

# *Euphrasia subarctica* (Arctic Eyebright)

## Predicted Suitable Habitat Modeling

**Distribution Status:** Present

**State Rank:** [S2](#) (Species of Concern)

**Global Rank:** [G5](#)

### Modeling Overview

**Data Source Last Updated:** March 16, 2021

**Model Produced On:** September 17, 2021



### Deductive Modeling

#### **Modeling Process, Outputs, and Suggested Uses**

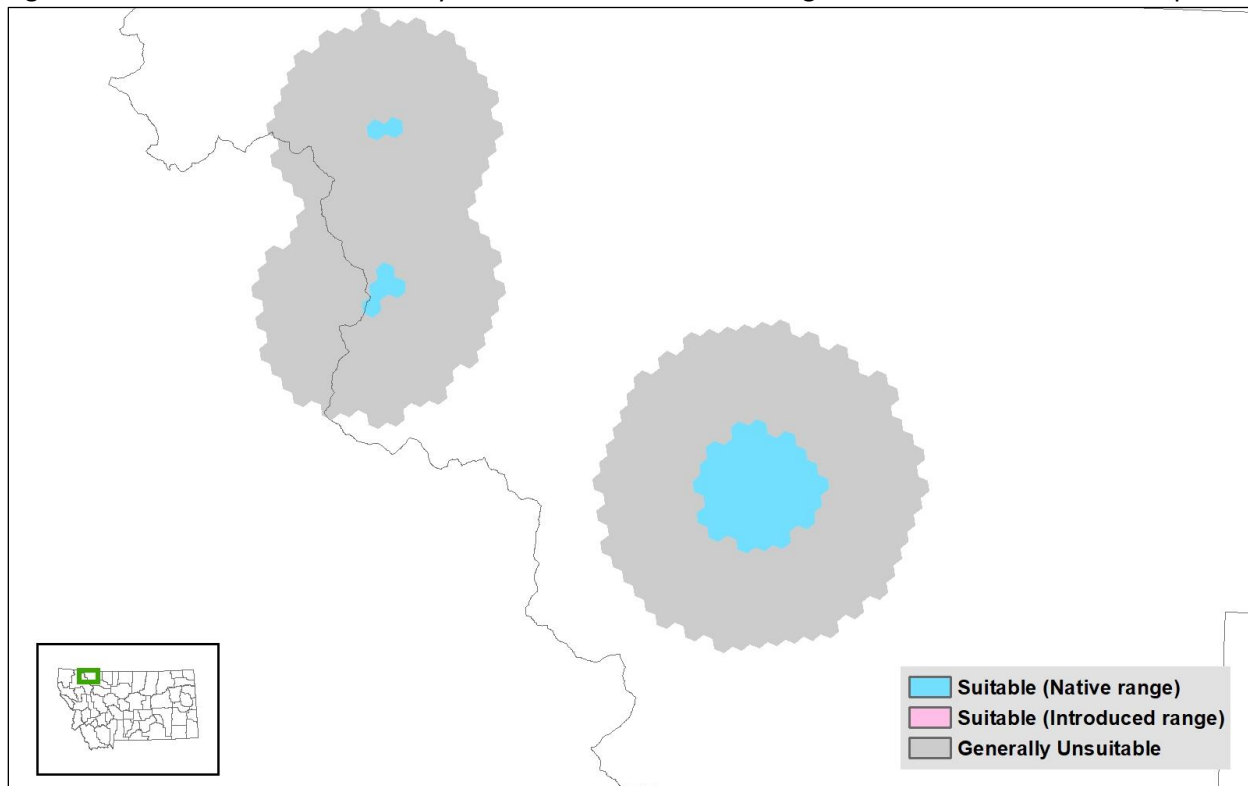
This is a simple rule-based model using species occurrences delineated for vascular and non-vascular plant species. These species could not be modeled with inductive methods, either due to limited observations or spatial extent or because an inductive model had poor performance. Species occurrences are discretely mapped polygons where the species has been documented. Plant species occurrence polygons are delineated by the MTNHP Botanist, and can be generated in two ways: 1) Polygons are hand-mapped and scaled to aggregate neighboring observation points and their adjacent habitat, while trying to exclude barriers, reduce known unoccupied habitat, and ignore management boundaries, or 2) Circular polygons are automatically generated by buffering the single observation point by its location uncertainty distance. For compatibility with other predictive distribution models the Montana Natural Heritage Program produces, we have intersected these species occurrences with a uniform grid of hexagons that have been used for planning efforts across the western United States (e.g. Western Association of Fish and Wildlife Agencies - [Crucial Habitat Assessment Tool](#)). Each hexagon is one square mile in area and approximately one kilometer in length on each side. Any hexagon that intersected a species occurrence was classified as suitable habitat. Model outputs are not evaluated and we suggest they be used to generate potential lists of species that may occupy lands within each hexagon for the purposes of landscape-level planning. Model outputs should not be used in place of on-the-ground surveys for species and wildlife and land management agency biologists should be consulted about the value of using model output to guide habitat management decisions for regional planning efforts or local projects. See [Suggested Contacts for State and Federal Natural Resource Agencies](#) attached to this document.

