

NATURAL RESOURCES AND CONSERVATION



GREG GIANFORTE, GOVERNOR

1539 ELEVENTH AVENUE

STATE OF MONTANA

DIRECTOR'S OFFICE: (406) 444-2074
FAX: (406) 444-2684PO BOX 201601
HELENA, MONTANA 59620-1601

FINAL ENVIRONMENTAL ASSESSMENT

Project Name:	Deer Lodge Water Supply Replacement Well
Proposed Implementation Date:	2024
Proponent:	City of Deer Lodge Public Works Department
Location:	46.397535 N, 122.735323 W
County:	Powell

I. TYPE AND PURPOSE OF ACTION

The City of Deer Lodge's (City's) Water System ceased use of one of their three public water wells following a Montana Department of Environmental Quality (DEQ) violation in 2013 for arsenic concentration which exceeded the maximum contamination level (MCL) of 0.010 mg/L or parts per million (ppm). The two remaining wells are also susceptible to arsenic contamination due to proximity of the Clark Fork River. Having only two remaining production wells poses a severe risk to the City's ability to provide reliable water service due to lack of redundant water supply. DEQ requires a minimum of two water supply sources and the City is at risk of non-compliance if contamination is found in one of the remaining water supply wells.

The goal of the project is to provide safe, reliable drinking water to the City's users by installing a new groundwater source well and provide for formal abandonment of the currently inactive Park Street Well. The project will reduce the current risk of arsenic contamination and provide a reliable drinking water source benefitting the entire public water supply.

The new replacement well will be located based on hydrogeologic analysis and well testing for projected yield and water quality. The need for treatment will be determined upon well completion, lithology, and comprehensive water quality testing. With the new replacement well, a new transmission main will also be connected to the existing distribution system.

Funding for the project will be through the State Revolving Fund Loan Program (SRF), the American Rescue Plan Act (ARPA) grant program and match funds from the City of Deer Lodge. The estimated completion date is October 2024.

II. PROJECT DEVELOPMENT

1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED:

Provide a brief chronology of the scoping and ongoing involvement for this project. List number of individuals contacted, number of responses received, and newspapers in which notices were placed and for how long. Briefly summarize issues received from the public.

The City has been actively searching for an answer to address the concerns for their drinking water system that was presented in a preliminary engineering report (PER) developed by Morrison-Maierle in 2014. The City retained infrastructure specialists of Stahly Engineering & Associates (Stahly) to develop an updated PER in 2019 and address the issues with water being supplied by the reduced well network. A public meeting was held by the City and Stahly in March 2018 to present these results to the public and to solicit their opinions. Several City Council meetings were held between August and November 2018 with opportunities for public comment regarding water rate increases, which were approved on December 3, 2018. In addition, the City has provided a letter of commitment from the mayor to commit funding to this project. No substantive public comments were received on the PER from the public meetings.

As part of the PER, Stahly informed local, state, and federal agencies of the project and requested comments on any potential environmental impacts resulting from the proposed project. Letters requesting comments on the Water Project were sent to the United States Army Corps of Engineers (USACE), DEQ, DNRC, Montana Fish, Wildlife, and Parks (FWP), State Historic Preservation Office (SHPO), and U.S. Fish and Wildlife Service (FWS) in January 2018. The comments received in 2018 are summarized below:

DEQ:

- The new well may require full time disinfection based upon today's design standards if the static water level is less than 25 feet.

FWP:

- The location of the well would be within 1,000 feet of Cottonwood Creek, which is identified as a priority area for restoration by FWP and the Natural Resource Damage Program. FWP is concerned that the cone of depression around well location #1 could impact surface water flows in Cottonwood Creek. This could exacerbate flow issues in the lower reach of the stream, leading to a degradation of water quality as well as available fish habitat. Significant restoration efforts have been made since 2008, and FWP is concerned that this well project – specifically proposed well location #1 (near the intersection of Montana Avenue and Kohrs Street) could impact or negate some of these efforts in lower Cottonwood Creek.

SHPO:

- Any structure over fifty years of age is considered historic and is potentially eligible for listing on the National Register of Historic Places. If any structures are to be altered and are over fifty years old, we would recommend that they be recorded and a determination of their eligibility be made.

FWS:

- There could be potential effects to migratory birds. To the extent practicable, necessary vegetation clearing, grubbing, and filling construction activities should be scheduled so as to avoid and minimize impacts to nesting birds, if present in the project area.
- If active eagle nests are present within 0.5 miles of the project during construction, the FWS recommend that the proponent comply with seasonal restrictions and construction/development distance buffers specified in the 2010 Montana Bald Eagle Management Guidelines in order to avoid/minimize the risk for eagle take.

The proposed well location area was updated to southwest of Deer Lodge and additional comments were solicited in May 2018 from the City of Deer Lodge Airport, City of Deer Lodge Planning Department, USACE, DEQ, DNRC, Federal Aviation Administration (FAA), FWP, Montana Natural

Heritage Program (MTNHP), Powell County Planning Department, SHPO, Montana State Prison (MSP), and FWS. The comments received are summarized below:

Montana Historical Society:

- The map provided showed a very general area for the new well and water transmission main. More specific information will be needed regarding where the ground disturbances will be taking place.

FWS:

- Given the developed nature of the immediate project area containing existing (and proposed) facilities, we do not anticipate substantive negative project-related effects to eagles; other migratory birds; listed, proposed or candidate threatened or endangered species; or listed or proposed critical habitat.
- If wetlands will be affected by the project, FWS recommends keeping wetland disturbances to the minimum extent and duration possible, with as much occurring “in the dry” as possible.

MSP:

- MSP has two deep wells and one shallower well on its property to meet the facility’s current water supply needs. MSP’s water system is not connected to the City’s water supply and distribution system. Please ensure that the City’s project will not negatively impact MSP’s water supply system or inordinately impact its surface land use. Additional information about the project was requested.

FAA:

- An Obstruction Evaluation/Airport Airspace Analysis, (OE/AAA), FAA Form 7460-1, Notice of Proposed Construction or Alteration, should be filed for the proposed improvements.

MTNHP:

- MTNHP provided maps and information for an Environmental Summary, which included Bald Eagle nesting locations, a Deer Lodge well summary, and a field guide for species of concern and potential concern in the area.

DNRC will post a draft of this Environmental Assessment to be available for public comment for 30 days on the DNRC – Public Notices webpage. For any comments submitted by the public, the MEPA Coordinator will review and work with the Grant Manager and applicant to adequately address those comments.

2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:

Examples: cost-share agreement with U.S. Forest Service, 124 Permit, 3A Authorization, Air Quality Major Open Burning Permit.

Review will be required from the following agencies:

- City of Deer Lodge Airport
- FAA – Submit FAA Form 7460 for OE/AAA
- DEQ
- MSP/Department of Corrections

The following permits may be required:

- Montana Pollutant Discharge Elimination System (MPDES) Construction General permit and Stormwater Pollution Prevention Plan (SWPPP)
- Montana Natural Streambed and Land Preservation Act (310 Permit)

- Federal Clean Water Act (404 Permit)

The City and County have authority over various portions of the system for this project. The City/County will be required to work with DEQ and DNRC to ensure that any deviation from the approved plans and specifications will be submitted to DEQ for review and approval. If work is being conducted in the flight path of the airport, the FAA will require an OE/AAA. If the aquifer cone of depression from the new well could impact the water supply wells at the Montana State Prison, coordination with the State Attorney will be required.

3. ALTERNATIVE DEVELOPMENT:

Describe alternatives considered and, if applicable, provide brief description of how the alternatives were developed. List alternatives that were considered but eliminated from further analysis and why. Include the No Action alternative.

From Stahly Engineering & Associates from a 2019 Preliminary Engineering Report:

Alternative 1 – No Action

The No Action Alternative would result in no improvements being made to the existing City of Deer Lodge water supply system. This alternative would continue to utilize the Milwaukee and Second Street groundwater wells as the sole source of public water supply, functioning in the current condition.

Alternative 2- Source Water Blending

This alternative would involve source water from the Park Street Well getting combined with another water supply that contains lower arsenic levels. The blending would then result in reduced average arsenic concentration levels needed to meet the MCL requirements.

Alternative 3 – New Ground Water Source (Selected Alternative)

In this alternative, another public groundwater supply well would be installed and developed to supplement the existing wells serving the City of Deer Lodge. A hydrogeological study has been conducted to determine a suitable location for a new groundwater supply well based on aquifer yield and water quality characteristics. Test wells will need to be constructed and aquifer testing performed to determine the adequate sustained water production yields and water quality parameters. This option will also require a new water transmission main from the new well to the existing water distribution system.

Alternative 4 - New Surface Water Source

In this alternative, water would be supplied to the District by utilizing surface water from the Clark Fork River or other tributary streams in the immediate vicinity and treating the water for distribution. Since arsenic contamination appears to be prevalent within the Clark Fork River corridor and surrounding natural surface water stores, there would not be a reliable nearby supply of uncontaminated surface water. Additionally, the Clark Fork River tributaries in the immediate area, with being subject to seasonal irrigation demands, do not provide a reliable quantity of surface water. In addition, this alternative would also require an extensive and very high-cost water treatment facility and pumping system to be constructed for the transmission of surface water to the City of Deer Lodge.

Alternative 5 – Absorption Media

In this alternative, the groundwater would be treated with an adsorption process that removes the arsenic contaminants by passing the water thorough a sorbent media. The negatively charged

arsenic ions are then adsorbed on the positively charged surfaces of the media. Depending on contamination levels and size of the media bed, the media material would need to be replaced periodically. For this alternative, construction of a water treatment facility would be required since the source water is subject to contact with media.

Alternative 6 – Filtration

In this alternative, the groundwater would be treated by passing through a semipermeable membrane to remove the arsenic contaminants from the water. High pressure can be applied to assist with the contaminant separation or a coagulant applied to alter the contaminate to a semi-solid state. The coagulation process uses the addition of a bonding agent to the contaminants making them large enough to be trapped by the membrane surface. The solids are then backwashed and discharged into a waste stream that is collected for disposal to a sewer system or a drying pond system. Collected waste discharged to the sewer system may require further treatment. Waste discharged to a drying pond system can be collected and disposed of in a non-hazardous landfill if the waste passes the Toxicity Characteristic Leaching Procedure (TLCPL) test. For this alternative, construction of a water treatment facility with either transmission of waste residuals to the city sewer system or a drying pond system would be required.

Selected Alternative – Alternative 3 (New Ground Water Source)

Considering the financial and technical feasibility, environmental impacts, public health and safety, and operation and maintenance detailed in the previous sections, the preferred alternative is the construction of a new ground water source to supplement the existing City of Deer Lodge water supply with a replacement well. Normally a ranking of alternatives is conducted to select a preferred alternative but is not needed in this case due to the elimination of all but one (1) alternative.

The Scope of Work (SOW) for the project includes the following:

- Abandonment of the existing inactive Park Street Well and disconnect from the water distribution system.
- Development of a new public ground water well.
- Construction of a new well house.
- Installation of water transmission mains to the City’s existing distribution system.

III. IMPACTS ON THE PHYSICAL ENVIRONMENT
• <i>RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.</i> • <i>Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.</i> • <i>Enter “NONE” If no impacts are identified or the resource is not present.</i>

- 4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:**
Consider the presence of fragile, compactable or unstable soils. Identify unusual geologic features. Specify any special reclamation considerations. Identify direct, indirect, and cumulative effects to soils.

Soils information for the area were obtained from the United States Department of Agriculture’s (USDA) National Resources Conservation Service (NRCS) database. The predominant soil types in the project area are loams and gravelly loams alluvial deposits

that can be classified as prime farmland or farmland of statewide importance. The USDA NRCS Web Soil Survey indicates that the soil near the project area consists of:

- 16.2% Beaverell cobbly loam, 0 to 4% slopes, hydrologic soil group B, well drained, moderately high to high transmissivity;
- 12.1% Carten loam, 0 to 4% slopes, hydrologic soil group C, somewhat poorly drained, moderately high transmissivity;
- 10.9% Conn loam, 0 to 4% slope, hydrologic soil group B, well drained, moderately high to high transmissivity;
- 8.3% sixbeacon gravelly loam, 0 to 4% slope, hydrologic soil group B, well drained, moderately high to high transmissivity;
- 6.0% Vaney-Conn loams, 0 to 4 % slope, hydrologic soil group B, well drained, moderately high to high transmissivity;
- 5.3% the soil type is listed as Cetrack loam, 0 to 4% slopes, hydrologic soil group B, well drained, moderately high to high transmissivity;
- 23 other soil types ranging from less than 1 to 5 percent of the project area;
- Surface soil at Test Well #1 is indicated as Carten loam or Conn loam;
- Surface soil at Test Well #2 is indicated as Cetrack loam;
- The corrosivity of concrete for these soil types is indicated to be low at the two proposed test well sites;
- The corrosivity of steel for these soil types is indicated to be generally high at the two proposed test well sites;
- Soil susceptibility to compaction for these soil types is indicated to be generally moderate across the project area;
- Site degradation susceptibility is indicated to be generally low across most of the project area with some areas moderate to high south of Test Well #2;
- Beaverell cobbly loam, Carten loam, and sixbeacon cobbly loam are indicated to be farmland of local importance;
- Conn loam, Cetrack loam, and Varney-Conn loams are indicated to be prime farmland if irrigated;
- Wind erodibility for the project area is generally low with the project area generally rated 6-7. The area southeast of Test Well #2 is moderately erodible with a rating of 4L.

The Montana Bureau of Mines and Geology (MBMG) *Geologic Map of the Deer Lodge and Conleys Lake 7.5' Quadrangles, Powell County, Southwestern Montana (Berg, R.B.)* indicates that the project is primarily located on Quaternary (Pleistocene) glacial outwash deposits (Qgo) at Test Well #1, and Quaternary (Holocene) alluvial terrace deposits (Qat1) near Test well #2. Qgo is described as "poorly sorted deposits of well-rounded material that ranges in size from boulder to sand (Berg, 2004)." Qat1 is described as "deposits on irregularly shaped, unpaired terraces 3-6 ft above the modern floodplain that consist of 3-6 ft of well- to poorly- sorted rock clasts derived from Tertiary and older strata (Derkey and others, 2004)."

Proposed Alternative – Potential direct, short-term, localized, non-reoccurring adverse impacts from construction activity. Construction to be conducted within the project area will be minimally invasive by utilizing drilling techniques to install well and minimal trenching to install water main pipes. Adverse impacts to the ground surface by construction equipment will be restored to preexisting conditions when construction is completed.

No Action Alternative – No impacts to soil quality, stability, and moisture.

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:

Identify important surface or groundwater resources. Consider the potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality. Identify direct, indirect, and cumulative effects to water resources.

No perennial surface water bodies exist within the project area. The nearest perennial surface water bodies are located north of Test Well #1 (Tin Cup Joe Creek), and west of Test Well #2 (Clark Fork River) and are located outside the project area.

Shallow groundwater aquifers exist in the project area with static water levels of approximately 5-19 feet below ground surface (bgs) according to the MBMG Groundwater Information Center (GWIC), particularly in the vicinity of Test Well #2 likely due to proximity to the Clark Fork River.

The current well contains elevated concentrations of arsenic greater than the MCL in 2013, and was removed from service for the City of Deer Lodge. DEQ requires a minimum of two public water supply wells, and the two other wells in service are susceptible to impacts from impaired surface water. This project will replace the current well and will provide the City of Deer Lodge reliable, safe drinking water.

Proposed Alternative – Direct and indirect, minor to major, long-term, localized beneficial impacts to water quality, quantity, and distribution. Project will be protective of groundwater by installing the new well in a manner consistent with the Administrative Rules of Montana (ARM) Chapter 36.21. No impacts are expected to nearby surface water bodies.

Any necessary stormwater discharge for the project will be covered under an MPDES Construction General Permit (CGP), a Stormwater Pollution Prevention Plan (SWPPP), and the appropriate permits for working in and around the floodplain or State Waters will be acquired as needed. Best Management Practices (BMPs) should be installed and monitored per the MPDES CGP and SWPPP, and other required permits. Construction standards within ARM 36.21 Subchapter 6 will be followed by the water well contractor when installing the new water well.

No Action Alternative – Potentially direct, moderate to major, short- and long-term, localized adverse impacts to water quality, quantity, and distribution. Continued increases in arsenic concentrations in the Clark Fork River could migrate to either of the existing public water supply wells, and could be detrimental to human health and safety. Detections of arsenic in either public well would constitute a water supply emergency for the City of Deer Lodge.

6. AIR QUALITY:

What pollutants or particulate would be produced (i.e. particulate matter from road use or harvesting, slash pile burning, prescribed burning, etc)? Identify the Airshed and Impact Zone (if any) according to the Montana/Idaho Airshed Group. Identify direct, indirect, and cumulative effects to air quality.

The proposed project is not located in an air quality Attainment Area, as set by the U.S. Environmental Protection Agency's (EPA's) National Ambient Air Quality Standards. The project area is not listed as impaired in air quality particulates per the Montana DEQ Air Quality Nonattainment Status List (Montana DEQ Air Quality Website visit). No air pollution facilities are within ½ mile of the project area. No nonattainment areas exist in the vicinity of the project.

Proposed Alternative – Potentially direct, minor, short-term, localized adverse impacts to air quality from dust introduced to the environment from construction activity and/or exhaust from heavy equipment operation. Dust control measures should be considered for a BMP in development of the SWPPP.

No Action Alternative – No impacts to air quality.

7. VEGETATION COVER, QUANTITY AND QUALITY:

What changes would the action cause to vegetative communities? Consider rare plants or cover types that would be affected. Identify direct, indirect, and cumulative effects to vegetation.

The project area is primarily within a developed, mixed commercial/industrial area, though the properties proposed for the test wells are undeveloped areas with native dryland grasses. Noxious weed control measures will be implemented during the project. Any areas disturbed by construction of new facilities will be revegetated with native grass.

Land cover provided by the MTNHP indicate the project area at Test well #1 is surrounded by private land, primarily within Human Land Use (56%), Grassland Systems (29%), Wetland and Riparian Systems (13%), Shrubland, Steppe, and Savanna Systems (<1%), Recently Disturbed or Modified (<1%). The land cover near test well #2 is primarily Human Land Use (48%), Grassland Systems (29%), Wetland and Riparian Systems (21%), Shrubland, Steppe, and Savanna Systems (1%), Recently Disturbed or Modified (<1%).

There are 10 plant species of concern and 3 potential plant species of concern that may potentially occur within the project area. The MTNHP Environmental Summary report is attached at the end of this document to view detailed land cover types.

Land classified by the USDA NRCS as “prime farmland if irrigated” is present in the proposed area for both test wells. Construction activities should minimize ground disturbance where possible. No critical habitat was identified by the USFWS within the project area.

Proposed Alternative – Potential direct to indirect, short- to long-term, localized adverse impacts to vegetation. Construction that may adversely impact existing vegetation will be required to be revegetated after construction is completed. Efforts should be made to preserve existing vegetation during construction where applicable. Work should be completed outside wetland boundaries, and wetlands should be protected by appropriate BMPs if working directly adjacent to wetlands. BMPs should be installed and maintained per the MPDES CGP and SWPPP, and other required permits.

No Action Alternative – No impacts to vegetation cover, quantity, and quality.

8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:

Consider substantial habitat values and use of the area by wildlife, birds or fish. Identify direct, indirect, and cumulative effects to fish and wildlife.

Project location is not identified as a priority area for terrestrial, avian, or aquatic conservation efforts within the Montana State Wildlife Action Plan (SWAP). The project is not within executive order Sage Grouse habitat, and the City of Deer Lodge is an exempt community. According to the FWS, “we do not anticipate its implementation would result in adverse effects to listed, proposed,

or candidate threatened or endangered species, or listed or proposed critical habitat.”

Records from the MTNHP indicate 19 species of concern have been identified in and around the project region including the following:

Species Occurrences:

Westslope Cutthroat Trout	<i>Oncorhynchus clarkii lewisi</i>
Bull Trout	<i>Salvelinus confluentus</i>
Mealy Primrose	<i>Primula incana</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Great Blue Heron	<i>Ardea herodias</i>

Species Occurrences (Cont.):

Lewis's Woodpecker	<i>Melanerpes lewis</i>
Long-billed Curlew	<i>Numenius americanus</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Evening Grosbeak	<i>Coccothraustes vespertinus</i>
Little Brown Myotis	<i>Myotis lucifugus</i>
Long-legged Myotis	<i>Myotis volans</i>
Western Toad	<i>Anaxyrus boreas</i>
Pileated Woodpecker	<i>Dryocopus pileatus</i>
Cassin's Finch	<i>Haemorhous cassinii</i>
Golden Eagle	<i>Aquila chrysaetos</i>
Grizzly Bear	<i>Ursus arctos</i>
Brown Creeper	<i>Certhia americana</i>
Idaho Sedge	<i>Carex idahoa</i>
Bat Roost (Non-Cave)	Bat Roost (Non-Cave)

Important animal habitat includes non-cave bat roosts. MTNHP records indicate 64 other observed and potential animal and plant species of concern may exist in the area, including the following:

Other Observations:

Hooded Merganser	<i>Lophodytes cucullatus</i>
North American Porcupine	<i>Erethizon dorsatum</i>
Rufous Hummingbird	<i>Selasphorus rufus</i>
American White Pelican	<i>Pelecanus erythrorhynchos</i>
White-faced Ibis	<i>Plegadis chihi</i>
Barrow's Goldeneye	<i>Bucephala islandica</i>
Short-eared Owl	<i>Asio flammeus</i>
Veery	<i>Catharus fuscescens</i>
Trumpeter Swan	<i>Cygnus buccinator</i>
Clark's Nutcracker	<i>Nucifraga columbiana</i>
Western Screech-Owl	<i>Megascops kennicottii</i>

Common Tern	<i>Sterna hirundo</i>
Black-necked Stilt	<i>Himantopus mexicanus</i>
Golden Eagle	<i>Aquila chrysaetos</i>
American Goshawk	<i>Accipiter atricapillus</i>
Forster's Tern	<i>Sterna forsteri</i>
Gray-crowned Rosy-Finch	<i>Leucosticte tephrocotis</i>
Varied Thrush	<i>Ixoreus naevius</i>
Caspian Tern	<i>Hydroprogne caspia</i>
Common Loon	<i>Gavia immer</i>
Horned Grebe	<i>Podiceps auritus</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>

Other Observations (Cont.):

Tennessee Warbler	<i>Leiothlypis peregrina</i>
-------------------	------------------------------

Potential Species:

Flatleaf Bladderwort	<i>Utricularia intermedia</i>
Crawe's Sedge	<i>Carex crawei</i>
Wedge-leaf Saltbush	<i>Atriplex truncata</i>
Western Spotted Skunk	<i>Spilogale gracilis</i>
Keeled Mountainsnail	<i>Oreohelix carinifera</i>
Suckley Cuckoo Bumble Bee	<i>Bombus suckleyi</i>
Hoary Bat	<i>Lasiurus cinereus</i>
Fleshy Stitchwort	<i>Stellaria crassifolia</i>
Platte Cinquefoil	<i>Potentilla plattensis</i>
Western Pygmy Shrew	<i>Sorex eximius</i>
Western Pearlshell	<i>Margaritifera falcata</i>
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>
Ferruginous Hawk	<i>Buteo regalis</i>
Monarch	<i>Danaus plexippus</i>
Spotted Bat	<i>Euderma maculatum</i>
Panic Grass	<i>Dichanthelium acuminatum</i>
Preble's Shrew	<i>Sorex preblei</i>
High Northern Buttercup	<i>Ranunculus hyperboreus</i>
Silver-haired Bat	<i>Lasionycteris noctivagans</i>
Fringed Myotis	<i>Myotis thysanodes</i>
Black Tern	<i>Chlidonias niger</i>
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>
Dwarf Shrew	<i>Sorex nanus</i>
Long-eared Myotis	<i>Myotis evotis</i>
Beaked Spikerush	<i>Eleocharis rostellata</i>
Linear-leaf Fleabane	<i>Erigeron linearis</i>
Hare's-foot Locoweed	<i>Oxytropis lagopus</i> var. <i>conjugans</i>

Long-sheath Waterweed	<i>Elodea bifoliata</i>
Common Poorwill	<i>Phalaenoptilus nuttallii</i>
Small Yellow Lady's-slipper	<i>Cypripedium parviflorum</i>
American Bittern	<i>Botaurus lentiginosus</i>
Wolverine	<i>Gulo gulo</i>
Sage Thrasher	<i>Oreoscoptes montanus</i>
Ovenbird	<i>Seiurus aurocapilla</i>
Meesia Moss	<i>Meesia triquetra</i>
North American Water Vole	<i>Microtus richardsoni</i>
Harlequin Duck	<i>Histrionicus histrionicus</i>

Potential Species (cont.):

Yellow-billed Cuckoo	<i>Coccyzus americanus</i>
Canada Lynx	<i>Lynx canadensis</i>
Townsend's Big-eared Bat	<i>Corynorhinus townsendii</i>
Pale-yellow Jewel-weed	<i>Impatiens aurella</i>

Proposed Alternative - Potentially direct, short-term, localized, non-recurring adverse impacts to terrestrial, avian, and aquatic life and habitats during construction. The project area is largely comprised of a developed residential area. The primary disturbance will likely occur on state- or county-owned property; however, disturbance will be minimal, and the contractor will be required to restore any disturbance to preexisting conditions.

No Action Alternative – No impacts to terrestrial, avian, and aquatic life and habitats.

9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:

Consider any federally listed threatened or endangered species or habitat identified in the project area. Determine effects to wetlands. Consider Sensitive Species or Species of special concern. Identify direct, indirect, and cumulative effects to these species and their habitat.

The project does not exist within a riverine or wetland system and can be completed without disturbing the adjacent riparian and wetland habitats. The National Wetlands Inventory (NWI) website was used to determine whether any wetlands were present within the lands adjacent to the project location (NWI map attached). This search indicated that two types of wetlands are present adjacent to the project area – riparian and freshwater emergent wetland habitats.

According to records from the MTNHP there are two unique, endangered, fragile, or limited environmental resources within the project area. The Yellow-billed Cuckoo (*Coccyzus americanus*) and Canada Lynx (*Lynx canadensis*) are listed as threatened on the potential species of concern list.

The yellow-billed cuckoo is a migratory rare summer breeder. MTNHP delineation criteria states “Observations with evidence of breeding activity buffered by a minimum distance of 300 meters in order to encompass the maximum foraging area size reported for the species and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.”

The Canada Lynx is year-round resident. MTNHP delineation criteria states “areas designated as Critical Habitat for the species by the U.S. Fish and Wildlife Service on September 12, 2014 because they currently contain physical and biological features (e.g. boreal forests with snowshoe hare) essential to the conservation of the species and state and other lands within the outer boundaries of USFWS Critical Habitat polygons.”

According to the USFWS, no critical habitat exists within the project area. The project does not have any identified unique natural features. Emergent wetlands exist primarily north and south of Test Well #1 and north of Test Well #2, but not within the proposed construction limits of the project.

Section 8 of this Environmental Assessment details 83 species of concern listed as present or potentially present using the project area as a viable habitat. DNRC also used the U.S. Fish and Wildlife Service IPaC tool to generate a resource list summarizing any endangered or threatened species that are known or expected to be near the project area. The IPaC list generated five (5) Federally listed species under the Endangered Species Act as potentially occurring in the greater project area, including:

Canada Lynx	<i>Lynx canadensis</i>
Grizzly Bear	<i>Ursus arctos horribilis</i>
North American Wolverine	<i>Gulo gulo luscus</i>
Bull Trout	<i>Salvelinus confluentus</i>
Monarch Butterfly	<i>Danaus plexippus</i>

The IPaC list generated fifteen (15) migratory bird species:

Bald Eagle	<i>Haliaeetus leucocephalus</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
California Gull	<i>Larus californicus</i>
Calliope Hummingbird	<i>Selasphorus calliope</i>
Cassin’s Finch	<i>Haemorhous cassinii</i>
Evening Grosbeak	<i>Coccothraustes vespertinus</i>
Flammulated Owl	<i>Psilosops flammeolus</i>
Franklin’s Gull	<i>Leucophaeus pipixcan</i>
Golden Eagle	<i>Aquila chrysaetos</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>
Lewis’s Woodpecker	<i>Melanerpes lewis</i>
Long-eared Owl	<i>Asio otus</i>
Rufous Hummingbird	<i>Selasphorus rufus</i>
Western Grebe	<i>Aechmophorus occidentalis</i>
Willet	<i>Tringa semipalmata</i>

The fifteen bird species are protected under the Bald and Golden Eagle Protection Act of 1940, Migratory Bird Treaty Act of 1918, and the Bald Eagle is also protected under the Montana Bald Eagle Management Plan, and Lacey Act of 1900.

Proposed Alternative – No impacts to unique, endangered, fragile, or limited environmental resources. Since the developed land does not provide habitat to any known species of concern, the minimal disturbance caused by the project should not impact any sensitive environmental resources. Efforts should be made to preserve existing vegetation where applicable, and disturbance of wetland habitat is not expected. BMPs should be installed and monitored per the MPDES CGP and SWPPP, and any other required permits.

No Action Alternative – No impacts to unique, endangered, fragile, or limited environmental resources.

10. HISTORICAL AND ARCHAEOLOGICAL SITES:

Identify and determine direct, indirect, and cumulative effects to historical, archaeological or paleontological resources.

No cultural or historical sites are expected to be within the construction extent for the project. The project proponent has not implemented a cultural survey. The Montana SHPO indicates there are no National Register Historic Properties and Districts within 1/2-mile of the project.

Proposed Alternative – No cultural or historical resource impacts are anticipated. However, if previously unknown cultural or paleontological materials are identified during project related activities, all work will cease until a professional assessment of such resources can be made.

No Action Alternative – No impacts to historical and archeological sites.

11. AESTHETICS:

Determine if the project is located on a prominent topographic feature, or may be visible from populated or scenic areas. What level of noise, light or visual change would be produced? Identify direct, indirect, and cumulative effects to aesthetics.

The project will be visible to local property owners and residents. Temporary exposure to noise from construction equipment will occur. In some cases, visual quality and aesthetics may be improved from planned activities for the project. Limited noise will occur during the construction phase of the project.

Proposed Alternatives – Potentially direct and indirect, negligible to minor, short-term, local, non-recurring adverse impacts to aesthetics during construction. Adverse nuisance impacts from heavy construction equipment will be temporary during the project and may include noise and exhaust fumes. Noise mitigation techniques to minimize impacts to the surrounding areas will be used by the contractor whenever possible. Construction working hours should be limited to 7 AM to 7 PM.

No Action Alternative – No impacts to aesthetics.

12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY:

Determine the amount of limited resources the project would require. Identify other activities nearby that the project would affect. Identify direct, indirect, and cumulative effects to environmental resources.

The proposed project will install a new groundwater drinking water well, which will satisfy a

demand for reliable water supply. It is assumed that the amount of water used will be like current conditions, and no increases in demands on environmental resources of land, water, air, or energy will occur. The City of Deer Lodge uses two wells to supply water to the community, and the third well will provide a backup supply in the case a well becomes impacted by metals leaching from the impaired Clark Fork River.

Proposed Alternatives and No Action Alternative – No impacts to demands on environmental resources of land, water, air, or energy. The project is not anticipated to have impacts on energy consumption or conservation exceeding current demands.

13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:

List other studies, plans or projects on this tract. Determine cumulative impacts likely to occur as a result of current private, state or federal actions in the analysis area, and from future proposed state actions in the analysis area that are under MEPA review (scoped) or permitting review by any state agency.

The consultant has provided a MEPA Environmental Checklist. The MEPA Environmental Checklist indicates that there are no potential impacts to resources. There were no other environmental documents provided that were pertinent to the area.

IV. IMPACTS ON THE HUMAN POPULATION
• <i>RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.</i> • <i>Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.</i> • <i>Enter "NONE" If no impacts are identified or the resource is not present.</i>

14. HUMAN HEALTH AND SAFETY:

Identify any health and safety risks posed by the project.

The project area is primarily an undeveloped property adjacent to developed industrial land that contains power lines and other potentially hazardous utilities. There are no known regulated underground storage tanks in the area. The MDT facility adjacent to Test Well #2 is listed as a State Superfund Unit Water Quality Act (WQA) Facility called MDOT Deer Lodge Maintenance Facility Salt Site (Facility ID 32481). The project area is likely hydraulically upgradient of the site, but the potential for well draw down to locally affect the groundwater gradient should be evaluated.

Proposed Alternative – Potentially direct and indirect, minor, short term, non-recurring, local adverse impacts to health and safety. There may be some temporary air quality effects including dust, odors and emissions associated with the construction disturbances and heavy equipment needed for the installation. The contractor will be required to mitigate excessive dust during construction and excessive equipment idling will be prohibited. There will be no long-term impacts in regard to the surrounding air quality as a result of the project. Operation of heavy equipment poses a potential threat to public safety. There should be no impact during construction, but the typical risk to the public’s safety may be increased during construction. BMPs should be installed to protect the public from the working construction extents.

Once completed, the project will provide direct, long-term, minor to moderate, localized beneficial impacts to human health and safety by reducing the threat of low water supply if the existing wells

become impacted with metals from the Clark Fork River. There may also be minor, potentially direct, adverse impacts to community and government services and facilities. The proposed project will likely promote additional growth in the area and subsequent increased demand on the existing community and government services and facilities. However, incorporation into the City will increase the tax base, allowing the means to provide and maintain the existing community and government services and facilities.

No Action Alternative – Potentially direct, negligible to major, short- to long-term, local, recurring adverse impacts may occur to human health and safety due to potential for arsenic contamination and the need for supplemental water volume.

15. INDUSTRIAL, COMMERCIAL AND AGRICULTURE ACTIVITIES AND PRODUCTION:

Identify how the project would add to or alter these activities.

Industrial, commercial, and agricultural facilities occur outside of the project area and are not affected by this project.

Proposed Alternatives and No Action Alternative – No impacts to industrial, commercial, and agriculture activities and production.

16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:

Estimate the number of jobs the project would create, move or eliminate. Identify direct, indirect, and cumulative effects to the employment market.

The project service area is within an undeveloped property in an industrial area in the City of Deer Lodge. According to applicant-provided documentation, the median annual household income of the service area, based on the 2015 census, is \$37,934.00. In 2015, 84 percent of households in the county lived at or above the poverty level, and 16 percent lived below the poverty level. 43.7 percent of households in the city lived at low and moderate incomes.

Proposed Alternative – Potentially direct and indirect, short-term, minor to moderate, non-recurring, localized beneficial impacts to quantity or distribution of employment. The construction of the project may temporarily bring local job opportunities that were not previously present.

No Action Alternative – No impacts to quantity and distribution of employment.

17. LOCAL AND STATE TAX BASE AND TAX REVENUES:

Estimate tax revenue the project would create or eliminate. Identify direct, indirect, and cumulative effects to taxes and revenue.

The property assessment for tax purposes in the project area ranges from approximately \$50,000 to \$500,000 for assessed homes in the area based on records obtained from Montana Cadastral. The average monthly water only rate was listed by the applicant as \$44.26 and wastewater only rates were listed as \$28.45 for a combined target rate of \$72.71 based on median household income in accordance with the Montana Department of Commerce.

