat trend in the plan area

No specific habitat trends are known within the plan area, but the forest conditions that support marten are well distributed across the plan area, including riparian forests.

Relevant life history traits and other information

Two species of marten were recognized within North America, the American Marten (*M. americana*) and Pacific Marten (*M. caurina*), until the early 1950's when morphometric assessments determined there was a single species (*M. americana*) (Wright 1953). Since that time marten have traditionally been classified into two morphological groups (Clark et al. 1987), but recent molecular evidence identified key differences between the two groups (Stone and Cook 2002, Small et al. 2003, Dawson and Cook 2017) such that they were again identified as independent species (Bradley et al. 2014). Both species are present in Montana and are known to hybridize (Wright 1953, Dawson et al. 2017, Dawson and Cook 2017). Both species are documented as present within the plan area (Lolo Meso-carnivore Report 2020, see planning record exhibit R22-003), which is also likely inclusive of the hybridization zone (Wright 1953, Dawson et al. 2017, Dawson and Cook 2017). However, the exact distribution and abundance of individual species within the plan area is unknown.

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 10/2023), there are no known unique threats to the species within the plan area.

Martens tend to avoid open areas, particularly in dry forest types (Shirk et al. 2014). Regeneration harvest practices may therefore affect habitat use and the localized distribution marten (Cushman et al. 2011, Moriarty et al. 2016), but such effects are unlikely to lead to population isolation (Koen et al. 2012Martens tend to avoid open areas, particularly in dry forest types (Shirk et al. 2014). Regeneration harvest practices may therefore affect habitat use and the localized distribution marten (Cushman et al. 2011, Moriarty et al. 2016), but such effects are unlikely to lead to population isolation (Koen et al. 2011), and some effects may be mitigated by providing suitable microhabitat elements for resting and denning (Seip et al. 2018) if prey is available (Vigeant-Langlois and Desrochers 2011). Marten may also change behaviors or alter habitat use in response to human recreation (Slauson et al. 2017).

Climate change is expected to reduce habitat availability for marten in the Northern Rockies with consequences for population dynamics and genetic diversity (Wasserman et al. 2013).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

There is insufficient information on the distribution and abundance of the species within the plan area. Members of the genera are widespread, but the specific representation for most observations is unknown. The species is apparently globally secure and the habitat the species occupies is available and widely distributed in the plan area.

Best available scientific information

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3.2 American Pika (*Ochotona princeps*)

Conservation Categories

G5/S5 (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004, Moyer-Horner et al. 2016) are not known to be on-going.

The species is discontinuously distributed across western mountain ranges from central British Columbia and southern Alberta south to California and northern New Mexico, and east to Wyoming and Colorado (NatureServe, natureserve.org, 10/2023). In Montana the species is known from roughly 1200 observations in the western half of the state, including dozens of locations spread throughout the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area.

Habitat description

The species will occupy areas of talus, broken rock, lava flows, inselbergs, mine tailings, and even road riprap assuming the area is surrounded by sufficient forage (Smith and Ruedas 2020).

Habitat trend in the plan area

No specific habitat trends are known within the plan area, but habitat that may support pika is disjunct but well distributed across the plan area.

Relevant life history traits and other information

The species has a relatively fast life history strategy, living on average 3-5 years but may breed twice per year under good conditions (Smith and Weston 1990). The species does not hibernate and instead occupies dens during the winter where it relies on food caches to meet energetic demands (Smith and Weston 1990).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 10/2023), there are no known unique threats to the species within the plan area. The species is thought to be sensitive to climate change (Smith and Ruedas 2020, Otto et al. 2015), especially when habitat is limited (Stewart et al. 2015); however, the effects of changing climatic conditions are likely to vary across the distribution of the species (Mathewson et al. 2017, Moyer-Horner et al. 2016, Smith and Ruedas 2020) due to the specific climatic and microclimatic conditions of occupied habitat (Jeffress et al. 2013, Benedict et al. 2020), local food availability and accessibility (Yandow et al. 2015), as well as the degree of behavioral plasticity within individuals in specific populations (Benedict et al. 2020, Millar and Smith 2022).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

There is insufficient information on the distribution and abundance of the species within the plan area. The species is globally secure and habitat the species occupies is available and widely distributed in the plan area.

Best available scientific information

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3.3 Bighorn Sheep (*Ovis canadensis*)

Conservation Categories

G4/S4, Regional Forester Sensitive Species, Species of Conservation Concern on a neighboring Forest (Montana Natural Heritage Program, mtnhp.org, 08/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are seven identified herds either partly or completely occupying the plan area (Montana Fish Wildlife and Parks 2010). Three herds reside in the Montana Fish, Wildlife and Parks Region 1 (North Clark Fork, Clark Fork Cut-Off, Perma-Paradise) and four in Region 2 (Grave Creek Range, John Long Range, West Rock Creek-Quigg Peak, Lower Blackfoot) (Montana Fish Wildlife and Parks 2010). In 2008, population sizes varied widely among herds (North Clark Fork – 270, Clark Fork Cut-Off – 141, Perma-Paradise – 324, Grave Creek Range – 151, John Long Range – 201, West Rock Creek-Quigg Peak – 342, Lower Blackfoot – 128), but all populations exceeded population objectives (Montana Fish Wildlife and Parks 2010). From 2015-2020, the minimum count average was 262 individuals for the Paradise-Perma herd, a figure that is below the desired population objective and 141 individuals for the Grave Creek Range herd (also known as Petty Creek herd), a figure that is at the desired population objective (Montana Fish Wildlife and Parks 2010, Garrott et al. 2019).

Historically, widely distributed from British Columbia and Alberta south to northern Mexico and from California to the western portions of the Dakotas, Nebraska, and Texas (Brewer et al. 2014). The species current range still encompasses largely the same geopolitical boundaries, but populations are less contiguous (Brewer et al. 2014). In Montana, the species is widely distributed, with at least five separate metapopulations mostly in the western half of the state, that are themselves are highly disjunct relative to historic populations (Montana Fish Wildlife and Parks 2010). In the plan area, herds are present in all but the extreme eastern extent (Garrott et al. 2019)(Montana Natural Heritage Program, mtnhp.org, 08/2022).

Population trend in the plan area

Although there is often substantial variation in population trends for the species (Montana Fish Wildlife and Parks 2010), within the plan area, six of seven herds have demonstrated substantial populations declines. For example, from 1988-2008, the minimum count for the Paradise-Perma herd varied from a low of 93 individuals in 1988 to a peak of 482 individuals in 1994 followed by a decline to 208 individuals in 1999 and then back to a peak of 501 individuals in 2006 (Montana Fish Wildlife and Parks 2010). Following the peak in 2006, however, the population declined and from 2015-2020. Currently, the minimum count average is 262 animals for the Paradise-Perma herd, a number that is roughly twenty percent below the desired population objective (Montana Fish Wildlife and Parks 2010, Garrott et al. 2019). Indeed, all three herds within Montana Fish, Wildlife and Parks Region 1 that occur within the plan area are below population objectives (Montana Fish Wildlife and Parks 2010)(Montana Fish, Wildlife and Parks Region 1 personal communication).

As is common throughout the species range, populations trends for the species in Montana, and the plan area are often correlated with disease outbreaks (Montana Fish Wildlife and Parks 2010, Enk et al. 2001, Ramsey et al. 2016). Within the Montana Fish, Wildlife and Parks Region 2, most herds have experienced population declines following a pneumonia outbreak in 2010, including the John Long Range, West Rock

Creek-Quigg Peak, and Lower Blackfoot herds within the plan area (Ramsey et al. 2016). As of 2022, hunting was discontinued within the range of the West Rock Creek-Quigg Peak herd, presumably due to population declines.

The only herd within the plan area that appears to have a somewhat stable population is the Grave Creek Range herd. From 2015-2020 the Grave Creek Range herd had a minimum count average of 141 animals (Garrott et al. 2019), which is on the high end of the desired population objective for the herd (Montana Fish Wildlife and Parks 2010); however, the Grave Creek Range herd did not experience a die-off (Ramsey et al. 2016). There is some concern however, that declining recruitment in the Grave Creek Range herd will reduce the population below desired objectives.

Habitat description

The species historically occupied a diversity of habitats, but now is largely confined to rugged mountainous terrain (Beecham et al. 2007). Bighorn sheep prefer open or semi-open habitats that provides high visibility for potential predators (Risenhoover and Bailey 1985, DeCesare and Pletscher 2006, Montana Fish Wildlife and Parks 2010) and may even abandon historic ranges if succession leads to conditions which inhibit visibility (Beecham et al. 2007). Something of a habitat generalist, bighorn sheep do require escape cover such as talus slopes, rock outcrops, or cliffs (Beecham et al. 2007, DeCesare and Pletscher 2006, Montana Fish Wildlife and Parks 2010), especially during the lambing period (Robinson et al. 2020). Seasonal use of different slopes, aspects, and elevations within a herds range provides for a variety of vegetation conditions that support forage and cover needs (Risenhoover and Bailey 1985, Valdez and Krausman 1999, Beecham et al. 2007). Although the species demonstrates flexibility in habitat use, individuals appear to prefer specific habitats that many have implications for traditional translocation success when those habitats are not present (Robinson et al. 2019, Bleich et al. 2018).

Habitat trend in the plan area

No specific habitat trends are known within the plan area, but across the species' distribution much of the available habitat is unoccupied (Brewer et al. 2014, Lula et al. 2020), suggesting habitat is not limiting. Changes in disturbance regimes that affect the distribution and abundance of open habitats can lead to localized changes in habitat selection, movement, vigilance, and foraging behavior (Smith et al. 1991, DeCesare and Pletscher 2006, Beecham et al. 2007) that may have demographic consequences (Clapp and Beck 2016, Conner et al. 2018). Fire suppression and increasing fire intensity have likely affected the distribution and relative abundance of the open habitat conditions, as well as the quality, quantity, and distribution of forage, as noted for other ungulates (Proffitt et al. 2016, Long et al. 2008, Allred et al. 2011), which can have important demographic consequences for bighorn sheep (Paterson et al. 2021, Proffitt et al. 2021).

Relevant life history traits and other information

The species exhibits a complex social system (Hass and Jenni 1991, Pelletier and Festa-Bianchet 2006, Vander Wal et al. 2016) that affects herd organization (Ruckstuhl 1998, Favre et al. 2008), migratory behaviors (Lowrey et al. 2019), reproductive potential (Pelletier and Festa-Bianchet 2006), and even management outcomes (Poirier and Festa-Bianchet 2018). All herds within the plan area were subject to regulated hunting mortality (Montana Fish Wildlife and Parks 2010), but in 2022 hunting was discontinued within the range of the West Rock Creek-Quigg Peak herd. Female bighorn sheep begin breeding at age 1-2, generally producing a single lamb annually, although pregnancy rates and lamb survival show significant variation among years and populations (Paterson et al. 2021, Proffitt et al. 2021). In contrast, males are unlikely to successfully breed until 6-8 years of age (Pelletier and Festa-Bianchet 2006), although younger rams may breed in some circumstances (Whiting et al. 2008).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The primary threats to the species across its distribution reflect the tendency for populations to be small and isolated, which present concerns for genetic variability as well as susceptibility to stochastic events such as weather, predation, and pathogens (Berger 1990, Portier et al. 1998, Singer et al. 2001, Festa-Bianchet et al. 2006, Hogg et al. 2006, Brewer et al. 2014, Poirier et al. 2019, Flesch et al. 2020, Flesch et al. 2022). The historic metapopulation structure of bighorn sheep that would have offset such concerns is difficult to replicate in translocated populations (Singer et al. 2001, Singer et al. 2000), as is the case in the plan area. This is in part because although the species is highly mobile, individuals tend not to disperse and colonize unoccupied habitats (Lula et al. 2020). Translocated populations (Jesmer et al. 2018, Lowrey et al. 2019) and populations isolated by infrastructure (Epps et al. 2005) appear particularly limited in their ability to move throughout larger landscapes.

Respiratory pathogens, and the domestic animals that carry them, are of particular concern to the persistence of small, isolated sheep populations (Beecham et al. 2007, Carpenter et al. 2014, Cassirer et al. 2018, Besser et al. 2017, Sells et al. 2015, Western Association of Fish and Wildlife Agencies (WAFWA) 2012). Currently there are no domestic sheep or goat grazing allotments within the plan area, but disease outbreaks are documented within the plan area suggesting there is a risk of contact with domestic animals outside of the plan area (Montana Fish Wildlife and Parks 2010, Enk et al. 2001, Ramsey et al. 2016). Although populations of bighorn sheep exposed to respiratory pathogens tend to persist, effects to survival and recruitment can be significant and persistent, reducing population growth (Cassirer et al. 2018, Besser et al. 2012, Enk et al. 2001, Monello et al. 2001, Cassirer and Sinclair 2007, Cassirer et al. 2013, Plowright et al. 2013, Smith et al. 2014, Smith and Grovenburg 2015, Manlove et al. 2016, Butler et al. 2017), as documented within the plan area (Ramsey et al. 2016). Moreover, effective management of disease ingression within a sheep population often involves depopulation of some or all of an infected herd (Cassirer et al. 2018, Montana Fish Wildlife and Parks 2010, Flesch et al. 2020, Almberg et al. 2022, Garwood et al. 2020), with obvious consequences for local population growth. Traditional approaches to repopulate herds through translocation likely have limited value if the disease persists in the population (Almberg et al. 2022, Flesch et al. 2020, Ramsey et al. 2016), and even if all diseased individuals are removed, reinfection may be likely if there is connectivity with other infected populations (Borg et al. 2017) or domestic source populations persist.

Noxious weeds, forest succession and encroachment into open habitat, and development may reduce habitat suitability, and disturbance from public recreation as well as mortality from auto collisions may affect population dynamics and behaviors (Montana Fish Wildlife and Parks 2010).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

Yes

Rational for determination

All herds within the plan area have demonstrated population declines, and currently most are well below population objectives. Disease, the primary cause of the population decline, is persistent within the plan area and is extremely difficult to manage (Ramsey et al. 2016). The species has a demonstrated propensity for localized extirpation even when surrounding populations are stable (Donovan et al. 2020), especially when populations fall below critical abundance thresholds (Berger 1990, Smith et al. 1991, Singer et al. 2001, Beecham et al. 2007, Carpenter et al. 2014), as is the case for some populations within the plan area.

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3.4 Fisher (*Pekania pennanti*)

Conservation Categories

G5/S3, Regional Forester Sensitive Species, Species of Conservation Concern on a neighboring Forest (Montana Natural Heritage Program, mtnhp.org, 08/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable abundance estimates for the species (Thompson 2004) are not known to be on-going. There are historic and on-going structured occupancy surveys for the species within the plan area and the larger region (Krohner et al. 2022, Golding et al. 2018, Yeats and Haufler 2020, Golding 2022). Indeed, across the species' range in the Northern Rockies, information on the species is largely limited to presence or presence-absence data that is valuable for estimating occupancy (Krohner et al. 2022, Lucid et al. 2019, Vinkey 2003, Coltrane and Inman 2021), but has limited value as an indices of population size for rare carnivores (Clare et al. 2015).

Fisher are broadly distributed across the boreal forests of Canada with more disjunct populations in the Pacific Northwest, New England and the Mid-Atlantic, the Great Lakes Region, and the Northern Rockies (Witmer et al. 1998). The Northern Rockies population occupies much of central and northern Idaho, but the distribution within Montana is more sporadic (Krohner et al. 2022). In the plan area fisher are more likely to occur in mesic landscapes nearer to the Idaho-Montana border (Montana Natural Heritage Program, mtnhp.org, 08/2022). There are no recent detections of the species in the eastern extent of plan area despite species specific surveys (Krohner et al. 2022, Yeats and Haufler 2020) and the presence of modeled suitable habitat (Olson et al. 2014).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area. Various accounts have suggested that fisher were extirpated from Montana in the early part of the twentieth century (Foresman 2012), but it is unclear if the current distribution and abundance of fisher within Montana has changed because historical information is uncertain (Coltrane and Inman 2021). Early trapping accounts for fisher in Montana are sparse, and there is only a single museum specimen dated prior to the initiation of reintroduction efforts within the state (Vinkey 2003). There is genetic evidence that the species occupied western Montana prior to introduction efforts and that individuals from the existent lineage continue to persist (Vinkey et al. 2006, Schwartz 2007).

Habitat description

The species is adaptable to a variety of forest structural conditions, but is less likely to use areas with limited cover (Buskirk and Powell 1994, Sauder and Rachlow 2014, Sauder 2014, Sauder and Rachlow 2015), which may limit occupancy and dispersal in fragmented landscapes (Carroll et al. 2001, Zielinski et al. 2013). Suitable habitat is characterized by a mosaic of seral stages, including young forests that provide important winter habitat (Jones 1991, Jones and Garton 1994, Roy 1991), but is largely dominated by mid- to late-seral mesic-forests with multilayered canopies. Such forest conditions provide protection against predation, large diameter trees and snags for dens, down logs for denning and resting, and coarse woody debris that supports abundant prey (Raley et al. 2012, Schwartz et al. 2013, Sauder and Rachlow 2014, Sauder 2014, Sauder and Rachlow 2015, Jones 1991, Weir and Corbould 2010, Heinemeyer and Jones 1994, Powell and Zielinski 1994, Ruggiero et al. 1994, Aubry et al. 2013, Olson et al. 2014, Heinemeyer 1993, Jones and Garton 1994, Weir and Harestad 2003, Lofroth et al. 2010). In the Northern Rockies, the species is closely tied to large stands of mature, maritime influenced, mesic forests (Olson et al. 2014, Krohner 2020, Schwartz et al. 2013, Sauder and Rachlow 2014, Krohner et al. 2022) and connected riparian areas with sufficient cover (Vinkey 2003, Jones 1991, Raley et al. 2012). Ponderosa and lodgepole pine forests typically do not provide the necessary conditions to support occupancy (Jones 1991, Schwartz et al. 2013, Olson et al. 2014, Krohner 2020, Krohner et al. 2022).

Habitat trend in the plan area

Historic management actions that reduced the distribution and abundance of large trees have likely reduced the availably and relative suitability of fisher habitat (Schwartz et al. 2013, Sauder and Rachlow 2014, Sauder 2014, Sauder and Rachlow 2015). Habitat remains widely distributed across the plan area (Olson et al. 2014) and management guidance for other species that rely upon mature forests (e.g., Northern Rockies Lynx Management Direction) has likely help to stabilize habitat conditions for the species within the plan area.

Importantly, however, most of the plan area is not maritime influenced. A natural west to east gradient in climatic conditions results in an associated gradient in habitat conditions, with modeled habitat patches generally becoming increasingly smaller, more isolated, and riparian associated at the eastern extent of the plan area (Olson et al. 2014). Changes in riparian management have largely improved riparian habitat conditions (Roper et al. 2018, Roper et al. 2019), but isolated habitat patches have lower occupancy rates despite suitable habitat conditions (Olson et al. 2014, Krohner 2020, Schwartz et al. 2013, Sauder and Rachlow 2014, Krohner et al. 2022).

Relevant life history traits and other information

The species expresses a relatively slow life history strategy as females do not reproduce every year and generally produce only 2-3 offspring (Green et al. 2018). Fisher have limited dispersal capacity (Matthews et al. 2013), that differs by sex and spatial connectivity (Tucker et al. 2017), and may ultimately limit population distribution and expansion following localized extirpation (Olson et al. 2014).