**Suggested Citation:** Montana Natural Heritage Program. 2021. *Euphrasia subarctica* (Arctic Eyebright) predicted suitable habitat models developed on September 17, 2021. Montana Natural Heritage Program, Helena, MT. 5 pp.

**Montana Field Guide Species Account:** <http://fieldguide.mt.gov/speciesDetail.aspx?elcode=PDSCROPOQQ>

### Deductive Model Map Output

Figure 1. Deductive habitat suitability model summarized into hexagons at a scale of 259 hectares per hexagon.

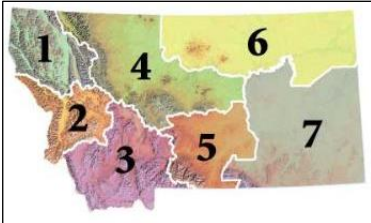


### Suggested Contacts for Natural Resource Agencies

As required by Montana statute (MCA 90-15), the Montana Natural Heritage Program works with state, federal, tribal, nongovernmental organizations, and private partners to ensure that the latest animal and plant distribution and status information is incorporated into our databases so that it can be used to inform a variety of planning processes and management decisions. In addition to the information you receive from us, we encourage you to contact state, federal, and tribal resource management agencies in the area where your project is located. They may have additional data or management guidelines relevant to your efforts. In particular, we encourage you to contact the Montana Department of Fish, Wildlife, and Parks for the latest data and management information regarding hunted and high profile management species and to use the U.S. Fish and Wildlife Service’s Information Planning and Conservation (IPAC) website <http://ecos.fws.gov/ipac/> regarding U.S. Endangered Species Act listed Threatened, Endangered, or Candidate species.

For your convenience, we have compiled a list of relevant agency contacts and links below; check [our website](#) for updates.

#### Montana Fish, Wildlife, and Parks

Fish Species	Zachary Shattuck <a href="mailto:zshattuck@mt.gov">zshattuck@mt.gov</a> (406) 444-1231 or Eric Roberts <a href="mailto:eroberts@mt.gov">eroberts@mt.gov</a> (406) 444-5334
American Bison Black-footed Ferret Black-tailed Prairie Dog Bald Eagle Golden Eagle Common Loon Least Tern Piping Plover Whooping Crane	Lauri Hanauska-Brown <a href="mailto:LHanauska-Brown@mt.gov">LHanauska-Brown@mt.gov</a> (406) 444-5209
Grizzly Bear Greater Sage Grouse Trumpeter Swan Big Game Upland Game Birds Furbearers	John Vore <a href="mailto:jvore@mt.gov">jvore@mt.gov</a> (406) 444-5209
Managed Terrestrial Game and Nongame Animal Data	Smith Wells – MFWP Data Analyst <a href="mailto:smith.wells@mt.gov">smith.wells@mt.gov</a> (406) 444-3759
Fisheries Data	Ryan Alger – MFWP Data Analyst <a href="mailto:ryan.alger@mt.gov">ryan.alger@mt.gov</a> (406) 444-5365
Wildlife and Fisheries Scientific Collector’s Permits	<a href="http://fwp.mt.gov/doingBusiness/licenses/scientificWildlife/">http://fwp.mt.gov/doingBusiness/licenses/scientificWildlife/</a> Kammi McClain for Wildlife <a href="mailto:Kammi.McClain@mt.gov">Kammi.McClain@mt.gov</a> (406) 444-2612 Kim Wedde for Fisheries <a href="mailto:kim.wedde@mt.gov">kim.wedde@mt.gov</a> (406) 444-5594
Fish and Wildlife Recommendations for Subdivision Development	Renee Lemon <a href="mailto:RLemon@mt.gov">RLemon@mt.gov</a> (406) 444-3738 See also: <a href="http://fwp.mt.gov/fishAndWildlife/livingWithWildlife/buildingWithWildlife/subdivisionRecommendations/">http://fwp.mt.gov/fishAndWildlife/livingWithWildlife/buildingWithWildlife/subdivisionRecommendations/</a>
Regional Contacts 	<a href="#">Region 1</a> (Kalispell) (406) 752-5501 <a href="#">Region 2</a> (Missoula) (406) 542-5500 <a href="#">Region 3</a> (Bozeman) (406) 994-4042 <a href="#">Region 4</a> (Great Falls) (406) 454-5840 <a href="#">Region 5</a> (Billings) (406) 247-2940 <a href="#">Region 6</a> (Glasgow) (406) 228-3700 <a href="#">Region 7</a> (Miles City) (406) 234-0900