Proposed Alternative – No impacts are expected as the project is a replacement for the existing drinking water system and no change of tax revenues or bases would be expected. Potentially

direct, minor to major, long-term, local, recurring beneficial impacts to the community if the project results in growth in the community.

No Action Alternative – No impacts to tax base and tax revenues.

18. DEMAND FOR GOVERNMENT SERVICES:

Estimate increases in traffic and changes to traffic patterns. What changes would be needed to fire protection, police, schools, etc.? Identify direct, indirect, and cumulative effects of this and other projects on government services

Short-term changes to traffic patterns, fire protection, police, schools, or other government services may be present during the project.

Proposed Alternative – Potential indirect, negligible to minor, short-term, local, non-recurring adverse impacts to demand for government services. Construction work may require road closures or traffic control at times which could hinder the ability of government services, such as police, fire, health, or other services.

No Action Alternative – No impacts on demand for government services.

19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS:

List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.

The existing drinking water system is not adequately supported to meet human health and safety standards for drinking water quality given the proximity of the two existing drinking water wells to impaired water from the Clark Fork River. The potential for a water shortage is documented in the PER provided by the applicant.

Proposed Alternative – Direct, minor to major, long-term, localized beneficial impacts to locally adopted environmental plans and goals. Installation of the new well will help meet drinking water quality standards and maintain adequate water supply for the community.

No Action Alternative – Potential for minor to major, short- to long-term, local, recurring adverse impacts to locally adopted environmental plans and goals. Potential failure of the drinking water system to meet drinking water qualities would result in harm to human health and safety, potential harm to aquatic life, and the possibility of fines and fees until the system meets drinking water quality standards.

20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:

Identify any wilderness or recreational areas nearby or access routes through this tract. Determine the effects of the project on recreational potential within the tract. Identify direct, indirect, and cumulative effects to recreational and wilderness activities.

The project is not located in or on a designated recreational, Wild & Scenic River, or Wilderness Area. There are no parks or green spaces located within the project area.

Proposed Alternative and No Action Alternative – No direct impacts to access to and quality of

recreational and wilderness activities. The preferred alternatives will not impact access to public lands, waterways, or public open spaces.

21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:

Estimate population changes and additional housing the project would require. Identify direct, indirect, and cumulative effects to population and housing.

Property adjacent to the project area is primarily used for industrial, commercial, and residential uses which are serviced by the City of Deer Lodge public water system. The land used within the project area is anticipated to have limited growth expected in the future.

Proposed Alternative and No Action Alternative – No impacts to density and distribution of population and housing as the proposed project is not expected to directly cause any changes in population demographics or housing conditions.

22. SOCIAL STRUCTURES AND MORES:

Identify potential disruption of native or traditional lifestyles or communities.

Social conduct, structures, and behaviors follow conventions that are typical of Deer Lodge.

Proposed Alternative and No Action Alternative – No impacts or changes to social structures are expected to occur.

23. CULTURAL UNIQUENESS AND DIVERSITY:

How would the action affect any unique quality of the area?

There are no unique facilities of unique culture or diversity in the project area.

Proposed Alternative and No Action Alternative – No impacts to cultural uniqueness and diversity.

24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

Include appropriate economic analysis. Identify potential future uses for the analysis area other than existing management. Identify direct, indirect, and cumulative economic and social effects likely to occur as a result of the proposed action.

Median household income is listed by the applicant as \$37,934.

Proposed Alternative – Potentially direct and indirect, negligible to minor, short-term, beneficial impacts to appropriate social and economic circumstances. Workers and materials required for the construction of the project may temporarily provide beneficial impacts to local businesses throughout construction. Upgrades to the system may be protective of property values and other economic circumstances and may bolster social morale in the community.

No Action Alternative – Potentially direct, minor to major, short- to long-term adverse impacts to appropriate social and economic circumstances. If drinking water becomes contaminated with metals, residents could be forced to purchase bulk water, and potentially be subjected to fines or fees, or reductions in property values if the public water system is not usable. Social effects will be

affected negatively by the lack of clean drinking water.

25. DRINKING WATER AND/OR CLEAN WATER

Identify potential impacts to water and/or sewer infrastructure (e.g., community water supply, stormwater, sewage system, solid waste management) and identify direct, indirect, and cumulative effects likely to occur as a result of the proposed action.

The project affects drinking water for more than 3,000 residents serviced by the City of Deer Lodge public water well system. The project does not affect wastewater treatment, solid waste management, or stormwater. The current conditions of the drinking water supply are usable, but with potential to become contaminated with metals related to the Clark Fork River impairment. One public well has been removed from service, leaving only two public wells servicing the community. If one more public well becomes impacted by metals, the City of Deer Lodge would not be in compliance with state drinking water regulations, and the residents would face a water supply shortage. The proposed alternative permanently decommissions and replaces the impacted well. The replacement well will be placed in an area least likely to become impacted by the Clark Fork River impairments and provide reliable, clean water for the City of Deer Lodge.

Proposed Alternatives – Direct, minor to major, long-term beneficial impacts will occur from completion of this project. The current drinking water supply has a known direct risk due to proximity to impaired surface water. Installation of a new well will decrease potential for the City of Deer Lodge to fall out of compliance and will improve drinking water quality.

No Action Alternative – Direct and indirect, minor to major, short- to long-term, localized, recurring adverse impacts if the condition of the existing water well system becomes impacted with metals or needs major repairs to either of the existing wells.

26. ENVIRONMENTAL JUSTICE

Will the proposed project result in disproportionately high or adverse human health or environmental effects on minority or low-income populations per the Environmental Justice Executive Order 12898? Identify potential impacts to and identify direct, indirect, and cumulative effects likely to occur as a result of the proposed action.

The current water source has high levels of arsenic in drinking water which poses an immediate and severe health threat. Additionally, with water being supplied by the two remaining wells which are also highly susceptible to arsenic contamination, the City of Deer Lodge is at a severe risk of being unable to provide reliable water service due to the lack of redundant water supplies with adequate capacities.

Proposed Alternatives and No Action Alternative – No impacts to environmental justice are expected as the proposed project will not result in disproportionately high or adverse human health or environmental effects on minority or low-income populations. The economic impact will ultimately affect all users of the system proportionately. No disproportionate effects on any portion of the community are expected.

EA Prepared By:	Name: Samantha Treu	Date: 01/05/2025
	Title: MEPA/NEPA Coordinator	Email: samantha.treu@mt.gov

V. FINDING

27. ALTERNATIVE SELECTED:

Alternative 3 – New Ground Water Source

In this alternative, another public groundwater supply well would be installed and developed to supplement the existing wells serving the City of Deer Lodge. A hydrogeological study has been conducted to determine a suitable location for a new groundwater supply well based on aquifer yield and water quality characteristics. Test wells will need to be constructed and aquifer testing performed to determine the adequate sustained water production yields and water quality parameters. This option will also require a new water transmission main from the new well to the existing water distribution system.

28. SIGNIFICANCE OF POTENTIAL IMPACTS:

WATER QUALITY, QUANTITY, AND DISTRIBUTION

During construction, the contractor must obtain any applicable permits required for construction. The area is relatively flat and precipitation runoff is not anticipated to pose much of an issue. BMPs protective of water quality should be installed, monitored, and maintained by the contractor per the MPDES CGP and SWPPP. If dewatering is necessary during the construction, applicable permit requirements should be followed to be protective of groundwater resources. Installation of the new water well should be protective of groundwater resources and prevent surface pollutants from infiltrating groundwater resources, and protective of potential pollutants in shallow groundwater aquifers from polluting deeper groundwater aquifers.

AIR QUALITY

Temporary, potentially direct, adverse impacts to air quality are likely to be minimal as there may be some dust introduced to the environment during construction. The contractor will be required to provide dust control throughout construction to mitigate any generated dust. Operation of heavy construction equipment should be limited around schools and sensitive individuals. Work should generally be conducted from 7 AM to 7 PM, unless otherwise restricted by local regulations.

VEGETATION COVER, QUANTITY, AND QUALITY

Potentially direct, minor to moderate, short-term, localized adverse impacts to vegetation cover exist during construction. The contractor should preserve existing vegetation where applicable. BMPs should be installed, monitored, and maintained per the MPDES CGP and SWPPP. Actions in the preferred alternative are not expected to have impacts on sensitive habitats.

TERRESTRIAL, AVIAN, AND AQUATIC LIFE AND HABITATS

Potentially indirect, negligible, short-term, localized adverse impacts to terrestrial, avian, and aquatic life and habitats. Vegetative removal should be limited. Final stabilization should be achieved by the end of the proposed construction period. The project is generally within residential areas, and species are typical of these areas. No endangered or threatened species are expected to be impacted by the project.

AESTHETICS/NOISE

Potentially adverse impacts exist during construction for aesthetics and noise. Overall, the proposed construction during this project is not anticipated to affect the visual quality negatively because the site will be restored by the end of the project and general construction at the surface will be limited. Noise above the project areas typical level will most likely be produced during construction. To minimize the impact of this disturbance, the contractor will only work within the hours of 7 AM to 7 PM. The increased noise will only be temporary and a minor disturbance. Exhaust fumes may be an adverse condition due to the operation of heavy construction equipment, and idling or operation of equipment near sensitive individuals should be limited.

STORMWATER

There is expected to be little to no impact on stormwater runoff based on the anticipated construction timing and scope of work. During construction, the contractor is not anticipated to be required to prepare and submit a SWPPP and acquire the required permits for construction. If a SWPPP is necessary, BMPs should be installed and maintained according to the SWPPP.

HUMAN HEALTH AND SAFETY

Potentially direct and indirect, minor, short-term, localized adverse impacts to human health and safety exist during construction. Heavy equipment would be used during construction of the proposed project. Operation of heavy equipment poses a potential threat to public safety. There should be no impact during construction, but the typical risk to the public's safety may be increased during construction. BMPs should be installed to protect the public from the working construction extents.

29. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

No impacts appear to require a mitigated EA or EIS.

This is the final environmental assessment. DNRC concludes that no significant adverse impacts will occur as a result of the proposed project work, and therefore no additional environmental review is required. This environmental assessment was posted for a 30-day public notice, after which the final environmental assessment was established, and the environmental review of this project is considered complete.

☐

EIS

☐

More Detailed EA

☐

No Further Analysis

EA Approved By:	Name: Mark W Bostrom
	Title: Division Administrator
Signature: Mark W Bostrom	
Date: 2/14/2025	



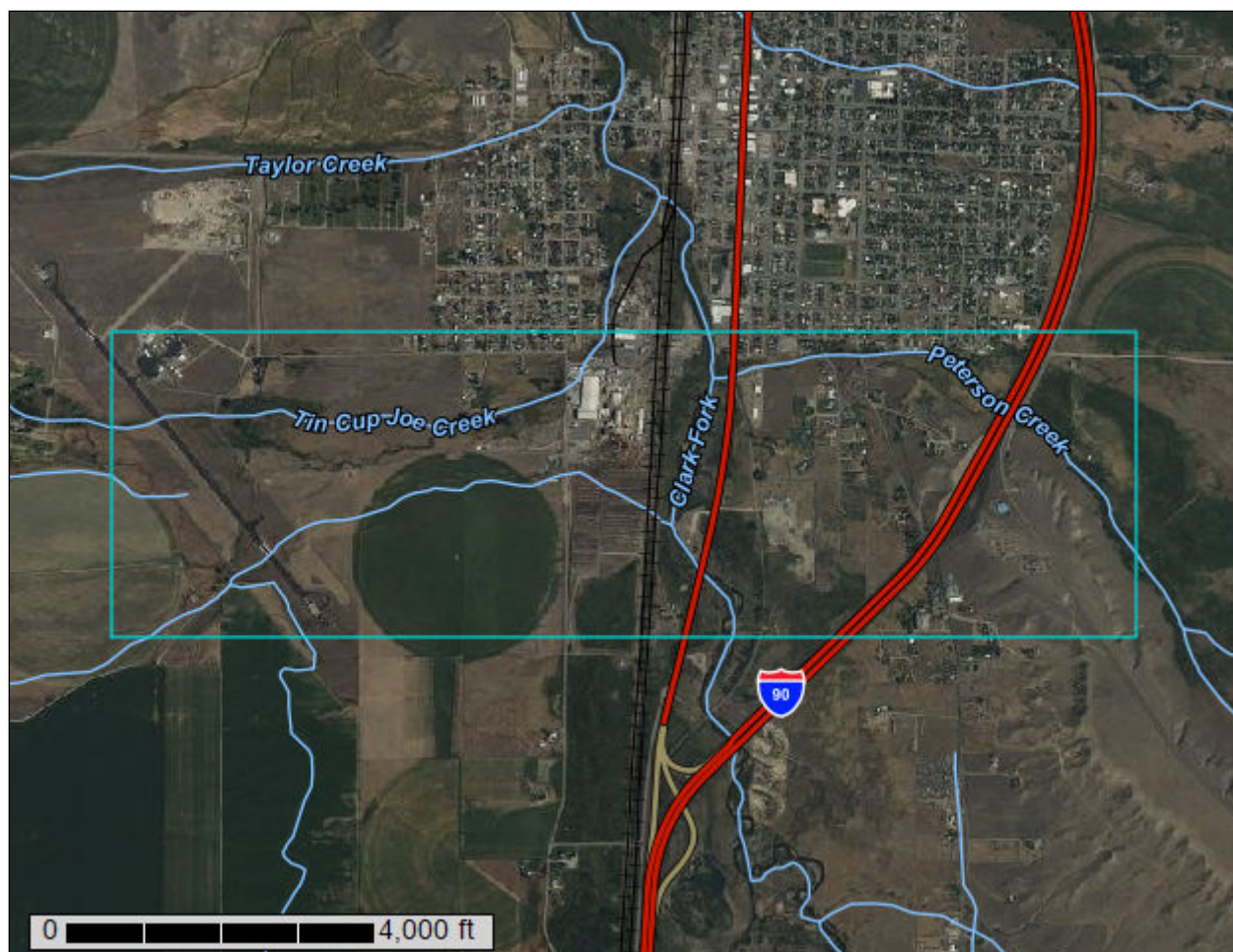
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Powell County Area, Montana**



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface	2
How Soil Surveys Are Made	6
Soil Map	9
Soil Map (Deer Lodge Well Soil Map).....	10
Legend.....	11
Map Unit Legend (Deer Lodge Well Soil Map).....	12
Map Unit Descriptions (Deer Lodge Well Soil Map).....	13
Powell County Area, Montana.....	15
4—Aquents-Slickens complex, 0 to 2 percent slopes, occasionally flooded.....	15
5—Slickens-Aquents complex, 0 to 2 percent slopes, occasionally flooded.....	16
24B—Conn loam, 0 to 4 percent slopes.....	17
24C—Conn loam, 4 to 8 percent slopes.....	18
24D—Conn loam, 8 to 15 percent slopes.....	20
31B—Varney clay loam, 0 to 4 percent slopes.....	21
34B—Cetrack loam, 0 to 4 percent slopes.....	22
36B—Varney-Conn loams, 0 to 4 percent slopes.....	24
36C—Varney-Conn loams, 4 to 8 percent slopes.....	26
36D—Varney-Conn loams, 8 to 15 percent slopes.....	28
102—Pits, gravel.....	30
109—Bohnly silt loam, 0 to 2 percent slopes.....	30
132B—Beaverell cobbly loam, 0 to 4 percent slopes.....	31
137B—Sixbeacon cobbly loam, 0 to 4 percent slopes.....	32
137D—Sixbeacon cobbly loam, 8 to 15 percent slopes.....	34
237B—Sixbeacon gravelly loam, 0 to 4 percent slopes.....	35
237C—Sixbeacon gravelly loam, 4 to 8 percent slopes.....	36
331B—Varney clay loam, 0 to 4 percent slopes, impacted.....	38
336B—Varney-Anaconda loams, 0 to 4 percent slopes, impacted.....	39
444—Gregson loam, 0 to 4 percent slopes, rarely flooded.....	41
445—Saypo loam, 0 to 4 percent slopes, rarely flooded.....	42
562—Carten loam, 0 to 4 percent slopes.....	44
635—Tetonview loam, 0 to 4 percent slopes.....	45
735—Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded....	47
824E—Conn-Sixbeacon cobbly loams, 15 to 35 percent slopes.....	49
824F—Conn-Sixbeacon cobbly loams, 35 to 60 percent slopes.....	51
834—Blossberg loam, 0 to 4 percent slopes, rarely flooded.....	53
835—Tetonview loam, 0 to 4 percent slopes, rarely flooded.....	54
DUMPS—Dumps, sanitary landfill.....	56
Soil Information for All Uses	57
Suitabilities and Limitations for Use.....	57
Building Site Development.....	57
Corrosion of Concrete (Deer Lodge Well Soil Map).....	57
Corrosion of Steel (Deer Lodge Well Soil Map).....	62

Custom Soil Resource Report

Land Classifications..... 67

 Farmland Classification (Deer Lodge Well Soil Map)..... 67

Land Management..... 74

 Site Degradation Susceptibility (Deer Lodge Well Soil Map)..... 74

Soil Health..... 82

 Soil Susceptibility to Compaction (Deer Lodge Well Soil Map)..... 82

Soil Properties and Qualities..... 111

 Soil Erosion Factors..... 111

 Wind Erodibility Group (Deer Lodge Well Soil Map)..... 111

 Soil Qualities and Features..... 115

 Unified Soil Classification (Surface) (Deer Lodge Well Soil Map)..... 116

References..... 122

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

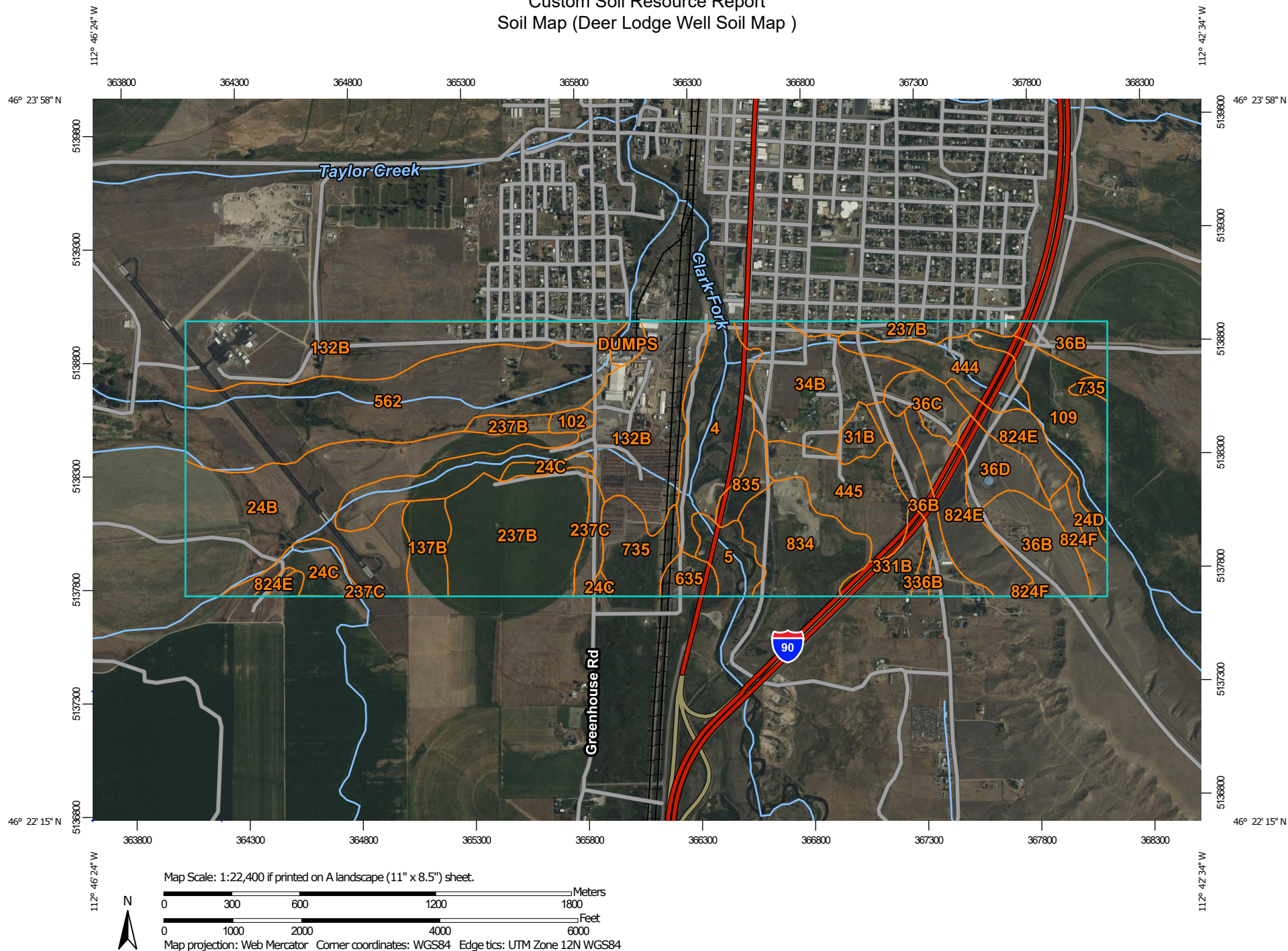
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map (Deer Lodge Well Soil Map)



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Powell County Area, Montana

Survey Area Data: Version 20, Aug 29, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 13, 2022—Aug 16, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Custom Soil Resource Report

Map Unit Legend (Deer Lodge Well Soil Map)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
4	Aquents-Slickens complex, 0 to 2 percent slopes, occasionally flooded	55.7	4.5%
5	Slickens-Aquents complex, 0 to 2 percent slopes, occasionally flooded	17.7	1.4%
24B	Conn loam, 0 to 4 percent slopes	133.2	10.9%
24C	Conn loam, 4 to 8 percent slopes	25.5	2.1%
24D	Conn loam, 8 to 15 percent slopes	5.5	0.4%
31B	Varney clay loam, 0 to 4 percent slopes	8.7	0.7%
34B	Cetrack loam, 0 to 4 percent slopes	64.6	5.3%
36B	Varney-Conn loams, 0 to 4 percent slopes	74.0	6.0%
36C	Varney-Conn loams, 4 to 8 percent slopes	16.8	1.4%
36D	Varney-Conn loams, 8 to 15 percent slopes	21.9	1.8%
102	Pits, gravel	4.4	0.4%
109	Bohnly silt loam, 0 to 2 percent slopes	45.7	3.7%
132B	Beaverell cobbly loam, 0 to 4 percent slopes	198.8	16.2%
137B	Sixbeacon cobbly loam, 0 to 4 percent slopes	18.9	1.5%
137D	Sixbeacon cobbly loam, 8 to 15 percent slopes	2.8	0.2%
237B	Sixbeacon gravelly loam, 0 to 4 percent slopes	101.1	8.3%
237C	Sixbeacon gravelly loam, 4 to 8 percent slopes	10.6	0.9%
331B	Varney clay loam, 0 to 4 percent slopes, impacted	16.6	1.4%
336B	Varney-Anaconda loams, 0 to 4 percent slopes, impacted	3.4	0.3%
444	Gregson loam, 0 to 4 percent slopes, rarely flooded	31.8	2.6%
445	Saypo loam, 0 to 4 percent slopes, rarely flooded	43.3	3.5%

Custom Soil Resource Report

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
562	Carten loam, 0 to 4 percent slopes	148.2	12.1%
635	Tetonview loam, 0 to 4 percent slopes	9.6	0.8%
735	Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded	31.2	2.5%
824E	Conn-Sixbeacon cobbly loams, 15 to 35 percent slopes	58.3	4.8%
824F	Conn-Sixbeacon cobbly loams, 35 to 60 percent slopes	10.7	0.9%
834	Blossberg loam, 0 to 4 percent slopes, rarely flooded	50.0	4.1%
835	Tetonview loam, 0 to 4 percent slopes, rarely flooded	10.9	0.9%
DUMPS	Dumps, sanitary landfill	5.5	0.5%
Totals for Area of Interest		1,225.6	100.0%

Map Unit Descriptions (Deer Lodge Well Soil Map)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor

Custom Soil Resource Report

components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Custom Soil Resource Report

Powell County Area, Montana

4—Aquents-Slickens complex, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 4wmt

Elevation: 3,600 to 5,200 feet

Mean annual precipitation: 10 to 14 inches

Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 105 days

Farmland classification: Not prime farmland

Map Unit Composition

Aquents and similar soils: 55 percent

Slickens: 30 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aquents

Setting

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Depth to water table: About 12 to 24 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified

Ecological site: R044BP801MT - Bottomland

Hydric soil rating: Yes

Description of Slickens

Setting

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified

Ecological site: R043BP818MT - Upland Grassland Group

Hydric soil rating: No

Minor Components

Nythar

Percent of map unit: 7 percent

Custom Soil Resource Report

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BP815MT - Subirrigated Grassland
Hydric soil rating: Yes

Riverwash

Percent of map unit: 5 percent
Hydric soil rating: No

Water

Percent of map unit: 3 percent
Hydric soil rating: No

5—Slickens-Aquents complex, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 4wpp
Elevation: 3,600 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Not prime farmland

Map Unit Composition

Slickens: 45 percent
Aquents and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Slickens

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Ecological site: R043BP818MT - Upland Grassland Group
Hydric soil rating: No

Description of Aquents

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Custom Soil Resource Report

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Depth to water table: About 12 to 24 inches
Frequency of flooding: Occasional
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Ecological site: R044BP801MT - Bottomland
Hydric soil rating: Yes

Minor Components

Riverwash

Percent of map unit: 5 percent
Hydric soil rating: No

Water

Percent of map unit: 5 percent
Hydric soil rating: No

Nythar

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BP815MT - Subirrigated Grassland
Hydric soil rating: Yes

24B—Conn loam, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 4wjc
Elevation: 4,000 to 5,000 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Conn and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Conn

Setting

Landform: Alluvial fans, stream terraces

Custom Soil Resource Report

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous alluvium

Typical profile

Ap - 0 to 7 inches: loam
Bw - 7 to 11 inches: clay loam
Bk1 - 11 to 34 inches: loam
Bk2 - 34 to 60 inches: gravelly loam

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
 (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A
Hydric soil rating: No

Minor Components

Conn, very gravelly

Percent of map unit: 10 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A
Hydric soil rating: No

Saypo

Percent of map unit: 5 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BP817MT - Subirrigated Shrubland
Hydric soil rating: No

24C—Conn loam, 4 to 8 percent slopes

Map Unit Setting

National map unit symbol: 4wjd

Custom Soil Resource Report

Elevation: 4,000 to 5,000 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Conn and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Conn

Setting

Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous alluvium

Typical profile

Ap - 0 to 7 inches: loam
Bw - 7 to 11 inches: clay loam
Bk1 - 11 to 34 inches: loam
Bk2 - 34 to 60 inches: gravelly loam

Properties and qualities

Slope: 4 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
 (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A
Hydric soil rating: No

Minor Components

Conn, very gravelly

Percent of map unit: 10 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A
Hydric soil rating: No

Saypo

Percent of map unit: 5 percent
Landform: Stream terraces

Custom Soil Resource Report

Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BP817MT - Subirrigated Shrubland
Hydric soil rating: No

24D—Conn loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 4wjf
Elevation: 4,000 to 5,000 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Farmland of local importance

Map Unit Composition

Conn and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Conn

Setting

Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous alluvium

Typical profile

Ap - 0 to 7 inches: loam
Bw - 7 to 11 inches: clay loam
Bk1 - 11 to 34 inches: loam
Bk2 - 34 to 60 inches: gravelly loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A

Custom Soil Resource Report

Hydric soil rating: No

Minor Components

Conn, very gravelly

Percent of map unit: 15 percent

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A

Hydric soil rating: No

31B—Varney clay loam, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 4wkj

Elevation: 4,000 to 5,200 feet

Mean annual precipitation: 10 to 14 inches

Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 105 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Varney and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Varney

Setting

Landform: Stream terraces, alluvial fans

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Typical profile

Ap - 0 to 7 inches: clay loam

Bt - 7 to 12 inches: clay loam

Bk1 - 12 to 28 inches: loam

Bk2 - 28 to 36 inches: gravelly loamy sand

Bk3 - 36 to 44 inches: loam

Bk4 - 44 to 52 inches: gravelly loamy sand

Bk5 - 52 to 60 inches: loam

Properties and qualities

Slope: 0 to 4 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Custom Soil Resource Report

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A
Hydric soil rating: No

Minor Components

Anaconda

Percent of map unit: 10 percent
Landform: Stream terraces, alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A
Hydric soil rating: No

Varney, very gravelly

Percent of map unit: 5 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A
Hydric soil rating: No

34B—Cetrack loam, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 4wl7
Elevation: 3,600 to 5,000 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Cetrack and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cetrack

Setting

Landform: Stream terraces, alluvial fans
Down-slope shape: Linear

Custom Soil Resource Report

Across-slope shape: Linear

Parent material: Calcareous loamy alluvium over sandy and gravelly alluvium

Typical profile

Ap - 0 to 6 inches: loam

Bw - 6 to 11 inches: loam

Bk - 11 to 30 inches: loam

2C - 30 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 4 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 30 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A

Hydric soil rating: No

Minor Components

Cetrack, cobbly

Percent of map unit: 3 percent

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A

Hydric soil rating: No

Cetrack, calcareous

Percent of map unit: 3 percent

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A

Hydric soil rating: No

Sixbeacon

Percent of map unit: 3 percent

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A

Hydric soil rating: No

Gregson

Percent of map unit: 3 percent

Landform: Stream terraces

Custom Soil Resource Report

Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BP817MT - Subirrigated Shrubland
Hydric soil rating: No

Cetrack, greater slope

Percent of map unit: 3 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A
Hydric soil rating: No

36B—Varney-Conn loams, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 4wln
Elevation: 4,000 to 5,000 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Varney and similar soils: 60 percent
Conn and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Varney

Setting

Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

Ap - 0 to 8 inches: loam
Bt - 8 to 14 inches: gravelly clay loam
Bk1 - 14 to 23 inches: gravelly sandy loam
Bk2 - 23 to 36 inches: gravelly loamy sand
Bk3 - 36 to 44 inches: loam
Bk4 - 44 to 52 inches: gravelly loamy sand
Bk5 - 52 to 60 inches: loam

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A
Hydric soil rating: No

Description of Conn

Setting

Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous alluvium

Typical profile

Ap - 0 to 7 inches: loam
Bw - 7 to 11 inches: clay loam
Bk1 - 11 to 34 inches: loam
Bk2 - 34 to 60 inches: gravelly loam

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A
Hydric soil rating: No

Minor Components

Varney, clay loam

Percent of map unit: 10 percent
Landform: Stream terraces, alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A

Custom Soil Resource Report

Hydric soil rating: No

Beaverell, cobbly

Percent of map unit: 5 percent

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BA134MT - Shallow to Gravel (SwGr) LRU 01 Subset A

Hydric soil rating: No

36C—Varney-Conn loams, 4 to 8 percent slopes

Map Unit Setting

National map unit symbol: 4wlq

Elevation: 4,000 to 5,000 feet

Mean annual precipitation: 10 to 14 inches

Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 105 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Varney and similar soils: 60 percent

Conn and similar soils: 25 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Varney

Setting

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Typical profile

Ap - 0 to 7 inches: loam

Bt - 7 to 12 inches: clay loam

Bk1 - 12 to 28 inches: loam

Bk2 - 28 to 36 inches: gravelly loamy sand

Bk3 - 36 to 44 inches: loam

Bk4 - 44 to 52 inches: gravelly loamy sand

Bk5 - 52 to 60 inches: loam

Properties and qualities

Slope: 4 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Custom Soil Resource Report

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A
Hydric soil rating: No

Description of Conn

Setting

Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous alluvium

Typical profile

Ap - 0 to 7 inches: loam
Bw - 7 to 11 inches: clay loam
Bk1 - 11 to 34 inches: loam
Bk2 - 34 to 60 inches: gravelly loam

Properties and qualities

Slope: 4 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A
Hydric soil rating: No

Minor Components

Tanna

Percent of map unit: 10 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A
Hydric soil rating: No

Cetrack

Percent of map unit: 5 percent

Custom Soil Resource Report

Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A
Hydric soil rating: No

36D—Varney-Conn loams, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 4wlr
Elevation: 4,000 to 5,710 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 70 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Varney and similar soils: 60 percent
Conn and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Varney

Setting

Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

Ap - 0 to 8 inches: loam
Bt - 8 to 14 inches: gravelly clay loam
Bk1 - 14 to 23 inches: gravelly sandy loam
Bk2 - 23 to 36 inches: gravelly loamy sand
Bk3 - 36 to 44 inches: loam
Bk4 - 44 to 52 inches: gravelly loamy sand
Bk5 - 52 to 60 inches: loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent

Custom Soil Resource Report

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A

Hydric soil rating: No

Description of Conn

Setting

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Calcareous alluvium

Typical profile

Ap - 0 to 7 inches: loam

Bw - 7 to 11 inches: clay loam

Bk1 - 11 to 34 inches: loam

Bk2 - 34 to 60 inches: gravelly loam

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 40 percent

Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A

Hydric soil rating: No

Minor Components

Varney, clay loam

Percent of map unit: 10 percent

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A

Hydric soil rating: No

Conn, cobbly clay loam

Percent of map unit: 5 percent

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Custom Soil Resource Report

Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A

Hydric soil rating: No

102—Pits, gravel

Map Unit Composition

Pits, gravel: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

109—Bohnly silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 4wfl

Elevation: 3,600 to 4,800 feet

Mean annual precipitation: 10 to 20 inches

Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 105 days

Farmland classification: Not prime farmland

Map Unit Composition

Bohnly and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bohnly

Setting

Landform: Stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Typical profile

Oi - 0 to 4 inches: slightly decomposed plant material

A - 4 to 16 inches: silt loam

Cg - 16 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: About 6 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: High (about 11.8 inches)

Custom Soil Resource Report

Interpretive groups

Land capability classification (irrigated): 5w

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: B/D

Ecological site: R044BP815MT - Subirrigated Grassland

Hydric soil rating: Yes

Minor Components

Dougcliff

Percent of map unit: 8 percent

Landform: Depressions

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BP815MT - Subirrigated Grassland

Hydric soil rating: Yes

Poronto

Percent of map unit: 7 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BP815MT - Subirrigated Grassland

Hydric soil rating: Yes

132B—Beaverell cobbly loam, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 4wft

Elevation: 3,600 to 5,200 feet

Mean annual precipitation: 10 to 14 inches

Mean annual air temperature: 37 to 45 degrees F

Frost-free period: 90 to 105 days

Farmland classification: Farmland of local importance

Map Unit Composition

Beaverell and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Beaverell

Setting

Landform: Stream terraces, alluvial fans

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Typical profile

A - 0 to 5 inches: cobbly loam

Custom Soil Resource Report

Bt - 5 to 20 inches: very gravelly loam
2Bk1 - 20 to 27 inches: extremely cobbly sand
2Bk2 - 27 to 38 inches: very gravelly loamy sand
2Bk3 - 38 to 49 inches: extremely cobbly sand
2Bk4 - 49 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: R044BP818MT - Upland Grassland
Hydric soil rating: No