Relevant threats to populations occupying the plan area

The relative distribution and connectivity of suitable habitat, including connectivity to the species core range in Idaho, is likely the primary threat to species persistence within the plan area. The lack of large areas of suitable habitat in the eastern extent of the plan area may ultimately limit the distribution of the species, independent of habitat suitability per se, as indicated by observed occupancy patterns (Krohner et al. 2022, Golding et al. 2018, Yeats and Haufler 2020, Golding 2022)(Montana Natural Heritage Program, mtnhp.org, 08/2022). Indeed, across the species range, the availability and distribution of mature mesic forest types may ultimately limit the species distribution (Irwin et al. 2018, Sauder and Rachlow 2014, 2015, Olson et al. 2014, Krohner et al. 2022). Changes in disturbance regimes within the plan area, particularly wildfire may further affect the abundance and distribution of the species, because although fisher will use areas affected by wildfires, high-intensity fires are more likely to reduce site use (Sweitzer et al. 2016, Blomdahl et al. 2019).

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no additional known unique threats to the species within the plan area.

Fisher tend to prefer areas with limited human development and use (Kordosky et al. 2021), but fisher occupancy is largely insensitive to the presence of roads (Carroll et al. 2001), and vehicular related mortalities are rare (Naney et al. 2012). In general, fisher appear tolerant to the presence of people and infrastructure, even persisting in suburban environments (LaPoint 2013). The development of infrastructure and increased human use can, however, lead to indirect increases in other threats to fisher populations, most notably trapping mortality. Fisher are curious and subject to trapping mortality, both intended and incidental (Naney et al. 2012).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

Yes

Rational for determination

Structured surveys within the plan area (Krohner et al. 2022, Golding et al. 2018, Yeats and Haufler 2020, Golding 2022) demonstrate that the species is extremely rare and has a distribution that is limited to the western extent of the plan area (Montana Natural Heritage Program, mtnhp.org, 08/2022). In the Northern Rockies the species occupies large home ranges, and does not generally occupy disconnected or small habitat patches (Olson et al. 2014, Krohner 2020, Schwartz et al. 2013, Sauder and Rachlow 2014, Krohner et al. 2022), which may prevent the species from increasing in distribution and abundance within the plan area where habitat is more disjunct. The species has a limited dispersal capacity and a slow life history strategy that may prevent the species from responding to stochastic events that reduce the population or substantially alters habitat conditions.

Best available scientific information

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3.5 Gray Wolf (*Canis lupis*)

Conservation Categories

G5/S4, Regional Forester Sensitive Species (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in the plan area. Within the Montana Fish, Wildlife and Parks Region 2, which includes the plan area, there are an estimated 40-55 packs representing 250-350 wolves and 180-210 packs in Montana representing 1050-1250 wolves (Sells et al. 2020).

The species formally occupied much of Europe, Asia, and North America, where current populations exist in much of Canada, Alaska, the upper Great Lakes Region, and the Northern Rockies. In Montana, the species primarily resides in the western third of the state. The plan area has a high predicted occupancy rate (Inman et al. 2020, Oakleaf et al. 2006), with dozens of documented observations across most of the extent of the plan area.

Population trend in the plan area

There are no known specific population trends for the species in the plan area, but wolves have consistently persisted within the plan area since the early 1990s (Confederated Salish and Kootenai Tribes 2020). Because the plan area has a high occupancy rate (Inman et al. 2020, Oakleaf et al. 2006), population trends are likely reflective of trends throughout Montana. Following natural colonization from Canada in the early 1990s and reintroduction efforts in Yellowstone National Park and Idaho in 1995 (Oakleaf et al. 2006, Wayne and Hedrick 2011), wolf population grew rapidly in Montana. The species was delisted in 2011 (Inman et al. 2020), and is currently managed as a game species under the 2004 Wolf Conservation and Management Plan (Inman et al. 2020). Populations in Montana peaked between 2011 and 2013 (Inman et al. 2020, Sells et al. 2020), declining slightly after the initiation of hunting and trapping in 2011 but have largely stabilized throughout the state.

Habitat description

The species is a habitat generalist (Mech 1995, Carroll et al. 2001, Carroll et al. 2000) that may exhibit localized habitat use or avoidance associated with prey availability, abundance, or encounter rates (Fuller 1989, Oakleaf et al. 2006, Huggard 1993, Houle et al. 2010, Milakovic et al. 2011, O'Neil et al. 2020); snow conditions (Nelson and Mech 1986, Fuller 1991); land ownership (Woodroffe 2000); livestock (Bangs and Fritts 1996, Bangs et al. 1998); human activity and infrastructure (Fuller 1989, Oakleaf et al. 2006, Mladenoff et al. 1995, Mladenoff et al. 1999, Callaghan 2002, Karlsson et al. 2007, Houle et al. 2010, Kaartinen et al. 2015, Rio-Maior et al. 2019, Barry et al. 2020, Bojarska et al. 2021, Fuller et al. 2003); or topography (Callaghan 2002, Carroll et al. 2006, Peterson et al. 2021).

Habitat trend in the plan area

As the species is a habitat generalist, habitat trends are largely reflective of trends in the availability of natural or semi-natural conditions and associated social tolerance (Murray et al. 2010). Outside of roads and trails, which wolves may avoid (Carricondo-Sanchez et al. 2020) or alter behaviors around (Whittington et al. 2022), especially when are open to public use (Whittington et al. 2005, Whittington et al. 2019, Anton et al. 2020), human development is largely limited within the plan area.

Relevant life history traits and other information

The species is highly adaptable, having formally occupied every habitat with large ungulates in the Northern Hemisphere (Fuller et al. 2003). Highly social, wolves pack size can vary greatly (Mech and Boitani 2003), but average around five individuals in Montana (Sells et al. 2020). Changes in pack composition due to mortality can have additional indirect effects on recruitment and behavior (Ausband et al. 2015, Ausband et al. 2017). Wolves are highly territorial and express strong intraspecific aggression that may ultimately limit populations size if unoccupied space is unavailable for territory establishment (Cubaynes et al. 2014, Cassidy et al. 2015, Keever 2020). However, wolves are also capable dispersers (Boyd and Pletscher 1999) which in some case can lead to rapid changes in the distribution of the species (Jimenez et al. 2017).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area. The species population dynamics are sensitive to changes in prey resources (Packard and Mech 1980, Mech and Peterson 2003, Mech and Fieberg 2015, Fuller et al. 2003), but many locations within the plan area and neighboring regions of Montana exceeding big game population objectives (Montana 2020 Elk Counts).

Human-caused mortality, both intended (i.e., harvest) and unintended (e.g., vehicular collisions), is assumed to be additive to natural sources of mortality (Creel and Rotella 2010, Murray et al. 2010, Horne et al. 2019) and may also indirectly affect recruitment (Ausband et al. 2015, Ausband et al. 2017). Historical persecution of wolves, for example, played a significant role in shaping the current distribution and abundance of wolves worldwide (Fuller et al. 2003). Wolves in Montana, including in the plan area, are managed as a game species with annual harvest rates between 17 to 36 percent (Inman et al. 2020, Sells et al. 2020). Wolf distribution and occupancy are relatively resilient to such harvest rates (Adams et al. 2008, Gude et al. 2012, Murray et al. 2010, Creel and Rotella 2010), although harvest may lead to individual turnover within a pack (Bassing et al. 2019) or decreased recruitment (Ausband et al. 2015, Ausband et al. 2017) that may affect pack size (Sells et al. 2022). Still, despite regular harvest, wolf populations trends in Montana are stable (Inman et al. 2020, Sells et al. 2020) and may have reached a biological or social carrying capacity (Keever 2020, Murray et al. 2010). Within the Montana Fish, Wildlife and Parks Region 2, which includes the plan area, harvest has increased in recent years (Inman et al. 2020), but the population growth rate, size and density have remained stable (Sells et al. 2020). Consistency in wolf population estimates across Montana, and specifically within the Montana Fish, Wildlife and Parks management Region 2 that includes the plan area (Inman et al. 2020, Sells et al. 2020), suggests that human-caused mortality is not reasonably likely to affect persistence of the species within the plan area.

Immigration may be an important factor in maintaining local wolf populations (Ballard et al. 1987, Larivière et al. 2000)(but see (Bassing et al. 2020). The population of wolves in Montana, and the plan area, is robust (Inman et al. 2020, Sells et al. 2020) and geographically connected to large populations of wolves in Idaho, Wyoming, and Canada. Natal dispersal of wolves' averages 100 km (Boyd and Pletscher 1999) and wolf habitat connectivity with neighboring populations is high (Carroll et al. 2012), allowing for reasonable rates of immigration, as is evident throughout the Northern Rocky Mountains (Jimenez et al. 2017, Vonholdt et al. 2010, Ausband and Waits 2020, Bassing et al. 2020). As the plan area is centrally located in the larger population of wolves in the Northern Rocky Mountains that has demonstrated consistent rates of movements among subpopulations (Jimenez et al. 2017, Vonholdt et al. 2010, Ausband and Waits 2020, Bassing et al. 2020), a lack of source populations is not reasonably likely to affect persistence of the species within the plan area.

Inbreeding depression can affect population dynamics of rare species in some cases to the point of local extirpation (Keller and Waller 2002), but there are only a few examples of inbreeding depression in wolves (Räikkönen et al. 2009, Gómez-Sánchez et al. 2018). Similarly, disease is an emerging challenge for wildlife management (Russell et al. 2020), but despite hosting multiple disease that can affect survival and recruitment, wolf population dynamics are rarely affected to the point of local extirpation (Brandell et al. 2020).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

Populations are stable within the plan area and throughout Montana (Inman et al. 2020, Sells et al. 2020). There is a lack of evidence to suggest that key threats to the species (food, people, source populations; (Fuller et al. 2003)) are of concern within the plan area.

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3.6 Hoary Bat (*Lasiurus cinereus*)

Conservation Categories

G3G4/S3B (Montana Natural Heritage Program, mtnhp.org, 11/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area. In general, estimating population size for the species is challenging and remains a critical data gap in the management of the species (Hammerson et al. 2017, Friedenberg and Frick 2021), although new approaches are beginning to address such limitations (Rodhouse et al. 2019, Reichert et al. 2021).

A migratory species that is present in Montana in the summer, hoary bats are widely distributed throughout much of North America and all of Montana (Campbell et al. 2022, Bachen et al. 2018, Bachen, McEwan, Burkholder, et al. 2020), although relatively uncommon (Shump Jr. and Shump 1982). The species is found across the plan area (Montana Natural Heritage Program, mtnhp.org, 11/2022); however, hoary bats segregate by sex during the summer with males primarily occupying western North America and females in the east, thus all the hoary bats using the plan area are likely male (Cryan et al. 2014, Cryan 2003, Bachen, McEwan, Burkholder, et al. 2020, Hayes et al. 2015).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area. Nearly one third of bat species in the United States are experiencing population declines (Hammerson et al. 2017), but population trends for most bat species are unknown (Frick et al. 2020). Throughout the species' range, there is increasing evidence that populations are declining (Rodhouse et al. 2019, Davy et al. 2021), largely due to mortality during migration (Frick et al. 2017, Arnett and Baerwald 2013, Goldenberg et al. 2021); however, in some locations populations remain robust (Green et al. 2021) making ascertains about population trends in any given location difficult.

Habitat description

The species occupies a wide variety of habitat types, including coniferous, mixed, and deciduous forests (Shump Jr. and Shump 1982, Koehler and Barclay 2000, Veilleux et al. 2009, Bachen, McEwan, Burkholder, et al. 2020, Taylor et al. 2020). Present in many successional stages, hoary bats forage in open habitats (Loeb and O'Keefe 2011), but may occupy old-growth stands (Jung et al. 1999), likely due to the high degree of structural heterogeneity (Jung et al. 2012) that may provide a diversity of roost-site microclimates (Willis and Brigham 2005). Typically, hoary bats roost alone or in small family groups in tree foliage and show little roost site fidelity (Shump Jr. and Shump 1982, Koehler and Barclay 2000, Veilleux et al. 2009, Bachen, McEwan, Burkholder, et al. 2020). Large trees and snags are frequently identified as important features for tree-dwelling bats (Kalcounis-Rüppell et al. 2005, Saltus and Britzke 2022, Fabianek et al. 2015). Ultimately, vegetation does not likely limit the distribution or abundance of the species as much as the availability of suitable prey resources (Mirts et al. 2022), which includes a range of insects as well as other bats (Montana Natural Heritage Program, mtnhp.org, 11/2022).

Habitat trend in the plan area

A habitat generalist, capable of occupying a variety of forest types and successional stages, which remain abundant within the plan area.

Relevant life history traits and other information

A solitary bat, except during migration, males and females come together only to mate in the fall (Shump Jr. and Shump 1982). Females typically give birth to 1-4 offspring between mid-May and late June (Shump Jr. and Shump 1982), with young growing relatively slowly as compared to other bat species, with subsequent consequences for migratory timing (Koehler and Barclay 2000).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The primary threat to hoary bats across the species' distribution is wind energy development (Johnson et al. 2003, Arnett et al. 2008), including in Montana (Bachen, McEwan, Burkholder, et al. 2020). Wind farms can substantially impact bat populations, especially migratory species (Frick et al. 2017, Hammerson et al. 2017, Arnett and Baerwald 2013, Thompson et al. 2017) and may result in population-level impacts as the distribution and abundance of wind turbines increases (Zimmerling and Francis 2016, Friedenberg and Frick 2021). There are no largescale wind energy facilities in the plan area. The migratory routes of the individuals using the plan area or other parts of western Montana are unknown, and therefore it is unknown whether wind energy development is a problem to hoary bat populations using the plan area.

White-nose syndrome, although a significant threat to cave-roosting bats (Welch et al. 2017, Bure and Moore 2019, Hoyt et al. 2021), is extremely rare in tree-roosting bats, with only a single observation of the fungus that causes the disease occurring on a hoary bat (Campbell et al. 2022) and no known observation of the species presenting diagnostic symptoms (https://whitenosesyndrome.org/static-page/bats-affected-by-wns, 02/2023). The fungus is documented in portions of Montana and all surrounding states but there are no known observations within the plan area (Bachen, McEwan, Skone, et al. 2020).

Roost, particularly large-trees and snags, are considered the most limiting habitat feature for forest dwelling bats and reductions in roost availability can reduce occupancy rates for most bat species (Arnett and Hayes 2009, Kalcounis-Rüppell et al. 2005, Loeb and O'Keefe 2011). Management practices that create heterogeneity in forest age and structure and retain mature trees and large snags can improve conditions for bats on managed forests (Humes et al. 1999), and may reduce risks to bat habitat from uncharacteristic wildlife fire (Jung 2020).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

The species and its habitats are widely distributed throughout the plan area (Montana Natural Heritage Program, mtnhp.org, 11/2022). The species is impacted by wind energy development, which while not present within the plan area, may still affect local populations if they migrate through areas with development (Frick et al. 2017, Hammerson et al. 2017, Arnett and Baerwald 2013, Thompson et al. 2017). There are documented population declines of the species elsewhere (Rodhouse et al. 2019, Davy et al. 2021), but in some locations populations remain robust (Green et al. 2021).

Best available scientific information

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3.7 Little Brown Myotis (*Myotis lucifugus*)

Conservation Categories

G34/S3, Regional Forester Sensitive Species (Montana Natural Heritage Program, mtnhp.org, 12/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area. The species is widely distributed throughout much of North America (Kunz and Reichard 2011, Fenton and Barclay 1980), is among the most common bats found in Montana (Bachen, McEwan, Burkholder, et al. 2020), and is found throughout the plan area (Montana Natural Heritage Program, mtnhp.org, 12/2022). The species is migratory, but the species is present in Montana year-round (Bachen, McEwan, Burkholder, et al. 2020)(Montana Natural Heritage Program, mtnhp.org, 12/2022), and was identified at 44 percent of suitable hibernacula, including five sites with more than 200 individuals (Weller et al. 2018).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area. Nearly one third of bat species in the United States are experiencing population declines (Hammerson et al. 2017), but population trends for most bat species are unknown (Frick et al. 2020). Population of little brown myotis have drop precipitously in the eastern half of the species range (Kunz and Reichard 2011, Frick et al. 2010, Dzal et al. 2011); however, population trends in the intermountain west appear more stable (Weller et al. 2018).

Habitat description

The species uses a wide range of habitat types and are present in many forest types and successional stages (Grindal and Brigham 1999, Patriquin and Barclay 2003), but often associates with riparian habitats, likely due to the species tendency to forage on aquatic insects (Fenton and Barclay 1980, Loeb et al. 2014, Nelson and Gillam 2017, Jung 2020). Large trees and snags are frequently identified as important features for tree-roosting bats (Kalcounis-Rüppell et al. 2005, Saltus and Britzke 2022, Fabianek et al. 2015), including little brown myotis (Lacki 2018); however, the species will roost in a variety of structures, including human structures (Bachen et al. 2019, Bergeson et al. 2015, Johnson et al. 2019, Bachen, McEwan, Burkholder, et al. 2020). In the summer males roost alone, but females form maternity colonies in buildings or large trees that can include hundreds of individuals (Fenton and Barclay 1980, Olson and Barclay 2013, Bergeson et al. 2015, Johnson et al. 2019, Kunz and Reichard 2011). Little brown myotis show substantial interannual fidelity to maternal colonies (Dixon 2011, Norquay et al. 2013). Increased density of suitable roosting locations is likely to increase the use of an area (Washinger 2021, Jung 2020), as broadly demonstrated for many bat species (Arnett and Hayes 2009, Kalcounis-Rüppell et al. 2005, Fabianek et al. 2015). Little brown myotis exhibit even higher philopatry to hibernacula than summer rooting habitats (Norquay et al. 2013). In Montana, some little brown myotis are known to overwinter in caves and mines, sometimes in large aggregations (Bachen et al. 2019, Bachen, McEwan, Burkholder, et al. 2020); however, rock crevices also provide suitable hibernacula for the species (Neubaum 2018).

Habitat trend in the plan area

The species is a forest habitat generalist, capable of occupying a variety of forest conditions (Grindal and Brigham 1999, Patriquin and Barclay 2003) and roost site structures (Kunz and Reichard 2011) that are readily available within the plan area. Within the plan area the availability and distribution of caves and rock crevices that may provide hibernacula is likely stable; however, mine closures and bridge removals may lead to reduced habitat availability (Kunz and Reichard 2011).

Relevant life history traits and other information

A highly gregarious bat, little brown myotis mate at hibernacula in the fall and winter (Kunz and Reichard 2011). Females are reproductively mature in their first year of life, but males aren't mature for another year (Kunz and Reichard 2011). Females typically give birth to a single offspring at summer nursery colonies (Fenton and Barclay 1980). In the winter, the species may congregate in hibernacula in the thousands, but overwintering congregations west of the Rocky Mountains tend to be significantly smaller, and in many cases may be limited to an individual or small group occupying small, dispersed hibernacula rather than a single hibernaculum (Jung et al. 2014).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The most significant threat to cave-roosting bats in North America is likely white-nose syndrome (Welch et al. 2017, Bure and Moore 2019, Hoyt et al. 2021), a disease caused by an invasive fungus (*Pseudogemnoascus destructans*). Humans and bats are both effective at spreading the fungus (Ballmann et al. 2017), which once introduced can, in some instances, reduce a bat population by over 90 percent (Moore et al. 2018). Importantly, however, although the fungus is documented in portions of Montana and all surrounding states, there are no known observations within the plan area (Bachen, McEwan, Burkholder, et al. 2020).

Wind farms can substantially impact bat populations, and although migratory species appear particularly sensitive to wind farm development (Frick et al. 2017, Hammerson et al. 2017, Arnett and Baerwald 2013) little brown myotis is not among the species regularly identified as experiencing mortality from wind turbines (Frick et al. 2017, Hammerson et al. 2017, Arnett and Baerwald 2013, Thompson et al. 2017, Zimmerling and Francis 2016, Friedenberg and Frick 2021), including in Montana (Bachen, McEwan, Burkholder, et al. 2020), and may benefit from openings created by wind farm installations in certain situations (Segers and Broders 2014).