**United States Fish and Wildlife Service**

Information Planning and Conservation (IPAC) website: <http://ecos.fws.gov/ipac/>  
 Montana Ecological Services Field Office: <http://www.fws.gov/montanafieldoffice/> (406) 449-5225  
 USFWS Information on Species Listed under the Endangered Species Act in Montana  
[https://www.fws.gov/montanafieldoffice/Endangered\\_Species/Species\\_information.html](https://www.fws.gov/montanafieldoffice/Endangered_Species/Species_information.html)

**Bureau of Land Management**

Montana Field Office Contacts:	
	Billings: (406) 896-5013
	Butte: (406) 533-7600
	Dillon: (406) 683-8000
	Glasgow: (406) 228-3750
	Havre: (406) 262-2820
	Lewistown: (406) 538-1900
	Malta: (406) 654-5100
	Miles City: (406) 233-2800
	Missoula: (406) 329-3914

**United States Forest Service**

<b>Regional Office – Missoula, Montana Contacts</b>		
Wildlife Program Leader	Tammy Fletcher	<a href="mailto:tammyfletcher@fs.fed.us">tammyfletcher@fs.fed.us</a> (406) 329-3588
Wildlife Ecologist	Cara Staab	<a href="mailto:cstaab@fs.fed.us">cstaab@fs.fed.us</a> (406) 329-3677
Fish Program Leader	Scott Spaulding	<a href="mailto:scottspaulding@fs.fed.us">scottspaulding@fs.fed.us</a> (406) 329-3287
Fish Ecologist	Cameron Thomas	<a href="mailto:cathomas@fs.fed.us">cathomas@fs.fed.us</a> (406) 329-3087
TES Program	Lydia Allen	<a href="mailto:lrallen@fs.fed.us">lrallen@fs.fed.us</a> (406) 329-3558
Interagency Grizzly Bear Coordinator	Scott Jackson	<a href="mailto:sjackson03@fs.fed.us">sjackson03@fs.fed.us</a> (406) 329-3664
Regional Botanist	Steve Shelly	<a href="mailto:sshelly@fs.fed.us">sshelly@fs.fed.us</a> (406) 329-3041
Invasive Species Program Manager	Michelle Cox	<a href="mailto:michelle.cox2@usda.gov">michelle.cox2@usda.gov</a> (406) 329-3669

**Tribal Nations**

	<a href="#">Assiniboine &amp; Gros Ventre Tribes – Fort Belknap Reservation</a>
	<a href="#">Assiniboine &amp; Sioux Tribes – Fort Peck Reservation</a>
	<a href="#">Blackfoot Tribe - Blackfoot Reservation</a>
	<a href="#">Chippewa Creek Tribe - Rocky Boy's Reservation</a>
	<a href="#">Crow Tribe – Crow Reservation</a>
	<a href="#">Little Shell Chippewa Tribe</a>
	<a href="#">Northern Cheyenne Tribe – Northern Cheyenne Reservation</a>
<a href="#">Salish &amp; Kootenai Tribes - Flathead Reservation</a>	

**Natural Heritage Programs and Conservation Data Centres in Surrounding States and Provinces**

- [Alberta Conservation Information Management System](#)
- [British Columbia Conservation Data Centre](#)
- [Idaho Natural Heritage Program](#)
- [North Dakota Natural Heritage Program](#)
- [Saskatchewan Conservation Data Centre](#)
- [South Dakota Natural Heritage Program](#)
- [Wyoming Natural Diversity Database](#)

**Invasive Species Management Contacts and Information**

Aquatic Invasive Species

[Montana Fish, Wildlife, and Parks Aquatic Invasive Species staff](#)

[Montana Department of Natural Resources and Conservation's Aquatic Invasive Species Grant Program](#)

[Montana Invasive Species Council \(MISC\)](#)

[Upper Columbia Conservation Commission \(UC3\)](#)

Noxious Weeds

[Montana Weed Control Association Contacts Webpage](#)

[Montana Biological Weed Control Coordination Project](#)

[Montana Department of Agriculture - Noxious Weeds](#)

[Montana Weed Control Association](#)

[Montana Fish, Wildlife, and Parks - Noxious Weeds](#)

[Montana State University Integrated Pest Management Extension](#)

[Integrated Noxious Weed Management after Wildfires](#)