Minor Components

Kleinschmidt

Percent of map unit: 15 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BP817MT - Subirrigated Shrubland
Hydric soil rating: No

137B—Sixbeacon cobbly loam, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 4wg1
Elevation: 3,800 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Farmland of local importance

Map Unit Composition

Sixbeacon and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Custom Soil Resource Report

Description of Sixbeacon

Setting

Landform: Stream terraces, alluvial fans

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Gravelly alluvium

Typical profile

Ap - 0 to 4 inches: cobbly loam

Bw - 4 to 12 inches: loam

2Bk1 - 12 to 24 inches: very gravelly sandy loam

3Bk2 - 24 to 60 inches: extremely gravelly loamy sand

Properties and qualities

Slope: 0 to 4 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 40 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Ecological site: R044BP818MT - Upland Grassland

Hydric soil rating: No

Minor Components

Sixbeacon, gravelly

Percent of map unit: 8 percent

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A

Hydric soil rating: No

Cetrack

Percent of map unit: 7 percent

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A

Hydric soil rating: No

Custom Soil Resource Report

137D—Sixbeacon cobbly loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 4wg3
Elevation: 3,800 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Farmland of local importance

Map Unit Composition

Sixbeacon, cobbly, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sixbeacon, Cobbly

Setting

Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium

Typical profile

Ap - 0 to 4 inches: cobbly loam
Bw - 4 to 12 inches: loam
2Bk1 - 12 to 24 inches: very gravelly sandy loam
3Bk2 - 24 to 60 inches: extremely gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
 (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R044BA036MT - Droughty (Dr) LRU 01 Subset A
Hydric soil rating: No

Custom Soil Resource Report

Minor Components

Sixbeacon

Percent of map unit: 8 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A
Hydric soil rating: No

Cetrack

Percent of map unit: 7 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A
Hydric soil rating: No

237B—Sixbeacon gravelly loam, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 4whz
Elevation: 3,800 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Farmland of local importance

Map Unit Composition

Sixbeacon and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sixbeacon

Setting

Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium

Typical profile

Ap - 0 to 4 inches: gravelly loam
Bw - 4 to 12 inches: loam
2Bk1 - 12 to 24 inches: very gravelly sandy loam
3Bk2 - 24 to 60 inches: extremely gravelly loamy sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches

Custom Soil Resource Report

Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
 (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R044BP818MT - Upland Grassland
Hydric soil rating: No

Minor Components

Anaconda

Percent of map unit: 10 percent
Landform: Stream terraces, alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A
Hydric soil rating: No

Sixbeacon, cobbly

Percent of map unit: 5 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A
Hydric soil rating: No

237C—Sixbeacon gravelly loam, 4 to 8 percent slopes

Map Unit Setting

National map unit symbol: 4wj0
Elevation: 3,800 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Farmland of local importance

Map Unit Composition

Sixbeacon and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Custom Soil Resource Report

Description of Sixbeacon

Setting

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Gravelly alluvium

Typical profile

Ap - 0 to 4 inches: gravelly loam

Bw - 4 to 12 inches: loam

2Bk1 - 12 to 24 inches: very gravelly sandy loam

3Bk2 - 24 to 60 inches: extremely gravelly loamy sand

Properties and qualities

Slope: 4 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 40 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Ecological site: R044BP818MT - Upland Grassland

Hydric soil rating: No

Minor Components

Anaconda

Percent of map unit: 10 percent

Landform: Stream terraces, alluvial fans

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A

Hydric soil rating: No

Sixbeacon, cobbly

Percent of map unit: 5 percent

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A

Hydric soil rating: No

Custom Soil Resource Report

331B—Varney clay loam, 0 to 4 percent slopes, impacted

Map Unit Setting

National map unit symbol: 4wkp
Elevation: 4,000 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Not prime farmland

Map Unit Composition

Varney and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Varney

Setting

Landform: Stream terraces, alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

Ap - 0 to 7 inches: clay loam
Bt - 7 to 12 inches: clay loam
Bk1 - 12 to 28 inches: loam
Bk2 - 28 to 36 inches: gravelly loamy sand
Bk3 - 36 to 44 inches: loam
Bk4 - 44 to 52 inches: gravelly loamy sand
Bk5 - 52 to 60 inches: loam

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
 (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R044BP818MT - Upland Grassland

Custom Soil Resource Report

Hydric soil rating: No

Minor Components

Sixbeacon, cobbly

Percent of map unit: 8 percent

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BA036MT - Droughty (Dr) LRU 01 Subset A

Hydric soil rating: No

Beaverell

Percent of map unit: 7 percent

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BA134MT - Shallow to Gravel (SwGr) LRU 01 Subset A

Hydric soil rating: No

336B—Varney-Anaconda loams, 0 to 4 percent slopes, impacted

Map Unit Setting

National map unit symbol: 4wks

Elevation: 4,000 to 5,000 feet

Mean annual precipitation: 10 to 14 inches

Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 105 days

Farmland classification: Not prime farmland

Map Unit Composition

Varney and similar soils: 60 percent

Anaconda and similar soils: 25 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Varney

Setting

Landform: Alluvial fans, stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Typical profile

Ap - 0 to 7 inches: loam

Bt - 7 to 12 inches: clay loam

Bk - 12 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 4 percent

Custom Soil Resource Report

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R044BP818MT - Upland Grassland
Hydric soil rating: No

Description of Anaconda

Setting

Landform: Stream terraces, alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous alluvium

Typical profile

A - 0 to 8 inches: sandy loam
Bw - 8 to 14 inches: sandy loam
Bk1 - 14 to 27 inches: sandy loam
Bk2 - 27 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R044BP818MT - Upland Grassland
Hydric soil rating: No

Minor Components

Tanna

Percent of map unit: 8 percent

Custom Soil Resource Report

Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A
Hydric soil rating: No

Varney, cobbly

Percent of map unit: 7 percent
Landform: Stream terraces, alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

444—Gregson loam, 0 to 4 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 4wnc
Elevation: 4,000 to 5,000 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Gregson and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gregson

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium over sandy and gravelly alluvium

Typical profile

Oe - 0 to 1 inches: slightly decomposed plant material
A - 1 to 9 inches: loam
Bw - 9 to 23 inches: loam
2C - 23 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: Rare

Custom Soil Resource Report

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Ecological site: R044BP801MT - Bottomland

Hydric soil rating: No

Minor Components

Gregson, very cobbly

Percent of map unit: 5 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BP817MT - Subirrigated Shrubland

Hydric soil rating: No

Blossberg

Percent of map unit: 5 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BP815MT - Subirrigated Grassland

Hydric soil rating: Yes

Canarway

Percent of map unit: 5 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BP817MT - Subirrigated Shrubland

Hydric soil rating: No

445—Saypo loam, 0 to 4 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 4wnd

Elevation: 3,800 to 5,000 feet

Mean annual precipitation: 10 to 14 inches

Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 105 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Saypo and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Custom Soil Resource Report

Description of Saypo

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy alluvium

Typical profile

Oe - 0 to 2 inches: mucky peat
Ap - 2 to 9 inches: loam
Bk1 - 9 to 17 inches: silt loam
Bk2 - 17 to 49 inches: silty clay loam
C - 49 to 60 inches: loam

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R044BP801MT - Bottomland
Hydric soil rating: No

Minor Components

Gregson

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BP817MT - Subirrigated Shrubland
Hydric soil rating: No

Saypo, saline

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BP817MT - Subirrigated Shrubland
Hydric soil rating: No

Tetonview

Percent of map unit: 5 percent
Landform: Flood plains

Custom Soil Resource Report

Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BP815MT - Subirrigated Grassland
Hydric soil rating: Yes

562—Carten loam, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 4wqr
Elevation: 3,600 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Farmland of local importance

Map Unit Composition

Carten and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carten

Setting

Landform: Outwash plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 7 inches: loam
Bw - 7 to 11 inches: loam
Bk - 11 to 17 inches: gravelly clay loam
2C - 17 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C

Custom Soil Resource Report

Ecological site: R044BP815MT - Subirrigated Grassland

Hydric soil rating: No

Minor Components

Blossberg

Percent of map unit: 15 percent

Landform: Depressions

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BP801MT - Bottomland

Hydric soil rating: Yes

635—Tetonview loam, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 4wrj

Elevation: 3,800 to 5,800 feet

Mean annual precipitation: 10 to 19 inches

Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 105 days

Farmland classification: Not prime farmland

Map Unit Composition

Tetonview and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tetonview

Setting

Landform: Stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Typical profile

A - 0 to 9 inches: loam

Bkg - 9 to 42 inches: clay loam

2Cg - 42 to 60 inches: gravelly sandy clay loam

Properties and qualities

Slope: 0 to 4 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: About 12 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 35 percent

Custom Soil Resource Report

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): 4w

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C/D

Ecological site: R043BP815MT - Subirrigated Grassland Group

Hydric soil rating: Yes

Minor Components

Nythar

Percent of map unit: 3 percent

Landform: Depressions

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R043BP815MT - Subirrigated Grassland Group

Hydric soil rating: Yes

Poronto

Percent of map unit: 3 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R043BP801MT - Bottomland Group

Hydric soil rating: Yes

Blossberg

Percent of map unit: 3 percent

Landform: Depressions

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R043BP815MT - Subirrigated Grassland Group

Hydric soil rating: Yes

Saypo

Percent of map unit: 3 percent

Landform: Stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R043BP817MT - Subirrigated Shrubland Group

Hydric soil rating: No

Saypo, saline

Percent of map unit: 3 percent

Landform: Stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R043BP813MT - Subirrigated Saline-Sodic Grassland Group

Hydric soil rating: No

Custom Soil Resource Report

735—Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 4wsq
Elevation: 3,800 to 6,000 feet
Mean annual precipitation: 10 to 19 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 70 to 105 days
Farmland classification: Not prime farmland

Map Unit Composition

Tetonview and similar soils: 45 percent
Blossberg and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tetonview

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 9 inches: loam
Bkg - 9 to 42 inches: clay loam
2Cg - 42 to 60 inches: gravelly sandy clay loam

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Ecological site: R044BP815MT - Subirrigated Grassland
Hydric soil rating: Yes

Custom Soil Resource Report

Description of Blossberg

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 14 inches: loam
Bg1 - 14 to 23 inches: loam
Bg2 - 23 to 28 inches: gravelly loam
2Cg - 28 to 60 inches: very cobbly sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
 (0.20 to 1.98 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: R044BP815MT - Subirrigated Grassland
Hydric soil rating: Yes

Minor Components

Nythar

Percent of map unit: 10 percent
Landform: Depressions
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BP815MT - Subirrigated Grassland
Hydric soil rating: Yes

Water

Percent of map unit: 5 percent
Hydric soil rating: No

Custom Soil Resource Report

824E—Conn-Sixbeacon cobbly loams, 15 to 35 percent slopes

Map Unit Setting

National map unit symbol: 4wth
Elevation: 4,000 to 5,000 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Not prime farmland

Map Unit Composition

Conn and similar soils: 55 percent
Sixbeacon, cobbly, and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Conn

Setting

Landform: Stream terraces, alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous alluvium

Typical profile

A - 0 to 8 inches: cobbly clay loam
Bw - 8 to 14 inches: clay loam
Bk1 - 14 to 23 inches: loam
Bk2 - 23 to 60 inches: gravelly loam

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
 (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A
Hydric soil rating: No

Custom Soil Resource Report

Description of Sixbeacon, Cobbly

Setting

Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium

Typical profile

A - 0 to 5 inches: cobbly loam
Bw - 5 to 14 inches: gravelly loam
2Bk - 14 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
 (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R044BA036MT - Droughty (Dr) LRU 01 Subset A
Hydric soil rating: No

Minor Components

Conn, calcareous

Percent of map unit: 5 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A
Hydric soil rating: No

Conn, greater slope

Percent of map unit: 5 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A
Hydric soil rating: No

Varney

Percent of map unit: 5 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A

Custom Soil Resource Report

Hydric soil rating: No

824F—Conn-Sixbeacon cobbly loams, 35 to 60 percent slopes

Map Unit Setting

National map unit symbol: 4wtj
Elevation: 4,000 to 5,000 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Not prime farmland

Map Unit Composition

Conn and similar soils: 55 percent
Sixbeacon, cobbly, and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Conn

Setting

Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous alluvium

Typical profile

A - 0 to 8 inches: cobbly clay loam
Bw - 8 to 14 inches: clay loam
Bk1 - 14 to 23 inches: loam
Bk2 - 23 to 60 inches: gravelly loam

Properties and qualities

Slope: 35 to 60 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
 (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A
Hydric soil rating: No

Custom Soil Resource Report

Description of Sixbeacon, Cobbly

Setting

Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium

Typical profile

A - 0 to 5 inches: cobbly loam
Bw - 5 to 14 inches: gravelly loam
2Bk - 14 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 35 to 60 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
 (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R044BA036MT - Droughty (Dr) LRU 01 Subset A
Hydric soil rating: No

Minor Components

Conn, calcareous

Percent of map unit: 8 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA001MT - Clayey (Cy) LRU 01 Subset A
Hydric soil rating: No

Varney

Percent of map unit: 7 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BA032MT - Loamy (Lo) LRU 01 Subset A
Hydric soil rating: No

Custom Soil Resource Report

834—Blossberg loam, 0 to 4 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 4wtr
Elevation: 3,800 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 105 days
Farmland classification: Not prime farmland

Map Unit Composition

Blossberg and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blossberg

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 14 inches: loam
Bg1 - 14 to 23 inches: loam
Bg2 - 23 to 28 inches: gravelly loam
2Cg - 28 to 60 inches: very cobbly sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
 (0.20 to 1.98 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: R044BP815MT - Subirrigated Grassland
Hydric soil rating: Yes

Custom Soil Resource Report

Minor Components

Dougcliff

Percent of map unit: 3 percent
Landform: Depressions
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BP815MT - Subirrigated Grassland
Hydric soil rating: Yes

Canarway

Percent of map unit: 3 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BP817MT - Subirrigated Shrubland
Hydric soil rating: Yes

Flintcreek

Percent of map unit: 3 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BP815MT - Subirrigated Grassland
Hydric soil rating: Yes

Gregson

Percent of map unit: 3 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BP817MT - Subirrigated Shrubland
Hydric soil rating: No

Turrah

Percent of map unit: 3 percent
Landform: Stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R044BP815MT - Subirrigated Grassland
Hydric soil rating: Yes

835—Tetonview loam, 0 to 4 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 4wts
Elevation: 3,800 to 5,800 feet
Mean annual precipitation: 10 to 19 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 70 to 105 days

Custom Soil Resource Report

Farmland classification: Not prime farmland

Map Unit Composition

Tetonview and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tetonview

Setting

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Typical profile

A - 0 to 9 inches: loam

Bkg - 9 to 42 inches: clay loam

2Cg - 42 to 60 inches: gravelly sandy clay loam

Properties and qualities

Slope: 0 to 4 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: About 12 to 24 inches

Frequency of flooding: Rare

Frequency of ponding: None

Calcium carbonate, maximum content: 35 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): 4w

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C/D

Ecological site: R044BP815MT - Subirrigated Grassland

Hydric soil rating: Yes

Minor Components

Blossberg

Percent of map unit: 3 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BP815MT - Subirrigated Grassland

Hydric soil rating: Yes

Saypo

Percent of map unit: 3 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BP801MT - Bottomland

Hydric soil rating: No

Custom Soil Resource Report

Bushong

Percent of map unit: 3 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BP817MT - Subirrigated Shrubland

Hydric soil rating: Yes

Turrah

Percent of map unit: 3 percent

Landform: Stream terraces

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BP817MT - Subirrigated Shrubland

Hydric soil rating: Yes

Dougcliff

Percent of map unit: 3 percent

Landform: Depressions

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: R044BP815MT - Subirrigated Grassland

Hydric soil rating: Yes

DUMPS—Dumps, sanitary landfill

Map Unit Composition

Dumps, sanitary landfill: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Building Site Development

Building site development interpretations are designed to be used as tools for evaluating soil suitability and identifying soil limitations for various construction purposes. As part of the interpretation process, the rating applies to each soil in its described condition and does not consider present land use. Example interpretations can include corrosion of concrete and steel, shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping.

Corrosion of Concrete (Deer Lodge Well Soil Map)

ENG

Engineering

AGR

Agronomy

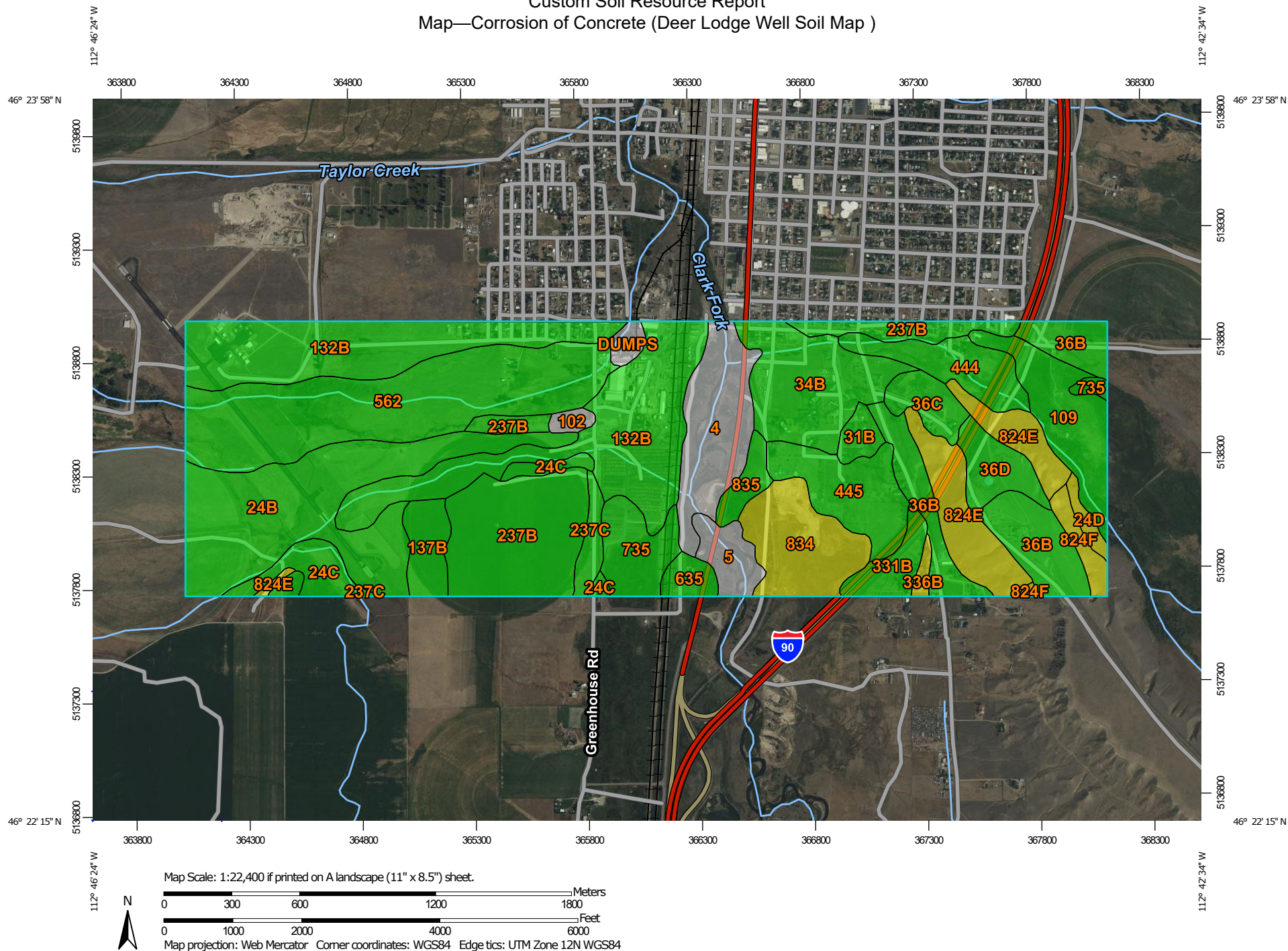
"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens concrete. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the concrete in installations that are entirely within one kind of soil or within one soil layer.

Custom Soil Resource Report

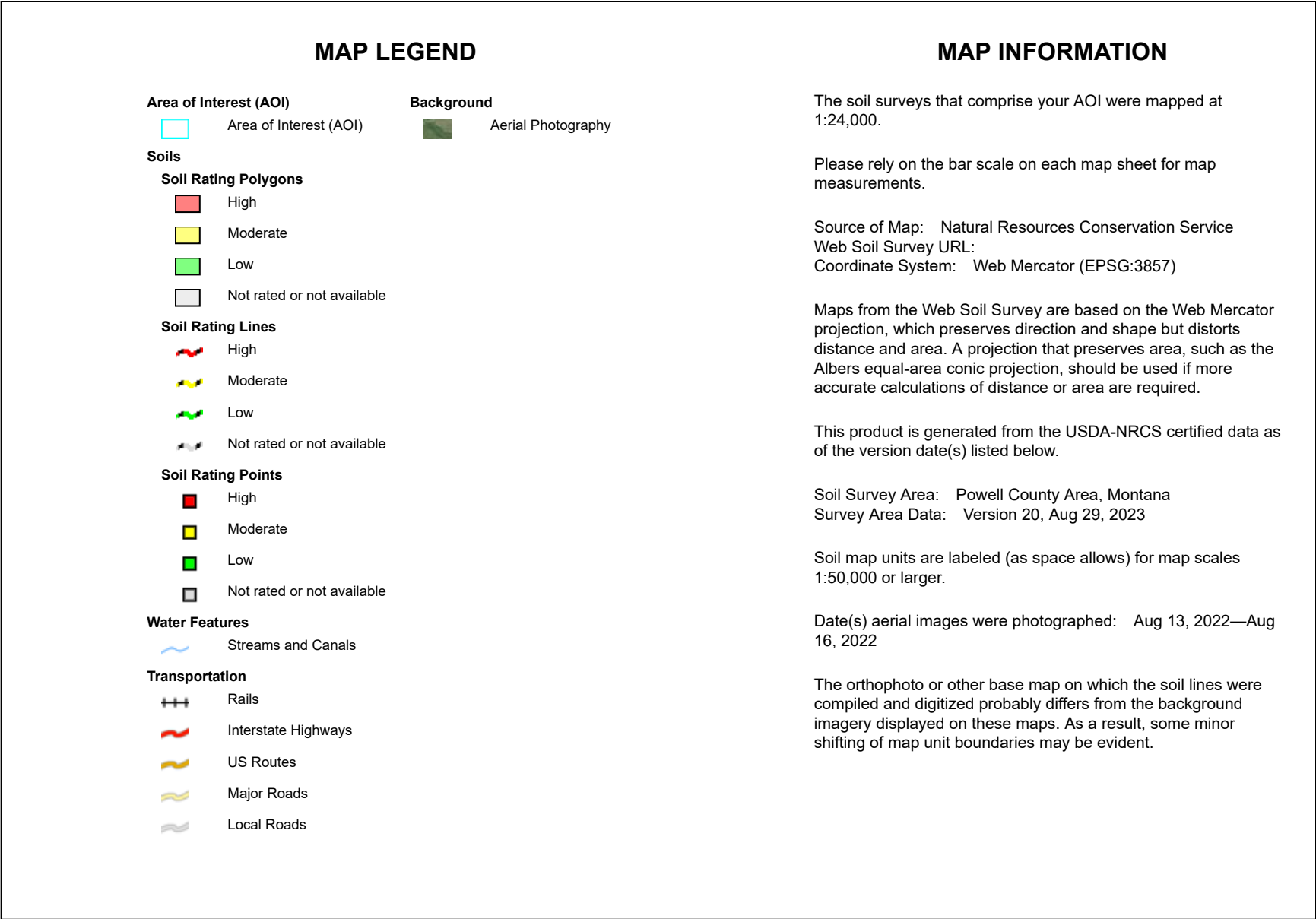
The risk of corrosion is expressed as "low," "moderate," or "high."

Custom Soil Resource Report

Map—Corrosion of Concrete (Deer Lodge Well Soil Map)



Custom Soil Resource Report



Custom Soil Resource Report

Table—Corrosion of Concrete (Deer Lodge Well Soil Map)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
4	Aquents-Slickens complex, 0 to 2 percent slopes, occasionally flooded		55.7	4.5%
5	Slickens-Aquents complex, 0 to 2 percent slopes, occasionally flooded		17.7	1.4%
24B	Conn loam, 0 to 4 percent slopes	Low	133.2	10.9%
24C	Conn loam, 4 to 8 percent slopes	Low	25.5	2.1%
24D	Conn loam, 8 to 15 percent slopes	Moderate	5.5	0.4%
31B	Varney clay loam, 0 to 4 percent slopes	Low	8.7	0.7%
34B	Cetrack loam, 0 to 4 percent slopes	Low	64.6	5.3%
36B	Varney-Conn loams, 0 to 4 percent slopes	Low	74.0	6.0%
36C	Varney-Conn loams, 4 to 8 percent slopes	Low	16.8	1.4%
36D	Varney-Conn loams, 8 to 15 percent slopes	Low	21.9	1.8%
102	Pits, gravel		4.4	0.4%
109	Bohnly silt loam, 0 to 2 percent slopes	Low	45.7	3.7%
132B	Beaverell cobbly loam, 0 to 4 percent slopes	Low	198.8	16.2%
137B	Sixbeacon cobbly loam, 0 to 4 percent slopes	Low	18.9	1.5%
137D	Sixbeacon cobbly loam, 8 to 15 percent slopes	Low	2.8	0.2%
237B	Sixbeacon gravelly loam, 0 to 4 percent slopes	Low	101.1	8.3%
237C	Sixbeacon gravelly loam, 4 to 8 percent slopes	Low	10.6	0.9%
331B	Varney clay loam, 0 to 4 percent slopes, impacted	Low	16.6	1.4%
336B	Varney-Anaconda loams, 0 to 4 percent slopes, impacted	Moderate	3.4	0.3%
444	Gregson loam, 0 to 4 percent slopes, rarely flooded	Low	31.8	2.6%

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
445	Saypo loam, 0 to 4 percent slopes, rarely flooded	Low	43.3	3.5%
562	Carten loam, 0 to 4 percent slopes	Low	148.2	12.1%
635	Tetonview loam, 0 to 4 percent slopes	Low	9.6	0.8%
735	Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded	Low	31.2	2.5%
824E	Conn-Sixbeacon cobbly loams, 15 to 35 percent slopes	Moderate	58.3	4.8%
824F	Conn-Sixbeacon cobbly loams, 35 to 60 percent slopes	Moderate	10.7	0.9%
834	Blossberg loam, 0 to 4 percent slopes, rarely flooded	Moderate	50.0	4.1%
835	Tetonview loam, 0 to 4 percent slopes, rarely flooded	Low	10.9	0.9%
DUMPS	Dumps, sanitary landfill		5.5	0.5%
Totals for Area of Interest			1,225.6	100.0%

Rating Options—Corrosion of Concrete (Deer Lodge Well Soil Map)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Corrosion of Steel (Deer Lodge Well Soil Map)

ENG

Engineering

AGR

Agronomy

"Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The

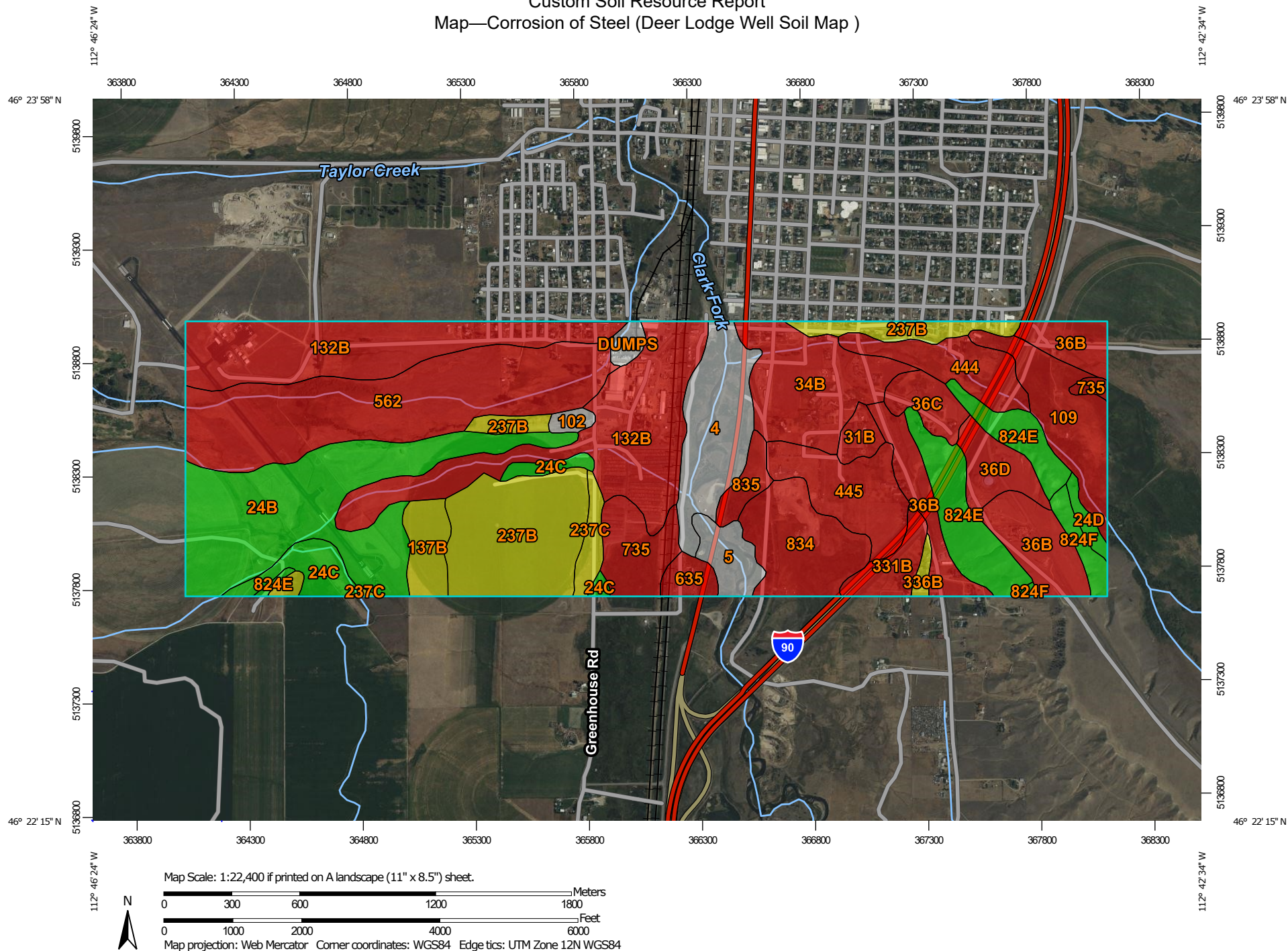
Custom Soil Resource Report

steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel in installations that are entirely within one kind of soil or within one soil layer.

The risk of corrosion is expressed as "low," "moderate," or "high."