Reductions in forest structural heterogeneity and snag availability can compromise habitat suitability for forest bats (Frick et al. 2020), particularly large-trees and snags, are considered the most limiting habitat feature for forest dwelling bats and reductions in roost availability can reduce occupancy rates for most bat species (Arnett and Hayes 2009, Kalcounis-Rüppell et al. 2005, Loeb and O'Keefe 2011, Fabianek et al. 2015). For little brown myotis, this includes the loss of mines, bridges or other human structures that provide roost and hibernacula sites (Bachen, McEwan, Skone, et al. 2020, Bachen, McEwan, Burkholder, et al. 2020, Bachen et al. 2019, Bachen 2019). Management practices that create heterogeneity in forest age and structure and retain mature trees and large snags can improve conditions for bats on managed forests (Humes et al. 1999), and may reduce risks to bat habitat from uncharacteristic wildlife fire (Jung 2020).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

The species is globally vulnerable; however regionally, population trends for the species suggest it is largely secure in the species' western range (Weller et al. 2018). The most significant threat to cave dwelling species, white-nose syndrome, is not known to occur within the plan area, limiting the threats to the species.

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3.8 Mountain Goat (*Oreamnos americanus*)

Conservation Categories

G5/S4 (Montana Natural Heritage Program, mtnhp.org, 10/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

The species is known from four disjunct, native populations that fully or partially overlap with the plan area (Smith and DeCesare 2017). In 2015, population estimates for the monitored populations that overlap the plan area varied from 16-55 individuals each (Smith and DeCesare 2017).

Historically distributed from Montana, Idaho, and Washington north through throughout Canadian Rockies and Alaska, the species was introduced outside of its native range south to Nevada and east to South Dakota (NatureServe, natureserve.org, 10/2023). In Montana, the species is represented by native populations in the west, including the plan area, and introduced populations in the central part of the state (Smith and DeCesare 2017). In the plan area, populations are very disjunct, occurring in the extreme western, northern and eastern extent (Smith and DeCesare 2017)(Montana Natural Heritage Program, mtnhp.org, 10/2023).

Population trend in the plan area

Population surveys for the plan area are limited (Smith and DeCesare 2017); however, for the three monitored populations harvest trends suggest populations have declined since the 1970s, a pattern that is common for all native populations in Montana (Smith and DeCesare 2017). Surveys of area biologists further supports that notion that native populations of the species are in decline throughout Montana, including the plan area (Smith and DeCesare 2017).

Habitat description

The species tends to occupy alpine or subalpine areas with steep, rugged geological features that provide conditions for minimizing risk of predation (Festa-Bianchet and Côté 2012, Côté and Festa-Bianchet 2003)(Sarmento and Berger 2020, Shafer et al. 2012). Ultimately, suitable habitat may be limited based on the relative juxtaposition of such geological formations to foraging habitats. Some populations exhibit seasonal migrations, occupying distinct summer and winter ranges, but many are nonmigratory (Côté and Festa-Bianchet 2003). Occupied areas are typified by cold harsh climates, and the species is thought to rely upon high winds to provide areas of limited snow depth for foraging in the winter (Poole et al. 2009)

Habitat trend in the plan area

No specific habitat trends are known within the plan area. The geological features that the species relies upon are likely unchanged, but changes in fire regimes due to fire suppression may limit the relative availability of suitable foraging habitat in proximity to such features (Idaho Department of Fish and Game 2019).

Relevant life history traits and other information

The species has a relatively slow life history strategy, with late maturation (4–5 years) and limited reproductive output, including a tendency to skip breeding opportunities based on body condition and population density (Festa-Bianchet and Côté 2012, Houston and Stevens 1988, Bowyer et al. 2014). Consequently, populations tend to exhibit slow growth rates, and are particular sensitivity to weather conditions and harvest regimes that affect female survival and condition (Côté and Festa-Bianchet 2003, Festa-Bianchet and Côté 2012, Rice and Gay 2010, Idaho Department of Fish and Game 2019, Hamel et al. 2006, Pettorelli et al. 2007, White et al. 2020, White et al. 2011).

Mineral limitations in the diet of the species are common, as such individuals often ingest soil rich in limited minerals (Côté and Festa-Bianchet 2003), which in some cases requires seasonal movements to specific locations with high sodium, calcium, and magnesium in the soil (Grusing et al. 2020).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 10/2023), there are no known unique threats to the species within the plan area.

The primary threats to the species across its distribution reflect the tendency for populations to be small and isolated, as is the case within the plan area, which present concerns for genetic variability as well as susceptibility to stochastic events such as weather, predation, and pathogens (Mountain Goat Management Team 2010, White et al. 2020). Gene flow among populations may be affected by natural and anthropogenic barriers as well as the relative availability of habitat that provides refuge from predator (Parks et al. 2015). Habitat loss from human development or timber harvest, as well as fire suppression, may further affect local populations (Idaho Department of Fish and Game 2019).

Like bighorn sheep, mountain goats are susceptible to infection by *Mycoplasma ovipneumoniae* (Lowrey et al. 2018, Wolff et al. 2019), the bacterium associated with pneumonia in sheep and goats. Although, significant adult mortality events associated with *M. ovipneumoniae* infection are not well documented within mountain goats, *M. ovipneumoniae* infection can reduce juvenile survival with subsequent consequences for recruitment (Wolff et al. 2019, Blanchong et al. 2018).

Compared to other ungulates, the species appears particularly sensitive to human disturbance (Mountain Goat Management Team 2010). Motorized and non-motorized recreation, as well as aerial vehicles, are well documented to affect the species, particularly during winter and kid rearing season, with impacts ranging from permanent or seasonal displace, to changes in behavior and productivity (Idaho Department of Fish and Game 2019, Mountain Goat Management Team 2010, Northern Wild Sheep and Goat Council 2020).

The species is expected to be largely negatively affected by climate change (Northern Wild Sheep and Goat Council 2022). Increasing summer temperatures can increase physiological costs to individuals while reducing forage productivity, with subsequent implications for recruitment and survival (White et al. 2011, White et al. 2020, Young et al. 2022, Northern Wild Sheep and Goat Council 2022). Ultimately, the area suitable for sustaining the species is expected to decline (White et al. 2020, Elsen and Tingley 2015), which due to the small population sizes typified by the species, may have additional effects if connectivity among populations is not enhanced (Young et al. 2022).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

Yes

Rational for determination

All herds within the plan area have demonstrated or are suspected to have population declines. Populations within the plan area are small and isolated and likely have limited connectivity to other populations due to suitable habitat arrangements within the larger landscape. Although the specific cause of the population decline are unknown, multiple threats to the species exist within the plan area, and when coupled with the inherently small populations within the plan area indicate there is substantial concern for the species.

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3.9 North American Porcupine (***Erethizon dorsatumorthern***)

Conservation Categories

G5/S3S4 (Montana Natural Heritage Program, mtnhp.org, 08/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004) are not known to be on-going.

The species is broadly distributed across the boreal forests of Canada and Alaska, and throughout the western United States (NatureServe, natureserve.org, 08/2023). The species occurs throughout Montana but is known from only two recent documented findings within the plan area (Montana Natural Heritage Program, mtnhp.org, 08/2023).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area; however, there is some evidence that populations are declining throughout the species range (Brown and Babb 2009, Dombro et al. 2020, Wasstrom et al. 2020, Appel et al. 2021), including in western Montana (Mally 2008).

Habitat description

Found in a variety of habitat types including forests and shrublands, and along riparian corridors; however, the species is increasingly less likely to occupy forestlands (Appel et al. 2021), including higher elevation forestlands in western Montana (Mally 2008).

Habitat trend in the plan area

No specific habitat trends are known within the plan area; however, the species can occupy a variety of habitats that are well dispersed throughout the plan area.

Relevant life history traits and other information

Predation and winter food resources can significantly affect the ecology and behavior of the species, and may interact to affect population trends and species distribution (Sweitzer 1996, Coltrane and Barboza 2010, Mabille et al. 2010, Dombro et al. 2020, Appel et al. 2021).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area. Changes in predator communities and climate may affect population dynamics and distribution of the species (Sweitzer 1996, Coltrane and Barboza 2010, Mabille et al. 2010, Dombro et al. 2020, Appel et al. 2021).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

There is insufficient information on the distribution and abundance of the species within the plan area. The species is globally secure and habitat the species occupies is available and widely distributed in the plan area.

Best available scientific information

Appel, C.L., Moriarty, K.M., Matthews, S.M., Green, D.S., Anderson, S., King, E., Yaeger, J.S., Brown, J., Bortot, C., and Bean, W.T. 2021. North American Porcupine Distribution in the Pacific Northwest and Evaluation of a Non-Invasive Monitoring Technique. Northwestern Naturalist 102 (1) 10.1898/1051-1733-102.1.9

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Dombro, L.M., Perez-Foust, E., Roddy, D., Mergen, D.E., and Gitzen, R.A. 2020. Occurrence of North American Porcupine (Erethizon dorsatum) in the Black Hills, South Dakota. Western North American Naturalist 80 (2) 10.3398/064.080.0214

Mabille, G., Descamps, S., and Berteaux, D. 2010. Predation as a probable mechanism relating winter weather to population dynamics in a North American porcupine population. Population Ecology 52 (4): 537-546 pp. 10.1007/s10144-010-0198-5

Mally, K.A. 2008. Hierarchical summer habitat selection by the North American porcupine in western Montana. M.S. Wildlife Biology, UNiversity of Montana, Missoula, MT. 47 p.

Sweitzer, R.A. 1996. Predation or Starvation: Consequences of Foraging Decisions by Porcupines (Erethizon dorsatum). Journal of Mammalogy 77 (4): 1068-1077 pp. 10.2307/1382787

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3.10 Northern Bog Lemming (*Synaptomys borealis*)

Conservation Categories

G5/S2, Regional Forester Sensitive Species (Montana Natural Heritage Program, mtnhp.org, 08/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004) are not known to be on-going.

The distribution of the species largely overlaps the boreal forests of North America from the tundra south to Washington, Montana, Minnesota, and New England (Reichel and Corn 1997, Benson 2019). Populations are highly localized, and the species is likely not common anywhere in its known extent (Reichel and Corn 1997). The species is known from roughly six locations in the plan area, primarily within the eastern extent (Montana Natural Heritage Program, mtnhp.org, 08/2022); however, the species is notoriously difficult to sample, limiting the available information on distribution and abundance (Reichel and Corn 1997, Benson 2019, Christian et al. 1993).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area.

Habitat description

Usually found in Engelmann spruce or subalpine fir forests and associated with wet meadows, fens, or bogs that include birch, willow, sedge (*Carex*), or spikerush (*Eleocharis*). Most common in areas with extensive moss mats, primarily sphagnum (Reichel and Beckstrom 1993, 1994, Clough and Albright 1987, Pearson 1999, Foresman 2012, Reichel and Corn 1997); however, due to surveying challenges, knowledge concerning the full extent of suitable habitat is limited and may be more extensive, particularly at higher elevations (Salt 2001).

Habitat trend in the plan area

No specific habitat trends are known within the plan area. The availability and distribution of suitable wetlands is likely largely stable, but little is known about trends in suitable microhabitats such as mats of moss that may ultimately limit species distribution and abundance. In general, the ecological conditions within suitable waterbodies are likely either stable or improving due to improvements in riparian and aquatic ecosystem management within the plan area (Roper et al. 2019, Roper et al. 2018).

Relevant life history traits and other information

Little is known about the species beyond identification of potential habitat associations.

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The greatest threats to the species are believed to be associated with threats to the wetland habitats the species commonly occupies, and associated microhabitat conditions, most notably extensive mats of moss.

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

There is insufficient information on the distribution and abundance of the species within the plan area. The species is globally secure and habitat the species occupies is available and widely distributed in the plan area.

Best available scientific information

Benson, K. 2019. Effectiveness of Lure in Capturing Northern Bog Lemmings on Trail Cameras.Senior Honors B.S., University of Montana, Missoula, MT. 25 p.

Christian, D.P., Mathisen, J., and Baker, R. 1993. Distribution And Abundance Of Bog Lemmings (Synaptomys Cooperi And S. Borealis) And Associated Small Mammals In Lowland Habitats In Northern Minnesota (Sensitive Small Mammals Of The Chippewa National Forest). Cass Lake, MN. University of Minnesota, Department of Biology. Cass Lake, MN. 43 p.

Clough, G.C., and Albright, J.J. 1987. Occurence of the northern bog lemming, Synaptomys borealis, in the northeastern United States. Canadian Field-Naturalist 101 (4): 611-613 pp.

Foresman, K.R. 2012. Mammals of Montana. Mountain Press Publishing Company.

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Reichel, J.D., and Beckstrom, S.G. 1994. Northern bog lemming survey 1993 Unpublished report. Helena, MT. 87 p. http://mtnhp.org/animal/reports/mammals/NBL_survey_1993.pdf, http://mtnhp.org/Reports.asp?key=7

Reichel, J.D., and Corn, J.G. 1997. Northern bog lemmings: Survey, population parameters, and population analysis. Unpublished report to the U.S. Department of Agriculture, Forest Service, Kootenai National Forest. April. Helena, MT. 27 p.

Roper, B.B., Capurso, J.M., Paroz, Y., and Young, M.K. 2018. Conservation of aquatic biodiversity in the context of multiple-use management on National Forest System lands. Fisheries 43 (9): 396-405 pp.

Roper, B.B., Saunders, W.C., and Ojala, J.V. 2019. Did changes in western federal land management policies improve salmonid habitat in streams on public lands within the Interior Columbia River Basin? Environmental Monitoring and Assessment 191 (9): 574 p.

Salt, J.R. 2001. A Note on Status and Habitat of Northern Lemming Vole, Synaptomys borealis. Alberta Naturalist, 30 (3): 54-56 pp.

Thompson, W.L. 2004. Sampling rare or elusive species: concepts, designs, and techniques for estimating population parameters. Washington D.C.: Island Press. 447 p.

3.11 Pacific Marten (*Martes caurina*)

Conservation Categories

G4/SNR (NatureServe, natureserve.org, 10/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable abundance estimates for the species (Thompson 2004) are not known to be on-going. There are historic and on-going structured occupancy surveys for the species within the plan area and the larger region (Krohner et al. 2022, Golding et al. 2018, Yeats and Haufler 2020, Golding 2022).

The species is broadly distributed across Alaska, south through British Columbia and much of the western Continental United States from California to South Dakota (NatureServe, natureserve.org, 10/2023). In Montana the genera is limited to the mountain ranges in the western portion of the state, with dozens of observations documented throughout the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2023) and known occupancy by the species (Lolo Meso-carnivore Report 2020, see planning record exhibit R22-003).

Population trend in the plan area

There are no known specific population trends for marten in Montana or the plan area, but the genera is regularly detected during meso-carnivore surveys (Krohner et al. 2022, Golding et al. 2018, Yeats and Haufler 2020, Golding 2022).

Habitat description

Marten occupy a variety of forest types (Clark et al. 1987), but are generally associated with forests with woody debris and large trees that provide resting, denning, and foraging opportunities (Buskirk et al. 1987, Buskirk and McDonald 1989, Buskirk et al. 1989)(Cheveau et al. Marten occupy a variety of forest types (Clark et al. 1987), but are generally associated with forests with woody debris and large trees that provide resting, denning, and foraging opportunities (Buskirk et al. 1987, Buskirk and McDonald 1989, Buskirk et al. 1989, Cheveau et al. 2013, Wiebe et al. 2015). Riparian forests may play a key role as habitat for marten and a means of connectivity among marten populations, even in highly forested landscapes (Shirk et al. 2014).

Habitat trend in the plan area

No specific habitat trends are known within the plan area, but the forest conditions that support marten are well distributed across the plan area, including riparian forests.

Relevant life history traits and other information

Two species of marten were recognized within North America, the American Marten (*M. americana*) and Pacific Marten (*M. caurina*), until the early 1950's when morphometric assessments determined there was a single species (*M. americana*) (Wright 1953). Since that time marten have traditionally been classified into two morphological groups (Clark et al. 1987), but recent molecular evidence identified key differences between the two groups (Stone and Cook 2002, Small et al. 2003, Dawson and Cook 2017) such that they were again identified as independent species (Bradley et al. 2014). Both species are present in Montana and are known to hybridize (Dawson et al. 2017, Wright 1953, Dawson and Cook 2017). Both species are documented as present within the plan area (Lolo Meso-carnivore Report 2020, see planning record exhibit R22-003), which is also likely inclusive of the hybridization zone (Dawson et al. 2017, Wright 1953, Dawson and Cook 2017). However, the exact distribution and abundance of individual species within the plan area is unknown.

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 10/2023), there are no known unique threats to the species within the plan area.

Martens tend to avoid open areas, particularly in dry forest types (Shirk et al. 2014). Regeneration harvest practices may therefore affect habitat use and the localized distribution marten (Cushman et al. 2011, Moriarty et al. 2016), but such effects are unlikely to lead to population isolation (Koen et al. 2011). Martens tend to avoid open areas, particularly in dry forest types (Shirk et al. 2014). Regeneration harvest practices may therefore affect habitat use and the localized distribution marten (Cushman et al. 2011, Moriarty et al. 2016), but such effects are unlikely to lead to population isolation (Koen et al. 2011), and some effects may be mitigated by providing suitable microhabitat elements for resting and denning (Seip et al. 2018) if prey is available (Vigeant-Langlois and Desrochers 2011). Marten may also change behaviors or alter habitat use in response to human recreation (Slauson et al. 2017).

Climate change is expected to reduce habitat availability for marten in the Northern Rockies with consequences for population dynamics and genetic diversity (Wasserman et al. 2013).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

There is insufficient information on the distribution and abundance of the species within the plan area. Members of the genera are widespread, but the specific representation for most observations is unknown. The species is apparently globally secure and the habitat the species occupies is available and widely distributed in the plan area.

Best available scientific information

Bradley, R.D., Ammerman, L.K., Baker, R.J., Bradley, L.C., Cook, J.A., Dowler, R.C., Jones, C., Schmidly, D.J., FrederickB. Stangl, J., Bussche, R.A.V.D., and Wursig, B. 2014. Revised checklist or North American mammals north of Mexico, 2014. Occasional Papers. University, Museum of Texas Tech, ed. 28 p.

Buskirk, S.W., Forrest, S.C., Raphael, M.G., and Harlow, H.J. 1989. Winter resting site ecology of marten in the central Rocky Mountains. Journal of Wildlife Management 53 (1): 191-196 pp. 10.2307/3801330

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Buskirk, S.W., and McDonald, L.L. 1989. Analysis of variability in home-range size of the American marten. Journal of Wildlife Management 53 (4): 997-1004 pp. 10.2307/3809601

Cheveau, M., Imbeau, L., Drapeau, P., and Belanger, L. 2013. Marten space use and habitat selection in managed coniferous boreal forests of eastern Canada. The Journal of Wildlife Management 77 (4): 749-760 pp. 10.1002/jwmg.511

Clark, T.W., Anderson, E., Douglas, C., and Strickland, M. 1987. *Martes americana*. Mammalian Species 289: 1-8 pp.