Custom Soil Resource Report

Map—Corrosion of Steel (Deer Lodge Well Soil Map)



Custom Soil Resource Report

Table—Corrosion of Steel (Deer Lodge Well Soil Map)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
4	Aquents-Slickens complex, 0 to 2 percent slopes, occasionally flooded		55.7	4.5%
5	Slickens-Aquents complex, 0 to 2 percent slopes, occasionally flooded		17.7	1.4%
24B	Conn loam, 0 to 4 percent slopes	Low	133.2	10.9%
24C	Conn loam, 4 to 8 percent slopes	Low	25.5	2.1%
24D	Conn loam, 8 to 15 percent slopes	Low	5.5	0.4%
31B	Varney clay loam, 0 to 4 percent slopes	High	8.7	0.7%
34B	Cetrack loam, 0 to 4 percent slopes	High	64.6	5.3%
36B	Varney-Conn loams, 0 to 4 percent slopes	High	74.0	6.0%
36C	Varney-Conn loams, 4 to 8 percent slopes	High	16.8	1.4%
36D	Varney-Conn loams, 8 to 15 percent slopes	High	21.9	1.8%
102	Pits, gravel		4.4	0.4%
109	Bohnly silt loam, 0 to 2 percent slopes	High	45.7	3.7%
132B	Beaverell cobbly loam, 0 to 4 percent slopes	High	198.8	16.2%
137B	Sixbeacon cobbly loam, 0 to 4 percent slopes	Moderate	18.9	1.5%
137D	Sixbeacon cobbly loam, 8 to 15 percent slopes	Moderate	2.8	0.2%
237B	Sixbeacon gravelly loam, 0 to 4 percent slopes	Moderate	101.1	8.3%
237C	Sixbeacon gravelly loam, 4 to 8 percent slopes	Moderate	10.6	0.9%
331B	Varney clay loam, 0 to 4 percent slopes, impacted	High	16.6	1.4%
336B	Varney-Anaconda loams, 0 to 4 percent slopes, impacted	Moderate	3.4	0.3%
444	Gregson loam, 0 to 4 percent slopes, rarely flooded	High	31.8	2.6%

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
445	Saypo loam, 0 to 4 percent slopes, rarely flooded	High	43.3	3.5%
562	Carten loam, 0 to 4 percent slopes	High	148.2	12.1%
635	Tetonview loam, 0 to 4 percent slopes	High	9.6	0.8%
735	Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded	High	31.2	2.5%
824E	Conn-Sixbeacon cobbly loams, 15 to 35 percent slopes	Low	58.3	4.8%
824F	Conn-Sixbeacon cobbly loams, 35 to 60 percent slopes	Low	10.7	0.9%
834	Blossberg loam, 0 to 4 percent slopes, rarely flooded	High	50.0	4.1%
835	Tetonview loam, 0 to 4 percent slopes, rarely flooded	High	10.9	0.9%
DUMPS	Dumps, sanitary landfill		5.5	0.5%
Totals for Area of Interest			1,225.6	100.0%

Rating Options—Corrosion of Steel (Deer Lodge Well Soil Map)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Farmland Classification (Deer Lodge Well Soil Map)

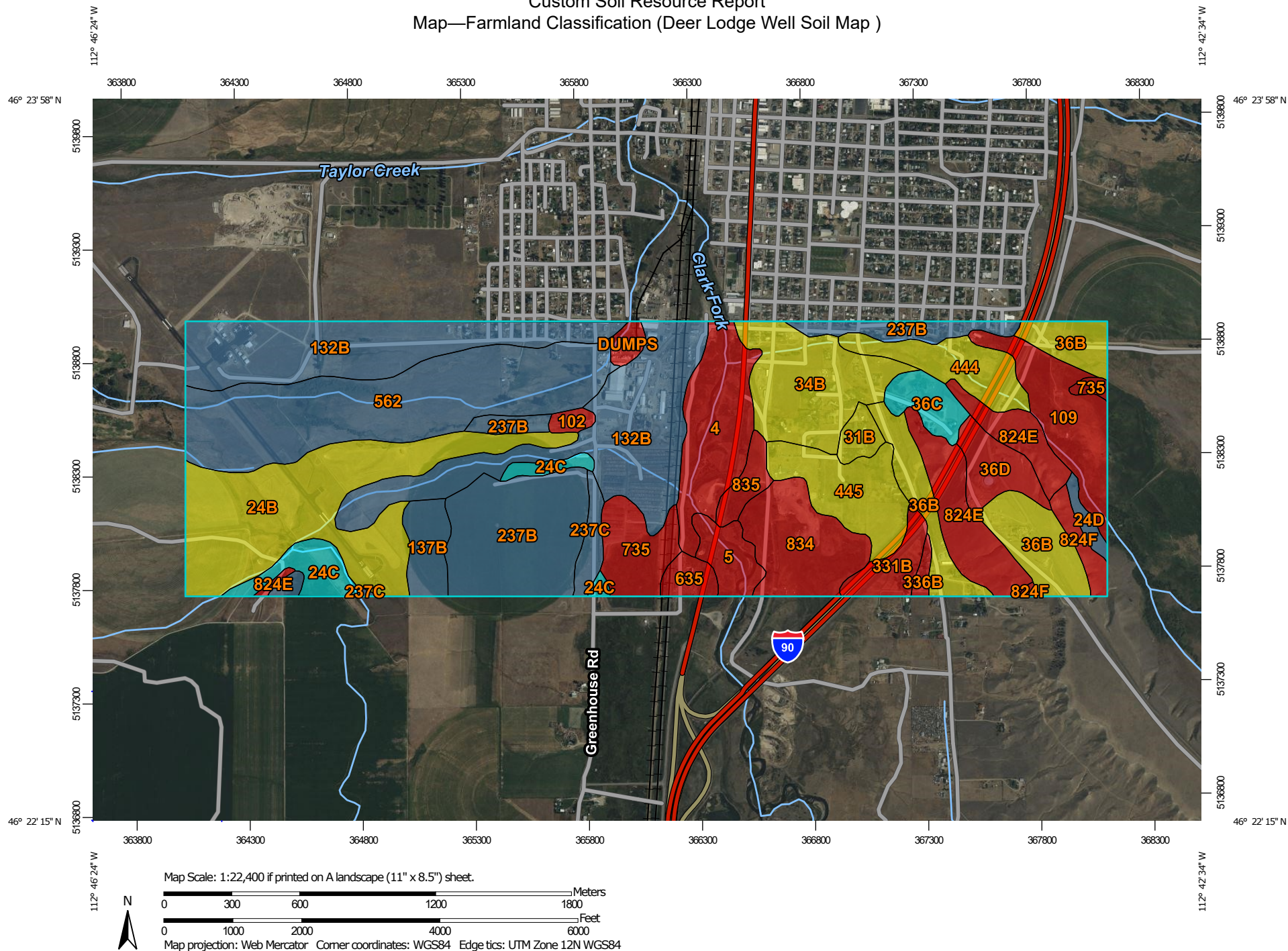
Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage,

Custom Soil Resource Report

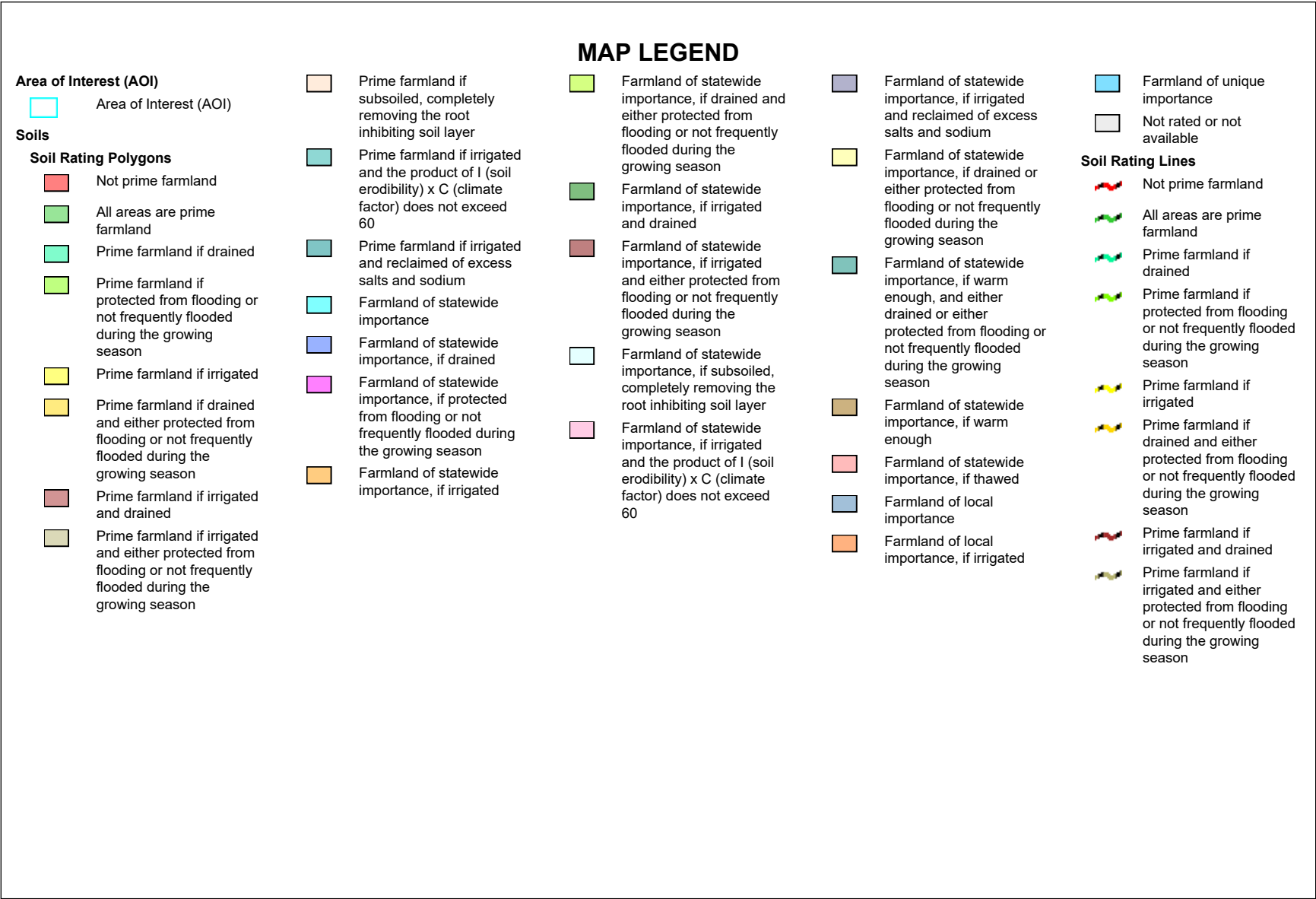
and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Custom Soil Resource Report

Map—Farmland Classification (Deer Lodge Well Soil Map)



Custom Soil Resource Report



Custom Soil Resource Report

	Prime farmland if subsoiled, completely removing the root inhibiting soil layer		Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season		Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium		Farmland of unique importance		Prime farmland if subsoiled, completely removing the root inhibiting soil layer
	Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60		Farmland of statewide importance, if irrigated and drained		Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season	Soil Rating Points			Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
	Prime farmland if irrigated and reclaimed of excess salts and sodium		Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season		Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season		Not prime farmland		Prime farmland if irrigated and reclaimed of excess salts and sodium
	Farmland of statewide importance		Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer		Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season		Prime farmland if drained		Farmland of statewide importance
	Farmland of statewide importance, if drained		Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60		Farmland of statewide importance, if warm enough		Prime farmland if protected from flooding or not frequently flooded during the growing season		Farmland of statewide importance, if drained
	Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season				Farmland of local importance		Prime farmland if irrigated		Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
	Farmland of statewide importance, if irrigated				Farmland of local importance, if irrigated		Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season		Farmland of statewide importance, if irrigated
							Prime farmland if irrigated and drained		
							Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season		

Custom Soil Resource Report

 Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season  Farmland of statewide importance, if irrigated and drained  Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season  Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer  Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60	 Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium  Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season  Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season  Farmland of statewide importance, if warm enough  Farmland of statewide importance, if thawed  Farmland of local importance  Farmland of local importance, if irrigated	 Farmland of unique importance  Not rated or not available Water Features  Streams and Canals Transportation  Rails  Interstate Highways  US Routes  Major Roads  Local Roads Background  Aerial Photography	The soil surveys that comprise your AOI were mapped at 1:24,000. Please rely on the bar scale on each map sheet for map measurements. Source of Map: Natural Resources Conservation Service Web Soil Survey URL: Coordinate System: Web Mercator (EPSG:3857) Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required. This product is generated from the USDA-NRCS certified data as of the version date(s) listed below. Soil Survey Area: Powell County Area, Montana Survey Area Data: Version 20, Aug 29, 2023 Soil map units are labeled (as space allows) for map scales 1:50,000 or larger. Date(s) aerial images were photographed: Aug 13, 2022—Aug 16, 2022 The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.
---	---	--	---

Custom Soil Resource Report

Table—Farmland Classification (Deer Lodge Well Soil Map)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
4	Aquents-Slickens complex, 0 to 2 percent slopes, occasionally flooded	Not prime farmland	55.7	4.5%
5	Slickens-Aquents complex, 0 to 2 percent slopes, occasionally flooded	Not prime farmland	17.7	1.4%
24B	Conn loam, 0 to 4 percent slopes	Prime farmland if irrigated	133.2	10.9%
24C	Conn loam, 4 to 8 percent slopes	Farmland of statewide importance	25.5	2.1%
24D	Conn loam, 8 to 15 percent slopes	Farmland of local importance	5.5	0.4%
31B	Varney clay loam, 0 to 4 percent slopes	Prime farmland if irrigated	8.7	0.7%
34B	Cetrack loam, 0 to 4 percent slopes	Prime farmland if irrigated	64.6	5.3%
36B	Varney-Conn loams, 0 to 4 percent slopes	Prime farmland if irrigated	74.0	6.0%
36C	Varney-Conn loams, 4 to 8 percent slopes	Farmland of statewide importance	16.8	1.4%
36D	Varney-Conn loams, 8 to 15 percent slopes	Not prime farmland	21.9	1.8%
102	Pits, gravel	Not prime farmland	4.4	0.4%
109	Bohnly silt loam, 0 to 2 percent slopes	Not prime farmland	45.7	3.7%
132B	Beaverell cobbly loam, 0 to 4 percent slopes	Farmland of local importance	198.8	16.2%
137B	Sixbeacon cobbly loam, 0 to 4 percent slopes	Farmland of local importance	18.9	1.5%
137D	Sixbeacon cobbly loam, 8 to 15 percent slopes	Farmland of local importance	2.8	0.2%
237B	Sixbeacon gravelly loam, 0 to 4 percent slopes	Farmland of local importance	101.1	8.3%
237C	Sixbeacon gravelly loam, 4 to 8 percent slopes	Farmland of local importance	10.6	0.9%
331B	Varney clay loam, 0 to 4 percent slopes, impacted	Not prime farmland	16.6	1.4%
336B	Varney-Anaconda loams, 0 to 4 percent slopes, impacted	Not prime farmland	3.4	0.3%
444	Gregson loam, 0 to 4 percent slopes, rarely flooded	Prime farmland if irrigated	31.8	2.6%

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
445	Saypo loam, 0 to 4 percent slopes, rarely flooded	Prime farmland if irrigated	43.3	3.5%
562	Carten loam, 0 to 4 percent slopes	Farmland of local importance	148.2	12.1%
635	Tetonview loam, 0 to 4 percent slopes	Not prime farmland	9.6	0.8%
735	Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded	Not prime farmland	31.2	2.5%
824E	Conn-Sixbeacon cobbly loams, 15 to 35 percent slopes	Not prime farmland	58.3	4.8%
824F	Conn-Sixbeacon cobbly loams, 35 to 60 percent slopes	Not prime farmland	10.7	0.9%
834	Blossberg loam, 0 to 4 percent slopes, rarely flooded	Not prime farmland	50.0	4.1%
835	Tetonview loam, 0 to 4 percent slopes, rarely flooded	Not prime farmland	10.9	0.9%
DUMPS	Dumps, sanitary landfill	Not prime farmland	5.5	0.5%
Totals for Area of Interest			1,225.6	100.0%

Rating Options—Farmland Classification (Deer Lodge Well Soil Map)

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

Land Management

Land management interpretations are tools designed to guide the user in evaluating existing conditions in planning and predicting the soil response to various land management practices, for a variety of land uses, including cropland, forestland, hayland, pastureland, horticulture, and rangeland. Example interpretations include suitability for a variety of irrigation practices, log landings, haul roads and major skid trails, equipment operability, site preparation, suitability for hand and mechanical planting, potential erosion hazard associated with various practices, and ratings for fencing and waterline installation.

Site Degradation Susceptibility (Deer Lodge Well Soil Map)

BLM - Bureau of Land Management

Custom Soil Resource Report

This interpretation rates each soil for its susceptibility for soil degradation to occur during disturbance, which is a function of resistance to degradation. Resistance to degradation of a rangeland or woodland site is a measure of its ability to function without change throughout a disturbance. The magnitude of decline in the capacity to function determines the degree of resistance to change. Resistance to degradation thus could be described as an area's buffering capacity. This depends upon soil type, vegetation, climate, land use, disturbance regime, temporal and spatial scales. The disturbance regime determines the type of stresses placed upon the soil, vegetation, and wildlife components of the site. Thus, soil factors of vulnerability will vary based upon the disturbance regime for a particular site.

The ratings represent the relative risk of water and wind erosion, salinization, sodification, organic matter and nutrient depletion and/or redistribution, and loss of adequate rooting depth to maintain desired plant communities. Dynamic soil properties which vary with time, e.g. microbial biomass/diversity and carbon/nitrogen ratio, are not used since they are not contained within the soil database.

Steep slopes increase the potential for water erosion. Shallow rooting depth, and excess salt or sodium can reduce plant diversity, resistance to stress, and seedling survival.

This rating should be used with the objective to protect vulnerable sites from the type of degradation that would result in accelerated erosion, reduction in water and air quality, invasion by annual grasses or noxious weeds, and other large scale potential natural plant community conversions. When degradation of soil and natural plant community characteristics goes beyond the threshold for the ecological site, the ecological site characteristics cannot be restored without artificial restoration efforts.

There may be unique circumstances where accelerated soil processes that are normally considered contributing to site degradation are actually beneficial to some attribute of the site, such as Indian ricegrass (*Achnatherum hymenoides*) being more competitive in shifting sands than most species.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the potential for degradation. "Highly susceptible" indicates that the soil has one or more features that are very favorable for degradation. "Moderately susceptible" indicates that the soil has features that are moderately favorable for damage to occur. "Slightly susceptible" indicates that the soil has features that generally make it unfavorable for degradation to occur.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is

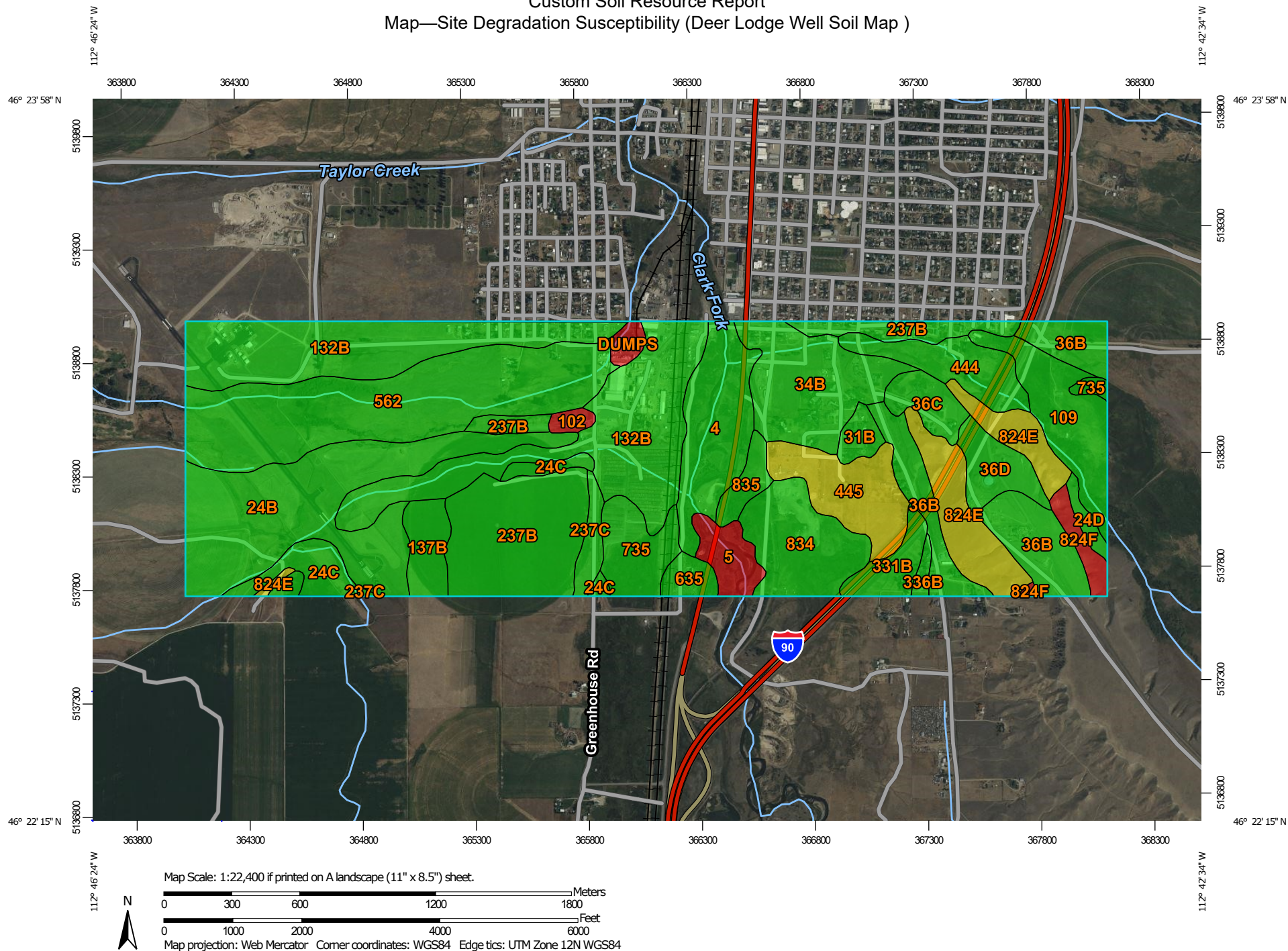
Custom Soil Resource Report

shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Custom Soil Resource Report

Map—Site Degradation Susceptibility (Deer Lodge Well Soil Map)



Custom Soil Resource Report

Tables—Site Degradation Susceptibility (Deer Lodge Well Soil Map)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
4	Aquents-Slickens complex, 0 to 2 percent slopes, occasionally flooded	Slightly susceptible	Aquents (55%)		55.7	4.5%
			Nythar (7%)			
5	Slickens-Aquents complex, 0 to 2 percent slopes, occasionally flooded	Highly susceptible	Slickens (45%)	Water erosion (1.00)	17.7	1.4%
			Riverwash (5%)	Water erosion (1.00)		
			Water (5%)	Water erosion (1.00)		
24B	Conn loam, 0 to 4 percent slopes	Slightly susceptible	Conn (85%)		133.2	10.9%
			Conn, very gravelly (10%)			
24C	Conn loam, 4 to 8 percent slopes	Slightly susceptible	Conn (85%)		25.5	2.1%
			Conn, very gravelly (10%)			
24D	Conn loam, 8 to 15 percent slopes	Slightly susceptible	Conn (85%)		5.5	0.4%
			Conn, very gravelly (15%)			
31B	Varney clay loam, 0 to 4 percent slopes	Slightly susceptible	Varney (85%)		8.7	0.7%
			Varney, very gravelly (5%)			
34B	Cetrack loam, 0 to 4 percent slopes	Slightly susceptible	Cetrack (85%)		64.6	5.3%
			Cetrack, cobbly (3%)			
			Sixbeacon (3%)			
			Gregson (3%)			
			Cetrack, greater slope (3%)			
36B	Varney-Conn loams, 0 to 4 percent slopes	Slightly susceptible	Varney (60%)		74.0	6.0%
			Conn (25%)			
			Varney, clay loam (10%)			
			Beaverell, cobbly (5%)			
36C	Varney-Conn loams, 4 to 8 percent slopes	Slightly susceptible	Varney (60%)		16.8	1.4%
			Conn (25%)			
			Tanna (10%)			
			Cetrack (5%)			

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
36D	Varney-Conn loams, 8 to 15 percent slopes	Slightly susceptible	Varney (60%)		21.9	1.8%
			Conn (25%)			
			Varney, clay loam (10%)			
			Conn, cobbly clay loam (5%)			
102	Pits, gravel	Highly susceptible	Pits, Gravel (100%)	Water erosion (1.00)	4.4	0.4%
109	Bohnly silt loam, 0 to 2 percent slopes	Slightly susceptible	Bohnly (85%)		45.7	3.7%
			Dougcliff (8%)			
			Poronto (7%)			
132B	Beaverell cobbly loam, 0 to 4 percent slopes	Slightly susceptible	Beaverell (85%)		198.8	16.2%
			Kleinschmidt (15%)			
137B	Sixbeacon cobbly loam, 0 to 4 percent slopes	Slightly susceptible	Sixbeacon (85%)		18.9	1.5%
			Sixbeacon, gravelly (8%)			
			Cetrack (7%)			
137D	Sixbeacon cobbly loam, 8 to 15 percent slopes	Slightly susceptible	Sixbeacon, cobbly (85%)		2.8	0.2%
			Sixbeacon (8%)			
			Cetrack (7%)			
237B	Sixbeacon gravelly loam, 0 to 4 percent slopes	Slightly susceptible	Sixbeacon (85%)		101.1	8.3%
			Anaconda (10%)			
			Sixbeacon, cobbly (5%)			
237C	Sixbeacon gravelly loam, 4 to 8 percent slopes	Slightly susceptible	Sixbeacon (85%)		10.6	0.9%
			Anaconda (10%)			
			Sixbeacon, cobbly (5%)			
331B	Varney clay loam, 0 to 4 percent slopes, impacted	Slightly susceptible	Varney (85%)		16.6	1.4%
			Sixbeacon, cobbly (8%)			
			Beaverell (7%)			
336B	Varney-Anaconda loams, 0 to 4 percent slopes, impacted	Slightly susceptible	Varney (60%)		3.4	0.3%
			Anaconda (25%)			
			Tanna (8%)			
			Varney, cobbly (7%)			
444	Gregson loam, 0 to 4 percent slopes, rarely flooded	Slightly susceptible	Gregson (85%)		31.8	2.6%
			Gregson, very cobbly (5%)			
			Blossberg (5%)			

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Canarway (5%)			
445	Saypo loam, 0 to 4 percent slopes, rarely flooded	Moderately susceptible	Saypo (85%)	Wind erosion (0.99)	43.3	3.5%
			Saypo, saline (5%)	Wind erosion (0.99)		
562	Carten loam, 0 to 4 percent slopes	Slightly susceptible	Carten (85%)		148.2	12.1%
			Blossberg (15%)			
635	Tetonview loam, 0 to 4 percent slopes	Slightly susceptible	Tetonview (85%)		9.6	0.8%
			Poronto (3%)			
			Blossberg (3%)			
			Nythar (3%)			
735	Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded	Slightly susceptible	Tetonview (45%)		31.2	2.5%
			Blossberg (40%)			
			Nythar (10%)			
824E	Conn-Sixbeacon cobbly loams, 15 to 35 percent slopes	Moderately susceptible	Conn (55%)	Water erosion (0.13)	58.3	4.8%
			Sixbeacon, cobbly (30%)	Water erosion (0.13)		
			Conn, calcareous (5%)	Water erosion (0.13)		
			Varney (5%)	Water erosion (0.13)		
824F	Conn-Sixbeacon cobbly loams, 35 to 60 percent slopes	Highly susceptible	Conn (55%)	Water erosion (1.00)	10.7	0.9%
			Sixbeacon, cobbly (30%)	Water erosion (1.00)		
			Conn, calcareous (8%)	Water erosion (1.00)		
			Varney (7%)	Water erosion (1.00)		
834	Blossberg loam, 0 to 4 percent slopes, rarely flooded	Slightly susceptible	Blossberg (85%)		50.0	4.1%
			Dougcliff (3%)			
			Canarway (3%)			
			Flintcreek (3%)			
			Gregson (3%)			
			Turrah (3%)			
835	Tetonview loam, 0 to 4 percent slopes, rarely flooded	Slightly susceptible	Tetonview (85%)		10.9	0.9%
			Blossberg (3%)			
			Bushong (3%)			
			Turrah (3%)			
			Dougcliff (3%)			

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
DUMPS	Dumps, sanitary landfill	Highly susceptible	Dumps, sanitary landfill (100%)	Water erosion (1.00)	5.5	0.5%
Totals for Area of Interest					1,225.6	100.0%

Rating	Acres in AOI	Percent of AOI
Slightly susceptible	1,085.5	88.6%
Moderately susceptible	101.6	8.3%
Highly susceptible	38.4	3.1%
Totals for Area of Interest	1,225.6	100.0%

Rating Options—Site Degradation Susceptibility (Deer Lodge Well Soil Map)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Soil Health

Soil health interpretations are designed to be used as tools for evaluating and managing a soil's capacity to function as a vital living ecosystem that sustains plants, animals, and humans. Example interpretations include compaction, surface sealing, carbon sequestration, resistance and resilience, management systems and practices, and cover crops.

Soil Susceptibility to Compaction (Deer Lodge Well Soil Map)

SOH - Soil Health

Soils are rated based on their susceptibility to compaction from the operation of ground-based equipment for planting, harvesting, and site preparation activities when soils are moist. Soil compaction is the process in which soil particles are pressed together more closely than in the original state. Typically, the soil must be moist to be compacted because the mineral grains must slide together. Compaction reduces the abundance mostly of large pores in the soil by damaging the structure of the soil. This produces several effects that are unwanted in agricultural soils since large pores are most effective at transmitting water and air through the soil. Compaction also increases the soil strength which can limit root penetration and growth. The ability of soil to hold water is adversely affected by compaction since the large pores hold water. The degree of compaction of a soil is measured by its

Custom Soil Resource Report

bulk density, which is the mass per unit volume, generally expressed in grams per cubic centimeter.

Compacted soils are less favorable for good plant growth because of high soil bulk density and hardness, reduced pore space, and poor aeration and drainage. Root penetration and growth is decreased in compacted soils because the hardness or strength of these soils prevents the expansion of roots. Supplies of air, water, and nutrients that roots need are also less favorable when compaction decreases soil porosity and drainage.

Interpretation ratings are based on soil properties in the upper 12 inches of the profile. Factors considered are soil texture, soil organic matter content, soil structure, rock fragment content, and the existing bulk density. Each of these is thought to contribute to resisting the susceptibility of a soil to compaction when present. Organic matter in the soil provides resistance to compaction and the resilience to ameliorate the effects with time. Soil structure adds strength as discrete aggregates and it is the aggregates that are deformed or destroyed by compactive forces, thus strong soil structure lowers the susceptibility to compaction. Similarly, rock fragments in the soil can bridge and provide a framework to resist compaction. Finally, if a soil is already fairly dense causing further compaction is more difficult.

Definitions of the ratings:

Low - The potential for compaction is insignificant. This soil is able to support standard equipment with minimal compaction. The soil is moisture insensitive, exhibiting only small changes in density with changing moisture content.

Medium - The potential for compaction is significant. The growth rate of seedlings may be reduced following compaction. After the initial compaction (i.e., the first equipment pass), this soil is able to support standard equipment with only minimal increases in soil density. The soil is intermediate between moisture insensitive and moisture sensitive.

High - The potential for compaction is significant. The growth rate of seedlings will be reduced following compaction. After initial compaction, this soil is still able to support standard equipment, but will continue to compact with each subsequent pass. The soil is moisture sensitive, exhibiting large changes in density with changing moisture content.

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be

Custom Soil Resource Report

viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

References:

Adams, P.W. 1998. Soil Compaction on Woodland Properties. Oregon State University Extension Publication EC 1109.

Adams, P.W. 1981. Compaction of Forest Soils. Oregon State University Extension Publication PNW 217.

Boyer, Don. 1997. Guidelines for Soil Resource Protection and Restoration for Timber Harvest and Post-Harvest Activities. U.S Forest Service, Pacific Northwest Region, Watershed Management.

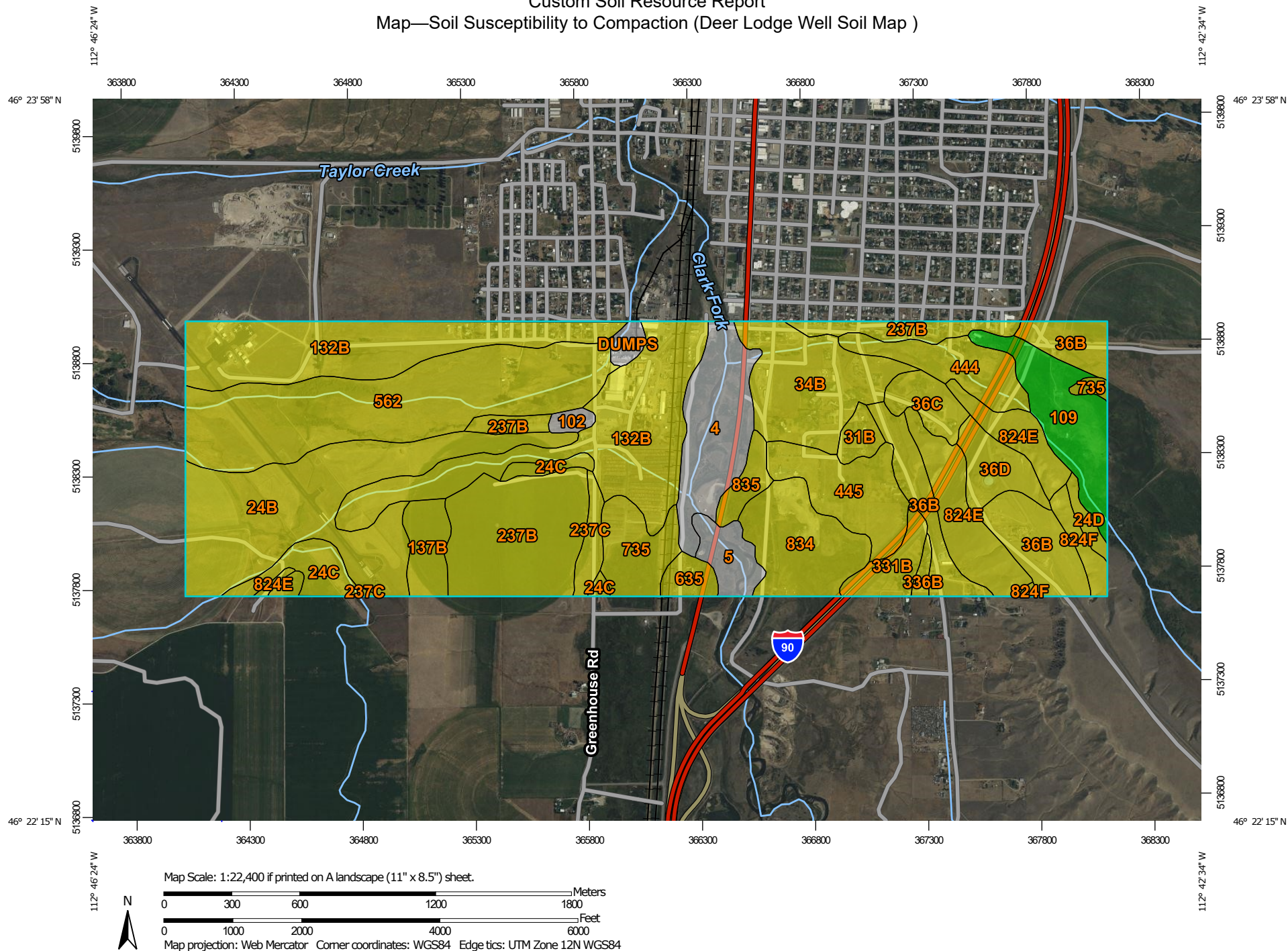
Geist, J.M.; Hazard, J.W.; Seidel, K.W. 1989. Assessing Physical Conditions of Some Pacific Northwest Volcanic Ash Soils After Forest Harvest. Soil Science Society of America Journal 53:946-950.

Froehlich, Henry A and David H. McNab. 1983. Minimizing Soil Compaction in Pacific Northwest Forests. Proceedings of Sixth North American Forest Soils Conference, University of Tennessee.

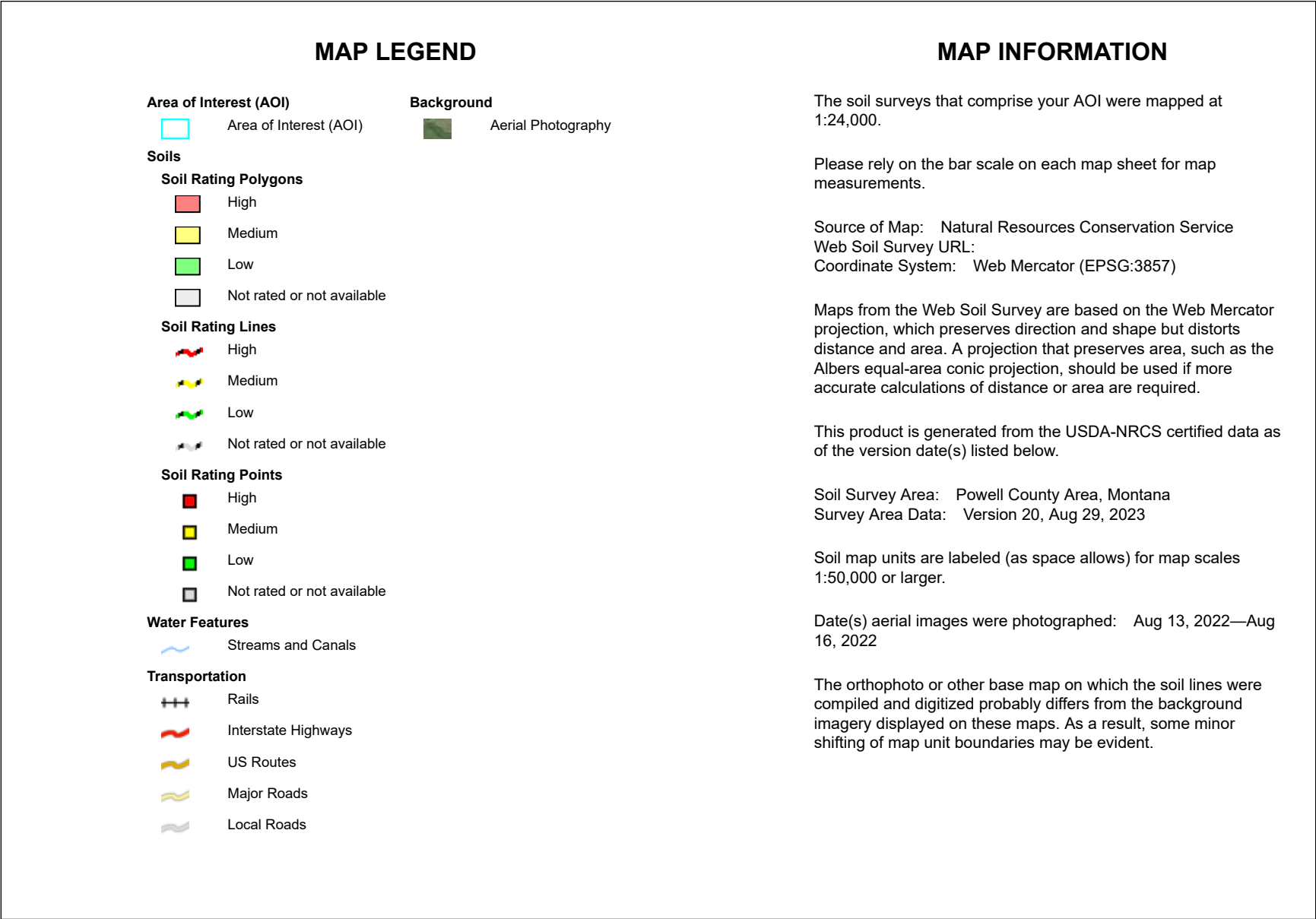
Page-Dumrose, Deborah S. 1993. Susceptibility of Volcanic Ash Influenced Soils in Northern Idaho to Mechanical Compaction. U.S. Forest Service Intermountain Research Station. Research Note INT-409.

Custom Soil Resource Report

Map—Soil Susceptibility to Compaction (Deer Lodge Well Soil Map)



Custom Soil Resource Report



Custom Soil Resource Report

Tables—Soil Susceptibility to Compaction (Deer Lodge Well Soil Map)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
4	Aquents-Slickens complex, 0 to 2 percent slopes, occasionally flooded	Not rated	Aquents (55%)		55.7	4.5%
			Slickens (30%)			
			Riverwash (5%)			
			Water (3%)			
5	Slickens-Aquents complex, 0 to 2 percent slopes, occasionally flooded	Not rated	Slickens (45%)		17.7	1.4%
			Aquents (40%)			
			Riverwash (5%)			
			Water (5%)			
24B	Conn loam, 0 to 4 percent slopes	Medium	Conn (85%)	Soil texture, 0-12 inches (1.00)	133.2	10.9%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.77)		
			Conn, very gravelly (10%)	Soil texture, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Rock fragments, 0-12 inches (0.98)		
				Organic matter content, 0-30 cm (0.77)		
			Saypo (5%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.67)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Soil structure grade, 0-12 inches (0.50)		
24C	Conn loam, 4 to 8 percent slopes	Medium	Conn (85%)	Soil texture, 0-12 inches (1.00)	25.5	2.1%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.77)		
			Conn, very gravelly (10%)	Soil texture, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Rock fragments, 0-12 inches (0.98)		
				Organic matter content, 0-30 cm (0.77)		
			Saypo (5%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.67)		
				Soil structure grade, 0-12 inches (0.50)		
24D	Conn loam, 8 to 15 percent slopes	Medium	Conn (85%)	Soil texture, 0-12 inches (1.00)	5.5	0.4%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
31B	Varney clay loam, 0 to 4 percent slopes	Medium	Conn, very gravelly (15%)	Organic matter content, 0-30 cm (0.77)	8.7	0.7%
				Soil texture, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Rock fragments, 0-12 inches (0.98)		
				Organic matter content, 0-30 cm (0.77)		
			Varney (85%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.80)		
			Anaconda (10%)	Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.78)		
				Bulk density-compactibility to 30cm (0.57)		
			Varney, very gravelly (5%)	Soil texture, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Rock fragments, 0-12 inches (0.99)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Organic matter content, 0-30 cm (0.78)		
34B	Cetrack loam, 0 to 4 percent slopes	Medium	Cetrack (85%)	Soil texture, 0-12 inches (1.00)	64.6	5.3%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.80)		
			Cetrack, cobbly (3%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.80)		
			Cetrack, calcareous (3%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.80)		
			Sixbeacon (3%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Organic matter content, 0-30 cm (0.89)		
				Gregson (3%)		
				Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Bulk density-compactibility to 30cm (0.54)		
				Soil structure grade, 0-12 inches (0.50)		
			Cetrack, greater slope (3%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.80)		
36B	Varney-Conn loams, 0 to 4 percent slopes	Medium	Varney (60%)	Soil texture, 0-12 inches (1.00)	74.0	6.0%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.78)		
			Conn (25%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Varney, clay loam (10%)	Organic matter content, 0-30 cm (0.77)		
				Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.80)		
			Beaverell, cobbly (5%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Organic matter content, 0-30 cm (1.00)		
				Subaerial (1.00)		
36C	Varney-Conn loams, 4 to 8 percent slopes	Medium	Varney (60%)	Soil texture, 0-12 inches (1.00)	16.8	1.4%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Bulk density-compactibility to 30cm (1.00)		
				Subaerial (1.00)		
			Conn (25%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Organic matter content, 0-30 cm (0.77)		
			Tanna (10%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.86)		
				Soil structure grade, 0-12 inches (0.50)		
			Cetrack (5%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.80)		
36D	Varney-Conn loams, 8 to 15 percent slopes	Medium	Varney (60%)	Soil texture, 0-12 inches (1.00)	21.9	1.8%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.78)		
			Conn (25%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Varney, clay loam (10%)	Organic matter content, 0-30 cm (0.77)		
				Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.80)		
			Conn, cobbly clay loam (5%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.74)		
102	Pits, gravel	Not rated	Pits, Gravel (100%)		4.4	0.4%
109	Bohnly silt loam, 0 to 2 percent slopes	Low	Bohnly (85%)	Soil texture, 0-12 inches (1.00)	45.7	3.7%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Bulk density-compactibility to 30cm (0.56)		
			Dougcliff (8%)	Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Soil texture, 0-12 inches (0.50)		
132B	Beaverell cobbly loam, 0 to 4 percent slopes	Medium	Beaverell (85%)	Soil texture, 0-12 inches (1.00)	198.8	16.2%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Organic matter content, 0-30 cm (1.00)		
				Subaerial (1.00)		
			Kleinschmidt (15%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Bulk density-compactibility to 30cm (0.69)		
137B	Sixbeacon cobbly loam, 0 to 4 percent slopes	Medium	Sixbeacon (85%)	Soil texture, 0-12 inches (1.00)	18.9	1.5%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.89)		
			Sixbeacon, gravelly (8%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
137D	Sixbeacon cobbly loam, 8 to 15 percent slopes	Medium	Cetrack (7%)	Organic matter content, 0-30 cm (0.89)	2.8	0.2%
				Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.80)		
			Sixbeacon, cobbly (85%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.89)		
			Sixbeacon (8%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.89)		
			Cetrack (7%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Organic matter content, 0-30 cm (0.80)		
237B	Sixbeacon gravelly loam, 0 to 4 percent slopes	Medium	Sixbeacon (85%)	Soil texture, 0-12 inches (1.00)	101.1	8.3%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.89)		
			Anaconda (10%)	Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.78)		
				Bulk density-compactibility to 30cm (0.57)		
			Sixbeacon, cobbly (5%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.89)		
237C	Sixbeacon gravelly loam, 4 to 8 percent slopes	Medium	Sixbeacon (85%)	Soil texture, 0-12 inches (1.00)	10.6	0.9%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.89)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Anaconda (10%)	Organic matter content, 0-30 cm (0.89)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.78)		
				Bulk density-compactibility to 30cm (0.57)		
			Sixbeacon, cobbly (5%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.89)		
331B	Varney clay loam, 0 to 4 percent slopes, impacted	Medium	Varney (85%)	Soil texture, 0-12 inches (1.00)	16.6	1.4%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.80)		
			Sixbeacon, cobbly (8%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Organic matter content, 0-30 cm (0.89)		
			Beaverell (7%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Organic matter content, 0-30 cm (1.00)		
				Subaerial (1.00)		
336B	Varney-Anaconda loams, 0 to 4 percent slopes, impacted	Medium	Varney (60%)	Soil texture, 0-12 inches (1.00)	3.4	0.3%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.80)		
			Anaconda (25%)	Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.78)		
				Bulk density-compactibility to 30cm (0.57)		
			Tanna (8%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.86)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Varney, cobbly (7%)	Soil structure grade, 0-12 inches (0.50)		
				Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.80)		
444	Gregson loam, 0 to 4 percent slopes, rarely flooded	Medium	Gregson (85%)	Soil texture, 0-12 inches (1.00)	31.8	2.6%
				Rock fragments, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Bulk density-compactibility to 30cm (0.54)		
				Soil structure grade, 0-12 inches (0.50)		
			Gregson, very cobbly (5%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Bulk density-compactibility to 30cm (0.54)		
				Soil structure grade, 0-12 inches (0.50)		
			Blossberg (5%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Bulk density-compactibility to 30cm (0.62)		
			Canarway (5%)	Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.82)		
				Bulk density-compactibility to 30cm (0.61)		
445	Saypo loam, 0 to 4 percent slopes, rarely flooded	Medium	Saypo (85%)	Soil texture, 0-12 inches (1.00)	43.3	3.5%
				Rock fragments, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.67)		
				Soil structure grade, 0-12 inches (0.50)		
			Gregson (5%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Bulk density-compactibility to 30cm (0.54)		
				Soil structure grade, 0-12 inches (0.50)		
			Saypo, saline (5%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.67)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Tetonview (5%)	Soil structure grade, 0-12 inches (0.50)		
				Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.66)		
562	Carten loam, 0 to 4 percent slopes	Medium	Carten (85%)	Soil texture, 0-12 inches (1.00)	148.2	12.1%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.76)		
			Blossberg (15%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Bulk density-compactibility to 30cm (0.62)		
635	Tetonview loam, 0 to 4 percent slopes	Medium	Tetonview (85%)	Soil texture, 0-12 inches (1.00)	9.6	0.8%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Poronto (3%)	Organic matter content, 0-30 cm (0.66)		
				Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.66)		
			Blossberg (3%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Bulk density-compactibility to 30cm (0.62)		
			Saypo (3%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.67)		
				Soil structure grade, 0-12 inches (0.50)		
			Saypo, saline (3%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.67)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
735	Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded	Medium	Nythar (3%)	Soil structure grade, 0-12 inches (0.50)	31.2	2.5%
				Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Bulk density-compactibility to 30cm (0.69)		
			Tetonview (45%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.66)		
			Blossberg (40%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Bulk density-compactibility to 30cm (0.62)		
			Nythar (10%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Bulk density-compactibility to 30cm (0.69)		
824E	Conn-Sixbeacon cobbly loams, 15 to 35 percent slopes	Medium	Conn (55%)	Soil texture, 0-12 inches (1.00)	58.3	4.8%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.74)		
			Sixbeacon, cobbly (30%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.86)		
			Conn, calcareous (5%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.74)		
			Conn, greater slope (5%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
824F	Conn-Sixbeacon cobbly loams, 35 to 60 percent slopes	Medium	Varney (5%)	Organic matter content, 0-30 cm (0.74)	10.7	0.9%
				Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.80)		
			Conn (55%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.74)		
			Sixbeacon, cobbly (30%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.86)		
			Conn, calcareous (8%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
			Varney (7%)	Organic matter content, 0-30 cm (0.74)		
				Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.80)		
834	Blossberg loam, 0 to 4 percent slopes, rarely flooded	Medium	Blossberg (85%)	Soil texture, 0-12 inches (1.00)	50.0	4.1%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Bulk density-compactibility to 30cm (0.62)		
			Canarway (3%)	Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.82)		
				Bulk density-compactibility to 30cm (0.61)		
			Flintcreek (3%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Organic matter content, 0-30 cm (0.44)		
			Gregson (3%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Bulk density-compactibility to 30cm (0.54)		
				Soil structure grade, 0-12 inches (0.50)		
			Turrah (3%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Bulk density-compactibility to 30cm (0.62)		
835	Tetonview loam, 0 to 4 percent slopes, rarely flooded	Medium	Tetonview (85%)	Soil texture, 0-12 inches (1.00)	10.9	0.9%
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.66)		
			Blossberg (3%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
				Bulk density-compactibility to 30cm (0.62)		
			Saypo (3%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.67)		
				Soil structure grade, 0-12 inches (0.50)		
			Bushong (3%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Organic matter content, 0-30 cm (0.89)		
			Turrah (3%)	Soil texture, 0-12 inches (1.00)		
				Rock fragments, 0-12 inches (1.00)		
				Soil structure grade, 0-12 inches (1.00)		
				Subaerial (1.00)		
				Bulk density-compactibility to 30cm (0.62)		
DUMPS	Dumps, sanitary landfill	Not rated	Dumps, sanitary landfill (100%)		5.5	0.5%
Totals for Area of Interest					1,225.6	100.0%

Rating	Acres in AOI	Percent of AOI
Medium	1,096.3	89.4%
Low	45.7	3.7%
Null or Not Rated	83.4	6.8%

Custom Soil Resource Report

Rating	Acres in AOI	Percent of AOI
Totals for Area of Interest	1,225.6	100.0%

Rating Options—Soil Susceptibility to Compaction (Deer Lodge Well Soil Map)

Aggregation Method: Dominant Condition
Component Percent Cutoff: None Specified
Tie-break Rule: Higher

Custom Soil Resource Report

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

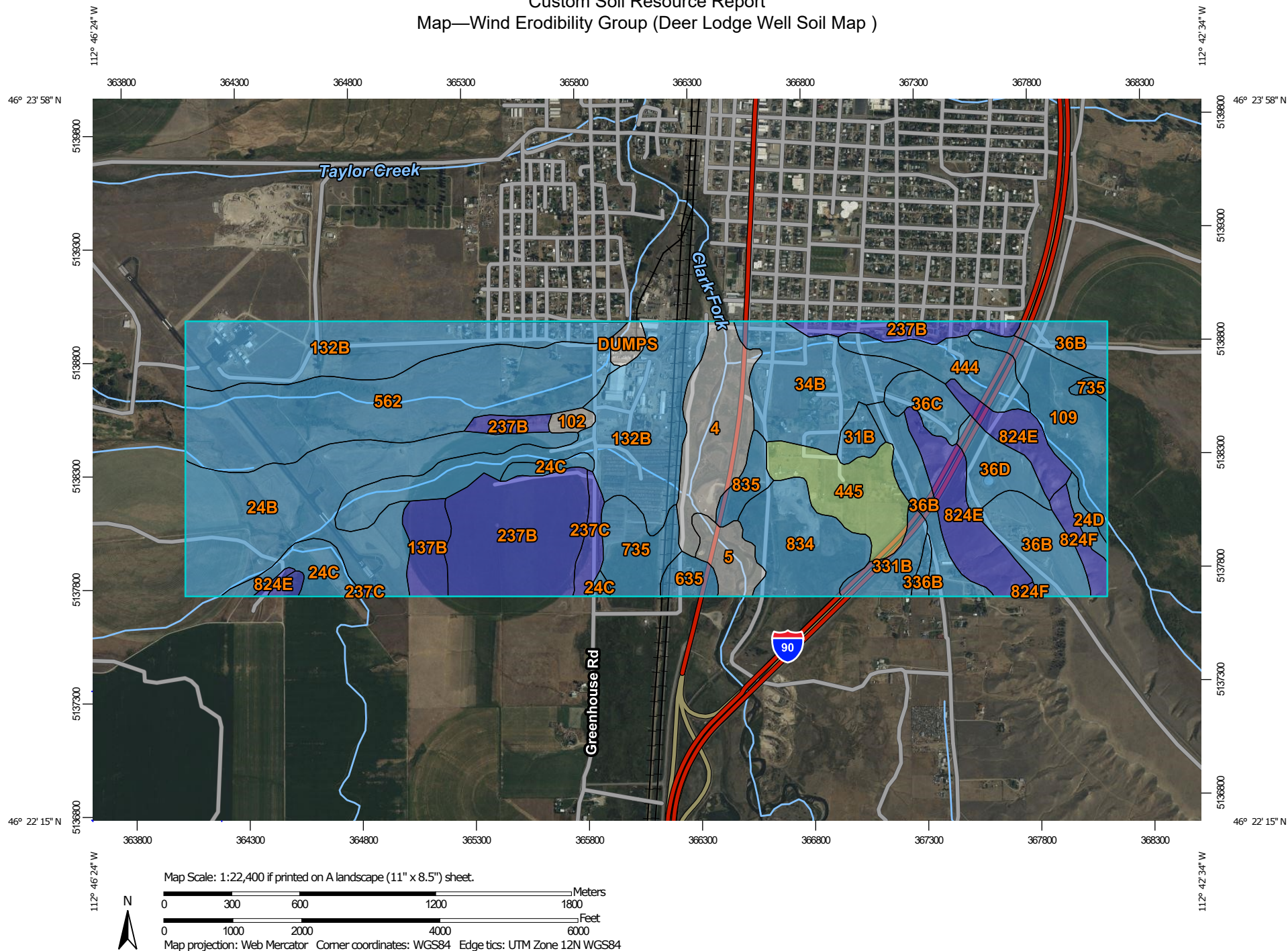
Soil Erosion Factors

Soil Erosion Factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

Wind Erodibility Group (Deer Lodge Well Soil Map)

A wind erodibility group (WEG) consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.

Custom Soil Resource Report Map—Wind Erodibility Group (Deer Lodge Well Soil Map)



Custom Soil Resource Report

Table—Wind Erodibility Group (Deer Lodge Well Soil Map)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
4	Aquents-Slickens complex, 0 to 2 percent slopes, occasionally flooded		55.7	4.5%
5	Slickens-Aquents complex, 0 to 2 percent slopes, occasionally flooded		17.7	1.4%
24B	Conn loam, 0 to 4 percent slopes	6	133.2	10.9%
24C	Conn loam, 4 to 8 percent slopes	6	25.5	2.1%
24D	Conn loam, 8 to 15 percent slopes	6	5.5	0.4%
31B	Varney clay loam, 0 to 4 percent slopes	6	8.7	0.7%
34B	Cetrack loam, 0 to 4 percent slopes	6	64.6	5.3%
36B	Varney-Conn loams, 0 to 4 percent slopes	6	74.0	6.0%
36C	Varney-Conn loams, 4 to 8 percent slopes	6	16.8	1.4%
36D	Varney-Conn loams, 8 to 15 percent slopes	6	21.9	1.8%
102	Pits, gravel		4.4	0.4%
109	Bohnly silt loam, 0 to 2 percent slopes	6	45.7	3.7%
132B	Beaverell cobbly loam, 0 to 4 percent slopes	6	198.8	16.2%
137B	Sixbeacon cobbly loam, 0 to 4 percent slopes	7	18.9	1.5%
137D	Sixbeacon cobbly loam, 8 to 15 percent slopes	7	2.8	0.2%
237B	Sixbeacon gravelly loam, 0 to 4 percent slopes	7	101.1	8.3%
237C	Sixbeacon gravelly loam, 4 to 8 percent slopes	7	10.6	0.9%
331B	Varney clay loam, 0 to 4 percent slopes, impacted	6	16.6	1.4%
336B	Varney-Anaconda loams, 0 to 4 percent slopes, impacted	6	3.4	0.3%
444	Gregson loam, 0 to 4 percent slopes, rarely flooded	6	31.8	2.6%

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
445	Saypo loam, 0 to 4 percent slopes, rarely flooded	4L	43.3	3.5%
562	Carten loam, 0 to 4 percent slopes	6	148.2	12.1%
635	Tetonview loam, 0 to 4 percent slopes	6	9.6	0.8%
735	Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded	6	31.2	2.5%
824E	Conn-Sixbeacon cobbly loams, 15 to 35 percent slopes	7	58.3	4.8%
824F	Conn-Sixbeacon cobbly loams, 35 to 60 percent slopes	7	10.7	0.9%
834	Blossberg loam, 0 to 4 percent slopes, rarely flooded	6	50.0	4.1%
835	Tetonview loam, 0 to 4 percent slopes, rarely flooded	6	10.9	0.9%
DUMPS	Dumps, sanitary landfill		5.5	0.5%
Totals for Area of Interest			1,225.6	100.0%

Rating Options—Wind Erodibility Group (Deer Lodge Well Soil Map)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Custom Soil Resource Report

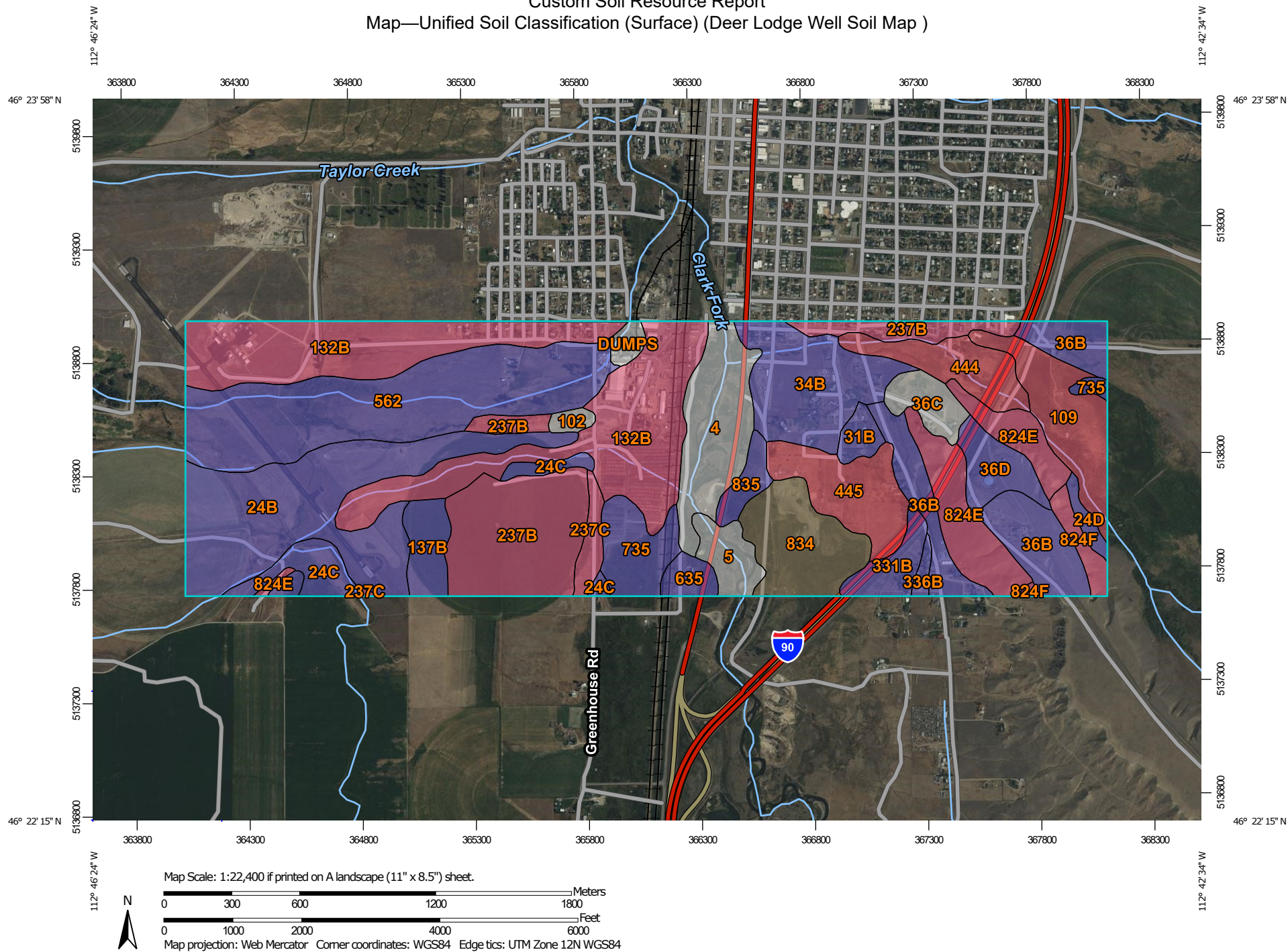
Unified Soil Classification (Surface) (Deer Lodge Well Soil Map)

The Unified soil classification system classifies mineral and organic mineral soils for engineering purposes on the basis of particle-size characteristics, liquid limit, and plasticity index. It identifies three major soil divisions: (i) coarse-grained soils having less than 50 percent, by weight, particles smaller than 0.074 mm in diameter; (ii) fine-grained soils having 50 percent or more, by weight, particles smaller than 0.074 mm in diameter; and (iii) highly organic soils that demonstrate certain organic characteristics. These divisions are further subdivided into a total of 15 basic soil groups. The major soil divisions and basic soil groups are determined on the basis of estimated or measured values for grain-size distribution and Atterberg limits. ASTM D 2487 shows the criteria chart used for classifying soil in the Unified system and the 15 basic soil groups of the system and the plasticity chart for the Unified system.

The various groupings of this classification correlate in a general way with the engineering behavior of soils. This correlation provides a useful first step in any field or laboratory investigation for engineering purposes. It can serve to make some general interpretations relating to probable performance of the soil for engineering uses.

For each soil horizon in the database one or more Unified soil classifications may be listed. One is marked as the representative or most commonly occurring. The representative classification is shown here for the surface layer of the soil.

Custom Soil Resource Report
Map—Unified Soil Classification (Surface) (Deer Lodge Well Soil Map)



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 CH
 CL
 CL-A (proposed)
 CL-K (proposed)
 CL-ML
 CL-O (proposed)
 CL-T (proposed)
 GC
 GC-GM
 GM
 GP
 GP-GC
 GP-GM
 GW
 GW-GC
 GW-GM
 MH
 MH-A (proposed)
 MH-K (proposed)
 MH-O (proposed)
 MH-T (proposed)
 ML

 ML-A (proposed)
 ML-K (proposed)
 ML-O (proposed)
 ML-T (proposed)
 OH
 OH-T (proposed)
 OL
 PT
 SC
 SC-SM
 SM
 SP
 SP-SC
 SP-SM
 SW
 SW-SC
 SW-SM
 Not rated or not available

Soil Rating Lines

 CH
 CL
 CL-A (proposed)
 CL-K (proposed)
 CL-ML
 CL-O (proposed)
 CL-T (proposed)

 GC
 GC-GM
 GM
 GP
 GP-GC
 GP-GM
 GW
 GW-GC
 GW-GM
 MH
 MH-A (proposed)
 MH-K (proposed)
 MH-O (proposed)
 MH-T (proposed)
 ML
 ML-A (proposed)
 ML-K (proposed)
 ML-O (proposed)
 ML-T (proposed)
 OH
 OH-T (proposed)
 OL
 PT
 SC
 SC-SM
 SM

 SP
 SP-SC
 SP-SM
 SW
 SW-SC
 SW-SM
 Not rated or not available

Soil Rating Points

 CH
 CL
 CL-A (proposed)
 CL-K (proposed)
 CL-ML
 CL-O (proposed)
 CL-T (proposed)
 GC
 GC-GM
 GM
 GP
 GP-GC
 GP-GM
 GW
 GW-GC
 GW-GM
 MH
 MH-A (proposed)

 MH-K (proposed)
 MH-O (proposed)
 MH-T (proposed)
 ML
 ML-A (proposed)
 ML-K (proposed)
 ML-O (proposed)
 ML-T (proposed)

 OH
 OH-T (proposed)
 OL
 PT
 SC
 SC-SM
 SM
 SP
 SP-SC
 SP-SM
 SW
 SW-SC
 SW-SM
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails

Custom Soil Resource Report

MAP INFORMATION

-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads
- Background

 Aerial Photography

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Powell County Area, Montana
Survey Area Data: Version 20, Aug 29, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 13, 2022—Aug 16, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Custom Soil Resource Report

Table—Unified Soil Classification (Surface) (Deer Lodge Well Soil Map)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
4	Aquents-Slickens complex, 0 to 2 percent slopes, occasionally flooded		55.7	4.5%
5	Slickens-Aquents complex, 0 to 2 percent slopes, occasionally flooded		17.7	1.4%
24B	Conn loam, 0 to 4 percent slopes	CL	133.2	10.9%
24C	Conn loam, 4 to 8 percent slopes	CL	25.5	2.1%
24D	Conn loam, 8 to 15 percent slopes	CL	5.5	0.4%
31B	Varney clay loam, 0 to 4 percent slopes	CL	8.7	0.7%
34B	Cetrack loam, 0 to 4 percent slopes	CL	64.6	5.3%
36B	Varney-Conn loams, 0 to 4 percent slopes	CL	74.0	6.0%
36C	Varney-Conn loams, 4 to 8 percent slopes		16.8	1.4%
36D	Varney-Conn loams, 8 to 15 percent slopes	CL	21.9	1.8%
102	Pits, gravel		4.4	0.4%
109	Bohnly silt loam, 0 to 2 percent slopes	PT	45.7	3.7%
132B	Beaverell cobbly loam, 0 to 4 percent slopes	SC	198.8	16.2%
137B	Sixbeacon cobbly loam, 0 to 4 percent slopes	CL	18.9	1.5%
137D	Sixbeacon cobbly loam, 8 to 15 percent slopes	CL	2.8	0.2%
237B	Sixbeacon gravelly loam, 0 to 4 percent slopes	SC	101.1	8.3%
237C	Sixbeacon gravelly loam, 4 to 8 percent slopes	SC	10.6	0.9%
331B	Varney clay loam, 0 to 4 percent slopes, impacted	CL	16.6	1.4%
336B	Varney-Anaconda loams, 0 to 4 percent slopes, impacted	CL	3.4	0.3%
444	Gregson loam, 0 to 4 percent slopes, rarely flooded	PT	31.8	2.6%

Custom Soil Resource Report

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
445	Saypo loam, 0 to 4 percent slopes, rarely flooded	PT	43.3	3.5%
562	Carten loam, 0 to 4 percent slopes	CL	148.2	12.1%
635	Tetonview loam, 0 to 4 percent slopes	CL	9.6	0.8%
735	Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded	CL	31.2	2.5%
824E	Conn-Sixbeacon cobbly loams, 15 to 35 percent slopes	SC	58.3	4.8%
824F	Conn-Sixbeacon cobbly loams, 35 to 60 percent slopes	SC	10.7	0.9%
834	Blossberg loam, 0 to 4 percent slopes, rarely flooded	ML	50.0	4.1%
835	Tetonview loam, 0 to 4 percent slopes, rarely flooded	CL	10.9	0.9%
DUMPS	Dumps, sanitary landfill		5.5	0.5%
Totals for Area of Interest			1,225.6	100.0%

Rating Options—Unified Soil Classification (Surface) (Deer Lodge Well Soil Map)

Aggregation Method: Dominant Condition

Component Percent Cutoff: 10

Tie-break Rule: Lower

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelpdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf



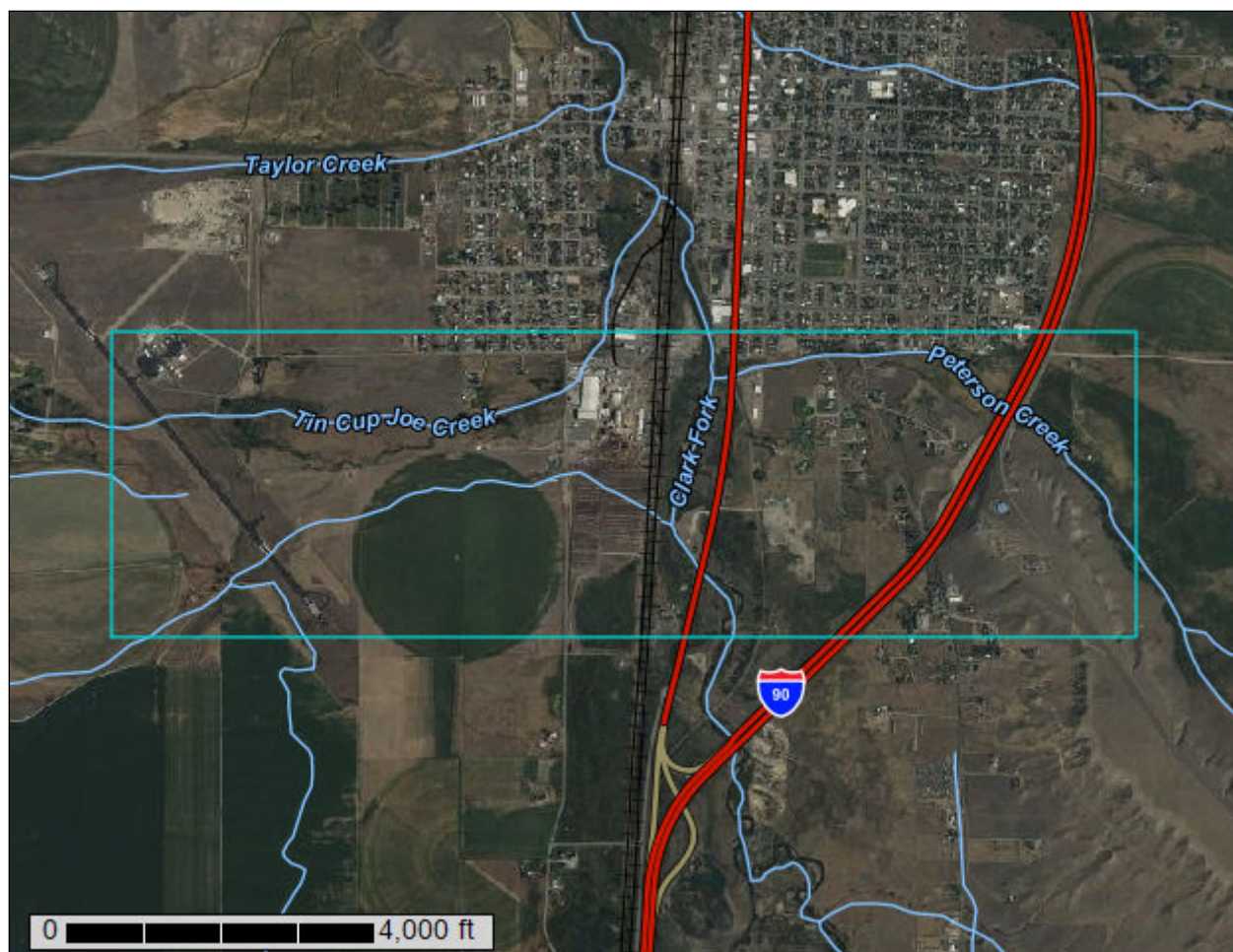
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Powell County Area, Montana**



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface..... 2

Soil Information for All Uses.....5

 Soil Reports..... 5

 Soil Physical Properties..... 5

 Physical Soil Properties (Deer Lodge Well Soil Map)..... 5

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Physical Soil Properties (Deer Lodge Well Soil Map)

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is

Custom Soil Resource Report

given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (K_{sat}), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (K_{sat}) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (K_{sat}) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause

Custom Soil Resource Report

damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (<http://soils.usda.gov>)