Cushman, S.A., Raphael, M.G., Ruggiero, L.F., Shirk, A.S., Wasserman, T.N., and O'Doherty, E.C. 2011. Limiting factors and landscape connectivity: The American marten in the Rocky Mountains. Landscape Ecology 26 (8): 1137-1149 pp. 10.1007/s10980-011-9645-8

Dawson, N., and Cook, J. 2017. 2. Behind the Genes: Diversification of North American Martens (Martes americana and M. caurina): A New Synthesis. 10.7591/9780801466076-005

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Golding, J.D., Schwartz, M.K., McKelvey, K.S., Squires, J.R., Jackson, S.D., Staab, C., and Sadak, R.B. 2018. Multispecies mesocarnivore monitoring: USDA Forest Service multiregional monitoring approach. Fort Collins, CO. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 10.2737/RMRS-GTR-388

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Krohner, J.M., Lukacs, P.M., Inman, R., Sauder, J.D., Gude, J.A., Mosby, C., Coltrane, J.A., Mowry, R.A., and Millspaugh, J.J. 2022. Finding fishers: Determining fisher occupancy in the Northern Rocky Mountains. Journal of Wildlife Management 86 (2): 20 p. https://doi.org/10.1002/jwmg.22162

Moriarty, K.M., Epps, C.W., and Zielinski, W.J. 2016. Forest thinning changes movement patterns and habitat use by Pacific marten. Journal of Wildlife Management 80 (4): 621-633 pp. 10.1002/jwmg.1060

Seip, C.R., Hodder, D.P., Crowley, S.M., and Johnson, C.J. 2018. Use of constructed coarse woody debris corridors in a clearcut by American martens (Martes americana) and their prey. Forestry: An International Journal of Forest Research 91 (4): 506-513 pp. 10.1093/forestry/cpy010

Shirk, A.J., Raphael, M.G., and Cushman, S.A. 2014. Spatiotemporal variation in resource selection: insights from the American marten (*Martes americana*). Ecological Applications 24 (6): 1434-1444 pp. 10.1890/13-1510.1

Slauson, K.M., Zielinski, W.J., and Schwartz, M.K. 2017. Ski areas affect Pacific marten movement, habitat use, and density. The Journal of Wildlife Management 81 (5): 892-904 pp. 10.1002/jwmg.21243

Small, M.P., Stone, K.D., and Cook, J.A. 2003. American marten (Martes americana) in the Pacific Northwest: population differentiation across a landscape fragmented in time and space. Molecular Ecology 12: pp. 89-103 pp.

Stone, K.D., and Cook, J.A. 2002. Molecular evolution of holarctic martens (genus Martes, Mammalia: Carnivora: Mustelidae). Molecular Phylogenetics and Evolution 24: pp.169-179 pp.

Thompson, W.L. 2004. Sampling rare or elusive species: concepts, designs, and techniques for estimating population parameters. Washington D.C.: Island Press. 447 p.

Vigeant-Langlois, C., and Desrochers, A. 2011. Movements of wintering American marten (*Martes americana*): relative influences of prey activity and forest stand age. Canadian Journal of Forest Research 41 (11): 2202-2208 pp. 10.1139/x11-133

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3.12 Silver-haired Bat (*Lasionycteris noctivagans*)

Conservation Categories

G3G4/S4 (Montana Natural Heritage Program 11/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area. A migratory species, the silver-haired bat is widely distributed throughout much of North America(Kunz 1982), all of Montana, and all of the plan area, where some individuals may be present throughout the year (Bachen et al. 2018, Bachen, McEwan, Burkholder, et al. 2020, Campbell et al. 2022).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area. Nearly one third of bat species in the United States are experiencing population declines (Hammerson et al. 2017), but population trends for most bat species are unknown (Frick et al. 2020). Throughout their range, there is increasing evidence that populations of silver-haired bats are declining (Davy et al. 2021), largely due to mortality during migration (Frick et al. 2017, Arnett and Baerwald 2013, Goldenberg et al. 2021).

Habitat description

The silver-haired bat is among the most common bats in the forests of North America (Taylor et al. 2020). Although present in many forest types and successional stages (Grindal and Brigham 1999, Patriquin and Barclay 2003, Lawson et al. 2019), silver-haired bats are more likely to use old-growth stands with large canopy gaps and an abundance of large trees, which likely provide important foraging habitats stands (Jung et al. 1999). Vegetation types do not likely limit the distribution or abundance of the species beyond the availability of suitable roost trees (Vonhof and Gwilliam 2007, Campbell et al. 1996, Kunz 1982), such as large trees and snags (Kalcounis-Rüppell et al. 2005, Saltus and Britzke 2022). Silver-haired bats roost in large, canopy or emergent trees, often aspen where available, with loose bark, cracks or cavities and prefers to forage in more open habitat despite being a forest dwelling species (Vonhof and Gwilliam 2007, Campbell et al. 1996). Increased density of suitable roost trees within a stand is likely to increase silver-haired bat use of a stand (Campbell et al. 1996, Mattson et al. 1996, Betts 1998, Kunz 1982), as broadly demonstrated for many bat species (Arnett and Hayes 2009, Kalcounis-Rüppell et al. 2005).

Habitat trend in the plan area

The species is a forest habitat generalist, capable of occupying a variety of forest conditions (Grindal and Brigham 1999, Patriquin and Barclay 2003, Lawson et al. 2019) that are readily available within the plan area.

Relevant life history traits and other information

A solitary bat, except during migration, males and females come together only to mate in the fall. Females typically give birth to 1-2 offspring between June and July, which are capable of flight in roughly a month (Kunz 1982).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The primary threat to silver-haired bats across their distribution is wind energy development (Ellison 2012, Johnson et al. 2003, Arnett et al. 2008, Cryan et al. 2012), including in Montana (Bachen, McEwan, Burkholder, et al. 2020). Wind farms can substantially impact bat populations, especially migratory species and may result in population-level impacts as the distribution and abundance of wind turbines increases (Frick et al. 2017, Hammerson et al. 2017, Arnett and Baerwald 2013, Thompson et al. 2017, Zimmerling and Francis 2016, Friedenberg and Frick 2021). There are no largescale wind energy facilities in the plan area. The migratory routes of the individuals using the plan area or other parts of western Montana are unknown, and therefore it is unknown whether wind energy development is a threat to populations using the plan area.

White-nose syndrome, although a significant threat to cave-roosting bats (Welch et al. 2017, Bure and Moore 2019, Hoyt et al. 2021), is extremely rare in tree-roosting bats, with only a single observation of the fungus that causes the disease occurring on a hoary bat (Campbell et al. 2022) and no known observation of the species presenting diagnostic symptoms (https://whitenosesyndrome.org/static-page/bats-affected-by-wns, 02/2023). The fungus is documented in portions of Montana and all surrounding states but there are no known observations within the plan area (Bachen, McEwan, Skone, et al. 2020).

Roost, particularly large-trees and snags, are considered the most limiting habitat feature for forest dwelling bats and reductions in roost availability can reduce occupancy rates for most bat species (Arnett and Hayes 2009, Kalcounis-Rüppell et al. 2005, Loeb and O'Keefe 2011). Management practices that create heterogeneity in forest age and structure and retain mature trees and large snags can improve conditions for bats on managed forests (Humes et al. 1999), and may reduce risks to bat habitat from uncharacteristic wildlife fire (Jung 2020).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

Silver-haired bats and their habitats are widely distributed throughout the plan area (Montana Natural Heritage Program, mtnhp.org, 11/2022). The species is impacted by wind energy development, which while not present within the plan area, may still affect local populations if they migrate through areas with development (Frick et al. 2017, Hammerson et al. 2017, Arnett and Baerwald 2013, Thompson et al. 2017). There are documented population declines of the species elsewhere (Rodhouse et al. 2019, Davy et al. 2021); however, the species is apparently secure within Montana (Montana Natural Heritage Program, mtnhp.org, 11/2022).

Best available scientific information

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3.13 Townsends Big-eared Bat (*Corynorhinus townsendii*)

Conservation Categories

G4/S3, Regional Forester Sensitive Species (Montana Natural Heritage Program, mtnhp.org, 10/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area.

The species is widely distributed throughout most of the western United States. Occupancy rates for suitable habitat are high, but local populations are often small, as the species generally occurs at low densities (Weller et al. 2018). In Montana, the species is well distributed and relatively common (Weller et al. 2018, Bachen et al. 2019). Among cave or mine dwelling bat species, the species is documented as the most common bat species in Montana (Bachen et al. 2019) and Idaho (Whiting et al. 2018), despite low detection probabilities (Sherwin et al. 2003). In Montana populations tend to be smaller (Call et al. 2018), likely due to cooler temperatures (Bachen, McEwan, Burkholder, et al. 2020), because the state is at the northeastern extent of the species' range (Weller et al. 2018). Between 1970 and 2015, 111 surveys in Montana verified occupancy at 39 percent of caves and 73 percent of mines visited, with no sites exceeding 36 individuals (Weller et al. 2018), numbers that align closely with more recent data (Bachen et al. 2019). The species is known to occupy several caves and old mines occurring within the plan area, including a site with one of the largest known group sizes in Montana (Weller et al. 2018)(Montana Natural Heritage Program, mtnhp.org, 11/2022).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area. Nearly one third of bat species in the United States are experiencing population declines (Hammerson et al. 2017), but population trends for most bat species are unknown (Frick et al. 2020). Throughout the species range, colony counts have remained stable or demonstrated slight increases (Weller et al. 2018), particularly when populations are not subject to human disturbance (Weller et al. 2014). Moreover, recent survey efforts have increased the number of known occupied hibernacula for the species across the species' range, further suggesting that populations are stable (Weller et al. 2018). Within the plan area, several sites have been documented as occupied since the early 1990s, and at least one since the 1930s (Montana Natural Heritage Program, mtnhp.org, 10/2022). Since the species naturally occurs at low densities (Weller et al. 2018), regular site occupancy suggests a relatively stable population within the plan area.

Habitat description

Present in Montana throughout the year, the species may use a variety of structures for roosting (Bachen et al. 2019), but is closely associated with caves, mines, or similar geological cavities that are used for maternity roosts and hibernacula (Bachen et al. 2018, Foresman 2012, Bachen et al. 2019, Bachen, McEwan, Burkholder, et al. 2020). The species uses hibernacula that maintain temperatures near freezing to conserve energy (Ingersoll et al. 2010, Hayes et al. 2011), but in Montana some caves may be too cool for use as maternity roosts (Bachen, McEwan, Burkholder, et al. 2020). The distribution of suitable caves or mines likely strongly affects localized habitat use of the species, as foraging areas tend to be proximate to hibernacula (Dobkin et al. 1995) and roost sites (Fellers and Pierson 2002). Townsend's big-eared bats appears quite capable of using a variety of forests types (Bachen et al. 2018, Foresman 2012, Bachen, McEwan, Burkholder, et al. 2020), but may avoid stands that lack openings (Irwin et al. 2018). Ultimately the presence of the species in a particular forest may have more to do with the available roosting features rather than vegetation (Neubaum and Aagaard 2022).

Habitat trend in the plan area

The species occupies many habitat types, suggesting vegetation structure is not limiting the distribution of the species (Bachen et al. 2018, Foresman 2012, Bachen, McEwan, Burkholder, et al. 2020, Neubaum and Aagaard 2022), which is more likely limited by the distribution and abundance of suitable roost and hibernacula sites (Bachen, McEwan, Burkholder, et al. 2020). Within the plan area the availability and distribution of caves is likely stable; however, across the species range, mine closures may lead to reduced habitat availability, including closures in Montana (Bachen, McEwan, Burkholder, et al. 2020).

Relevant life history traits and other information

Living up to 16 years (Kunz and Martin 1982), female become sexually mature in their first summer, and breed in the subsequent fall and winter with ovulation and fertilization delayed until the following spring (Bachen, McEwan, Burkholder, et al. 2020). A single offspring is born to a female, and generally weened by six weeks and dispersing by three months (Bachen, McEwan, Burkholder, et al. 2020). The species is a capable disperser, as even in landscapes with barriers to dispersal genetic connectivity among maternal colonies is high (Anderson et al. 2018).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area. The most significant threat to cave-roosting bats in North America is likely white-nose syndrome (Welch et al. 2017, Bure and Moore 2019, Hoyt et al. 2021), a disease caused by an invasive fungus (*Pseudogemnoascus destructans*). Humans and bats are both effective at spreading the fungus (Ballmann et al. 2017), which once introduced can, in some instances, reduce a bat population by over 90 percent (Moore et al. 2018). Importantly, however, although the fungus is documented in portions of Montana and all surrounding states, there are no known observations within the plan area (Bachen, McEwan, Skone, et al. 2020).

Wind farms can substantially impact bat populations, but losses are primarily limited to migratory species (Frick et al. 2017, Hammerson et al. 2017, Arnett and Baerwald 2013).

Given the absence of white-nose syndrome, the greatest threat to the species in the plan area is the loss of suitable hibernacula and roosting locations due to the collapse and closure of mines (Bachen, McEwan, Burkholder, et al. 2020). Even bat-friendly closures may have negative effects on the species, although they are likely short-term (Tobin and Chambers 2017, Diamond and Diamond 2014, Tobin et al. 2018). Townsend's big-eared bat appear particularly sensitive to disturbance at maternal roost sites, which may explain localized population declines in other areas (Pierson and Rainey 1998, Pierson et al. 1999, Fellers 2015). Alterations to the vegetation surrounding suitable hibernacula and roosting locations may also affect populations if changes in vegetation alter local microclimates (Bilecki 2003); however, the species appears adept at finding hibernacula with suitable microclimates throughout the species' range (McGuire et al. 2022). Townsend's big-eared bats may be especially sensitive to changes in the microclimates of maternity colonies as compared to other bat species (Betts 2010); however, suitable microclimates may be readily available in most caverns (Gillies et al. 2014).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

Although there are no population estimates or trends for the species within the plan area there are several known locations that the species occupies, and more broadly the population trends for the species suggest it is largely secure throughout its range (Weller et al. 2018). Diagnostic symptoms associated with the most significant threat to cave dwelling species, white-nose syndrome, is not known in this species (https://whitenosesyndrome.org/static-page/bats-affected-by-wns, 02/2023), and the fungus associated with the disease is not documented within the plan area.

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4. Reptiles

4.1 Northern Alligator Lizard (*Elgaria coerulea*)

Conservation Categories

G5/S3 (Montana Natural Heritage Program, mtnhp.org, 08/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004) are not known to be on-going.

The species occurs along the west coast from central California to southern British Columbia and then south into the northern Rocky Mountains of Idaho and Montana (Montana Natural Heritage Program, mtnhp.org, 08/2023). In Montana, the species is documented from nearly 200 locations west of the continental divide, with fewer than twenty disparate observations within the plan area (Montana Natural Heritage Program, mtnhp.org, 08/2023).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area.

Habitat description

The species is something of a habitat generalist occupying rocky outcroppings, talus slopes, and coniferous forests (Montana Natural Heritage Program, mtnhp.org, 08/2023). Individuals rarely stray far from cover, including rocks, downed logs, and shrubs (Rutherford and Gregory 2003).

Habitat trend in the plan area

There are no specific habitat trends for the plan area, but as a habitat generalist available habitat is likely widespread throughout the plan area.

Relevant life history traits and other information

The species has high site fidelity and limited dispersal ability (Rutherford and Gregory 2003).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 08/2023), there are no known unique threats to the species within the plan area. In general, herpetofauna face threats from habitat destruction and fragmentation, invasive species, pollution, disease, climate change, and fire (Gibbons et al. 2000, Böhm et al. 2016, Cordier et al. 2021).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

There is insufficient information on the distribution and abundance of the species within the plan area. The species is globally secure and occupies a variety of habitats that are widely distributed throughout the plan area.

Best available scientific information

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4.2 Prairie Rattlesnake (*Crotalus viridisorthern*)

Conservation Categories

G5/S4 (Montana Natural Heritage Program, mtnhp.org, 08/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004) are not known to be on-going.

The species is widely distributed across the plains of central North America and west to Idaho, Utah, and Arizona (NatureServe, natureserve.org, 08/2023). The species is widespread throughout the eastern part of Montana but has a more limited distribution in the large valleys of western Montana. The species is documented from fewer than twenty disparate observations within the plan area (Montana Natural Heritage Program, mtnhp.org, 08/2023).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area.

Habitat description

The species is found in open, arid habitats including ponderosa pine savannahs in western Montana (Montana Natural Heritage Program, mtnhp.org, 08/2023).

Habitat trend in the plan area

There are no specific habitat trends for the plan area, but dry south facing slopes are suitable habitat, and are widely distributed and readily available throughout the plan area.

Relevant life history traits and other information

None

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 08/2023), there are no known unique threats to the species within the plan area. In general, herpetofauna face threats from habitat destruction and fragmentation, invasive species, pollution, disease, climate change. and fire (Gibbons et al. 2000, Böhm et al. 2016, Cordier et al. 2021).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

There is insufficient information on the distribution and abundance of the species within the plan area. The species is globally secure and habitats the species may occupy are widely distributed throughout the plan area.

Best available scientific information

Böhm, M., Williams, R., Bramhall, H.R., McMillan, K.M., Davidson, A.D., Garcia, A., Bland, L.M., Bielby, J., and Collen, B. 2016. Correlates of extinction risk in squamate reptiles: the relative importance of biology, geography, threat and range size. Global Ecology and Biogeography 25 (4): 391-405 pp. 10.1111/geb.12419

Cordier, J.M., Aguilar, R., Lescano, J.N., Leynaud, G.C., Bonino, A., Miloch, D., Loyola, R., and Nori, J. 2021. A global assessment of amphibian and reptile responses to land-use changes. Biological Conservation 253 10.1016/j.biocon.2020.108863

Gibbons, J.W., Scott, D.E., Ryan, T.J., Buhlmann, K.A., Tuberville, T.D., Metts, B.S., Greene, J.L., Mills, T., Leiden, Y., Poppy, S., and Winne, C.T. 2000. The Global Decline of Reptiles, Déjà Vu Amphibians. BioScience 50 (8): 653-666 pp. https://doi.org/10.1641/0006-3568(2000)050[0653:TGDORD]2.0.CO;2

Thompson, W.L. 2004. Sampling rare or elusive species: concepts, designs, and techniques for estimating population parameters. Washington D.C.: Island Press. 447 p.

5. Terrestrial Insects

5.1 Gillette's Checkerspot (*Euphydryas gillettii*)

Conservation Categories

G3/S2 (Montana Natural Heritage Program, mtnhp.org, 10/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004) are not known to be on-going.

The species occurs throughout the Rocky Mountains from southern Alberta and eastern British Columbia south through northern Idaho, western Montana, and northwestern Wyoming (Williams 1988) with a disjunct and introduced population in Colorado (Boggs et al. 2006). The species distribution is likely a relic of the last glaciation (Williams 2012, Zimmermann et al. 2000). Throughout the species range, colonies are patchy, reflecting the distribution of the species preferred habitat, and often limited to 40 or fewer individuals per site (Williams 1988, Dulc and Hobbs 2013, Boggs et al. 2006), although colonies likely act as a larger metapopulation (Williams 2012, 1995, Debinski 1994). The species is documented from six widely disparate locations across the plan area; however, there is only a single observation in the last forty years (Montana Natural Heritage Program, mtnhp.org, 10/2022).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area. The species is locally extirpated from some historic habitats within Montana, Wyoming, and Idaho (Williams and Baker 2012, Williams 1995), and generally pollinators as a cross-taxonomic group have shown population declines and range retractions in other areas (Potts et al. 2010, Ollerton 2017).

Habitat description

The species occupies open, mesic habitats, often along streams in mid- to upper elevation forest (Williams 1988, Dulc and Hobbs 2013, Williams 2012, 1995). In Montana, the species is typically associated with wet meadows, burned areas, and logged areas within lodgepole pine and spruce habitats (Williams 2012). Occupied habitat is characterized by an abundance of shrubs and nectar producing flowers (Williams 1988, Dulc and Hobbs 2013), such as twinberry honeysuckle (*Lonicera involcrate*) (Williams 2012, 1988), which is common and well distributed in western Montana and the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2022). Disturbance, particularly wildfire but also silvicultural practices, play an important role in maintaining the distribution and abundance of suitable habitat as well as providing connectivity among habitat patches (Williams 2012, Dulc and Hobbs 2013).

Habitat trend in the plan area

There are no specific habitat trends for the plan area, but riparian areas are common and widely distributed. Changes in disturbance regimes and vegetation succession have likely altered the spatial and temporal extent of suitable habitat within the plan area. Decades of fire suppression and subsequent conifer encroachment into meadows may have reduced overall habitat availability or suitability for many pollinator species (Williams 2012, Mola and Williams 2018, Roberts et al. 2017).