Custom Soil Resource Report

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties—Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
4—Aquests-Slickens complex, 0 to 2 percent slopes, occasionally flooded														
Aquests	—	—	—	—	—	—	—	—	—					
Slickens	—	—	—	—	—	—	—	—	—					
5—Slickens-Aquests complex, 0 to 2 percent slopes, occasionally flooded														
Slickens	—	—	—	—	—	—	—	—	—					
Aquests	—	—	—	—	—	—	—	—	—					
24B—Conn loam, 0 to 4 percent slopes														
Conn	0-7	-40-	-38-	18-23- 27	-1.39-	4.00-9.00-14.00	0.11-0.14-0.17	1.7- 2.8- 4.1	2.0- 3.0- 4.0	.28	.28	5	6	48
	7-11	-35-	-33-	18-33- 35	-1.35-	4.00-9.00-14.00	0.14-0.16-0.18	1.6- 4.5- 5.9	1.0- 2.0- 3.0	.24	.24			
	11-34	-38-	-36-	18-27- 35	-1.50-	4.00-9.00-14.00	0.13-0.15-0.17	0.8- 2.0- 4.6	0.5- 0.8- 1.0	.32	.32			
	34-60	-40-	-38-	18-23- 27	-1.53-	4.00-9.00-14.00	0.12-0.15-0.17	0.9- 1.5- 3.1	0.0- 0.3- 0.5	.24	.37			

Custom Soil Resource Report

Physical Soil Properties—Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
24C—Conn loam, 4 to 8 percent slopes														
Conn	0-7	-40-	-38-	18-23- 27	-1.39-	4.00-9.00-14.00	0.11-0.14-0.17	1.7- 2.8- 4.1	2.0- 3.0- 4.0	.28	.28	5	6	48
	7-11	-35-	-33-	18-33- 35	-1.35-	4.00-9.00-14.00	0.14-0.16-0.18	1.6- 4.5- 5.9	1.0- 2.0- 3.0	.24	.24			
	11-34	-38-	-36-	18-27- 35	-1.50-	4.00-9.00-14.00	0.13-0.15-0.17	0.8- 2.0- 4.6	0.5- 0.8- 1.0	.32	.32			
	34-60	-40-	-38-	18-23- 27	-1.53-	4.00-9.00-14.00	0.12-0.15-0.17	0.9- 1.5- 3.1	0.0- 0.3- 0.5	.24	.37			
24D—Conn loam, 8 to 15 percent slopes														
Conn	0-7	-40-	-38-	18-23- 27	-1.39-	4.00-9.00-14.00	0.11-0.14-0.17	1.7- 2.8- 4.1	2.0- 3.0- 4.0	.28	.28	5	6	48
	7-11	-35-	-33-	18-33- 35	-1.35-	4.00-9.00-14.00	0.14-0.16-0.18	1.6- 4.5- 5.9	1.0- 2.0- 3.0	.24	.24			
	11-34	-38-	-36-	18-27- 35	-1.50-	4.00-9.00-14.00	0.13-0.15-0.17	0.8- 2.0- 4.6	0.5- 0.8- 1.0	.32	.32			
	34-60	-40-	-38-	18-23- 27	-1.53-	4.00-9.00-14.00	0.12-0.15-0.17	0.9- 1.5- 3.1	0.0- 0.3- 0.5	.24	.37			

Custom Soil Resource Report

Physical Soil Properties—Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/in	Pct	Pct					
31B—Varney clay loam, 0 to 4 percent slopes														
Varney	0-7	-34-	-37-	27-29- 30	-1.38-	4.00-9.00-14.00	0.14-0.16-0.18	3.4- 3.9- 4.8	2.0- 3.0- 4.0	.20	.20	5	6	48
	7-12	-35-	-34-	27-31- 35	-1.39-	4.00-9.00-14.00	0.12-0.14-0.15	2.5- 4.3- 5.8	1.0- 1.5- 2.0	.28	.28			
	12-28	-42-	-38-	10-20- 30	-1.44-	4.00-9.00-14.00	0.11-0.12-0.13	0.3- 1.2- 3.8	0.5- 0.8- 1.0	.37	.37			
	28-36	-81-	- 9-	5-10- 15	-1.64-	4.00-9.00-14.00	0.09-0.10-0.10	0.1- 0.7- 1.2	0.0- 0.3- 0.5	.10	.20			
	36-44	-45-	-40-	10-15- 20	-1.54-	4.00-9.00-14.00	0.09-0.10-0.10	0.4- 1.1- 1.5	0.0- 0.3- 0.5	.37	.37			
	44-52	-81-	- 9-	5-10- 15	-1.64-	4.00-9.00-14.00	0.09-0.10-0.10	0.1- 0.7- 1.2	0.0- 0.3- 0.5	.10	.20			
	52-60	-45-	-40-	10-15- 20	-1.54-	4.00-9.00-14.00	0.09-0.10-0.10	0.4- 1.1- 1.5	0.0- 0.3- 0.5	.37	.37			
34B—Cetrack loam, 0 to 4 percent slopes														
Cetrack	0-6	-42-	-38-	15-20- 25	-1.41-	4.00-9.00-14.00	0.16-0.18-0.20	1.4- 2.1- 3.6	2.0- 3.0- 4.0	.24	.24	3	6	48
	6-11	-37-	-37-	22-26- 32	-1.43-	4.00-9.00-14.00	0.14-0.16-0.18	1.9- 3.3- 5.2	1.0- 2.0- 3.0	.28	.28			
	11-30	-41-	-37-	18-22- 25	-1.52-	4.00-9.00-14.00	0.14-0.16-0.18	1.0- 1.6- 2.7	0.5- 0.8- 1.0	.37	.37			
	30-60	-79-	-17-	0- 5- 10	-1.60-	42.00-92.00-141.00	0.02-0.03-0.03	0.0- 0.2- 0.6	0.0- 0.3- 0.5	.05	.15			

Custom Soil Resource Report

Physical Soil Properties–Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/in	Pct	Pct					
36B—Varney-Conn loams, 0 to 4 percent slopes														
Varney	0-8	-40-	-38-	18-23- 27	-1.39-	4.00-9.00-14.00	0.16-0.18-0.20	1.5- 2.4- 3.7	2.0- 3.0- 4.0	.24	.24	5	6	48
	8-14	-35-	-33-	30-33- 35	-1.38-	4.00-9.00-14.00	0.12-0.14-0.15	2.9- 3.8- 5.8	1.0- 1.5- 2.0	.15	.28			
	14-23	-67-	-15-	10-18- 30	-1.53-	4.00-9.00-14.00	0.11-0.12-0.13	0.3- 1.0- 3.8	0.5- 0.8- 1.0	.10	.20			
	23-36	-81-	- 9-	5-10- 15	-1.64-	4.00-9.00-14.00	0.09-0.10-0.10	0.1- 0.7- 1.2	0.0- 0.3- 0.5	.10	.20			
	36-44	-45-	-40-	10-15- 20	-1.54-	4.00-9.00-14.00	0.09-0.10-0.10	0.4- 1.1- 1.5	0.0- 0.3- 0.5	.37	.37			
	44-52	-81-	- 9-	5-10- 15	-1.64-	4.00-9.00-14.00	0.09-0.10-0.10	0.1- 0.7- 1.2	0.0- 0.3- 0.5	.10	.20			
	52-60	-45-	-40-	10-15- 20	-1.54-	4.00-9.00-14.00	0.09-0.10-0.10	0.4- 1.1- 1.5	0.0- 0.3- 0.5	.37	.37			
Conn	0-7	-40-	-38-	18-23- 27	-1.39-	4.00-9.00-14.00	0.11-0.14-0.17	1.7- 2.8- 4.1	2.0- 3.0- 4.0	.28	.28	5	6	48
	7-11	-35-	-33-	18-33- 35	-1.35-	4.00-9.00-14.00	0.14-0.16-0.18	1.6- 4.5- 5.9	1.0- 2.0- 3.0	.24	.24			
	11-34	-38-	-36-	18-27- 35	-1.50-	4.00-9.00-14.00	0.13-0.15-0.17	0.8- 2.0- 4.6	0.5- 0.8- 1.0	.32	.32			
	34-60	-40-	-38-	18-23- 27	-1.53-	4.00-9.00-14.00	0.12-0.15-0.17	0.9- 1.5- 3.1	0.0- 0.3- 0.5	.24	.37			

Custom Soil Resource Report

Physical Soil Properties–Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/in	Pct	Pct					
36C—Varney-Conn loams, 4 to 8 percent slopes														
Varney	0-7	-40-	-38-	18-23- 27	1.10-1.20-1.30	4.00-9.00-14.00	0.16-0.18-0.20	0.0- 1.5- 2.9	2.0- 3.0- 4.0	.24	.24	5	6	48
	7-12	-35-	-34-	27-31- 35	1.45-1.55-1.65	4.00-9.00-14.00	0.12-0.14-0.15	3.0- 4.5- 5.9	1.0- 1.5- 2.0	.28	.28			
	12-28	-42-	-38-	10-20- 30	1.50-1.60-1.70	4.00-9.00-14.00	0.11-0.12-0.13	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.37	.37			
	28-36	-81-	- 9-	5-10- 15	-1.64-	4.00-9.00-14.00	0.09-0.10-0.10	0.1- 0.7- 1.2	0.0- 0.3- 0.5	.10	.20			
	36-44	-45-	-40-	10-15- 20	-1.54-	4.00-9.00-14.00	0.09-0.10-0.10	0.4- 1.1- 1.5	0.0- 0.3- 0.5	.37	.37			
	44-52	-81-	- 9-	5-10- 15	-1.64-	4.00-9.00-14.00	0.09-0.10-0.10	0.1- 0.7- 1.2	0.0- 0.3- 0.5	.10	.20			
	52-60	-45-	-40-	10-15- 20	-1.54-	4.00-9.00-14.00	0.09-0.10-0.10	0.4- 1.1- 1.5	0.0- 0.3- 0.5	.37	.37			
Conn	0-7	-40-	-38-	18-23- 27	-1.39-	4.00-9.00-14.00	0.11-0.14-0.17	1.7- 2.8- 4.1	2.0- 3.0- 4.0	.28	.28	5	6	48
	7-11	-35-	-33-	18-33- 35	-1.35-	4.00-9.00-14.00	0.14-0.16-0.18	1.6- 4.5- 5.9	1.0- 2.0- 3.0	.24	.24			
	11-34	-38-	-36-	18-27- 35	-1.50-	4.00-9.00-14.00	0.13-0.15-0.17	0.8- 2.0- 4.6	0.5- 0.8- 1.0	.32	.32			
	34-60	-40-	-38-	18-23- 27	-1.53-	4.00-9.00-14.00	0.12-0.15-0.17	0.9- 1.5- 3.1	0.0- 0.3- 0.5	.24	.37			

Custom Soil Resource Report

Physical Soil Properties—Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/in	Pct	Pct					
36D—Varney-Conn loams, 8 to 15 percent slopes														
Varney	0-8	-40-	-38-	18-23- 27	-1.39-	4.00-9.00-14.00	0.16-0.18-0.20	1.5- 2.4- 3.7	2.0- 3.0- 4.0	.24	.24	5	6	48
	8-14	-35-	-33-	30-33- 35	-1.38-	4.00-9.00-14.00	0.12-0.14-0.15	2.9- 3.8- 5.8	1.0- 1.5- 2.0	.15	.28			
	14-23	-67-	-15-	10-18- 30	-1.53-	4.00-9.00-14.00	0.11-0.12-0.13	0.3- 1.0- 3.8	0.5- 0.8- 1.0	.10	.20			
	23-36	-81-	- 9-	5-10- 15	-1.64-	4.00-9.00-14.00	0.09-0.10-0.10	0.1- 0.7- 1.2	0.0- 0.3- 0.5	.10	.20			
	36-44	-45-	-40-	10-15- 20	-1.54-	4.00-9.00-14.00	0.09-0.10-0.10	0.4- 1.1- 1.5	0.0- 0.3- 0.5	.37	.37			
	44-52	-81-	- 9-	5-10- 15	-1.64-	4.00-9.00-14.00	0.09-0.10-0.10	0.1- 0.7- 1.2	0.0- 0.3- 0.5	.10	.20			
	52-60	-45-	-40-	10-15- 20	-1.54-	4.00-9.00-14.00	0.09-0.10-0.10	0.4- 1.1- 1.5	0.0- 0.3- 0.5	.37	.37			
Conn	0-7	-40-	-38-	18-23- 27	-1.39-	4.00-9.00-14.00	0.11-0.14-0.17	1.7- 2.8- 4.1	2.0- 3.0- 4.0	.28	.28	5	6	48
	7-11	-35-	-33-	18-33- 35	-1.35-	4.00-9.00-14.00	0.14-0.16-0.18	1.6- 4.5- 5.9	1.0- 2.0- 3.0	.24	.24			
	11-34	-38-	-36-	18-27- 35	-1.50-	4.00-9.00-14.00	0.13-0.15-0.17	0.8- 2.0- 4.6	0.5- 0.8- 1.0	.32	.32			
	34-60	-40-	-38-	18-23- 27	-1.53-	4.00-9.00-14.00	0.12-0.15-0.17	0.9- 1.5- 3.1	0.0- 0.3- 0.5	.24	.37			
102—Pits, gravel														
Pits, gravel	—	—	—	—	—	—	—	—	—					

Custom Soil Resource Report

Physical Soil Properties—Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/in	Pct	Pct					
109—Bohnly silt loam, 0 to 2 percent slopes														
Bohnly	0-4	—	—	—	0.26-0.31-0.37	42.00-373.00-705.00	0.15-0.30-0.45	—	28.0-50.0-70.0			5	6	48
	4-16	- 7-	-70-	18-23- 27	-1.19-	4.00-9.00-14.00	0.18-0.19-0.20	1.7- 2.6- 3.4	4.0- 6.0- 8.0	.32	.32			
	16-60	- 7-	-68-	18-25- 32	-1.38-	4.00-9.00-14.00	0.18-0.19-0.20	1.9- 3.4- 5.0	0.5- 0.8- 1.0	.49	.49			
132B—Beaverell cobbly loam, 0 to 4 percent slopes														
Beaverell	0-5	-43-	-39-	10-19- 27	-1.38-	4.00-9.00-14.00	0.12-0.14-0.16	0.6- 1.5- 3.4	1.0- 2.0- 3.0	.17	.32	2	6	48
	5-20	-38-	-36-	20-26- 35	-1.43-	4.00-9.00-14.00	0.06-0.08-0.10	0.9- 2.0- 3.6	0.5- 0.8- 1.0	.10	.32			
	20-27	-90-	- 7-	0- 3- 5	-1.62-	42.00-92.00-141.00	0.02-0.03-0.04	0.0- 0.0- 0.1	0.0- 0.3- 0.5	.02	.15			
	27-38	-80-	-17-	0- 3- 5	-1.62-	42.00-92.00-141.00	0.02-0.03-0.04	0.0- 0.0- 0.2	0.0- 0.3- 0.5	.05	.15			
	38-49	-90-	- 7-	0- 3- 5	-1.62-	42.00-92.00-141.00	0.02-0.03-0.04	0.0- 0.0- 0.1	0.0- 0.3- 0.5	.02	.15			
	49-60	-80-	-17-	0- 3- 5	-1.62-	42.00-92.00-141.00	0.02-0.03-0.04	0.0- 0.0- 0.2	0.0- 0.3- 0.5	.05	.15			

Custom Soil Resource Report

Physical Soil Properties—Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
137B— Sixbeacon cobbly loam, 0 to 4 percent slopes														
Sixbeacon	0-4	-39-	-37-	20-24- 27	-1.38-	4.00-9.00-14.00	0.12-0.14-0.15	1.5- 2.6- 3.4	2.0- 3.0- 4.0	.15	.24	3	7	38
	4-12	-39-	-37-	20-24- 27	-1.38-	4.00-9.00-14.00	0.14-0.16-0.18	1.2- 2.5- 3.7	1.0- 1.5- 2.0	.32	.32			
	12-24	-66-	-19-	10-15- 20	-1.45-	4.00-9.00-14.00	0.06-0.08-0.10	0.1- 0.6- 0.7	0.5- 0.8- 1.0	.10	.24			
	24-60	-81-	-17-	0- 3- 5	-1.62-	42.00-92.00-141.00	0.02-0.03-0.03	0.0- 0.0- 0.0	0.0- 0.3- 0.5	.02	.15			
137D— Sixbeacon cobbly loam, 8 to 15 percent slopes														
Sixbeacon, cobbly	0-4	-39-	-37-	20-24- 27	-1.38-	4.00-9.00-14.00	0.12-0.14-0.15	1.5- 2.6- 3.4	2.0- 3.0- 4.0	.15	.24	3	7	38
	4-12	-39-	-37-	20-24- 27	-1.38-	4.00-9.00-14.00	0.14-0.16-0.18	1.2- 2.5- 3.7	1.0- 1.5- 2.0	.32	.32			
	12-24	-66-	-19-	10-15- 20	-1.45-	4.00-9.00-14.00	0.06-0.08-0.10	0.1- 0.6- 0.7	0.5- 0.8- 1.0	.10	.24			
	24-60	-81-	-17-	0- 3- 5	-1.62-	42.00-92.00-141.00	0.02-0.03-0.03	0.0- 0.0- 0.0	0.0- 0.3- 0.5	.02	.15			

Custom Soil Resource Report

Physical Soil Properties—Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
237B— Sixbeacon gravelly loam, 0 to 4 percent slopes														
Sixbeacon	0-4	-39-	-37-	20-24- 27	-1.38-	4.00-9.00-14.00	0.12-0.14-0.15	1.5- 2.5- 3.4	2.0- 3.0- 4.0	.15	.24	3	7	38
	4-12	-39-	-37-	20-24- 27	-1.38-	4.00-9.00-14.00	0.14-0.16-0.18	1.2- 2.5- 3.7	1.0- 1.5- 2.0	.32	.32			
	12-24	-66-	-19-	10-15- 20	-1.45-	4.00-9.00-14.00	0.06-0.08-0.10	0.1- 0.6- 0.7	0.5- 0.8- 1.0	.10	.24			
	24-60	-81-	-17-	0- 3- 5	-1.62-	42.00-92.00-141.00	0.02-0.03-0.03	0.0- 0.0- 0.0	0.0- 0.3- 0.5	.02	.15			
237C— Sixbeacon gravelly loam, 4 to 8 percent slopes														
Sixbeacon	0-4	-39-	-37-	20-24- 27	-1.38-	4.00-9.00-14.00	0.12-0.14-0.15	1.5- 2.5- 3.4	2.0- 3.0- 4.0	.15	.24	3	7	38
	4-12	-39-	-37-	20-24- 27	-1.38-	4.00-9.00-14.00	0.14-0.16-0.18	1.2- 2.5- 3.7	1.0- 1.5- 2.0	.32	.32			
	12-24	-66-	-19-	10-15- 20	-1.45-	4.00-9.00-14.00	0.06-0.08-0.10	0.1- 0.6- 0.7	0.5- 0.8- 1.0	.10	.24			
	24-60	-81-	-17-	0- 3- 5	-1.62-	42.00-92.00-141.00	0.02-0.03-0.03	0.0- 0.0- 0.0	0.0- 0.3- 0.5	.02	.15			

Custom Soil Resource Report

Physical Soil Properties—Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
331B—Varney clay loam, 0 to 4 percent slopes, impacted														
Varney	0-7	-34-	-37-	27-29- 30	-1.38-	4.00-9.00-14.00	0.14-0.16-0.18	3.4- 3.9- 4.8	2.0- 3.0- 4.0	.20	.20	5	6	48
	7-12	-35-	-34-	27-31- 35	-1.39-	4.00-9.00-14.00	0.12-0.14-0.15	2.5- 4.3- 5.8	1.0- 1.5- 2.0	.28	.28			
	12-28	-42-	-38-	10-20- 30	-1.44-	4.00-9.00-14.00	0.11-0.12-0.13	0.3- 1.2- 3.8	0.5- 0.8- 1.0	.37	.37			
	28-36	-81-	- 9-	5-10- 15	-1.64-	4.00-9.00-14.00	0.09-0.10-0.10	0.1- 0.7- 1.2	0.0- 0.3- 0.5	.10	.20			
	36-44	-45-	-40-	10-15- 20	-1.54-	4.00-9.00-14.00	0.09-0.10-0.10	0.4- 1.1- 1.5	0.0- 0.3- 0.5	.37	.37			
	44-52	-81-	- 9-	5-10- 15	-1.64-	4.00-9.00-14.00	0.09-0.10-0.10	0.1- 0.7- 1.2	0.0- 0.3- 0.5	.10	.20			
	52-60	-45-	-40-	10-15- 20	-1.54-	4.00-9.00-14.00	0.09-0.10-0.10	0.4- 1.1- 1.5	0.0- 0.3- 0.5	.37	.37			

Custom Soil Resource Report

Physical Soil Properties—Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
336B—Varney-Anaconda loams, 0 to 4 percent slopes, impacted														
Varney	0-7	-40-	-38-	18-23- 27	-1.39-	4.00-9.00-14.00	0.16-0.18-0.20	1.7- 2.6- 4.1	2.0- 3.0- 4.0	.24	.24	5	6	48
	7-12	-35-	-34-	27-31- 35	-1.39-	4.00-9.00-14.00	0.12-0.14-0.15	3.3- 4.4- 5.8	1.0- 1.5- 2.0	.28	.28			
	12-60	-67-	-15-	10-18- 30	-1.53-	4.00-9.00-14.00	0.11-0.12-0.13	0.6- 1.4- 4.6	0.5- 0.8- 1.0	.10	.20			
Anaconda	0-8	-66-	-23-	5-12- 18	-1.43-	4.00-9.00-14.00	0.13-0.15-0.17	0.3- 1.1- 2.0	2.0- 3.0- 4.0	.17	.17	5	5	56
	8-14	-66-	-23-	5-12- 18	-1.55-	4.00-9.00-14.00	0.12-0.14-0.15	0.3- 1.1- 1.9	1.0- 1.5- 2.0	.28	.28			
	14-27	-66-	-23-	5-12- 18	-1.45-	4.00-9.00-14.00	0.11-0.13-0.14	0.2- 1.0- 1.9	0.5- 0.8- 1.0	.28	.28			
	27-60	-66-	-23-	5-12- 18	-1.45-	4.00-9.00-14.00	0.10-0.13-0.15	0.2- 1.0- 1.9	0.0- 0.3- 0.5	.28	.28			

Custom Soil Resource Report

Physical Soil Properties—Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/In	Pct	Pct					
444—Gregson loam, 0 to 4 percent slopes, rarely flooded														
Gregson	0-1	—	—	—	0.10-0.20-0.30	42.00-373.00-705.00	0.15-0.30-0.45	—	28.0-50.0-70.0			3	6	48
	1-9	-40-	-38-	18-23- 27	-1.22-	4.00-9.00-14.00	0.19-0.21-0.22	2.0- 3.0- 4.1	3.0- 5.0- 7.0	.20	.20			
	9-23	-38-	-36-	18-27- 35	-1.41-	4.00-9.00-14.00	0.18-0.20-0.21	1.9- 3.9- 5.9	2.0- 3.0- 4.0	.20	.20			
	23-60	-81-	-17-	0- 3- 5	-1.56-	42.00-92.00-141.00	0.03-0.04-0.05	0.0- 0.0- 0.2	0.5- 0.8- 1.0	.05	.15			
445—Saypo loam, 0 to 4 percent slopes, rarely flooded														
Saypo	0-2	—	—	—	0.13-0.36-0.53	10.00-30.00-50.00	0.30-0.45-0.60	—	55.0-70.0-90.0			5	4L	86
	2-9	-39-	-37-	22-25- 27	-1.40-	4.00-9.00-14.00	0.15-0.17-0.19	2.2- 3.1- 3.9	3.0- 4.0- 5.0	.24	.24			
	9-17	-20-	-54-	22-26- 35	-1.36-	4.00-9.00-14.00	0.13-0.15-0.17	1.3- 2.3- 4.7	1.0- 1.5- 2.0	.37	.37			
	17-49	-18-	-54-	22-29- 35	-1.43-	1.40-2.70-4.00	0.11-0.13-0.14	0.7- 2.2- 4.2	0.5- 0.8- 1.0	.43	.43			
	49-60	-39-	-37-	22-24- 40	-1.40-	1.40-2.70-4.00	0.10-0.12-0.13	1.3- 2.5- 6.2	0.5- 0.8- 1.0	.37	.37			

Custom Soil Resource Report

Physical Soil Properties—Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
562—Carten loam, 0 to 4 percent slopes														
Carten	0-7	-40-	-38-	18-23- 27	-1.44-	4.00-9.00-14.00	0.14-0.16-0.18	1.6- 2.6- 4.0	2.0- 3.0- 4.0	.28	.28	2	6	48
	7-11	-39-	-37-	20-25- 30	-1.41-	1.40-2.70-4.00	0.15-0.17-0.19	1.4- 3.1- 4.4	1.0- 2.0- 3.0	.28	.28			
	11-17	-34-	-38-	20-28- 30	-1.33-	1.40-2.70-4.00	0.13-0.15-0.16	1.2- 2.6- 3.7	1.0- 2.0- 3.0	.15	.32			
	17-60	-78-	-16-	2- 6- 10	-1.60-	42.00-92.00-141.00	0.03-0.04-0.05	0.0- 0.2- 0.6	0.0- 0.3- 0.5	.05	.15			
635—Tetonview loam, 0 to 4 percent slopes														
Tetonview	0-9	-39-	-37-	20-24- 27	-1.40-	4.00-9.00-14.00	0.16-0.18-0.20	1.9- 3.1- 4.0	2.0- 3.5- 5.0	.24	.24	5	6	48
	9-42	-35-	-38-	20-28- 35	-1.35-	1.40-2.70-4.00	0.14-0.16-0.18	0.9- 2.6- 4.8	1.0- 1.5- 2.0	.32	.32			
	42-60	-57-	-18-	20-25- 30	-1.62-	1.40-2.70-4.00	0.11-0.13-0.14	0.7- 1.7- 3.1	0.5- 0.8- 1.0	.15	.24			

Custom Soil Resource Report

Physical Soil Properties—Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
735— Tetonview- Blossberg loams, 0 to 4 percent slopes, rarely flooded														
Tetonview	0-9	-39-	-37-	20-24- 27	-1.40-	4.00-9.00-14.00	0.16-0.18-0.2 0	2.0- 3.1- 4.1	2.0- 3.5- 5.0	.24	.24	5	6	48
	9-42	-35-	-38-	20-28- 35	-1.35-	1.40-2.70-4.00	0.14-0.16-0.1 8	1.9- 3.7- 5.8	1.0- 1.5- 2.0	.32	.32			
	42-60	-57-	-18-	20-25- 30	-1.62-	1.40-2.70-4.00	0.11-0.13-0.1 4	1.4- 2.5- 3.9	0.5- 0.8- 1.0	.15	.24			
Blossberg	0-14	-40-	-38-	18-23- 27	-1.22-	4.00-9.00-14.00	0.14-0.16-0.1 8	1.7- 2.7- 4.1	4.0- 5.0- 6.0	.20	.20	3	6	48
	14-23	-38-	-36-	18-27- 35	-1.38-	1.40-7.70-14.00	0.15-0.17-0.1 8	1.7- 3.4- 5.9	2.0- 3.0- 4.0	.28	.28			
	23-28	-44-	-41-	10-15- 20	-1.41-	4.00-23.00-42.0 0	0.09-0.10-0.1 1	0.5- 1.1- 2.0	1.0- 1.5- 2.0	.17	.37			
	28-60	-94-	- 1-	0- 5- 10	-1.65-	42.00-92.00-14 1.00	0.02-0.03-0.0 3	0.0- 0.2- 0.6	0.0- 0.3- 0.5	.02	.02			

Custom Soil Resource Report

Physical Soil Properties—Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
824E—Conn- Sixbeacon cobbly loams, 15 to 35 percent slopes														
Conn	0-8	-40-	-30-	27-30- 32	-1.40-	4.00-9.00-14.00	0.11-0.13-0.1 4	2.6- 3.4- 4.4	2.0- 3.0- 4.0	.10	.20	5	7	38
	8-14	-35-	-33-	18-33- 35	-1.35-	4.00-9.00-14.00	0.14-0.16-0.1 8	1.6- 4.5- 5.9	1.0- 2.0- 3.0	.24	.24			
	14-23	-38-	-36-	18-27- 35	-1.50-	4.00-9.00-14.00	0.13-0.15-0.1 7	0.8- 2.0- 4.6	0.5- 0.8- 1.0	.32	.32			
	23-60	-40-	-38-	18-23- 27	-1.53-	4.00-9.00-14.00	0.12-0.14-0.1 6	0.9- 1.5- 3.1	0.0- 0.3- 0.5	.24	.37			
Sixbeacon, cobbly	0-5	-39-	-37-	20-24- 27	-1.45-	4.00-9.00-14.00	0.12-0.14-0.1 5	1.5- 2.6- 3.4	2.0- 3.0- 4.0	.15	.24	5	7	38
	5-14	-39-	-37-	20-24- 27	-1.38-	4.00-9.00-14.00	0.14-0.16-0.1 8	1.2- 2.0- 3.7	1.0- 1.5- 2.0	.15	.32			
	14-60	-66-	-19-	10-15- 20	-1.45-	4.00-9.00-14.00	0.06-0.08-0.1 0	0.2- 0.6- 0.9	0.5- 0.8- 1.0	.10	.24			

Custom Soil Resource Report

Physical Soil Properties—Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
824F—Conn-Sixbeacon cobbly loams, 35 to 60 percent slopes														
Conn	0-8	-40-	-30-	27-30- 32	-1.40-	4.00-9.00-14.00	0.11-0.13-0.14	2.6- 3.4- 4.4	2.0- 3.0- 4.0	.10	.20	5	7	38
	8-14	-35-	-33-	18-33- 35	-1.35-	4.00-9.00-14.00	0.14-0.16-0.18	1.6- 4.5- 5.9	1.0- 2.0- 3.0	.24	.24			
	14-23	-38-	-36-	18-27- 35	-1.50-	4.00-9.00-14.00	0.13-0.15-0.17	0.8- 2.0- 4.6	0.5- 0.8- 1.0	.32	.32			
	23-60	-40-	-38-	18-23- 27	-1.53-	4.00-9.00-14.00	0.12-0.14-0.16	0.9- 1.5- 3.1	0.0- 0.3- 0.5	.24	.37			
Sixbeacon, cobbly	0-5	-39-	-37-	20-24- 27	-1.45-	4.00-9.00-14.00	0.12-0.14-0.15	1.5- 2.6- 3.4	2.0- 3.0- 4.0	.15	.24	5	7	38
	5-14	-39-	-37-	20-24- 27	-1.38-	4.00-9.00-14.00	0.14-0.16-0.18	1.2- 2.0- 3.7	1.0- 1.5- 2.0	.15	.32			
	14-60	-66-	-19-	10-15- 20	-1.45-	4.00-9.00-14.00	0.06-0.08-0.10	0.2- 0.6- 0.9	0.5- 0.8- 1.0	.10	.24			

Custom Soil Resource Report

Physical Soil Properties—Powell County Area, Montana														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/in	Pct	Pct					
834—Blossberg loam, 0 to 4 percent slopes, rarely flooded														
Blossberg	0-14	-40-	-38-	18-23- 27	-1.22-	4.00-9.00-14.00	0.14-0.16-0.18	1.7- 2.7- 4.1	4.0- 5.0- 6.0	.20	.20	3	6	48
	14-23	-38-	-36-	18-27- 35	-1.38-	1.40-7.70-14.00	0.15-0.17-0.18	1.7- 3.4- 5.9	2.0- 3.0- 4.0	.28	.28			
	23-28	-44-	-41-	10-15- 20	-1.41-	4.00-23.00-42.00	0.09-0.10-0.11	0.5- 1.1- 2.0	1.0- 1.5- 2.0	.17	.37			
	28-60	-94-	- 1-	0- 5- 10	-1.65-	42.00-92.00-141.00	0.02-0.03-0.03	0.0- 0.2- 0.6	0.0- 0.3- 0.5	.02	.02			
835—Tetonview loam, 0 to 4 percent slopes, rarely flooded														
Tetonview	0-9	-39-	-37-	20-24- 27	-1.40-	4.00-9.00-14.00	0.16-0.18-0.20	1.9- 3.1- 4.0	2.0- 3.5- 5.0	.24	.24	5	6	48
	9-42	-35-	-38-	20-28- 35	-1.35-	1.40-2.70-4.00	0.14-0.16-0.18	0.9- 2.6- 4.8	1.0- 1.5- 2.0	.32	.32			
	42-60	-57-	-18-	20-25- 30	-1.62-	1.40-2.70-4.00	0.11-0.13-0.14	0.7- 1.7- 3.1	0.5- 0.8- 1.0	.15	.24			
DUMPS—Dumps, sanitary landfill														
Dumps, sanitary landfill	—	—	—	—	—	—	—	—	—					



Deer Lodge Well Replacement EA



July 18, 2024

Wetlands

	Estuarine and Marine Deepwater		Freshwater Emergent Wetland		Lake
	Estuarine and Marine Wetland		Freshwater Forested/Shrub Wetland		Other
			Freshwater Pond		Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.



MONTANA STATE LIBRARY

NATURAL HERITAGE PROGRAM

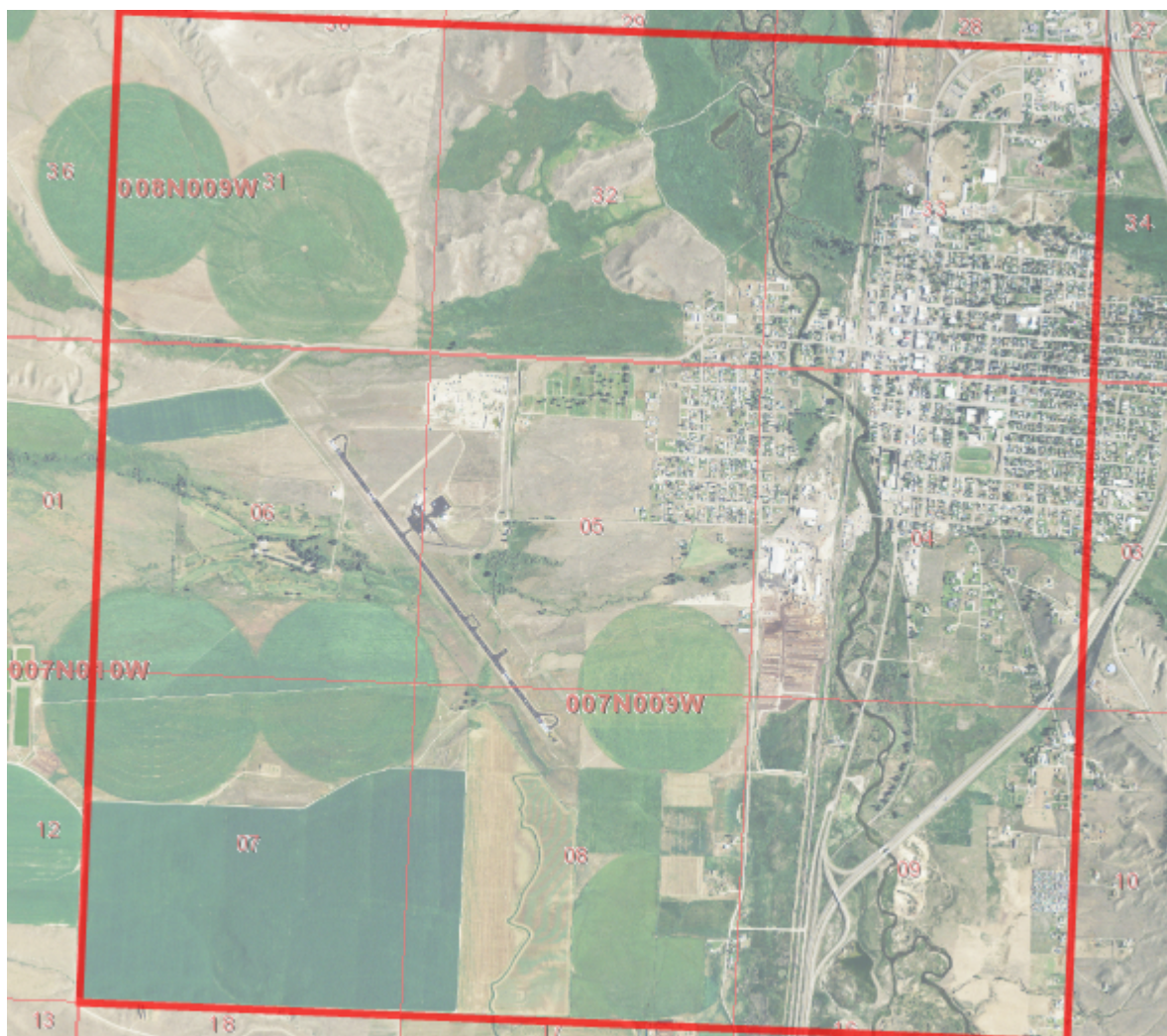
mtnhp.org

1201 11th Ave • P.O. Box 201800 • Helena, MT 59620-1800 • fax 406-444-0266 • phone 406-444-3989



Latitude Longitude
46.36619 -112.72396
46.41313 -112.78615

Summarized by:
007N009W005
(Buffered PLSS Section)



Suggested Citation

Montana Natural Heritage Program. Environmental Summary Report.

for Latitude 46.36619 to 46.41313 and Longitude -112.72396 to -112.78615. Retrieved on 5/28/2024.