Relevant life history traits and other information

Females lay a single brood of eggs that hatch in three to four weeks (Williams et al. 1984). The species exhibits a biennial life cycle, whereby larvae overwinter in communal webs over two winters before metamorphosis (Williams et al. 1984). Adults typically emerge in late June through July and are active for approximately a month (Dulc and Hobbs 2013). This short period with winged butterflies may limit identification of site occupancy, particularly when incidental observations are relied upon rather than formal surveys. Populations exist as a metapopulations, with individual colonies fluctuating significantly in abundance and occurrence (Williams 2012, Boggs et al. 2006).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The primary threat to the species across its distribution is the loss of suitable mesic habitat from desiccation or tree encroachment associated with changes in climate, hydrology, and disturbance regimes (Williams 2012, Dulc and Hobbs 2013). Given the metapopulation dynamics of the species, changes in the availably and distribution of suitable habitat can have further effects beyond local colony persistence by affecting regional population dynamics and genetics (Williams 2012, Debinski 1994).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

There is insufficient information on the distribution and abundance of the species within the plan area as highlighted by a single observation in the last 40 years. The species is globally vulnerable; however, within the plan area habitat is available and widely distributed, including riparian and burned areas as well as important host plants such as twinberry honeysuckle.

Best available scientific information

Boggs, C.L., Holdren, C.E., Kulahci, I.G., Bonebrake, T.C., Inouye, B.D., Fay, J.P., McMillan, A., Williams, E.H., and Ehrlich, P.R. 2006. Delayed population explosion of an introduced butterfly. Journal of Animal Ecology 75 (2): 466-75 pp.

Debinski, D.M. 1994. Genetic diversity assessment in a metapopulation of the butterfly Euphydryas gillettii. Biological Conservation 70 (1): 25-31 pp.

Dulc, S., and Hobbs, J. 2013. Gillett’s Checkerspot Inventory and Monitoring in the Flathead River Basin. 2012 Surveys - Final Report. Great Northern Landscape Conservation Cooperative

Mola, J.M., and Williams, N.M. 2018. Fire-induced change in floral abundance, density, and phenology benefits bumble bee foragers. Ecosphere 9 (1) 10.1002/ecs2.2056

Ollerton, J. 2017. Pollinator diversity: Distribution, ecological function, and conservation. Annual Review of Ecology, Evolution, and Systematics 48 (1): 353-376 pp. 10.1146/annurev-ecolsys-110316-022919

Potts, S.G., Biesmeijer, J.C., Kremen, C., Neumann, P., Schweiger, O., and Kunin, W.E. 2010. Global pollinator declines: trends, impacts and drivers. Trends in Ecology and Evolution 25 (6): 345-353 pp.

Roberts, H.P., King, D.I., and Milam, J. 2017. Factors affecting bee communities in forest openings and adjacent mature forest. Forest Ecology and Management 394: 111-122 pp. 10.1016/j.foreco.2017.03.027

Thompson, W.L. 2004. Sampling rare or elusive species: concepts, designs, and techniques for estimating population parameters. Washington D.C.: Island Press. 447 p.

Williams, E.H. 1988. Habitat and range of Euphydryas Gillettii (Nymphalidae). Journal of the Lepidopterists' Society 42 (1): 37-45 pp.

Williams, E.H. 1995. Fire-burned habitat and reintroductions of the butterfly Euphydryas Gillettii (Nymphalidae). Journal of the Lepidopterists' Society 49(3) (3): 183-191 pp.

Williams, E.H. 2012. Population loss and gain in the rare butterfly Euphydryas gillettii(Nymphalidae). Journal of the Lepidopterists' Society 66 (3): 147-155 pp. 10.18473/lepi.v66i3.a5

Williams, E.H., Holdren, C.E., and Ehrlich, P.R. 1984. The life history and ecology of Euphydrias gillettii Barnes (Nymphalidae). Journal of the Lepidopterists Society 38(1) (1): 1-12 pp.

Williams, M.A., and Baker, W.L. 2012. Spatially extensive reconstructions show variable-severity fire and heterogeneous structure in historical western United States dry forests. Global Ecology and Biogeography 21 (10): 1042-1052 pp. 10.1111/j.1466-8238.2011.00750.x

Zimmermann, M., Wahlberg, N., and Descimon, H. 2000. Phylogeny of Euphydryas checkerspot butterflies (Lepidoptera: Nymphalidae) based on mitochondrial DNA sequence data. Annals of the Entomological Society of America 93 (3): 347-355 pp.

5.2 Suckley's Cuckoo Bumble Bee (*Bombus suckleyi*)

Conservation Categories

G2G3/S1 (Montana Natural Heritage Program, mtnhp.org, 10/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004) are not known to be on-going within the plan area.

The species is broadly distributed occurring from Alaska south to northern California and east to South Dakota. The species is rarer in Eastern North America, but there are records from Newfoundland south to Virginia (Williams et al. 2014). In Montana, the species is widely distributed across the state, but as is noted elsewhere (Williams et al. 2014), the occupied range is somewhat fragmented (Dolan et al. 2017). The species is documented from a single, 35-year-old, location in the eastern plan area, but standardized survey protocols that consider the phenology, as well as the habitat associations of the species are largely lacking, which may substantially affect the known distribution and abundance of bee species (Graves et al. 2020).

Population trend in the plan area

There are no known specific population trends for the species in Montana (Dolan et al. 2017) or the plan area. Many species of bumble bees have shown substantial population declines and range retractions (Schweitzer et al. 2012, Cameron and Sadd 2020), including this species (Hatfield et al. 2015, Koch et al. 2015).

Habitat description

The species is generalist that forages on a wide variety of flowers and thus inhabits a diversity of open fields and meadows across a range of elevations (Williams et al. 2014), although the species may show some aversion to agricultural landscapes (MacKenzie and Winston 1984). In general, bumble bees benefit from high landscape and local habitat heterogeneity that provides the diverse structural and floral complexity necessary to support the various life stages of individual species (Liczner and Colla 2020, Eckerter et al. 2021, Goulson et al. 2015).

Habitat trend in the plan area

There are no specific habitat trends for the plan area, but the habitat types the species occupies are common and modeled suitable habitat is readily available and widely dispersed, although often of low suitability (Montana Natural Heritage Program 2022). Fire suppression and subsequent conifer encroachment into meadows may reduce overall habitat availability or suitability (Roberts et al. 2017, Mola and Williams 2018)..

Relevant life history traits and other information

The Suckley's cuckoo bumble bee is an obligate nest parasite that takes over the colonies of other bumble bees, primarily *Bombus. occidentalis*, but also *B. terricola, B. rufocinctus, B. fervidus, B. nevadensis,* and *B. appositus* (Williams et al. 2014, Lhomme and Hines 2019). The distribution and dispersal for Suckley's Cuckoo Bumble Bee is also dependent on the distribution of host populations. Although there is little information on bumble bee dispersal, given the patchiness of bumble bee habitat (Dolan et al. 2017, Hatfield and LeBuhn 2007) and problems associated with small effective population sizes (Packer and Owen 2001, Zayed and Packer 2005), dispersal, particularly by females searching for suitable nests sites (Goulson 2010) is likely important to the species population dynamics survival. Ultimately, the reliance on host bee makes parasitic bumble bees at greater risk of extinction if host populations are not robust (Suhonen et al. 2019, Suhonen et al. 2015).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The primary threats to the species across its distribution are those common to most bumble bee species including habitat loss, parasites and disease, pesticides, loss of floral diversity, competition from domestic bees, climate change, and interactions among these factors (Goulson et al. 2008, Goulson et al. 2015, Cameron et al. 2011, Whitehorn et al. 2012, Whitehorn et al. 2014, Cameron and Sadd 2020), but the effects may be more substantial due to the species reliance on other bumble bee species that are facing similar threats (Suhonen et al. 2015).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

There is insufficient information on the distribution and abundance of the species within the plan area. The species is globally vulnerable; however, within the plan area habitat is readily available and widely distributed (Montana Natural Heritage Program 2022).

Best available scientific information

Cameron, S.A., Lozier, J.D., Strange, J.P., Koch, J.B., Cordes, N., Solter, L.F., and Griswold, T.L. 2011. Patterns of widespread decline in North American bumble bees. Proceedings of the National Academy of Sciences of the United States of America 108 (2): 662-667 pp.

Cameron, S.A., and Sadd, B.M. 2020. Global Trends in Bumble Bee Health. Annual Reviews of Entomology 65: 209-232 pp.

Dolan, A.C., Delphia, C.M., O'Neill, K.M., and Ivie, M.A. 2017. Bumble Bees (Hymenoptera: Apidae) of Montana. Annals of the Entomological Society of America 110(2) (2): 129-144 pp.

Eckerter, T., Buse, J., Bauhus, J., Förschler, M.I., and Klein, A.M. 2021. Wild bees benefit from structural complexity enhancement in a forest restoration experiment. Forest Ecology and Management 496: 1-11 pp.

Goulson, D. 2010. Bumblebees: behaviour, ecology, and conservation. New York, NY: Oxford University Press on Demand.

Goulson, D., Lye, G.C., and Darvill, B. 2008. The decline and conservation of bumble bees. Annual Review of Entomology 53 (1): 191-208 pp. 10.1146/annurev.ento.53.103106.093454

Goulson, D., Nicholls, E., Botias, C., and Rotheray, E.L. 2015. Bee declines driven by combined stress from parasites, pesticides, and lack of flowers. Science 347 (6229): 1255957 p.

Graves, T.A., Janousek, W.M., Gaulke, S.M., Nicholas, A.C., Keinath, D.A., Bell, C.M., Cannings, S., Hatfield, R.G., Heron, J.M., Koch, J.B., Loffland, H.L., Richardson, L.L., Rohde, A.T., Rykken, J., Strange, J.P., Tronstad, L.M., and Sheffield, C.S. 2020. Western bumble bee: declines in the continental United States and range-wide information gaps. Ecosphere 11 (6): 1-13 pp. 10.1002/ecs2.3141

Hatfield, R., Colla, S., Jepsen, S., Richardson, L., Thorp, R., and Jordan, S.F. 2015. IUCN assessments for North American Bombus spp. Portland, OR. The Xerces Society for Invertebrate Conservation. 56 p.

Hatfield, R.G., and LeBuhn, G. 2007. Patch and landscape factors shape community assemblage of bumble bees, Bombus spp. (Hymenoptera: Apidae), in montane meadows. Biological Conservation 39: 150-158 pp. 10.1016/j.biocon.2007.06.019

Koch, G., St. Clair, B., and Erickson, V. 2015. No place like home: Using seed zones to improve restoration of native grasses in the West. Vol. 171. Portland, OR. Science Findings, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 6 p.

Lhomme, P., and Hines, H.M. 2019. Ecology and Evolution of Cuckoo Bumble Bees. Annals of the Entomological Society of America 112(3) (3): 122-140 pp. 10.1093/aesa/say031

Liczner, A.R., and Colla, S.R. 2020. One-size does not fit all: at-risk bumble bee habitat management requires species-specific local and landscape considerations. Insect Conservation and Diversity 13 (6): 558-570 pp. 10.1111/icad.12419

MacKenzie, K.E., and Winston, M.L. 1984. Diversity and Abundance of Native Bee Pollinators on Berry Crops and Natural Vegetation in the Lower Fraser Valley, British Columbia. The Canadian Entomologist 116 (7): 965-974 pp. 10.4039/Ent116965-7

Mola, J.M., and Williams, N.M. 2018. Fire-induced change in floral abundance, density, and phenology benefits bumble bee foragers. Ecosphere 9 (1) 10.1002/ecs2.2056

Montana Natural Heritage Program. 2022. Suckley Cuckoo Bumble Bee (Bombus suckleyi) Predicted Suitable Habitat Modeling. Helena, MT. Montana Natural Heritage Program. 1-17 pp.

Packer, L., and Owen, R. 2001. Population genetic aspects of pollinator decline. Conservation Ecology 5 (1) http://www.jstor.org/stable/26271799

Roberts, H.P., King, D.I., and Milam, J. 2017. Factors affecting bee communities in forest openings and adjacent mature forest. Forest Ecology and Management 394: 111-122 pp. 10.1016/j.foreco.2017.03.027

Schweitzer, D.F., Capuano, N.A., Young, B.E., and Colla, S.R. 2012. Conservation and management of North American bumble bees. Washington, D.C. U.S. Department of Agriculture, Forest Service and NatureServe. 18 p.

Suhonen, J., Ilvonen, J.J., Nyman, T., and Sorvari, J. 2019. Brood parasitism in eusocial insects (Hymenoptera): role of host geographical range size and phylogeny. Philosophical Transactions of the Royal Society B: Biological Sciences 374 (1769): 1-12 pp.

Suhonen, J., Rannikko, J., and Sorvari, J. 2015. The rarity of host species affects the co-extinction risk in socially parasitic bumblebee Bombus(*Psithyrus*) species. Annales Zoologici Fennici 52 (4): 236-242 pp. 10.5735/086.052.0402

Thompson, W.L. 2004. Sampling rare or elusive species: concepts, designs, and techniques for estimating population parameters. Washington D.C.: Island Press. 447 p.

Whitehorn, P.R., O'connor, S., Wackers, F.L., and Goulson, D. 2012. Neonicotinoid pesticide reduces bumble bee colony growth and queen production. Science 336 (6079): 351-352 pp.

Whitehorn, P.R., Tinsley, M.C., Brown, M.J.F., Darvill, B., and Goulson, D. 2014. Genetic diversity and parasite prevalence in two species of bumblebee. Journal of Insect Conservation 18 (4): 667-673 pp. 10.1007/s10841-014-9673-1

Williams, P.H., Thorp, R.W., Richardson, L.L., and Colla, S.R. 2014. Bumble Bees of North America: An Identification Guide. Vol. 87. Princeton: Princeton University Press.

Zayed, A., and Packer, L. 2005. Complementary sex determination substantially increases extinction proneness of haplodiploid populations. Proceedings of the National Academy of Sciences 102 (30): 10742-10746 pp.

5.3 Western Bumble Bee (*Bombus occidentalis*)

Conservation Categories

G3/SNR, Under review by the US Fish and Wildlife Service (Montana Natural Heritage Program, mtnhp.org, 10/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004) are not known to be on-going within the plan area.

The species ranges throughout the western United States and the southwestern Canadian provinces. In Montana, the species is widely distributed across the state, with fewer than ten documented disparate observations scattered across the plan area (Montana Natural Heritage Program, mtnhp.org, 10/2022); however, observations likely reflect low detection rates rather than occupancy, which is predicted to be high within many parts of the plan area (Graves et al. 2020). Standardized survey protocols that consider the phenology, as well as the habitat associations of the species are largely lacking within the plan area, which may substantially affect the known distribution and abundance of bee species (Graves et al. 2020).

Population trend in the plan area

There are no known specific population trends for the species in Montana (Dolan et al. 2017) or the plan area. Many species of bumble bees have shown substantial population declines and range retractions (Schweitzer et al. 2012, Cameron and Sadd 2020), including this species (Hatfield et al. 2015, Koch et al. 2015).

Habitat description

The species is generalist that forages on a wide variety of flowers and thus inhabits a diversity of habitat conditions across a range of elevations (Williams et al. 2014, Roof et al. 2018); however, forests habitats are presumed to have higher occupancy (Graves et al. 2020). In general, bumble bees benefit high landscape and local habitat heterogeneity that provides the diverse structural and floral complexity necessary to support the various life stages of individual species (Goulson et al. 2015, Liczner and Colla 2020, Eckerter et al. 2021).

Habitat trend in the plan area

There are no specific habitat trends for the plan area, but the habitat types the species occupies are common (Graves et al. 2020) and modeled suitable habitat is readily available and widely dispersed within the plan area, although often of low suitability (Montana Natural Heritage Program 2022).

Relevant life history traits and other information

None

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area. The primary threats to the species across its distribution are those common to most bumble bee species including habitat loss, parasites and disease, pesticides, loss of floral diversity, competition from domestic bees, climate change, and interactions among these factors (Goulson et al. 2008, Goulson et al. 2015, Cameron et al. 2011, Whitehorn et al. 2012, Whitehorn et al. 2014, Cameron and Sadd 2020).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

There is insufficient information on the distribution and abundance of the species within the plan area. The species is globally vulnerable; however, within the plan area habitat is readily available and widely distributed (Montana Natural Heritage Program 2022) and occupancy is presumed high (Graves et al. 2020).

Best available scientific information

Cameron, S.A., Lozier, J.D., Strange, J.P., Koch, J.B., Cordes, N., Solter, L.F., and Griswold, T.L. 2011. Patterns of widespread decline in North American bumble bees. Proceedings of the National Academy of Sciences of the United States of America 108 (2): 662-667 pp.

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Dolan, A.C., Delphia, C.M., O'Neill, K.M., and Ivie, M.A. 2017. Bumble Bees (Hymenoptera: Apidae) of Montana. Annals of the Entomological Society of America 110(2) (2): 129-144 pp.

Eckerter, T., Buse, J., Bauhus, J., Förschler, M.I., and Klein, A.M. 2021. Wild bees benefit from structural complexity enhancement in a forest restoration experiment. Forest Ecology and Management 496: 1-11 pp.

Goulson, D., Lye, G.C., and Darvill, B. 2008. The decline and conservation of bumble bees. Annual Review of Entomology 53 (1): 191-208 pp. 10.1146/annurev.ento.53.103106.093454

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Graves, T.A., Janousek, W.M., Gaulke, S.M., Nicholas, A.C., Keinath, D.A., Bell, C.M., Cannings, S., Hatfield, R.G., Heron, J.M., Koch, J.B., Loffland, H.L., Richardson, L.L., Rohde, A.T., Rykken, J., Strange, J.P., Tronstad, L.M., and Sheffield, C.S. 2020. Western bumble bee: declines in the continental United States and range-wide information gaps. Ecosphere 11 (6): 1-13 pp. 10.1002/ecs2.3141

Hatfield, R., Colla, S., Jepsen, S., Richardson, L., Thorp, R., and Jordan, S.F. 2015. IUCN assessments for North American Bombus spp. Portland, OR. The Xerces Society for Invertebrate Conservation. 56 p.

Koch, G., St. Clair, B., and Erickson, V. 2015. No place like home: Using seed zones to improve restoration of native grasses in the West. Vol. 171. Portland, OR. Science Findings, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 6 p.

Liczner, A.R., and Colla, S.R. 2020. One-size does not fit all: at-risk bumble bee habitat management requires species-specific local and landscape considerations. Insect Conservation and Diversity 13 (6): 558-570 pp. 10.1111/icad.12419

Montana Natural Heritage Program. 2022. Western bumble bee (bombus occidentalis) predicted suitable habitat modeling. Helena, Montana. 17 p.

Roof, S.M., DeBano, S., Rowland, M.M., and Burrows, S. 2018. Associations between blooming plants and their bee visitors in a riparian ecosystem in eastern Oregon. Northwest Science 92(2) (2): 119-135 pp. 10.3955/046.092.0205

Schweitzer, D.F., Capuano, N.A., Young, B.E., and Colla, S.R. 2012. Conservation and management of North American bumble bees. Washington, D.C. U.S. Department of Agriculture, Forest Service and NatureServe. 18 p.

Thompson, W.L. 2004. Sampling rare or elusive species: concepts, designs, and techniques for estimating population parameters. Washington D.C.: Island Press. 447 p.

Whitehorn, P.R., O'connor, S., Wackers, F.L., and Goulson, D. 2012. Neonicotinoid pesticide reduces bumble bee colony growth and queen production. Science 336 (6079): 351-352 pp.