The Montana Natural Heritage Program is part of the Montana State Library's Natural Resource Information System. Since 1985, it has served as a neutral and non-regulatory provider of easily accessible information on Montana's species and biological communities to inform all stakeholders in environmental review, permitting, and planning processes. The program is part of the NatureServe network that is composed of over 60 member programs across North America that work to provide current and comprehensive distribution and status information on species and biological communities.



Environmental Summary

Table of Contents

- [Species Report](#)
- [Structured Surveys](#)
- [Land Cover](#)
- [Wetland and Riparian](#)
- [Land Management](#)
- [Biological Reports](#)
- [Invasive and Pest Species](#)
- [Introduction to Montana Natural Heritage Program](#)
- [Data Use Terms and Conditions](#)
- [Suggested Contacts for Natural Resource Agencies](#)
- [Introduction to Native Species](#)
- [Introduction to Land Cover](#)
- [Introduction to Wetland and Riparian](#)
- [Introduction to Land Management](#)
- [Introduction to Invasive and Pest Species](#)
- [Additional Information Resources](#)

Introduction to Environmental Summary Report

Environmental Summary Reports from the Montana Natural Heritage Program (MTNHP) provide information on species and biological communities to inform all stakeholders in environmental review, permitting, and planning processes. For information on environmental permits in Montana, please see permitting overviews by the [Montana Department of Environmental Quality](#), the [Montana Department of Natural Resources and Conservation](#), the [Index of Environmental Permits for Montana](#) and our [Suggested Contacts for Natural Resource Management Agencies](#). The report for your area of interest consists of introductory and related materials in this PDF and an Excel workbook with worksheets summarizing information managed in the MTNHP databases for: (1) species occurrences; (2) other observed species without species occurrences; (3) other species potentially present based on their range, presence of associated habitats, or predictive distribution model output if available; (4) structured surveys that follow a protocol capable of detecting one or more species; (5) land cover mapped as ecological systems; (6) wetland and riparian mapping; (7) land management categories; and (8) biological reports associated with plant and animal observations. If your area of interest corresponds to a statewide polygon layer (e.g., watersheds, counties, or public land survey sections) information summaries in your report will exactly match those boundaries. However, if your report is for a custom area, users should be aware that summaries do not correspond to the exact boundaries of the polygon they have specified, but instead are a summary across a layer of hexagons intersected by the polygon they specified as shown on the report cover. Summarizing by these hexagons which are one square mile in area and approximately one kilometer in length on each side allows for consistent and rapid delivery of summaries based on a uniform grid that has been used for planning efforts across North America.

In presenting this information, MTNHP is working towards assisting the user with rapidly assessing the known or potential species and biological communities, land management categories, and biological reports associated with the report area. Users are reminded that this information is likely incomplete and may be inaccurate as surveys to document species are lacking in many areas of the state, species' range polygons often include regions of unsuitable habitat, methods of predicting the presence of species or communities are constantly improving, and information is constantly being added and updated in our databases. **Field verification by professional biologists of the absence or presence of species and biological communities in a report area will always be an important obligation of users of our data. Users are encouraged to only use this environmental summary report as a starting point for more in depth analyses and are encouraged to contact state, federal, and tribal resource management agencies for additional data or management guidelines relevant to your efforts. Please see the Appendix for introductory materials to each section of the report, additional information resources, and a list of relevant agency contacts.**



MONTANA
STATE LIBRARY

NATURAL HERITAGE PROGRAM

A program of the Montana State Library's
Natural Resource Information System

Legend

Model Icons

Suitable (native range)

Optimal Suitability

Moderate Suitability

Low Suitability

Suitable (introduced range)

Habitat Icons

Common

Occasional

Range Icons

Native / Year-round

Summer

Winter

Migratory

Non-native

Historical

Num Obs

Count of obs with
'good precision'
(≤1000m)

+ indicates
additional 'poor
precision' obs
(1001m-
10,000m)



Latitude
46.36619
46.41313

Longitude
-112.72396
-112.78615

Native Species

Summarized by: **007N009W005 (Buffered PLSS Section)**
Filtered by:
Native Species reports are filtered for Species with MT Status = Species of Concern, Special Status, Important Animal Habitat, Potential SOC

Species Occurrences

F - Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*)

SOC

USFWS
Sec7

SO

Obs

Predicted
Model

Range

View in Field Guide

View Predicted Models

View Range Maps

Species of Concern - Native/Non-native Species - (depends on location or taxa)

Global: **G5T4** State: **S2**

USFS: **Sensitive - Known in Forests (BD, BRT, KOOT, LOLO)**

Species of Conservation Concern in Forests (CG, HLC)

BLM: **SENSITIVE** FWP SWAP: **SGCN2**

Delineation Criteria Stream reaches and standing water bodies where the species presence has been confirmed through direct capture or where they are believed to be present based on the professional judgement of a fisheries biologist due to confirmed presence in adjacent areas. In order to reflect the importance of adjacent terrestrial habitats to survival, stream reaches are buffered 100 meters, standing water bodies greater than 1 acre are buffered 50 meters, and standing water bodies less than 1 acre are buffered 30 meters into the terrestrial habitat based on PACFISH/INFISH Riparian Conservation Area standards. (Last Updated: Mar 08, 2024)

Predicted Models: 50% Suitable (native range) (deductive)

F - Bull Trout (*Salvelinus confluentus*)

SOC

USFWS
Sec7

SO

Obs

Predicted
Model

Range

View in Field Guide

View Predicted Models

View Range Maps

Species of Concern - Native Species

Global: **G5** State: **S2** USFWS: **LT; CH** BLM: **THREATENED** FWP SWAP: **SGCN2**

Delineation Criteria Stream reaches and standing water bodies where the species is believed to be present based on the professional judgement of a fisheries biologist, potentially supported by habitat assessment, direct capture, or confirmed presence in adjacent areas. In order to reflect the importance of adjacent terrestrial habitats to survival, stream reaches are buffered 100 meters, standing water bodies greater than 1 acre are buffered 50 meters, and standing water bodies less than 1 acre are buffered 30 meters into the terrestrial habitat based on PACFISH/INFISH Riparian Conservation Area standards. (Last Updated: Mar 19, 2024)

Predicted Models: 45% Suitable (native range) (deductive)

V - Primula incana (Mealy Primrose)

SOC

USFWS
Sec7

SO

Obs

Predicted
Model

Range

View in Field Guide

View Predicted Models

View Range Maps

Species of Concern - Native Species

Global: **G5** State: **S3** Plant Threat Score: **High** CCVI: **Highly Vulnerable**

Delineation Criteria Individual occurrences are generally based upon a discretely mapped area provided by an observer and are not separated by any pre-defined distance. Individual clusters of plants mapped at fine spatial scales (separated by less than approximately 25-50 meters) may be grouped together into one occurrence if they are not separated by distinct areas of habitat or terrain features. Point observations are buffered to encompass any locational uncertainty associated with the observation. (Last Updated: Mar 14, 2024)

Predicted Models: 2% Optimal (inductive), 25% Moderate (inductive), 62% Low (inductive)

Docusign Envelope ID: 4DC45EA9-B5A6-43EE-BD2E-7571288DA069				13	10		S	M
View in Field GuideView Predicted ModelsView Range Maps Species of Concern - Native Species Global: G5 State: S3B USFWS: MBTA; BCC10; BCC11; BCC17 FWP SWAP: SGCN3 PIF: 3 Delineation Criteria Confirmed breeding area buffered by the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 150 meters in order to conservatively encompass male territory size reported for the species and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Dec 28, 2023) Predicted Models: 64% Moderate (inductive), 36% Low (inductive)								
▢ B - Great Blue Heron (<i>Ardea herodias</i>) SOC				3	17		Y	S
View in Field GuideView Predicted ModelsView Range Maps Species of Concern - Native Species Global: G5 State: S3 USFWS: MBTA FWP SWAP: SGCN3 Delineation Criteria Confirmed nesting area buffered by a minimum distance of 6,500 meters in order to be conservative about encompassing the areas commonly used for foraging near the breeding colony and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Apr 03, 2024) Predicted Models: 50% Moderate (inductive), 50% Low (inductive)								
▢ B - Lewis's Woodpecker (<i>Melanerpes lewis</i>) SOC				4	2		S	M
View in Field GuideView Predicted ModelsView Range Maps Species of Concern - Native Species Global: G4 State: S2B USFWS: MBTA; BCC10; BCC17 USFS: Species of Conservation Concern in Forests (HLC) BLM: SENSITIVE FWP SWAP: SGCN2 PIF: 2 Delineation Criteria Confirmed breeding area based on the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 300 meters in order to encompass the likely foraging area used by breeding adults around the nest tree and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Dec 28, 2023) Predicted Models: 35% Moderate (inductive), 62% Low (inductive)								
▢ B - Long-billed Curlew (<i>Numenius americanus</i>) SOC				6	4		S	M
View in Field GuideView Predicted ModelsView Range Maps Species of Concern - Native Species Global: G4 State: S3B USFWS: MBTA; BCC11 BLM: SENSITIVE FWP SWAP: SGCN3 PIF: 2 Delineation Criteria Confirmed breeding area based on the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 200 meters in order to approximate the breeding territory size reported for the species in Idaho and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Apr 03, 2024) Predicted Models: 34% Moderate (inductive), 66% Low (inductive)								
▢ B - Bald Eagle (<i>Haliaeetus leucocephalus</i>) SSS				2	28		Y	
View in Field GuideView Predicted ModelsView Range Maps Special Status Species - Native Species Global: G5 State: S4 USFWS: BGEPA; MBTA USFS: Sensitive - Known in Forests (LOLO) BLM: SENSITIVE PIF: 2 Delineation Criteria Confirmed nesting area buffered by a minimum distance of 2,000 meters in order to be conservative about encompassing the breeding territory and area commonly used for renesting. Only nesting observations with a locational uncertainty of 1,000 meters or less will be used to delineate a nesting area. (Last Updated: Apr 01, 2024) Predicted Models: 25% Moderate (inductive), 74% Low (inductive)								
▢ B - Evening Grosbeak (<i>Coccothraustes vespertinus</i>) SOC				10	33		Y	W
View in Field GuideView Predicted ModelsView Range Maps Species of Concern - Native Species Global: G5 State: S3 USFWS: MBTA; BCC10 FWP SWAP: SGCN3 Delineation Criteria Confirmed breeding area based on the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 1,000 meters in order to encompass the maximum foraging distance from nests reported for the species and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Dec 28, 2023) Predicted Models: 16% Moderate (inductive), 30% Low (inductive)								
▢ M - Little Brown Myotis (<i>Myotis lucifugus</i>) SOC				1	2		Y	
View in Field GuideView Predicted ModelsView Range Maps Species of Concern - Native Species Global: G3G4 State: S3 USFS: Sensitive - Known in Forests (BD, BRT, KOOT) FWP SWAP: SGCN3 Delineation Criteria Confirmed area of occupancy based on the documented presence (mistnet captures, definitively identified acoustic recordings, or definitively identified roosting individuals) of adults or juveniles. Point observation location is buffered by a distance of 1,600 meters in order to encompass the greater than 1,500 meters foraging distance reported for the species in New Brunswick, Canada and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. When cave locations are involved, point observations are mapped in the center of a one-square mile hexagon to protect the exact location of the cave entrance as per the Federal Cave Resource Protection Act and associated regulations (U.S. Code Title 16 Chapter 63, Code of Federal Regulations Title 43 Subtitle A Part 37). The outer edges of the hexagon are then buffered by a distance of 1,600 meters and otherwise by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. All of the one-square mile hexagons intersecting this buffered area are presented as the Species Occurrence record. (Last Updated: Jul 06, 2023) Predicted Models: 11% Moderate (inductive), 89% Low (inductive)								
▢ M - Long-legged Myotis (<i>Myotis volans</i>) SOC				1	1		Y	
View in Field GuideView Predicted ModelsView Range Maps Species of Concern - Native Species Global: G4G5 State: S3 Delineation Criteria Confirmed area of occupancy based on the documented presence (mistnet captures, definitively identified acoustic recordings, and definitively identified roosting individuals) of adults or juveniles. Point observation location is buffered by a minimum distance of 2,000 meters in order to encompass the average distances traveled from capture locations to roosts in Washington, Oregon, and in the Black Hills of South Dakota and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. When cave locations are involved, point observations are mapped in the center of a one-square mile hexagon to protect the exact location of the cave entrance as per the Federal Cave Resource Protection Act and associated regulations (U.S. Code Title 16 Chapter 63, Code of Federal Regulations Title 43 Subtitle A Part 37). The outer edges of the hexagon are then buffered by a distance of 2,000 meters and otherwise by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. All of the one-square mile hexagons intersecting this buffered area are presented as the Species Occurrence record. (Last Updated: Jul 06, 2023) Predicted Models: 9% Moderate (inductive), 88% Low (inductive)								
▢ A - Western Toad (<i>Anaxyrus boreas</i>) SOC				1	2		Y	
View in Field GuideView Predicted ModelsView Range Maps Species of Concern - Native Species Global: G4 State: S2 USFS: Sensitive - Known in Forests (BD, BRT, KOOT, LOLO) BLM: SENSITIVE FWP SWAP: SGCN2 Delineation Criteria Standing water bodies or portions of large water bodies with confirmed evidence of reproduction (calling adults, eggs, larvae or new metamorphs) buffered by 100 meters in order to reflect importance of adjacent terrestrial habitats to survival of breeding adults and newly metamorphosed juveniles. (Last Updated: Mar 20, 2024) Predicted Models: 96% Low (inductive)								
▢ B - Pileated Woodpecker (<i>Dryocopus pileatus</i>) SOC				1			Y	
View in Field GuideView Predicted ModelsView Range Maps Species of Concern - Native Species Global: G5 State: S3 USFWS: MBTA FWP SWAP: SGCN3 PIF: 2 Delineation Criteria Observations with evidence of breeding activity buffered by a minimum distance of 1,500 meters in order to be conservative about encompassing home ranges and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Dec 28, 2023) Predicted Models: 60% Low (inductive)								

View in Field GuideView Predicted ModelsView Range Maps Species of Concern - Native SpeciesGlobal: G5State: S3USFWS: MBTA; BCC10FWP SWAP: SGCN3PIF: 3 Delineation Criteria Observations with evidence of breeding activity buffered by a minimum distance of 300 meters in order to be conservative about encompassing the courtship and foraging distance from nesting areas and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Jun 30, 2023) Predicted Models:  51% Low (inductive)					
M - Grizzly Bear (<i>Ursus arctos</i>) SOC					
View in Field GuideView Range Maps Species of Concern - Native SpeciesGlobal: G4State: S2S3USFWS: LTBLM: THREATENEDFWP SWAP: SGCN2-3 Delineation Criteria Species Occurrence polygons represent areas delineated by the U.S. Fish and Wildlife Service (USFWS) that encompass both home ranges and potential transitory movements based on verified sightings. Within these areas, the USFWS wants project proponents to consider whether the species “may be present” when evaluating the potential impacts of a project and to work with the USFWS to develop and implement best management practices to minimize or eliminate project effects on the species. (Last Updated: Dec 22, 2023)					
B - Brown Creeper (<i>Certhia americana</i>) SOC					
View in Field GuideView Range Maps Species of Concern - Native SpeciesGlobal: G5State: S3USFWS: MBTAFWP SWAP: SGCN3PIF: 1 Delineation Criteria Observations with evidence of breeding activity buffered by a minimum distance of 300 meters in order to be conservative about encompassing home ranges and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Jun 29, 2023)					
V - Carex idaho (<i>Idaho Sedge</i>) SOC					
View in Field GuideView Range Maps Species of Concern - Native SpeciesGlobal: G3State: S3USFS: Sensitive - Known in Forests (BD)BLM: SENSITIVEPlant Threat Score: High CCVI: Highly Vulnerable Delineation Criteria Individual occurrences are generally based upon a discretely mapped area provided by an observer and are not separated by any pre-defined distance. Individual clusters of plants mapped at fine spatial scales (separated by less than approximately 25-50 meters) may be grouped together into one occurrence if they are not separated by distinct areas of habitat or terrain features. Point observations are buffered to encompass any locational uncertainty associated with the observation. (Last Updated: Mar 17, 2023)					
O - Bat Roost (Non-Cave) (<i>Bat Roost (Non-Cave)</i>) IAH					
View in Field Guide Important Animal Habitat - Native SpeciesGlobal: GNRState: SNR Delineation Criteria Confirmed area of occupancy based on the documented presence of adults or juveniles of any bat species at non-cave natural roost sites (e.g. rock outcrops, trees), below ground human created roost sites (e.g. mines), and above ground human created roost sites (e.g., bridges, buildings). Point observation locations are buffered by a distance of 4,500 meters in order to encompass the 95% confidence interval for nightly foraging distance reported for Townsend’s Big-eared Bat (a resident Montana bat Species of Concern) and otherwise by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Oct 22, 2019)					

Legend

Model Icons

- Suitable (native range)
- Optimal Suitability
- Moderate Suitability
- Low Suitability
- Suitable (introduced range)

Habitat Icons

- Common
- Occasional

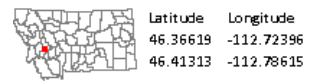
Range Icons

- Native / Year-round
- Summer
- Winter
- Migratory
- Non-native
- Historical

Num Obs

Count of obs with 'good precision' (<=1000m)

+ indicates additional 'poor precision' obs (1001m-10,000m)



Native Species

Summarized by: **007N009W005** (*Buffered PLSS Section*)
Filtered by:
Native Species reports are filtered for Species with MT Status = Species of Concern, Special Status, Important Animal Habitat, Potential SOC

Other Observed Species

	USFWS Sec7	# Obs	Predicted Model	Range
B - Hooded Merganser (<i>Lophodytes cucullatus</i>) PSOC		9		
View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G5 State: S4 USFWS: MBTA FWP SWAP: SGIN PIF: 2 Predicted Models: 35% Optimal (inductive), 14% Moderate (inductive), 37% Low (inductive)				
M - North American Porcupine (<i>Erethizon dorsatum</i>) PSOC		1		
View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G5 State: S3S4 FWP SWAP: SGIN Predicted Models: 86% Moderate (inductive), 14% Low (inductive)				
B - Rufous Hummingbird (<i>Selasphorus rufus</i>) PSOC		15		
View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G4 State: S4B USFWS: MBTA; BCC10 PIF: 3 Predicted Models: 49% Moderate (inductive), 50% Low (inductive)				
B - American White Pelican (<i>Pelecanus erythrorhynchos</i>) SOC		8		
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4 State: S3B USFWS: MBTA FWP SWAP: SGCN3 PIF: 3 Predicted Models: 37% Moderate (inductive), 49% Low (inductive)				
B - White-faced Ibis (<i>Plegadis chihi</i>) SOC		6		
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S3B USFWS: MBTA BLM: SENSITIVE FWP SWAP: SGCN3 PIF: 2 Predicted Models: 37% Moderate (inductive), 35% Low (inductive)				
B - Barrow's Goldeneye (<i>Bucephala islandica</i>) PSOC		5		
View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G5 State: S4 USFWS: MBTA FWP SWAP: SGIN PIF: 2 Predicted Models: 35% Moderate (inductive), 60% Low (inductive)				
B - Short-eared Owl (<i>Asio flammeus</i>) PSOC		1		
View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G5 State: S4 USFWS: MBTA; BCC11; BCC17 PIF: 3 Predicted Models: 20% Moderate (inductive), 42% Low (inductive)				
B - Veery (<i>Catharus fuscescens</i>) SOC		1		
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S3B USFWS: MBTA BLM: SENSITIVE FWP SWAP: SGCN3 PIF: 2 Predicted Models: 19% Moderate (inductive), 51% Low (inductive)				
B - Trumpeter Swan (<i>Cygnus buccinator</i>) SOC		8		
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4 State: S3 USFWS: MBTA BLM: SENSITIVE FWP SWAP: SGCN3 PIF: 1 Predicted Models: 11% Moderate (inductive), 79% Low (inductive)				
B - Clark's Nutcracker (<i>Nucifraga columbiana</i>) SOC		12		
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S3 USFWS: MBTA USFS: Species of Conservation Concern in Forests (FLAT) FWP SWAP: SGCN3 PIF: 3 Predicted Models: 40% Low (inductive)				
B - Western Screech-Owl (<i>Megascops kennicottii</i>) PSOC		2		
View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G4G5 State: S3S4 USFWS: MBTA FWP SWAP: SGIN PIF: 3 Predicted Models: 25% Low (inductive)				
B - Common Tern (<i>Sterna hirundo</i>) SOC		1		
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S3B USFWS: MBTA BLM: SENSITIVE FWP SWAP: SGCN3 PIF: 2 Predicted Models: 21% Low (inductive)				

Legend			
Model Icons	Habitat Icons	Range Icons	Num Obs
Suitable (native range)	Common	Native / Year-round	Count of obs with 'good precision' (<=1000m) + indicates additional 'poor precision' obs (1001m-10,000m)
Optimal Suitability	Occasional	Summer	
Moderate Suitability		Winter	
Low Suitability		Migratory	
Suitable (introduced range)		Non-native	
		Historical	



Latitude	Longitude
46.36619	-112.72396
46.41313	-112.78615

Native Species

Summarized by: **007N009W005** (*Buffered PLSS Section*)
Filtered by:
Native Species reports are filtered for Species with MT Status = Species of Concern, Special Status, Important Animal Habitat, Potential SOC

Other Potential Species

	USFWS Sec7	Predicted Model	Range
V - <i>Utricularia intermedia</i> (<i>Flatleaf Bladderwort</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S2 USFS: Sensitive - Known in Forests (KOOT) Plant Threat Score: No Known Threats Predicted Models: 85% Moderate (inductive), 15% Low (inductive)			
V - <i>Carex crawei</i> (<i>Crawe's Sedge</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S2S3 Plant Threat Score: Low Predicted Models: 78% Moderate (inductive), 22% Low (inductive)			
V - <i>Atriplex truncata</i> (<i>Wedge-leaf Saltbush</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S3 Plant Threat Score: Unknown Predicted Models: 76% Moderate (inductive), 24% Low (inductive)			
M - <i>Western Spotted Skunk</i> (<i>Spilogale gracilis</i>) View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G5 State: SU FWP SWAP: SGIN Predicted Models: 75% Moderate (inductive), 15% Low (inductive)			
I - <i>Oreohelix carinifera</i> (<i>Keeled Mountainsnail</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G1 State: S1 Predicted Models: 73% Moderate (inductive), 26% Low (inductive)			
I - <i>Bombus suckleyi</i> (<i>Suckley Cuckoo Bumble Bee</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G2G3 State: S1 Predicted Models: 69% Moderate (inductive), 30% Low (inductive)			
M - <i>Hoary Bat</i> (<i>Lasiurus cinereus</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G3G4 State: S3B BLM: SENSITIVE FWP SWAP: SGCN3 Predicted Models: 56% Moderate (inductive), 44% Low (inductive)			
V - <i>Stellaria crassifolia</i> (<i>Fleshy Stitchwort</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S2 Plant Threat Score: No Known Threats Predicted Models: 50% Moderate (inductive), 32% Low (inductive)			
V - <i>Potentilla platensis</i> (<i>Platte Cinquefoil</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4 State: S3 Plant Threat Score: No Known Threats CCVI: Highly Vulnerable Predicted Models: 50% Moderate (inductive), 27% Low (inductive)			
M - <i>Western Pygmy Shrew</i> (<i>Sorex eximius</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4 State: S3 FWP SWAP: SGCN3 Predicted Models: 40% Moderate (inductive), 44% Low (inductive)			
I - <i>Margaritifera falcata</i> (<i>Western Pearlshell</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S2 USFS: Sensitive - Known in Forests (BD, BRT, KOOT, LOLO) Species of Conservation Concern in Forests (CG, HLC) BLM: SENSITIVE FWP SWAP: SGCN2 Predicted Models: 37% Moderate (inductive), 25% Low (inductive)			
B - <i>Broad-tailed Hummingbird</i> (<i>Selasphorus platycercus</i>) View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G5 State: S4B USFWS: MBTA; BCC10 FWP SWAP: SGIN Predicted Models: 35% Moderate (inductive), 42% Low (inductive)			

Global: **G5** State: **S4B** USFWS: **MBTA** FWP SWAP: **SGIN** PIF: **3**Global: **G5** State: **S3S4** **Species of Conservation Concern in Forests (CG, HLC)**USFS: **Sensitive - Known in Forests (LOLO)**

Species of Conservation Concern in Forests (CG, HLC)

The diagram shows a 2D grid with a yellow square and a grey square. To the right, there is a legend with two labels: 'S' in a green box and 'M' in a yellow box.

Global: **G5** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **3**

7 Y

Global: **G4** State: **S3** USFWS: **LT** USFS: **Sensitive - Known in Forests (LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN3**

SFS: **Sensitive - Known in Forests (LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN3**

Global: **G4** State: **S3B** USFWS: **MBTA** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **3**

Global: **G5** State: **S4B** USFWS: **MBTA** PIF: **3**

USFWS: MBTA PIF: 3

A diagram of a 1D lattice with two sites. The left site is highlighted in yellow and the right site is highlighted in purple. The sites are connected by a horizontal line.

Global: **G5** State: **S2** **Species of Conservation Concern in Forests (CG, FLAT)**

USFS: **Sensitive - Known in Forests (BD, BRT, KOOT)**

Sensitive - Suspected in Forests (LOLO)

Species of Conservation Concern in Forests (CG, FLAT)

Global: **G5** State: **S4**Global: **G4** State: **S2B** USFWS: **MBTA** **Sensitive - Migratory in Forests (BRT)** FWP SWAP: **SGCN2** PIF: **1**

TA Sensitive - Migratory in Forests (BRT)

TA Sensitive - Migratory in Forests (BRT)

FWP SWAP: **SGCN2** PIF: **1**

7 S M

Global: **G5** State: **S3B** USFWS: **PS: LT; MBTA** BLM: **THREATENED** FWP SWAP: **SGCN3, SGIN** PIF: **2**

LT; MBTA BLM: **THREATENED** FWP SWAP: **SGCN3, SGIN** PIF: **2**

7 Not Assessed Y

Global: **G5** State: **S3** USFWS: **LT; CH** BLM: **THREATENED** FWP SWAP: **SGCN3**

Structured Surveys

Summarized by: **007N009W005** (*Buffered PLSS Section*)

The Montana Natural Heritage Program (MTNHP) records information on the locations where more than 80 different types of well-defined repeatable survey protocols capable of detecting an animal species or suite of animal species have been conducted by state, federal, tribal, university, or private consulting biologists. Examples of structured survey protocols tracked by MTNHP include: visual encounter and dip net surveys for pond breeding amphibians, point counts for birds, call playback surveys for selected bird species, visual surveys of migrating raptors, kick net stream reach surveys for macroinvertebrates, visual encounter cover object surveys for terrestrial mollusks, bat acoustic or mist net surveys, pitfall and/or snap trap surveys for small terrestrial mammals, track or camera trap surveys for large mammals, and trap surveys for turtles. Whenever possible, photographs of survey locations are stored in MTNHP databases.

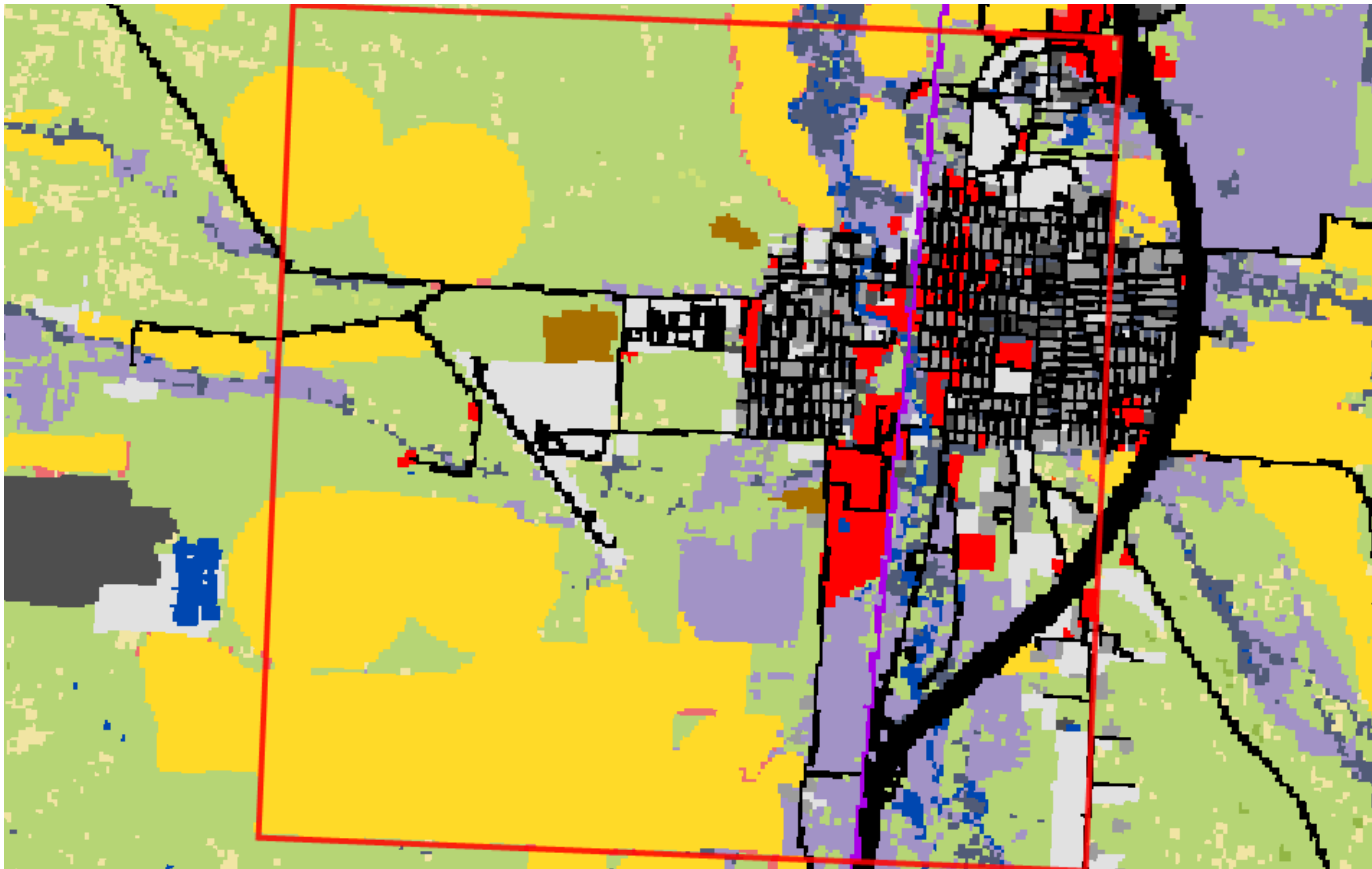
MTNHP does not typically manage information on structured surveys for plants; surveys for invasive species may be a future exception.

Within the report area you have requested, structured surveys are summarized by the number of each type of structured survey protocol that has been conducted, the number of species detections/observations resulting from these surveys, and the most recent year a survey has been conducted.

B-Bald Eagle Nest (<i>Bald Eagle Nest Survey</i>)	Survey Count: 1	Obs Count: 1	Recent Survey: 2009
B-Long-billed Curlew (<i>Long-billed Curlew, Road-based, Point Count</i>)	Survey Count: 1	Obs Count:	Recent Survey: 2012
E-Invasive Mussel Plankton Tow (<i>Plankton tows for veligers of Invasive Mussels</i>)	Survey Count: 3	Obs Count:	Recent Survey: 2023
E-Kicknet (<i>Kicknet Collection Survey for Invasive Mussels and Snails</i>)	Survey Count: 3	Obs Count:	Recent Survey: 2023
E-Noxious Weed, Road-based (<i>Noxious Weed Road-based Visual Surveys</i>)	Survey Count: 17	Obs Count: 39	Recent Survey: 2003
E-Visual Aquatic Invasives (<i>Visual Encounter Surveys for Aquatic Invasives on Shorelines or Underwater</i>)	Survey Count: 4	Obs Count: 7	Recent Survey: 2023
F-Fish Electrofishing (<i>Fish Electrofishing Surveys</i>)	Survey Count: 4	Obs Count: 8	Recent Survey: 2020
M-Bat Acoustic (<i>Bat Acoustic Survey</i>)	Survey Count: 1	Obs Count: 1	Recent Survey: 2005
M-Bat Mistnet (<i>Bat Mistnet Survey</i>)	Survey Count: 3	Obs Count: 5	Recent Survey: 2006
M-Bat Roost (Active Season) (<i>Bat Roost (Active Season) Survey</i>)	Survey Count: 3	Obs Count: 5	Recent Survey: 2019
P-Algal scraping (<i>Algal Scraping</i>)	Survey Count: 8	Obs Count: 418	Recent Survey: 2018

Land Cover

Summarized by: **007N009W005** (*Buffered PLSS Section*)



Grassland Systems
Montane Grassland

 Rocky Mountain Lower Montane, Foothill, and Valley Grassland

30% (1,702 Acres)

This grassland system of the northern Rocky Mountains is found at lower montane to foothill elevations in mountains and valleys throughout Montana. These grasslands are floristically similar to Big Sagebrush Steppe but are defined by shorter summers, colder winters, and young soils derived from recent glacial and alluvial material. They are found at elevations from 548 - 1,650 meters (1,800-5,413 feet). In the lower montane zone, they range from small meadows to large open parks surrounded by conifers; below the lower treeline, they occur as extensive foothill and valley grasslands. Soils are relatively deep, fine-textured, often with coarse fragments, and non-saline. Microphytic crust may be present in high-quality occurrences. This system is typified by cool-season perennial bunch grasses and forbs (>25%) cover, with a sparse shrub cover (<10%). Rough fescue (*Festuca campestris*) is dominant in the northwestern portion of the state and Idaho fescue (*Festuca idahoensis*) is dominant or co-dominant throughout the range of the system. Bluebunch wheatgrass (*Pseudoroegneria spicata*) occurs as a co-dominant throughout the range as well, especially on xeric sites. Western wheatgrass (*Pascopyrum smithii*) is consistently present, often with appreciable coverage (>10%) in lower elevation occurrences in western Montana and virtually always present, with relatively high coverages (>25%), on the edge of the Northwestern Great Plains region. Species diversity ranges from a high of more than 50 per 400 square meter plot on mesic sites to 15 (or fewer) on xeric and disturbed sites. Most occurrences have at least 25 vascular species present. Farmland conversion, noxious species invasion, fire suppression, heavy grazing and oil and gas development are major threats to this system.