Whitehorn, P.R., Tinsley, M.C., Brown, M.J.F., Darvill, B., and Goulson, D. 2014. Genetic diversity and parasite prevalence in two species of bumblebee. Journal of Insect Conservation 18 (4): 667-673 pp. 10.1007/s10841-014-9673-1

Williams, P.H., Thorp, R.W., Richardson, L.L., and Colla, S.R. 2014. Bumble Bees of North America: An Identification Guide. Vol. 87. Princeton: Princeton University Press.

6. Terrestrial Mollusks

6.1 Mesic Forest Species

Conservation Categories

Humped Coin (*Polygyrella polygyrella*) – G3/S1S2

Lyre Mantleslug (*Udosarx lyrate*) – G3/S1

Magnum Mantleslug (*Magnipelta mycophaga*) – G3/S2S3

Marbled Jumping-slug (*Hemphillia danielsi*) – G3/S1S2

Pale Jumping-slug (*Hemphillia camelus*) – G4/S1S2

Pygmy Slug (*Kootenaia burkei*) – G3/S1S2

Sheathed Slug (*Zacoleus idahoensis*) – G3G4/S2S3

Smoky Taildropper (*Prophysaon humile*) – G3/S2S3

Shiny Tightcoil (*Pristiloma wascoense*) – G3G4/S1S3

Thinlip Tightcoil (*Pristiloma idahoense*) – G3/S1S2

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for any of the species considered here, for Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for any of the species (Thompson 2004) are not known to be on-going within the plan area.

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area. Many terrestrial mollusks species are suspected to be in decline (Lydeard et al. 2004, Regnier et al. 2009, Jordan and Black 2012); however, most species are cryptic, difficult to identify, and sampling efforts are often inadequate and improperly designed to elucidate population trends (Cameron and Pokryszko 2005, Coppolino 2010, Lucid et al. 2018).

Habitat description

Representative species primarily occupy mesic, mixed-conifer forests or riparian woodlands, often close to water such as streams and seeps. Common canopy species include Engelmann spruce, subalpine fir, western redcedar, western hemlock, grand fir, Douglas-fir, alder, aspen, black cottonwood, and western white pine. Generally found under woody debris, rotten logs, rocks, or in damp soil and humus. (Montana Natural Heritage Program, mtnhp.org, 10/2022).

Habitat trend in the plan area

Mesic forests are well represented within the plan area, but suitable habitat for terrestrial mollusks may be more fragmented and isolated in the eastern extent of the plan area due to natural climatic gradients. Changes in riparian management have largely improved riparian habitat conditions across the Northern Rockies (Roper et al. 2018, Roper et al. 2019), and thereby terrestrial mollusk habitat.

Relevant life history traits and other information

Terrestrial mollusks within the plan area, and throughout Western Montanan are a result of a molluscan radiation associated with a Pleistocene refuge in Northern Idaho (Shafer et al. 2010) and therefore are closely affiliated with mollusk communities from Northern Idaho (Hendricks 2016). Terrestrial mollusks differ in the timing and expression of life cycles, which may affect sensitivity to certain stressors, but all species are dependent on the availability and function of suitable habitats that support the species life cycle. The distribution of shell forming terrestrial mollusks is affected by soil elements, particularly conditions that affect the availability of calcium (Skeldon et al. 2007, Juřičková et al. 2008, Dhiman et al. 2020). In forests of the western United States, stands of deciduous trees may provide important habitat components for terrestrial mollusks (Karlin 1961). In general, terrestrial mollusks have limited dispersal ability, which may affect connectivity among isolated populations as well as responses to changing climatic conditions (Nicolai and Ansart 2017); however, many mollusks can self-fertilize, which can prolong the longevity of isolated populations, but may come with additional costs (Jarne et al. 1991, Baur and Baur 1997) although such relationships are species and even population specific (Escobar et al. 2011, Felmy et al. 2020).

Relevant threats to populations occupying the plan area

Beyond threats documented across each species' range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to any of the species considered within the plan area.

Terrestrial mollusks are particularly sensitive to changing micro- and macro-climate as well as vegetation conditions that affect micro-climate such as course-woody debris, leaf litter and canopy cover (Prezio et al. 1999, Nicolai and Ansart 2017, Kirchenbaur et al. 2017, Schweizer et al. 2019, Jordan and Black 2012). Indeed, at least six species identified as cool air associates (*Hemphillia camelus, Magnipelta mycophaga, Pristiloma idahoense, Pristiloma wascoense, Prophysaon humile, Udosarx lyrate*) may be particularly sensitive to regional climate change, especially if populations are restricted to higher elevations (Lucid et al. 2021). Changes in micro-climate conditions due to harvest or other disturbances may further lead to reductions in species abundance or changes in terrestrial mollusk community composition (Hylander et al. 2004, Severns 2005, Jordan and Black 2012).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

There is insufficient information on the distribution and abundance of the representative species within the plan area. Most of the representative species are globally vulnerable; however, within the plan area habitat is readily available and widely distributed.

Best available scientific information

Baur, B., and Baur, A. 1997. Random mating with respect to relatedness in the simultaneously hermaphroditic landsnail arianta arbustorum. American Microscopical Society 116 (4): 5 p.

Cameron, R., and Pokryszko, B. 2005. Estimating the species richness and composition of land mollusc communities: Problems, consequences and practical advice. Journal of Conchology 38 (5): 529-548 pp.

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Juřičková, L., Horsák, M., Cameron, R., Hylander, K., Míkovcová, A., Hlaváč, J.Č., and Rohovec, J. 2008. Land snail distribution patterns within a site: The role of different calcium sources. European Journal of Soil Biology 44 (2): 172-179 pp. 10.1016/j.ejsobi.2007.07.001

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Kirchenbaur, T., Fartmann, T., Bässler, C., Löffler, F., Müller, J., Strätz, C., and Seibold, S. 2017. Small-scale positive response of terrestrial gastropods to dead-wood addition is mediated by canopy openness. Forest Ecology and Management 396: 85-90 pp. 10.1016/j.foreco.2017.03.034

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6.2 Talus Slope Species

Conservation Categories

Bitterroot Mountainsnail (*Oreohelix amariradix*) – G1G2/S1S2

Lyrate Mountainsnail (*Oreohelix haydeni*) – G2/S1S3

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for any of the species considered here, for Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for any of the species (Thompson 2004) are not known to be on-going within the plan area.

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area. Many terrestrial mollusks species are suspected to be in decline (Lydeard et al. 2004, Regnier et al. 2009, Jordan and Black 2012); however, most species are cryptic, difficult to identify, and sampling efforts are often inadequate and improperly designed to elucidate population trends (Cameron and Pokryszko 2005, Coppolino 2010, Lucid et al. 2018).

Habitat description

Species are generally found in talus slopes, in the duff or soil that accumulates among the rocks. (Montana Natural Heritage Program, mtnhp.org, 10/2022).

Habitat trend in the plan area

Talus slopes are common within the plan area and likely stable in occurrence.

Relevant life history traits and other information

Terrestrial mollusks within the plan area, and throughout Western Montanan are a result of a molluscan radiation associated with a Pleistocene refuge in Northern Idaho (Shafer et al. 2010) and therefore are closely affiliated with mollusk communities from Northern Idaho (Hendricks 2016). Terrestrial mollusks differ in the timing and expression of life cycles, which may affect sensitivity to certain stressors, but all species are dependent on the availability and function of suitable habitats that support the species life cycle. The distribution of shell forming terrestrial mollusks is affected by soil elements, particularly conditions that affect the availability of calcium (Skeldon et al. 2007, Juřičková et al. 2008, Dhiman et al. 2020). In forests of the western United States, stands of deciduous trees may provide important habitat components for terrestrial mollusks (Karlin 1961). In general, terrestrial mollusks have limited dispersal ability, which may affect connectivity among isolated populations as well as responses to changing climatic conditions (Nicolai and Ansart 2017); however, many mollusks can self-fertilize, which can prolong the longevity of isolated populations, but may come with additional costs (Jarne et al. 1991, Baur and Baur 1997) although such relationships are species and even population specific (Escobar et al. 2011, Felmy et al. 2020).

Relevant threats to populations occupying the plan area

Beyond threats documented across each species' range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to any of the species considered within the plan area.

Terrestrial mollusks are particularly sensitive to changing micro- and macro-climate as well as vegetation conditions that affect micro-climate such as course-woody debris, leaf litter and canopy cover (Prezio et al. 1999, Nicolai and Ansart 2017, Kirchenbaur et al. 2017, Schweizer et al. 2019, Jordan and Black 2012). Indeed, at least six species identified as cool air associates (*Hemphillia camelus, Magnipelta mycophaga, Pristiloma idahoense, Pristiloma wascoense, Prophysaon humile, Udosarx lyrate*) may be particularly sensitive to regional climate change, especially if populations are restricted to higher elevations (Lucid et al. 2021). Changes in micro-climate conditions due to harvest or other disturbances may further lead to reductions in species abundance or changes in terrestrial mollusk community composition (Hylander et al. 2004, Severns 2005, Jordan and Black 2012).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

There is insufficient information on the distribution and abundance of the representative species within the plan area. Both representative species are considered globally imperiled; however, habitat is readily available and widely distributed within the plan area.

Best available scientific information

Baur, B., and Baur, A. 1997. Random mating with respect to relatedness in the simultaneously hermaphroditic landsnail arianta arbustorum. American Microscopical Society 116 (4): 5 p.

Cameron, R., and Pokryszko, B. 2005. Estimating the species richness and composition of land mollusc communities: Problems, consequences and practical advice. Journal of Conchology 38 (5): 529-548 pp.

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Lydeard, C., Cowie, R.H., Ponder, W.F., Bogan, A.E., Bouchet, P., Clark, S.A., Cummings, K.S., Frest, T.J., Gargominy, O., Herbert, D.G., Hershler, R., Perez, K.E., Roth, B., Seddon, M., Strong, E.E., and Thompson, F.G. 2004. The global decline of nonmarine mollusks. BioScience 54 (4): 321-330 pp.

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Prezio, J.R., Lankester, M.W., Lautenschlager, R.A., and Bell, F.W. 1999. Effects of alternative conifer release treatments on terrestrial gastropods of regenerating spruce plantations. Canadian Journal of Forest Research 29: 1141-1148 pp.

Regnier, C., Fontaine, B., and Bouchet, P. 2009. Not knowing, not recording, not listing: numerous unnoticed mollusk extinctions. Conservation Biology 23 (5): 1214-1221 pp.

Schweizer, M., Triebskorn, R., and Kohler, H.-R. 2019. Snails in the sun: Strategies of terrestrial gastropods to cope with hot and dry conditions. Ecology and Evolution 9 (22): 12940-12960 pp.

Severns, P.M. 2005. Response of a terrestrial mollusc community to an autumn prescribed burn in a rare wetland prairie of western Oregon, USA. Journal of Molluscan Studies 71 (2): 181-187 pp. 10.1093/mollus/eyi021

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7. Amphibians

7.1 Coeur d’Alene Salamander (*Plethodon idahoensis*)

Conservation Categories

G4/S2, Regional Forester Sensitive Species (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004) are not known to be on-going.

The species is the is the only *plethodontid* found in the northern Rockies, where it is widely distributed across Idaho, Western Montana and Southeastern British Columbia (Wilson et al. 1997). Populations are often small and isolated (Cassirer et al. 1994), with documented occurrence at a minimum of 50 isolated locations in Montana (Maxell 2009). Local populations are healthy when microhabitats remain undisturbed; however, the status of the species within the larger region and connectivity between populations is unknown (Maxell 2009). The species is generally restricted to the western and northwestern extent of the plan area with confirmed sightings at a single location in Mineral County, multiple distinct locations within Saunders County, and historic records within Missoula County.

In British Columbia the population is estimated at more than 10,000 individuals based on occupancy at 56 sites (Committee on the Status of Endangered Wildlife in Canada 2007). Given a similar number of occupied sites within Montana, it may be reasonable to assume the population size within Montana is similar; however, there is considerable uncertainty in population estimates for this species anywhere within its known range due to limited sampling and low detection rates (Committee on the Status of Endangered Wildlife in Canada 2007).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area. Amphibians have shown long-term population declines in the western United States (Corn 1994, Halstead et al. 2022), across North America (Grant et al. 2016) and throughout the world (González-del-Pliego et al. 2019). However, when compared to most amphibian populations, populations of species of *plethodontid* are relatively stable (Grover 1998), and the Coeur d’Alene salamander is thought to be stable in other portions of its range (Committee on the Status of Endangered Wildlife in Canada 2007).

Habitat description

A terrestrial, lungless salamander, the Coeur d'Alene salamander requires wet environments (e.g., spring or seeps, waterfall spray zones or damp streambanks) for respiration, to prevent desiccation, and to provide thermal stability (Cassirer et al. 1994)(Montana Natural Heritage Program, mtnhp.org, 04/2022). The species spends much of its life in underground refugia (Cassirer et al. 1994), particularly fractured bedrock or deep moist talus, to escape predators and regulate temperature and moisture from freezing temperatures, heat stress, and desiccation (Wilson and Larsen 1988, Kirwin Werner and Reichel 1994, Wilson et al. 1997, Committee on the Status of Endangered Wildlife in Canada 2007).

Habitat trend in the plan area

There are numerous locations with the localized habitat conditions conducive to supporting the species with the plan area. Habitat suitability along multiple waterways is modeled as optimal (Montana Natural Heritage Program 2017), suggesting that habitat availability is not likely limiting. Although historic management actions have in some cases degraded habitat conditions that may support the species, in managed catchments throughout the upper Columbia River drainage localized habitat conditions and aquatic ecosystem function are either stable or improving (Roper et al. 2019, Roper et al. 2018), including within the plan area (Saunders et al. 2023).

Relevant life history traits and other information

Originally classified as a subspecies of *Plethodon vandykei*, morphometric (Wilson and Larsen 1998), genetic work (Carstens et al. 2004, Howard et al. 1993) confirmed the species status of the Coeur d'Alene salamander. Coeur d'Alene salamanders are long-lived (Committee on the Status of Endangered Wildlife in Canada 2007). Females are not reproductive until they are 4-5 years old and likely only reproduce in alternative years (Committee on the Status of Endangered Wildlife in Canada 2007)(Montana Natural Heritage Program, mtnhp.org, 04/2022). Breeding occurs from April to May or more commonly from August to October (Lynch and Wallace 1987) with females storing sperm for up to nine months (Cassirer et al. 1994). Clutch sizes are small, ranging from 4-12 eggs (Committee on the Status of Endangered Wildlife in Canada 2007)(Montana Natural Heritage Program, mtnhp.org, 04/2022). There is no larval stage for the species (Committee on the Status of Endangered Wildlife in Canada 2007) and juveniles grow slowly compared to other congeners (Cassirer et al. 1994). The species exhibits limited dispersal that may be constrained by dry upland habitat (Committee on the Status of Endangered Wildlife in Canada 2007).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

The life history strategy of the species along with its natural distribution within the plan area and throughout its range, make individual populations susceptible to localized extinction events (Cassirer et al. 1994). Highly localized populations are more susceptible to local extirpation from stochastic events because a single event is more likely to exceed the spatial extent of the population (Smith and Almeida 2020). Of particular concern within the plan area would be the growing risk of high-intensity fire (Reinhardt et al. 2008, Stephens et al. 2012), that are increasingly resulting in high-intensity burns within riparian habitat (Halofsky and Hibbs 2008, Dwire et al. 2016) that may exceed historical fire intensity (Van de Water and North 2011). High-intensity fires within riparian areas may alter habitat conditions, nutrient loading, sedimentation, debris flow, channel morphology, hydroperiod, and water temperature with consequences for survival and reproduction (Pilliod et al. 2003), particularly for stream dependent amphibian species (Bury 2004).

Additionally, there are several common and wide-ranging threats to amphibian populations that may affect Coeur d'Alene salamander populations. Climate change (Zellmer et al. 2020), invasive species (Falaschi et al. 2020), disease (Blaustein et al. 2012), and land-use practices (deMaynadier and Hunter 1995, Tilghman et al. 2012) may all affect population dynamics and persistence of amphibians, but the effects are often species specific (Grant et al. 2020) making the practice of predicating outcomes for species with limited information challenging despite the potential risk (Howard and Bickford 2014). In many cases, amphibian occupancy and abundance are best explained by very localized factors (Grant et al. 2016). Although specific threats to Coeur d'Alene salamander populations associated with localized management have not been studied, road and trial maintenance, logging, and water diversion are assumed to present potential risks (Cassirer et al. 1994, Committee on the Status of Endangered Wildlife in Canada 2007).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

Although known occupancy is limited to fewer than 15 locations, the locations are well distributed across the plan area. Populations at individual sites may be subject to stochastic events, but there is redundancy within the plan area. Furthermore, there are no directed surveys for the species within the project area and given the cryptic nature of the species and availability of suitable habitat, additional occupied sites are likely, especially within occupied drainages (Committee on the Status of Endangered Wildlife in Canada 2007). Generally, the species is considered stable in much of its range (Cassirer et al. 1994, Committee on the Status of Endangered Wildlife in Canada 2007) and there are no specific threats within the plan area to suggest that population is an exception. Moreover, aquatic ecosystem function is either stable or improving (Roper et al. 2019, Roper et al. 2018).

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7.2 Idaho Giant Salamander (*Dicamptodon aterrimus*)

Conservation Categories

G3G4/S2 (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable abundance estimates for the species (Thompson 2004) are not known to be on-going within the plan area; however, extensive eDNA surveys have produced reliable occupancy estimates (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Although there are no specific population estimates, sampling in 2006 confirmed an estimated 450 individuals (Montana Natural Heritage Program, mtnhp.org, 04/2022). Estimates of the effective population size for two catchments off the St. Regis River that represent a significant portion of the species range within the plan area, were somewhere between 150-400 individuals (Mullen et al. 2010)

Genetically isolated (Daugherty et al. 1983) the Idaho giant salamander is one of four members of the family *Dicamptodontidae* endemic to the northwest United States and southwest Canada (Stebbins 2003). The distribution of the species is largely limited to north-central Idaho, with a highly restricted distribution within Montana that largely overlaps the plan area. First detected in Montana in 2005, the species was confirmed in 11 tributaries of 3 major watersheds in Mineral County by 2007 (Montana Natural Heritage Program, mtnhp.org, 04/2022). Despite continued surveys of more than 100 waterbodies in western Montana the species is known to occupy only 16 waterbodies, all of which are co-located in Mineral County (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area. In general, populations of amphibians have shown long-term population declines in the western United States (Corn 1994, Halstead et al. 2022), across North America (Grant et al. 2016) and throughout the world (González-del-Pliego et al. 2019).

Habitat description

Considered a stream obligate of moist coniferous forests, the species is more likely to occupy unfragmented, headwater streams with few roads (Sepulveda and Lowe 2009). The larvae and aquatic adult morphs of the species are associated with cold, fast-moving streams, although they may also occupy lakes or ponds. Terrestrial adults use near stream refugia including rocks, bark, logs and stones (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Habitat trend in the plan area

There are numerous headwater streams that could likely support the species within the plan area; however, most are unoccupied (Montana Natural Heritage Program, mtnhp.org, 04/2022) with little likelihood of being occupied in the near term due to the limited dispersal ability of the species (Mullen et al. 2010, Honeycutt et al. 2016). Locally there is sufficient habitat that is modeled as suitable for supporting the species in proximity to the known populations (Montana Natural Heritage Program 2017), suggesting that habitat availability is not likely limiting. Although historic management actions have in some cases degraded habitat conditions that may support the species, in managed catchments throughout the upper Columbia River drainage localized habitat conditions and aquatic ecosystem function are either stable or improving (Roper et al. 2019, Roper et al. 2018) including within the plan area (Saunders et al. 2023).

Relevant life history traits and other information

The species is facultatively paedomorphic, such that individuals may be reproductively mature in the larval form or metamorphose into terrestrial adults (Montana Natural Heritage Program, mtnhp.org, 04/2022). Although the species is capable of dispersing overland, individuals generally only move short distances (3-23 m) downstream along the stream corridor (Honeycutt et al. 2016), resulting in limited dispersal among subpopulations (Mullen et al. 2010). Annual survival of aquatic adults ranges from 0.4-0.5 (Honeycutt et al. 2016). Adults breed in the spring or fall, in water-filled nest chambers under logs or stones that are in mountain streams or lakes. Incubation lasts for 275 days. Females guard the eggs throughout the incubation period, which may limit breeding to alternate years (Montana Natural Heritage Program, mtnhp.org, 04/2022). Metamorphose occurs after two years (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Relevant threats to populations occupying the plan area

Range size is among the most consistent predictors of extinction risk (Chichorro et al. 2019), including for amphibians (Sodhi et al. 2008). The population of Idaho giant salamander within the plan area, and Montana more generally, is geographically isolated from the core population in Idaho (Mullen et al. 2010) and is highly localized within the plan area. Populations that are geographically isolated from core populations are at greater risk for localized extinction (Dias 1996, Ovaskainen and Hanski 2004), especially when species exhibit slow life history strategies, exist at low densities, and have limited dispersal capacity, as is the case with Idaho giant salamander (Honeycutt et al. 2016)(Montana Natural Heritage Program, mtnhp.org, 04/2022). Furthermore, small, highly localized populations are more susceptible to extirpation from stochastic events because a single event is more likely to exceed the spatial extent of the population (Smith and Almeida 2020). Of particular concern within the plan area would be the growing risk of high-intensity fire (Reinhardt et al. 2008, Stephens et al. 2012), that are increasingly resulting in high-intensity burns within riparian habitat (Halofsky and Hibbs 2008, Dwire et al. 2016) that may exceed historical fire intensity (Van de Water and North 2011). High-intensity fires within riparian areas may alter habitat conditions, nutrient loading, sedimentation, debris flow, channel morphology, hydroperiod, and water temperature with consequences for survival and reproduction (Pilliod et al. 2003), particularly for stream dependent amphibian species (Bury 2004).

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no other known unique threats to the species within the plan area. The species appears sensitive to habitat fragmentation, likely due to the lack of effective dispersal capability to support source sink dynamics at larger spatial scales (Sepulveda and Lowe 2009, Mullen et al. 2010). In particularly roads may affect habitat connectivity and occupancy (Sepulveda and Lowe 2009), likely due to the associated changes in stream sedimentation that can reduce population abundance (Honeycutt et al. 2016). The effects of timber management are less clear, as populations of closely related species seem resilient to even intensive silvicultural practices (Jackson et al. 2007, Pollett et al. 2010, Leuthold et al. 2012), although the effects may reflect behavioral rather than demographic resilience (Chelgren and Adams 2017).

Additionally, there are several common and wide-ranging threats to amphibian populations that may affect Idaho giant salamander populations. Climate change (Zellmer et al. 2020), invasive species (Falaschi et al. 2020), disease (Blaustein et al. 2012), and land-use practices (deMaynadier and Hunter 1995, Tilghman et al. 2012) may all affect population dynamics and persistence of amphibians, but the effects are often species specific (Grant et al. 2020) making the practice of predicating outcomes for species with limited information challenging despite the potential risk (Howard and Bickford 2014). In many cases, amphibian occupancy and abundance are best explained by very localized factors (Grant et al. 2016).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

Yes

Rational for determination

Structured surveys suggest the species has a limited distribution within the plan area (Montana Natural Heritage Program, mtnhp.org 04/2022) composed of only a few small populations (Mullen et al. 2010). The populations within the plan area are geographically isolated from neighboring source populations within the core distribution of the species (Sepulveda and Lowe 2009, Mullen et al. 2010, Honeycutt et al. 2016). Small populations are more likely to face localized extirpation, particularly when isolated from other source populations (Dias 1996, Ovaskainen and Hanski 2004, Smith and Almeida 2020). The species also exhibits a slow life history strategy and has limited mobility, which further limit the ability of the species to respond to perturbation.

Best available scientific information

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7.3 Western Toad (*Anaxyrus boreas*)

Conservation Categories

G4/S2, Regional Forester Sensitive Species (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004) are not known to be on-going.

The species is widely distributed across western North America and western Montana (Montana Natural Heritage Program, mtnhp.org, 04/2022). The species is widespread, but more commonly documented in the northwestern and northeastern portions of the plan area (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area. Throughout their range in the United States western toad populations have declined significantly (Blaustein et al. 1994, Stuart and Painter 1994, Fisher and Shaffer 1996, Thompson et al. 2004, Corn et al. 2011, Muths and Hossack 2022), with occupancy reduced by 99 percent in some cases (Keinath and McGee 2005). In the northern Rocky Mountains, western toad are still widespread, but occupancy rates have declined (Kirwin Werner and Reichel 1994, Reichel and Flath 1995, Reichel 1995, 1996, Hendricks and Reichel 1996, Maxell 2000, Maxell et al. 2009, Olson et al. 2009).

Habitat description

The western toad is found in wide range of habitats, but normally is associated with ponds, lakes, reservoirs, and slow-moving rivers and streams during the day (Maxell et al. 2009, Keinath and McGee 2005). The species exhibits seasonal migration that results in species-habitat relationships that are responsive to habitat conditions at fine scales (50-100m), as well as very large scales (5km) (Browne et al. 2009). The species often overwinters in caverns or rodent burrows and will move long distances between breeding and hibernation sites (Maxell et al. 2009, Keinath and McGee 2005, Loeffler 2001, Browne and Paszkowski 2010, Maxell 2009, Browne and Paszkowski 2018).

Habitat trend in the plan area

The species uses a variety of habitats and there are numerous locations within the plan area that are conducive to supporting the species. Habitat suitability along multiple waterways is modeled as optimal (Montana Natural Heritage Program 2017), suggesting that habitat availability is not likely limiting within the plan area. Although historic management actions have in some cases degraded habitat conditions that may support the species, in managed catchments throughout the upper Columbia River drainage localized habitat conditions and aquatic ecosystem function are either stable or improving (Roper et al. 2019, Roper et al. 2018), including within the plan area (Saunders et al. 2023).

Relevant life history traits and other information

Western toads are long-lived, and females are not reproductive until they are 6 years old (Keinath and McGee 2005)(Montana Natural Heritage Program, mtnhp.org, 04/2022). Individuals gathers at breeding sites from April to mid-July depending on temperature, snowmelt, and the presence of surface water from flooding (Keinath and McGee 2005)(Montana Natural Heritage Program, mtnhp.org, 04/2022). The species demonstrates breeding site fidelity (Bull and Carey 2008), especially males (Bartelt et al. 2004), which may limit active breeding sites to only a subset of available sites. Females lay a clutch of thousands of eggs that hatch in a few days to a couple of weeks (Keinath and McGee 2005)(Montana Natural Heritage Program, mtnhp.org, 04/2022). Metamorphosis occurs in late summer or early autumn of the same year. The species is highly mobile, with juveniles and adults capable of moving in stream (Schmetterling and Young 2008) and adults known to move several miles over land (Corn et al. 1997).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

There are several common and wide-ranging threats to amphibian populations that may affect western toad populations. Climate change (Zellmer et al. 2020), invasive species (Falaschi et al. 2020), disease (Blaustein et al. 2012), and land-use practices (deMaynadier and Hunter 1995, Tilghman et al. 2012) may all affect population dynamics and persistence of amphibians, but the effects are often species specific (Grant et al. 2020) making the practice of predicating outcomes for species with limited information challenging despite the potential risk (Howard and Bickford 2014).

For western toad, there is substantial evidence to support the role of disease in declining populations (Muths and Hossack 2022). Infection by chytrid fungus (*Batrachochytrium dendrobatidis*) may reduce western toad survival by upwards of 50 percent (Pilliod et al. 2010, Russell et al. 2019, Hossack et al. 2020), and may also affect thermoregulation (Murphy et al. 2008) and habitat choice (Barrile et al. 2021). Chytrid fungus is the most likely cause of declines of western toads in western Montana (Maxell 2009), but due to density dependent mechanism inherent to disease transmission (Briggs et al. 2010) may now be acting as a low-level, chronic disease (Pilliod et al. 2010). The species is also susceptible to other pathogens that may limit reproductive success (e.g., *Saprolegnia ferax*) and even development (e.g., *Ribeiroia ondatrae*) (Blaustein et al. 1994, Johnson et al. 2002).

Unlike many amphibian species (Zellmer et al. 2020) the relationship between western toad populations and climate change is not entirely negative (Bartelt et al. 2022). Western toads appear to capable of altering development (Thurman and Garcia 2017) and possibly breeding timing (Blaustein et al. 2001) to address changing climatic conditions, but may face challenges limited breeding habitat availability in a warmer climate (Bartelt et al. 2022). A warmer climate, however, may reduce thermoregulatory costs (Bartelt et al. 2022) and possibly mortality associated with of chytrid fungus infection (Barrile et al. 2021).

Like many amphibians, western toads demonstrate sensitivity to sedimentation (Wood and Richardson 2009) and changes in localized vegetation around breeding habitats (Barrile et al. 2021). The species is sensitive to road and trial maintenance (Keinath and McGee 2005) as well as cattle grazing (Barrile et al. 2021), but appear rather resilient to changes in upland vegetation (Deguise and Richardson 2009), likely because western toads are adaptable to open habitat (Hossack et al. 2009, Browne and Paszkowski 2014) as long as there is suitable microhabitat (Browne and Paszkowski 2018).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

Although the species has declined precipitously throughout much of its range, and likely within the plan area, western toads are still relatively common and broadly distributed across the plan area. The species uses a variety of habitats that are highly connected within the plan area and throughout western Montana, and the species is highly mobile and capable of colonization in the event of local extirpation. Aquatic ecosystem function is either stable or improving (Roper et al. 2019, Roper et al. 2018). The species is relatively long-lived, and is highly fecund, life history characteristics that allow for relatively high resiliency to population perturbations. In addition, the species appears resilient to habitat and climate change.

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8. Aquatic Invertebrates

8.1 Western Pearlshell (*Margaritifera falcata*)

Conservation Categories

G5/S2, Regional Forester Sensitive Species, Species of Conservation Concern on a neighboring Forest (Montana Natural Heritage Program, mtnhp.org, 11/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no specific population estimates for the species in Montana or the plan area, and surveys designed to provide reliable abundance estimates for the species (Thompson 2004) are not known to be on-going within the plan area. However, occupancy surveys are on-going within the plan area, producing reliable information on the distribution of the species as well as the relative status of individual populations based on site conditions and abundance estimates (Stagliano 2015).

Formerly well distributed across the Northern Rockies and the Pacific Northwest, but many watersheds no longer support the species (Jepsen et al. 2010). In Western Montana the species formally occupied many of the major river systems, but the distribution within the state and individual river systems has contracted, including within the plan area (Stagliano 2015). Within the plan area only a fraction of the historic populations remain, all of which are substantially reduced in abundance (Stagliano 2015).

Population trend in the plan area

The distribution of the species within the plan area has contracted substantially, with only a single watershed sustaining a viable population (Stagliano 2015). The species is absent from a substantial portion of its historic range in North America (Jepsen et al. 2010). In Montana, approximately 20 percent of the historic populations are extirpated, including the complete extirpation from 25 percent of the watersheds the species formally occupied (Stagliano 2015). Remaining populations are small and isolated, with only 35 population in Montana demonstrating sufficient recruitment to ensure long-term population viability (Stagliano 2015).

Habitat description

The species occupies clear, cold, perennial rivers and streams (Frest and Johannes 1995), where they tend to prefer cobble or gravel substrates interspersed with boulders, usually in locations that are well aerated but stable and protected from scouring (Howard and Cuffey 2003, Vannote and Minshall 1982, Stone et al. 2004, Hastie and Toy 2008, Geist and Auerswald 2007). Stream flow dynamics, particularly flooding and scouring, likely play a substantial role in the availably and distribution of suitable habitat within a waterbody (May and Pryor 2016).

Habitat trend in the plan area

Although historic management actions have in some cases degraded habitat conditions that may support aquatic invertebrates, in managed catchments throughout the upper Columbia River drainage localized habitat conditions and aquatic ecosystem function are either stable or improving (Roper et al. 2019, Roper et al. 2018), including within the plan area (Saunders et al. 2023).

Relevant life history traits and other information

The species is a long lived (>100 years), with delayed maturation (Hastie and Toy 2008) and long generation times (Mock et al. 2013). The species lives in aggregations that may include thousands of individuals of both sexes (Jepsen et al. 2010); however, in Montana most aggregations are small (Stagliano 2015) and most individuals are hermaphroditic (Cook 2022). Due to high rates of self-fertilization, pearlshell populations in Montana have limited genetic divergence and high inbreeding (Mock et al. 2013). Western pearlshell are an obligate parasite that depends on fish hosts to support the lavae stage of its life history and disperse the species upstream (Jepsen et al. 2010, Cook 2022).

Relevant threats to populations occupying the plan area

The primary threats to the species within the plan area is that known aggregates are small and isolated (Stagliano 2015). Populations that are isolated from core populations are at greater risk for localized extinction (Dias 1996, Ovaskainen and Hanski 2004), especially when species exhibit slow life history strategies, exist at low densities, and have limited dispersal capacity, as is the case with western pearlshell (Jepsen et al. 2010, Cook 2022). Furthermore, small, highly localized populations are more susceptible to extirpation from stochastic events because a single event is more likely to exceed the spatial extent of the population (Smith and Almeida 2020). Of particular concern within the plan area would be the growing risk of high-intensity fire (Reinhardt et al. 2008, Stephens et al. 2012), that are increasingly resulting in high-intensity burns within riparian habitat (Halofsky and Hibbs 2008, Dwire et al. 2016) that may exceed historical fire intensity (Van de Water and North 2011). High-intensity fires within riparian areas may alter habitat conditions, nutrient loading, sedimentation, debris flow, channel morphology, hydroperiod, and water temperature. Western pearlshell appear particularly sensitive to sedimentation (Jepsen et al. 2010), and thus the consequences of larger, high intensity fires (Isaak et al. 2018).

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known additional unique threats to the species within the plan area. Aquatic invertebrates are subject to numerous threats that may be escalating (Costante et al. 2022) and more generally are sensitive to changes in hydrology, water pollution, sedimentation, overexploitation, habitat fragmentation and degradation, invasive species, and climate change (Johnson et al. 2013, Dudgeon et al. 2006, Strayer 2006, Collen et al. 2012).

Changes in river flow dynamics due to impoundments (but see (Williams and Searles Mazzacano 2022), dewatering, riparian or upland habitat degradation, and climate change all have the potential to alter sedimentation rates and scouring with substantial consequences for the species (Jepsen et al. 2010, Wade et al. 2016, May and Pryor 2016). As filter feeders, the species is susceptible to contaminants and eutrophication (Jepsen et al. 2010); however, accumulations of containments may be less than for other filter feeding species because aggregations do not occur in areas with high sedimentation (Bettaso and Goodman 2010). The species is susceptible to changes in water temperature (Jepsen et al. 2010) and may face increasing challenges due to increasing water temperatures within the plan area (Wade et al. 2016).

In addition to direct threats, western pearlshell are also susceptible to threats to host fish species (Jepsen et al. 2010, Isaak et al. 2018). Although many of the threats to native fish stocks are the same as those facing western pearlshell, changes in fish population abundance or behavior associated with hybridization and competition with non-native fish further exacerbates the conservation challenges for western pearlshell (Isaak et al. 2018), particularly if pearlshell do not readily parasitize non-native fish species as has been demonstrated in other systems (Tremblay et al. 2016).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

Yes

Rational for determination

Structured surveys indicate that the distribution and abundance of the species has significantly contracted to the extent that the plan area now supports a single viable population that is substantially separated from other viable populations (Stagliano 2015). Small populations are more likely to face localized extirpation, particularly when isolated from other source populations (Dias 1996, Ovaskainen and Hanski 2004, Smith and Almeida 2020). The species also has limited mobility and exhibits a life history strategy that is dependent upon other species that increasingly face conservation challenges, both of which may further limit the ability of the species to respond to perturbation.

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8.2 River Species

Conservation Categories

Sinuous Snaketail (*Ophiogomphus occidentis*) – G5/S2S4

Unnamed Caddisfly (*Zumatrichia notosa*) – G2G4/SNR

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004) are not known to be on-going.

Population trend in the plan area

There are no known specific population trends for the representative species in Montana or the plan area. Aquatic invertebrates are declining across many ecosystems (Johnson et al. 2013, Böhm et al. 2021, Montgomery et al. 2020, Cardoso et al. 2020, Lysne et al. 2008); however, there is often insufficient information to thoroughly evaluate the conservation status of a substantial proportion of aquatic invertebrates (Collier et al. 2016), even when listed as endangered (Wilcove and Master 2005) due to sampling issues (Robinson et al. 2016, Didham et al. 2020). Indeed, perceived rarity due to limited survey efforts or a lack of taxonomic resolution has led to the misassignment of the conservation status of some invertebrate species in Montana (Stagliano 2016). As observed more broadly, information concerning the population status of aquatic invertebrates within the plan area is largely lacking.

Habitat description

Cool to cold, clear-water streams at moderate elevation (1200-2000m) with moderate gradient and a permanent flow that is seasonally variable due to melting snowpack. Suitable habitat includes rivers with boulder and cobble riffles, cobble and gravel runs and pools, and silt on the margins or in the deepest pools (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Habitat trend in the plan area

Although historic management actions have in some cases degraded habitat conditions that may support aquatic invertebrates, in managed catchments throughout the upper Columbia River drainage localized habitat conditions and aquatic ecosystem function are either stable or improving (Roper et al. 2019, Roper et al. 2018), including within the plan area (Saunders et al. 2023).

Relevant life history traits and other information

Aquatic invertebrates differ in the timing and expression of life cycles, which may affect sensitivity to certain stressors, but all species are dependent on the availability and function of suitable aquatic and riparian habitats that support the species life cycle.

Relevant threats to populations occupying the plan area

Beyond threats documented across the specific ranges of the species considered here (NatureServe, natureserve.org, 01/2023), there are no known unique threats within the plan area.

For many species of aquatic invertebrates specific threats are unknown (NatureServe, natureserve.org, 01/2023). In general, aquatic invertebrates are subject to numerous threats that may be escalating (Costante et al. 2022) including changes in hydrology, water pollution, sedimentation, overexploitation, habitat fragmentation and degradation, invasive species, and climate change (Johnson et al. 2013, Dudgeon et al. 2006, Strayer 2006, Collen et al. 2012). The relative importance of individual stressors driving population dynamics may vary by broad habitat types (e.g., lentic versus lotic; (Dijkstra et al. 2014), but is usually species and location specific (Collier et al. 2016). For example, the effects of timber harvest on aquatic invertebrates varies markedly across ecosystems (Stone and Wallace 1998, Fuchs et al. 2003), in some cases with no discernable effects (e.g., (Gravelle et al. 2009). Importantly, however, changes in riparian and aquatic ecosystem management practices on National Forests have greatly reduced the occurrence of potential threats (Roper et al. 2018), resulting in aquatic and riparian ecosystem conditions that are generally improving (Roper et al. 2019).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

There is insufficient information on the life-histories as well as the distribution and abundance of the populations to substantiate the risk to the species within the plan area. In general, the habitat conditions and ecosystem processes that should support the representative species are either stabilizing or improving (Roper et al. 2019, Roper et al. 2018).

Best available scientific information

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8.3 Stream Species

Conservation Categories

Mission Mountains Snowfly (*Bolshecapnia missiona*) – G2/SNR

Lolo Mayfly (*Caurinella idahoensis*) – G3/S2

Northern Rocky Mountains Refugium Caddisfly (*Goereilla* baumanni) – G1/S2

Unnamed Caddisfly (*Philocasca banksi*) – G1G3/SNR

Unnamed Caddisfly (*Rossiana montana*) – G2G3/S2

Alexander's Rhyacophilan Caddisfly (*Rhyacophila alexanderi*) – G2/S2

Unnamed Caddisfly (*Rhyacophila betteni*) – G1G4/SNR

Potter's Free-living Caddisfly (*Rhyacophila potteri*) – G3/S2

Unnamed Caddisfly (*Sericostriata surdickae*) – G3/S3

Clearwater Roachfly (*Soliperla salish*) – G2/S2

Rocky Mountain Forestfly (*Soyedina potteri*) – G2G3/S2

Lolo Sailfly (*Sweltsa durfeei*) – G3/S2

Rocky Mountain Duskysnail (*Colligyrus greggi*) – G4/S2

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004) are not known to be on-going.

Population trend in the plan area

There are no known specific population trends for the representative species in Montana or the plan area. Aquatic invertebrates are declining across many ecosystems (Johnson et al. 2013, Böhm et al. 2021, Montgomery et al. 2020, Cardoso et al. 2020, Lysne et al. 2008); however, there is often insufficient information to thoroughly evaluate the conservation status of a substantial proportion of aquatic invertebrates (Collier et al. 2016), even when listed as endangered (Wilcove and Master 2005) due to sampling issues (Robinson et al. 2016, Didham et al. 2020). Indeed, perceived rarity due to limited survey efforts or a lack of taxonomic resolution has led to the misassignment of the conservation status of some invertebrate species in Montana (Stagliano 2016). As observed more broadly, information concerning the population status of aquatic invertebrates within the plan area is largely lacking.

Habitat description

Found in mountainous terrain spanning from foothill to high elevation (1200-2500m) forests, these small-to-medium sized, moderately flowing streams have permanent flow. The hydrology is usually relatively stable but often experiences strong seasonal variability due to melting snowpack. Habitat is dominated by steps and pools at higher elevations and riffles and pools at lower elevations. Substrates including boulders, cobbles, and gravel are common, but large woody debris from the surrounding forest provides important and abundant substrate (Montana Natural Heritage Program, mtnhp.org, 04/2022).

Habitat trend in the plan area

Although historic management actions have in some cases degraded habitat conditions that may support aquatic invertebrates, in managed catchments throughout the upper Columbia River drainage localized habitat conditions and aquatic ecosystem function are either stable or improving (Roper et al. 2019, Roper et al. 2018), including within the plan area (Saunders et al. 2023).

Relevant life history traits and other information

Aquatic invertebrates differ in the timing and expression of life cycles, which may affect sensitivity to certain stressors, but all species are dependent on the availability and function of suitable aquatic and riparian habitats that support the species life cycle.

Relevant threats to populations occupying the plan area

Beyond threats documented across the specific ranges of the species considered here (NatureServe, natureserve.org, 01/2023), there are no known unique threats within the plan area.

For many species of aquatic invertebrates, specific threats are unknown (NatureServe, natureserve.org, 01/2023). In general, aquatic invertebrates are subject to numerous threats that may be escalating (Costante et al. 2022) including changes in hydrology, water pollution, sedimentation, overexploitation, habitat fragmentation and degradation, invasive species, and climate change (Johnson et al. 2013, Dudgeon et al. 2006, Strayer 2006, Collen et al. 2012). The relative importance of individual stressors driving population dynamics may vary by broad habitat types (e.g., lentic versus lotic; (Dijkstra et al. 2014), but is usually species and location specific (Collier et al. 2016). For example, the effects of timber harvest on aquatic invertebrates varies markedly across ecosystems (Stone and Wallace 1998, Fuchs et al. 2003), in some cases with no discernable effects (e.g., (Gravelle et al. 2009). Importantly, however, changes in riparian and aquatic ecosystem management practices on National Forests have greatly reduced the occurrence of potential threats (Roper et al. 2018), resulting in aquatic and riparian ecosystem conditions that are generally improving (Roper et al. 2019).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

There is insufficient information on the life-histories as well as the distribution and abundance of the populations to substantiate the risk to the species within the plan area. Representative species are likely rare where they do occur (e.g. Lolo Mayfly; (Stagliano et al. 2007), but for many species suitable habitat has not been adequately surveyed to determine the distribution and thus the conservation status of individual species (Stagliano et al. 2007, Stagliano 2016). In general, the habitat conditions and ecosystem processes that should support the representative species are either stabilizing or improving (Roper et al. 2019, Roper et al. 2018), and continued streamside management is likely to benefit the representative species (Stagliano et al. 2007), suggesting that risks may be limited.

Best available scientific information

Böhm, M., Dewhurst-Richman, N.I., Seddon, M., Ledger, S.E.H., Albrecht, C., Allen, D., Bogan, A.E., Cordeiro, J., Cummings, K.S., Cuttelod, A., Darrigran, G., Darwall, W., Fehér, Z., Gibson, C., Graf, D.L., Köhler, F., Lopes-Lima, M., Pastorino, G., Perez, K.E., Smith, K., van Damme, D., Vinarski, M.V., von Proschwitz, T., von Rintelen, T., Aldridge, D.C., Aravind, N.A., Budha, P.B., Clavijo, C., Van Tu, D., Gargominy, O., Ghamizi, M., Haase, M., Hilton-Taylor, C., Johnson, P.D., Kebapçı, Ü., Lajtner, J., Lange, C.N., Lepitzki, D.A.W., Martínez-Ortí, A., Moorkens, E.A., Neubert, E., Pollock, C.M., Prié, V., Radea, C., Ramirez, R., Ramos, M.A., Santos, S.B., Slapnik, R., Son, M.O., Stensgaard, A.-S., and Collen, B. 2021. The conservation status of the world's freshwater molluscs. Hydrobiologia 848 (12): 3231-3254 pp.

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8.4 Wet Meadow, Wetland, Pond, and Lake Species

Conservation Categories

Zigzag Darner (*Aeshna sitchensis*) – G5/S1S2

Subarctic Darner (*Aeshna subarctica*) – G5/S1S2

Ocellated Emerald (*Somatochlora minor*) – G5/S2S4

Brush-tipped Emerald (*Somatochlora walshii*) – G5/S1S2

Red-veined Meadowhawk (*Sympetrum madidum*) – G5/S2S3

Black-tipped Darner (*Aeshna tuberculifera*) – G5/S2S4

Ringed Emerald (*Somatochlora albicincta*) – G5/S1S3

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable occupancy or abundance estimates for the species (Thompson 2004) are not known to be on-going.

Population trend in the plan area

There are no known specific population trends for the representative species in Montana or the plan area. Aquatic invertebrates are declining across many ecosystems (Johnson et al. 2013, Böhm et al. 2021, Montgomery et al. 2020, Cardoso et al. 2020, Lysne et al. 2008); however, there is often insufficient information to thoroughly evaluate the conservation status of a substantial proportion of aquatic invertebrates (Collier et al. 2016), even when listed as endangered (Wilcove and Master 2005) due to sampling issues (Robinson et al. 2016, Didham et al. 2020). Indeed, perceived rarity due to limited survey efforts or a lack of taxonomic resolution has led to the misassignment of the conservation status of some invertebrate species in Montana (Stagliano 2016). As observed more broadly, information concerning the population status of aquatic invertebrates within the plan area is largely lacking.

Habitat description

Habitats include a variety of wetland and larger waterbody types that extent from valley floors to high-elevation systems. The combination of elevation, hydrology, chemistry, and organic inputs shapes the flora and fauna of individual waterbody types. Wet meadows, for example, are associated with snowmelt and are usually not subjected to high disturbance events such as flooding. Fens are associated groundwater discharge, peat accumulation, and very high floral diversity. Emergent marshes are found in depressions adjacent to larger waterbodies, are generally semipermanent, and are often alkaline or semi-alkaline. Vernal pools are seasonal freshwater wetlands of glacial origin that in the plan area are often surrounded by trees. Larger waterbodies such as ponds or lakes are perennial and vary in form based on substrate as well as nutrient flow.

Habitat trend in the plan area

Waterbodies represent a minor portion of the plan area, but are widely distributed throughout the plan area, and are largely stable in distribution and abundance. Although historic management actions have in some cases degraded habitat conditions that may support aquatic invertebrates, in managed catchments throughout the upper Columbia River drainage localized habitat conditions and aquatic ecosystem function are either stable or improving (Roper et al. 2019, Roper et al. 2018).

Relevant life history traits and other information

Aquatic invertebrates differ in the timing and expression of life cycles, which may affect sensitivity to certain stressors, but all species are dependent on the availability and function of suitable aquatic and riparian habitats that support the species life cycle.

Relevant threats to populations occupying the plan area

Beyond threats documented across the specific ranges of the species considered here (NatureServe, natureserve.org, 01/2023), there are no known unique threats within the plan area.

For many species of aquatic invertebrates specific threats are unknown (NatureServe, natureserve.org, 01/2023). In general, aquatic invertebrates are subject to numerous threats that may be escalating (Costante et al. 2022) including changes in hydrology, water pollution, sedimentation, overexploitation, habitat fragmentation and degradation, invasive species, and climate change (Johnson et al. 2013, Dudgeon et al. 2006, Strayer 2006, Collen et al. 2012). The relative importance of individual stressors driving population dynamics may vary by broad habitat types (e.g., lentic versus lotic; (Dijkstra et al. 2014), but is usually species and location specific (Collier et al. 2016). For example, the effects of timber harvest on aquatic invertebrates varies markedly across ecosystems (Stone and Wallace 1998, Fuchs et al. 2003), in some cases with no discernable effects (e.g., (Gravelle et al. 2009). Importantly, however, changes in riparian and aquatic ecosystem management practices on National Forests have greatly reduced the occurrence of potential threats (Roper et al. 2018), resulting in aquatic and riparian ecosystem conditions that are generally improving (Roper et al. 2019).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

No

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

There is insufficient information on the life-histories as well as the distribution and abundance of the populations to substantiate the risk to the species within the plan area. In general, the habitat conditions and ecosystem processes that should support the representative species are either stabilizing or improving (Roper et al. 2019, Roper et al. 2018).

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9. Fish

9.1 Cedar Sculpin (*Cottus schitsuumsh*)

Conservation Categories

G3G4/SU (Montana Natural Heritage Program, mtnhp.org, 02/2023).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable abundance estimates for the species (Thompson 2004) are not known to be on-going within the plan area.

Endemic to northern Idaho and western Montana, the species distribution is associated with historic glacial refugia within the region (Lemoine et al. 2014). In Montana, the species is known from roughly 35 observations, almost all of which occur within the western extent of the plan area (Montana Natural Heritage Program, mtnhp.org, 02/2023).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area.

Habitat description

The species occupies cool water streams with cobble and gravel bottoms (Lemoine et al. 2014).

Habitat trend in the plan area

There are numerous locations with the localized habitat conditions conducive to supporting the species with the plan area. Habitat suitability along multiple waterways is modeled as optimal (Montana Natural Heritage Program 2017), suggesting that habitat availability is not likely limiting. Although historic management actions have in some cases degraded habitat conditions that may support the species, in managed catchments throughout the upper Columbia River drainage localized habitat conditions and aquatic ecosystem function are either stable or improving (Roper et al. 2019, Roper et al. 2018), including within the plan area (Saunders et al. 2023).

Relevant life history traits and other information

Newly described species (Lemoine et al. 2014, Young et al. 2022).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

Range size is among the most consistent predictors of extinction risk (Chichorro et al. 2019). The known populations of the species within the plan area, and Montana more generally, are geographically isolated from other populations in Idaho (Lemoine et al. 2014). Populations that are geographically isolated from core populations are at greater risk for localized extinction (Dias 1996, Ovaskainen and Hanski 2004).

Climate change may be a particularly important threat given the species reliance on cool to cold streams. Although the specific effects to the species are unknown, the effects of climate change on other cold water fish species (Dobos et al. 2016, Isaak et al. 2012, Isaak et al. 2015, Wenger et al. 2011, Yau and Taylore 2013, Kovach et al. 2015, Young et al. 2018) that co-occur with the cedar sculpin suggest negative effects are likely, as demonstrated locally in other sculpin species (LeMoine et al. 2020). Changes in fire regimes and instream connectivity may further exacerbate the effects of climate change (LeMoine et al. 2020, Hossack et al. 2023).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

The species is well distributed within the western extent of the plan area, and where found, tends to be abundant (Lemoine et al. 2014). In addition, habitat for the species is likely stable or improving (Saunders et al. 2023).

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9.2 Westslope Cutthroat Trout (*Oncorhynchus clarkia lewisi*)

Conservation Categories

G5T4/S2, Regional Forester Sensitive Species (Montana Natural Heritage Program, mtnhp.org, 08/2022).

Is the species native and known to occupy the plan area?

Yes

Distribution and abundance in the plan area

There are no known population estimates for the species in Montana or the plan area, and surveys designed to provide reliable abundance estimates for the species (Thompson 2004) are not known to be on-going within the plan area; however, but the species is common and widely distributed among many drainages (Montana Natural Heritage Program, mtnhp.org, 11/2022; Montana Fish, Wildlife and Parks Species Distribution, https://myfwp.mt.gov/fishMT/distribution/speciesdistribution, 11/2022).

Native to Washington, Oregon, Idaho, Wyoming, Montana British Columbia, and eastern Alberta, the species is among the most widely distributed subspecies of cutthroat trout (Shepard et al. 2005) (Allendorf and Leary 1988, Behnke 1992, Young et al. 2017, Janowicz et al. 2018). In Montana the species is distributed largely west of the continental divide, but likely occupies less than 40 percent of the habitat it formally occupied (Shepard et al. 2003, Van Eimeren 1996).

Population trend in the plan area

There are no known specific population trends for the species in Montana or the plan area. Although the abundance is lower than historic population estimates across much of the species' range (Shepard et al. 2003), within the plan area occupancy is largely unchanged in the recent past (Bell et al. 2021) and the species remains common (Montana Fish, Wildlife and Parks Species Distribution, https://myfwp.mt.gov/fishMT/distribution/speciesdistribution, 11/2022). Neighboring populations in Idaho have increased from historic lows, and are now largely stable due to a combination of restoration efforts and changing management practices (Kennedy and Meyer 2014, Mallet and Thurow 2021), a pattern documented in some drainages within the plan area (Pierce et al. 2013).

Habitat description

The species occupies cold, oligotrophic waterbodies. Westslope cutthroat trout are generally present throughout the entire length of occupied river basins (Young 1995), but are more likely to occupy and occur at higher densities in reaches with higher stream gradients (D'Angelo and Muhlfeld 2013, Heckel et al. 2020). Headwater streams provide particularly value habitat for reproductive and juvenile life stages (Northcote 1997, Rieman and Apperson 1989, Young 1995, Behnke 1992, Shepard 2004, Janowicz et al. 2018), and in many cases support the most genetically pure populations within a river basin (Allendorf et al. 2003), including within the plan area (Montana Fish, Wildlife and Parks Species Distribution, https://myfwp.mt.gov/fishMT/distribution/speciesdistribution, 11/2022).

Habitat trend in the plan area

Although historic management actions have in some cases degraded habitat conditions that may support westslope cutthroat trout (Kennedy and Meyer 2014, Mallet and Thurow 2021), in waterbodies throughout the upper Columbia River drainage localized habitat conditions and aquatic ecosystem function are either stable or improving (Roper et al. 2019, Roper et al. 2018), including within the plan area (Saunders et al. 2023). Moreover, restoration efforts within the plan area have in some cases improved habitat conditions for the species (Pierce et al. 2013).

Relevant life history traits and other information

The species exhibits three migratory strategies; resident, fluvial, and adfluvial (Shepard et al. 2005, Muhlfeld, McMahon, et al. 2009, Heckel et al. 2020), all of which can be present in a single population (McIntyre and Rieman 1995) and all of which are present within the plan area (Smith 2021). The species can reach maturity by 2-3 years but often later for females (Downs et al. 1997, Janowicz et al. 2018). Survival for juveniles is very low, but annual survival for adults can approach 60 percent, resulting in fish that exceed a decade in age (Downs et al. 1997, Janowicz et al. 2018).

Relevant threats to populations occupying the plan area

Beyond threats documented across the species range (NatureServe, natureserve.org, 01/2023), there are no known unique threats to the species within the plan area.

Throughout the species range, threats include impoundments (Schmetterling 2003, Ardren and Bernall 2017), timber harvest (Hicks et al. 1991), roads (Heckel et al. 2020), grazing (Peterson et al. 2010), mining (Mayfield et al. 2019), climate change (Dobos et al. 2016, Isaak et al. 2012, Isaak et al. 2015, Wenger et al. 2011, Yau and Taylore 2013, Kovach, Muhlfeld, Al-Chokhachy, et al. 2015, Young et al. 2018) as well as competition and hybridization with non-native fish (Bell et al. 2021), which is generally considered a significant threat (Allendorf et al. 2003).

Hybridization with rainbow trout is highly variable throughout the species range (Muhlfeld et al. 2017) and is often the consequence of human modifications to the landscape (Biermann and Havlick 2021) that may also present challenges (e.g., dams and roads (Schmetterling 2003, Heckel et al. 2020, Ardren and Bernall 2017). Genetically pure populations are present in only a fraction of the waterbodies in the species historic range (Shepard et al. 2005, Hitt et al. 2003, Muhlfeld et al. 2017, McKelvey et al. 2016); however, non-hybridized westslope cutthroat continue to coexist in areas with extensive non-native fisheries (Smith 2021). Rates of hybridization have increased in waterbodies in Western Montana (Muhlfeld et al. 2017, Dangora 2022), and are likely to continue to increase due to changing hydrological conditions associated with climate change and subsequent changes in non-native species distribution (Muhlfeld et al. 2014, Bell et al. 2021). Hybridization with rainbow trout alters trait expression, including migratory behaviors, growth rates and reproductive strategies (Corsi et al. 2013, Strait et al. 2021, Dangora 2022), which may have fitness consequences (Kovach, Muhlfeld, Boyer, et al. 2015, Muhlfeld, Kalinowski, et al. 2009, Drinan et al. 2015, Kovach, Al-Chokhachy, et al. 2016, Kovach, Luikart, et al. 2016). Within the plan area, the degree of hybridization is substantial, but numerous drainages retain pure strain populations (Montana Department of Fish Wildlife and Parks and U.S. Department of Agriculture 2007)(Montana Fish, Wildlife and Parks Species Distribution, https://myfwp.mt.gov/fishMT/distribution/speciesdistribution, 11/2022) and non-hybridized individuals (Smith 2021). Unfortunately, many of the genetically pure populations are isolated in small patches of habitat which can reduce population persistence (Peterson et al. 2009), genetic diversity (Carim et al. 2016, Bell 2022, Kovach et al. 2022), and fitness (Feuerstein 2022).

Is there sufficient scientific information available to determine if there is substantial concern for long-term persistence of the species in the plan area?

Yes

Is this species identified as a Species of Conservation Concern for the Revised Land Management plan and FEIS?

No

Rational for determination

The species is common and widely distributed across the plan area (Montana Department of Fish Wildlife and Parks and U.S. Department of Agriculture 2007)(Montana Fish, Wildlife and Parks Species Distribution, https://myfwp.mt.gov/fishMT/distribution/speciesdistribution, 11/2022). There is considerable hybridization within many populations, but there are numerous genetically pure populations within the plan area (Montana Department of Fish Wildlife and Parks and U.S. Department of Agriculture 2007)(Montana Fish, Wildlife and Parks Species Distribution, https://myfwp.mt.gov/fishMT/distribution/speciesdistribution, 11/2022). Moreover, potentially genetically isolated populations are widely distributed, maintaining a high degree of genetic and phenotypic variation across the plan area (Fausch et al. 2009). In addition, habitat for the species is likely stable or improving (Saunders et al. 2023).

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