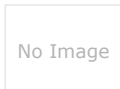


Human Land Use
Agriculture

 Cultivated Crops

29% (1,676 Acres)

These areas used for the production of crops, such as corn, soybeans, small grains, sunflowers, vegetables, and cotton, typically on an annual cycle. Agricultural plant cover is variable depending on season and type of farming. Other areas include more stable land cover of orchards and vineyards.



Human Land Use
Developed

 Other Roads

10% (572 Acres)

County, city and or rural roads generally open to motor vehicles.



9% (514 Acres)

Wet meadow

Alpine-Montane Wet Meadow

These moderate-to-high-elevation systems are found throughout the Rocky Mountains, dominated by herbaceous species found on wetter sites with very low-velocity surface and subsurface flows. Occurrences range in elevation from montane to alpine at 1,000 to 3,353 meters (3,280-11,000 feet). This system typically occurs in cold, moist basins, seeps and alluvial terraces of headwater streams or as a narrow strip adjacent to alpine lakes (Hansen et al., 1996). Wet meadows are typically found on flat areas or gentle slopes, but may also occur on sub-irrigated sites with slopes up to 10 percent. In alpine regions, sites are typically small depressions located below late-melting snow patches or on snowbeds. The growing season may only last for one to two months. Soils of this system may be mineral or organic. In either case, soils show typical hydric soil characteristics, including high organic content and/or low chroma and redoximorphic features. This system often occurs as a mosaic of several plant associations, often dominated by graminoids such as tufted hairgrass (*Deschampsia caespitosa*), and a diversity of montane or alpine sedges such as small-head sedge (*Carex illota*), small-winged sedge (*Carex microptera*), black alpine sedge (*Carex nigricans*), Holm’s Rocky Mountain sedge (*Carex scopulorum*) shortstalk sedge (*Carex podocarpa*) and Payson’s sedge (*Carex paysonis*). Drummond’s rush (*Juncus drummondii*), Merten’s rush (*Juncus mertensianus*), and high elevation bluegrasses (*Poa arctica* and *Poa alpina*) are often present. Forbs such as arrow-leaf groundsel (*Senecio triangularis*), slender-sepal marsh marigold (*Caltha leptosepala*), and spreading globeflower (*Trollius laxus*) often form high cover in higher elevation meadows. Wet meadows are associated with snowmelt and are usually not subjected to high disturbance events such as flooding.



6% (318 Acres)

Human Land Use
Developed

Developed, Open Space

Vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes. Impervious surfaces account for less than 20% of total cover. This category often includes highway and railway rights of way and graveled rural roads.

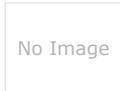


4% (206 Acres)

Human Land Use
Developed

Low Intensity Residential

Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-50% of total cover. These areas most commonly include single-family housing units in rural and suburban areas. Paved roadways may be classified into this category.



3% (178 Acres)

Human Land Use
Developed

Commercial / Industrial

Businesses, industrial parks, hospitals, airports; utilities in commercial/industrial areas.



3% (164 Acres)

Wetland and Riparian Systems
Floodplain and Riparian

Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland

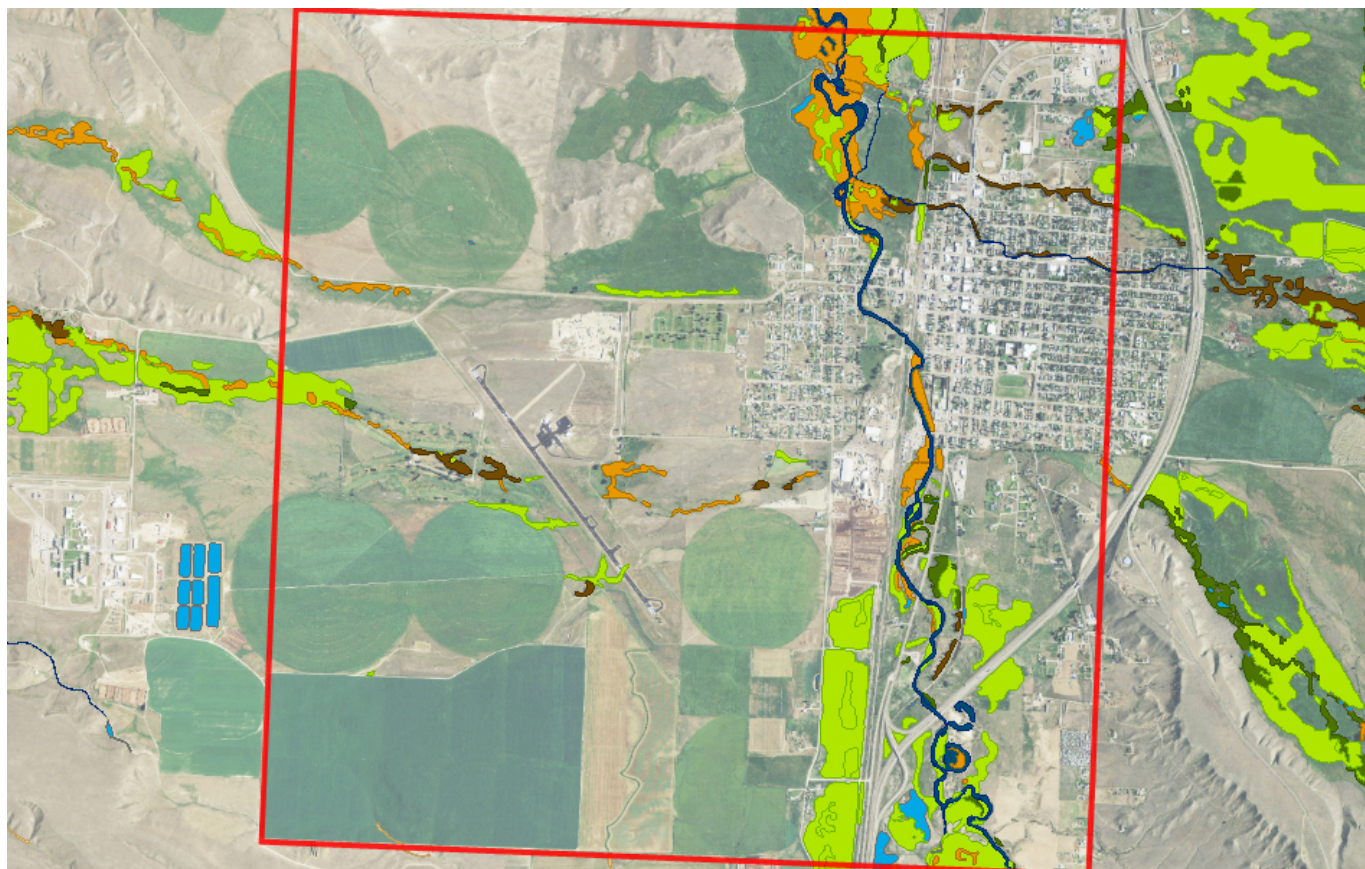
This ecological system is found throughout the Rocky Mountain and Colorado Plateau regions. In Montana, sites occur at elevations of 609-1,219 meters (2,000-4,000 feet) west of the Continental Divide. East of the Continental Divide, this system ranges up to 1,676 meters (5,500 feet). It generally comprises a mosaic of multiple communities that are tree-dominated with a diverse shrub component. It is dependent on a natural hydrologic regime with annual to episodic flooding, so it is usually found within the flood zone of rivers, on islands, sand or cobble bars, and along streambanks. It can form large, wide occurrences on mid-channel islands in larger rivers, or narrow bands on small, rocky canyon tributaries and well-drained benches. It is also typically found in backwater channels and other perennially wet but less scoured sites, such as floodplains, swales and irrigation ditches. In some locations, occurrences extend into moderately high intermountain basins where the adjacent vegetation is sage steppe. Black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) is the key indicator species. Other dominant trees may include boxelder maple (*Acer negundo*), narrowleaf cottonwood (*Populus angustifolia*), eastern cottonwood (*Populus deltoides*), Douglas-fir (*Pseudotsuga menziesii*), peachleaf willow (*Salix amygdaloides*), or Rocky Mountain juniper (*Juniperus scopulorum*). Dominant shrubs include Rocky Mountain maple (*Acer glabrum*), thinleaf alder (*Alnus incana*), river birch (*Betula occidentalis*), redbud (*Cornus sericea*), hawthorne (*Crataegus* species), chokecherry (*Prunus virginiana*), skunkbush sumac (*Rhus trilobata*), willows (*Salix* species), rose (*Rosa* species), silver buffaloberry (*Shepherdia argentea*), or snowberry (*Symphoricarpos* species).

Additional Limited Land Cover

- 1% (86 Acres) Interstate
- 1% (66 Acres) Open Water
- 1% (63 Acres) Major Roads
- 1% (46 Acres) Quarries, Strip Mines and Gravel Pits
- 1% (39 Acres) Railroad
- 1% (39 Acres) High Intensity Residential
- 1% (36 Acres) Montane Sagebrush Steppe
- <1% (14 Acres) Introduced Upland Vegetation - Annual and Biennial Forbland
- <1% (4 Acres) Rocky Mountain Subalpine-Montane Mesic Meadow
- <1% (0 Acres) Insect-Killed Forest
- <1% (0 Acres) Rocky Mountain Montane-Foothill Deciduous Shrubland



Wetland and Riparian

Summarized by: **007N009W005** (Buffered PLSS Section)

Wetland and Riparian Mapping

P - Palustrine

AB - Aquatic Bed

F - Semipermanently Flooded	18 Acres
(no modifier)	4 Acres PABF
x - Excavated	14 Acres PABFx

P - Palustrine, AB - Aquatic Bed

Wetlands with vegetation growing on or below the water surface for most of the growing season.

EM - Emergent

A - Temporarily Flooded	243 Acres
(no modifier)	243 Acres PEMA
C - Seasonally Flooded	25 Acres
(no modifier)	25 Acres PEMC

P - Palustrine, EM - Emergent

Wetlands with erect, rooted herbaceous vegetation present during most of the growing season.

SS - Scrub-Shrub

A - Temporarily Flooded	15 Acres
(no modifier)	15 Acres PSSA

P - Palustrine, SS - Scrub-Shrub

Wetlands dominated by woody vegetation less than 6 meters (20 feet) tall. Woody vegetation includes tree saplings and trees that are stunted due to environmental conditions.

R - Riverine (Rivers)

2 - Lower Perennial

UB - Unconsolidated Bottom

H - Permanently Flooded	31 Acres
(no modifier)	31 Acres R2UBH

R - Riverine (Rivers), 2 - Lower Perennial, UB - Unconsolidated Bottom

Stream channels where the substrate is at least 25% mud, silt or other fine particles.

US - Unconsolidated Shore

A - Temporarily Flooded	13 Acres
(no modifier)	13 Acres R2USA

R - Riverine (Rivers), 2 - Lower Perennial, US - Unconsolidated Shore

Shorelines with less than 75% areal cover of stones, boulders, or bedrock and less than 30% vegetation cover. The area is also irregularly exposed due to seasonal or irregular flooding and subsequent drying.

4 - Intermittent

SB - Stream Bed

C - Seasonally Flooded	3 Acres
(no modifier)	2 Acres R4SBC

R - Riverine (Rivers), 4 - Intermittent, SB - Stream Bed

Active channel that contains periodic water flow.

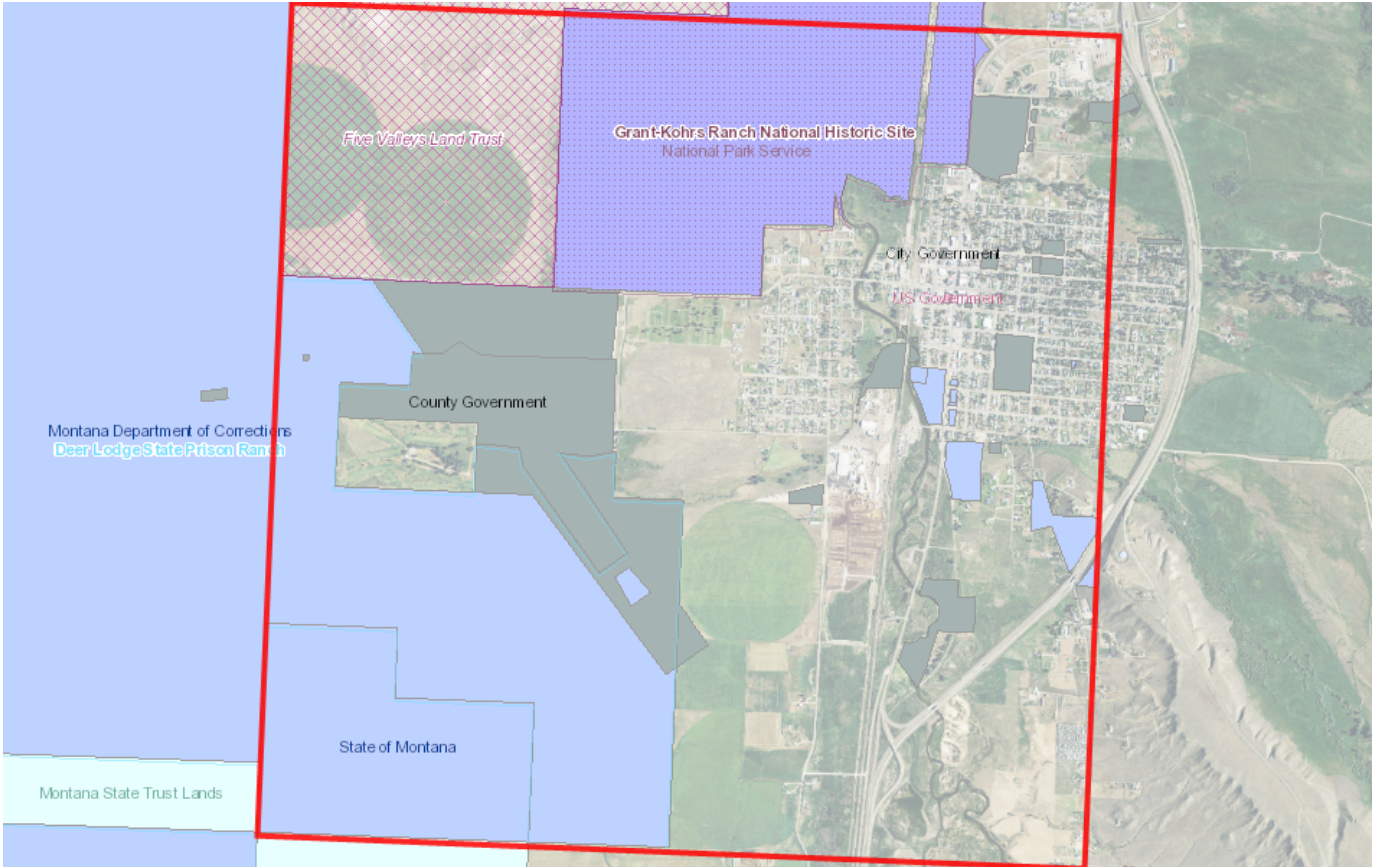
Rp - Riparian

1 - Lotic

SS - Scrub-Shrub (no modifier)	92 Acres Rp1SS	Rp - Riparian, 1 - Lotic, SS - Scrub-Shrub <i>This type of riparian area is dominated by woody vegetation that is less than 6 meters (20 feet) tall. Woody vegetation includes tree saplings and trees that are stunted due to environmental conditions.</i>
FO - Forested (no modifier)	24 Acres Rp1FO	Rp - Riparian, 1 - Lotic, FO - Forested <i>This riparian class has woody vegetation that is greater than 6 meters (20 feet) tall.</i>
EM - Emergent (no modifier)	<1 Acres Rp1EM	Rp - Riparian, 1 - Lotic, EM - Emergent <i>Riparian areas that have erect, rooted herbaceous vegetation during most of the growing season.</i>

Land Management

Summarized by: 007N009W005 (Buffered PLSS Section)



Land Management Summary				
	Ownership	Tribal	Easements	Other Boundaries (possible overlap)
+ Public Lands	2,629 Acres (46%)			
+ Federal	754 Acres (13%)			
+ National Parks	753 Acres (13%)			
+ National Park Service Owned	753 Acres (13%)			
+ National Historic Sites				773 Acres
+ Grant-Kohrs Ranch National Historic Site				773 Acres
+ US Government	1 Acres (<1%)			
+ US Government Owned	1 Acres (<1%)			
+ State	1,302 Acres (23%)			
+ Montana State Trust Lands	7 Acres (<1%)			
+ MT State Trust Owned	7 Acres (<1%)			
+ Montana Department of Corrections	879 Acres (15%)			
+ MTDOC Owned	879 Acres (15%)			
+ MTDOC Experimental Areas				967 Acres
+ Deer Lodge State Prison Ranch				967 Acres
+ State of Montana	416 Acres (7%)			
+ State of Montana Owned	416 Acres (7%)			
+ Local	573 Acres (10%)			
+ Local Government	573 Acres (10%)			
+ Local Government Owned	573 Acres (10%)			
+ Conservation Easements			623 Acres (11%)	
+ Private			623 Acres (11%)	
+ Five Valleys Land Trust			623 Acres (11%)	
+ Private Lands or Unknown Ownership	2,470 Acres (43%)			



Biological Reports

Summarized by: **007N009W005** (*Buffered PLSS Section*)

Within the report area you have requested, citations for all reports and publications associated with plant or animal observations in Montana Natural Heritage Program (MTNHP) databases are listed and, where possible, links to the documents are included.

The MTNHP plans to include reports associated with terrestrial and aquatic communities in the future as allowed for by staff resources. If you know of reports or publications associated with species or biological communities within the report area that are not shown in this report, please let us know: mtnhp@mt.gov

- Hossack, B., D. Pilliod, and P.S. Corn. 2001a. **Reptile and amphibian inventory at Grant-Kohrs Ranch National Historic Site and Little Bighorn Battlefield National Monument**. USGS Northern Rocky Mountain Science Center, Aldo Leopold Wilderness Research Institute, Missoula, MT. 6 p.
-  Wolfe, M.L. and A. Kozlowski. 2006. **Bat inventories at Grant-Kohrs Ranch National Historic Site and Little Bighorn Battlefield National Monument, Final Report**. Rocky Mountains Cooperative Ecosystems Studies Unit. Utah State University. Logan, UT. 26 pp.



Legend			
Model Icons	Habitat Icons	Range Icons	Num Obs
Suitable (native range)	Common	Non-native	Count of obs with 'good precision' (<=1000m) + indicates additional 'poor precision' obs (1001m-10,000m)
Optimal Suitability	Occasional		
Moderate Suitability			
Low Suitability			
Suitable (introduced range)			



Latitude	Longitude
46.36619	-112.72396
46.41313	-112.78615

Invasive and Pest Species

Summarized by: 007N009W005 (Buffered PLSS Section)

		# Obs	Predicted Model	Range
Aquatic Invasive Species				
V - Iris pseudacorus (Yellowflag Iris) N2A/AIS				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 2A - Aquatic Invasive Species - Non-native Species		Global: GNR State: SNA		
Predicted Models: 35% Moderate (inductive), 38% Low (inductive)				
V - Nymphaea odorata (American Water-lily) AIS				
View in Field Guide View Predicted Models View Range Maps Aquatic Invasive Species - Non-native Species		Global: G5 State: SNA		
Predicted Models: 61% Suitable (introduced range) (deductive)				
Noxious Weeds: Priority 1A				
V - Isatis tinctoria (Dyer's Woad) N1A				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1A - Non-native Species		Global: GNR State: SNA		
Predicted Models: 48% Optimal (inductive), 36% Moderate (inductive), 15% Low (inductive)				
V - Centaurea solstitialis (Yellow Starthistle) N1A		1		
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1A - Non-native Species		Global: GNR State: SNA		
Predicted Models: 38% Optimal (inductive), 35% Moderate (inductive), 23% Low (inductive)				
V - Taeniatherum caput-medusae (Medusahead) N1A				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1A - Non-native Species		Global: G4G5 State: SNA		
Predicted Models: 52% Low (inductive)				
V - Phragmites australis ssp. australis (European Common Reed) N1A				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1A - Non-native Species		Global: G5T5 State: SNA		
Predicted Models: 37% Low (inductive)				
Noxious Weeds: Priority 1B				
V - Lythrum salicaria (Purple Loosestrife) N1B				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1B - Non-native Species		Global: G5 State: SNA		
Predicted Models: 49% Optimal (inductive), 24% Moderate (inductive), 24% Low (inductive)				
V - Polygonum cuspidatum (Japanese Knotweed) N1B				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1B - Non-native Species		Global: GNRTNR State: SNA		
Predicted Models: 16% Optimal (inductive), 53% Moderate (inductive), 31% Low (inductive)				
V - Polygonum x bohemicum (Bohemian Knotweed) N1B				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1B - Non-native Species		Global: GNA State: SNA		
Predicted Models: 26% Moderate (inductive), 11% Low (inductive)				
V - Echium vulgare (Blueweed) N1B				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1B - Non-native Species		Global: GNR State: SNA		
Predicted Models: 60% Low (inductive)				
V - Cytisus scoparius (Scotch Broom) N1B				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1B - Non-native Species		Global: GNR State: SNA		
Predicted Models: 46% Low (inductive)				
Noxious Weeds: Priority 2A				
V - Rhamnus cathartica (Common Buckthorn) N2A				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 2A - Non-native Species		Global: GNR State: SNA		
Predicted Models: 38% Optimal (inductive), 35% Moderate (inductive), 17% Low (inductive)				
V - Lepidium latifolium (Perennial Pepperweed) N2A		19		
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 2A - Non-native Species		Global: GNR State: SNA		
Predicted Models: 38% Optimal (inductive), 23% Moderate (inductive), 31% Low (inductive)				

Frequency	Count
Never	1
Sometimes	2
Often	5
Very often	2

View in Field Guide

View Predicted Models

View Range Maps

Noxious Weed: Priority 2B - Non-native Species

Global: G5 State: SNA

Predicted Models:

M

 23% Moderate (inductive),

L

 77% Low (inductive)

V - Convolvulus arvensis (Field Bindweed) N2B

1

N

View in Field Guide

View Predicted Models

View Range Maps

Noxious Weed: Priority 2B - Non-native Species

Global: GNR State: SNA

Predicted Models:

M

 11% Moderate (inductive),

L

 62% Low (inductive)

V - Tamarix ramosissima (Salt Cedar) N2B

N

View in Field Guide

View Predicted Models

View Range Maps

Noxious Weed: Priority 2B - Non-native Species

Global: GNR State: SNA

Predicted Models:

L

 50% Low (inductive)

V - Hypericum perforatum (Common St. John's-wort) N2B

N

View in Field Guide

View Predicted Models

View Range Maps

Noxious Weed: Priority 2B - Non-native Species

Global: GNR State: SNA

Predicted Models:

L

 37% Low (inductive)

V - Potentilla recta (Sulphur Cinquefoil) N2B

N

View in Field Guide

View Predicted Models

View Range Maps

Noxious Weed: Priority 2B - Non-native Species

Global: GNR State: SNA

Predicted Models:

L

 23% Low (inductive)

Regulated Weeds: Priority 3

V - Bromus tectorum (Cheatgrass) R3

N

View in Field Guide

View Predicted Models

View Range Maps

Regulated Weed: Priority 3 - Non-native Species

Global: GNR State: SNA

Predicted Models:

L

 74% Low (inductive)

V - Elaeagnus angustifolia (Russian Olive) R3

1

N

View in Field Guide

View Predicted Models

View Range Maps

Regulated Weed: Priority 3 - Non-native Species

Global: GNR State: SNA

Predicted Models:

L

 50% Low (inductive)

Biocontrol Species

I - Aphthona lacertosa (Brown-legged Leafy Spurge Flea Beetle) BIOCNTRL

N

View in Field Guide

View Predicted Models

View Range Maps

Biocontrol Species - Non-native Species

Global: GNR State: SNA

Predicted Models:

R

 10% Optimal (inductive),

M

 90% Moderate (inductive)

I - Oberea erythrocephala (Red-headed Leafy Spurge Stem Borer) BIOCNTRL

N

View in Field Guide

View Predicted Models

View Range Maps

Biocontrol Species - Non-native Species

Global: GNR State: SNA

Predicted Models:

M

 62% Moderate (inductive),

L

 28% Low (inductive)

I - Cyphocleonus achates (Knapweed Root Weevil) BIOCNTRL

N

View in Field Guide

View Predicted Models

View Range Maps

Biocontrol Species - Non-native Species

Global: GNR State: SNA

Predicted Models:

M

 50% Moderate (inductive),

L

 36% Low (inductive)

I - Aphthona nigricutis (Black Dot Leafy Spurge Flea Beetle) BIOCNTRL

N

View in Field Guide

View Predicted Models

View Range Maps

Biocontrol Species - Non-native Species

Global: GNR State: SNA

Predicted Models:

M

 44% Moderate (inductive),

L

 47% Low (inductive)

I - Mecinus janthiniformis (Dalmatian Toadflax Stem-boring Weevil) BIOCNTRL

N

View in Field Guide

View Predicted Models

View Range Maps

Biocontrol Species - Non-native Species

Global: GNR State: SNA

Predicted Models:

L

 100% Low (inductive)

I - Mecinus janthinus (Yellow Toadflax Stem-boring Weevil) BIOCNTRL

N

View in Field Guide

View Predicted Models

View Range Maps

Biocontrol Species - Non-native Species

Global: GNR State: SNA

Predicted Models:

L

 35% Low (inductive)

Introduction to Montana Natural Heritage Program



PO Box 201800 • 1201 11th Avenue • Helena, MT 59620-1800 • fax 406.444.0266 • phone 406.444.3989 • mtnhp.org

INTRODUCTION

The Montana Natural Heritage Program (MTNHP) is Montana's source for reliable and objective information on Montana's native species and habitats, emphasizing those of conservation concern. MTNHP was created by the Montana legislature in 1983 as part of the Natural Resource Information System (NRIS) at the Montana State Library (MSL). MTNHP is "a program of information acquisition, storage, and retrieval for data relating to the flora, fauna, and biological community types of Montana" (MCA 90-15-102). MTNHP's activities are guided by statute as well as through ongoing interaction with, and feedback from, principal data source agencies such as Montana Fish, Wildlife, and Parks, the Montana Department of Environmental Quality, the Montana Department of Natural Resources and Conservation, the Montana University System, the US Forest Service, and the US Bureau of Land Management. Since the first staff was hired in 1985, the Program has logged a long record of success, and developed into a highly respected, service-oriented program. MTNHP is widely recognized as one of the most advanced and effective of over 60 natural heritage programs that are distributed across North America.

VISION

Our vision is that public agencies, the private sector, the education sector, and the general public will trust and rely upon MTNHP as the source for information and expertise on Montana's species and habitats, especially those of conservation concern. We strive to provide easy access to our information to allow users to save time and money, speed environmental reviews, and make informed decisions.

CORE VALUES

- We endeavor to be a single statewide source of accurate and up-to-date information on Montana's plants, animals, and aquatic and terrestrial biological communities.
- We actively listen to our data users and work responsively to meet their information and training needs.
- We strive to provide neutral, trusted, timely, and equitable service to all of our information users.
- We make every effort to be transparent to our data users in setting work priorities and providing data products.

CONFIDENTIALITY

All information requests made to the Montana Natural Heritage Program are considered library records and are protected from disclosure by the Montana Library Records Confidentiality Act (MCA 22-1-11).

INFORMATION MANAGED

Information managed at the Montana Natural Heritage Program is botanical, zoological, and ecological information that describes the distribution (e.g., observations, structured surveys, range polygons, predicted habitat suitability models), conservation status (e.g., global and state conservation status ranks, including threats), and other supporting information (e.g., accounts and references) on the biology and ecology of species and biological communities.

Data Use Terms and Conditions

- Montana Natural Heritage Program (MTNHP) products and services are based on biological data and the objective interpretation of those data by professional scientists. MTNHP does not advocate any particular philosophy of natural resource protection, management, development, or public policy.
- MTNHP has no natural resource management or regulatory authority. Products, statements, and services from MTNHP are intended to inform parties as to the state of scientific knowledge about certain natural resources, and to further develop that knowledge. The information is not intended as natural resource management guidelines or prescriptions or a determination of environmental impacts. MTNHP recommends consultation with appropriate state, federal, and tribal resource management agencies and authorities in the area where your project is located.
- Information on the status and spatial distribution of biological resources produced by MTNHP are intended to inform parties of the state-wide status, known occurrence, or the likelihood of the presence of those resources. **These products are not intended to substitute for field-collected data, nor are they intended to be the sole basis for natural resource management decisions.**
- MTNHP does not portray its data as exhaustive or comprehensive inventories of rare species or biological communities. **Field verification of the absence or presence of sensitive species and biological communities will always be an important obligation of users of our data.**
- MTNHP responds equally to all requests for products and services, regardless of the purpose or identity of the requester.
- Because MTNHP constantly updates and revises its databases with new data and information, products will become outdated over time. Interested parties are encouraged to obtain the most current information possible from MTNHP, rather than using older products. We add, review, update, and delete records on a daily basis. Consequently, we strongly advise that you update your MTNHP data sets at a minimum of every four months for most applications of our information.
- MTNHP data require a certain degree of biological expertise for proper analysis, interpretation, and application. Our staff is available to advise you on questions regarding the interpretation or appropriate use of the data that we provide. See [Contact Information for MTNHP Staff](#)
- The information provided to you by MTNHP may include sensitive data that if publicly released might jeopardize the welfare of threatened, endangered, or sensitive species or biological communities. This information is intended for distribution or use only within your department, agency, or business. Subcontractors may have access to the data during the course of any given project, but should not be given a copy for their use on subsequent, unrelated work.
- MTNHP data are made freely available. Duplication of hard-copy or digital MTNHP products with the intent to sell is prohibited without written consent by MTNHP. Should you be asked by individuals outside your organization for the type of data that we provide, please refer them to MTNHP.
- MTNHP and appropriate staff members should be appropriately acknowledged as an information source in any third-party product involving MTNHP data, reports, papers, publications, or in maps that incorporate MTNHP graphic elements.
- Sources of our data include museum specimens, published and unpublished scientific literature, field surveys by state and federal agencies and private contractors, and reports from knowledgeable individuals. MTNHP actively solicits and encourages additions, corrections and updates, new observations or collections, and comments on any of the data we provide.
- MTNHP staff and contractors do not enter or cross privately-owned lands without express permission from the landowner. However, the program cannot guarantee that information provided to us by others was obtained under adherence to this policy.

Suggested Contacts for Natural Resource Management 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 permitting and planning processes and management decisions. We encourage you to contact state, federal, and tribal resource management agencies in the area where your project is located and review the permitting overviews by the [Montana Department of Environmental Quality](#), the [Montana Department of Natural Resources and Conservation](#) and the [Index of Environmental Permits for Montana](#) for 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 Consultation \(IPAC\) website 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:

Montana Fish, Wildlife, and Parks

Fish Species	Zachary Shattuck zshattuck@mt.gov (406) 444-1231 or Eric Roberts eroberts@mt.gov (406) 444-5334																												
American Bison Black-footed Ferret Black-tailed Prairie Dog Bald Eagle Golden Eagle Common Loon Least Tern Piping Plover Whooping Crane	Kristina Smucker KSmucker@mt.gov (406) 444-5209																												
Grizzly Bear Greater Sage Grouse Trumpeter Swan Big Game Upland Game Birds Furbearers	Brian Wakeling brian.wakeling@mt.gov (406) 444-3940																												
Managed Terrestrial Game Data	Adam Messer – MFWP GIS Coordinator amesser@mt.gov (406) 444-0095																												
Fisheries Data and Nongame Animal Data	Adam Messer – MFWP GIS Coordinator amesser@mt.gov (406) 444-0095																												
Wildlife and Fisheries Scientific Collector’s Permits	https://fwp.mt.gov/buyandapply/commercialwildlifeandscientificpermits/scientific Kristina Smucker for Wildlife ksmucker@mt.gov (406) 444-5209 Dave Schmetterling for Fisheries dschmetterling@mt.gov (406) 542-5514																												
Fish and Wildlife Recommendations for Subdivision Development	Stevie Burton stevie.burton@mt.gov (406) 594-7354 See https://fwp.mt.gov/conservation/living-with-wildlife/subdivision-recommendations																												
Regional Contacts 	<table><tr><td>Region 1</td><td>(Kalispell)</td><td>(406) 752-5501</td><td>fwprg12@mt.gov</td></tr><tr><td>Region 2</td><td>(Missoula)</td><td>(406) 542-5500</td><td>fwprg22@mt.gov</td></tr><tr><td>Region 3</td><td>(Bozeman)</td><td>(406) 577-7900</td><td>fwprg3@mt.gov</td></tr><tr><td>Region 4</td><td>(Great Falls)</td><td>(406) 454-5840</td><td>fwprg42@mt.gov</td></tr><tr><td>Region 5</td><td>(Billings)</td><td>(406) 247-2940</td><td>fwprg52@mt.gov</td></tr><tr><td>Region 6</td><td>(Glasgow)</td><td>(406) 228-3700</td><td>fwprg62@mt.gov</td></tr><tr><td>Region 7</td><td>(Miles City)</td><td>(406) 234-0900</td><td>fwprg72@mt.gov</td></tr></table>	Region 1	(Kalispell)	(406) 752-5501	fwprg12@mt.gov	Region 2	(Missoula)	(406) 542-5500	fwprg22@mt.gov	Region 3	(Bozeman)	(406) 577-7900	fwprg3@mt.gov	Region 4	(Great Falls)	(406) 454-5840	fwprg42@mt.gov	Region 5	(Billings)	(406) 247-2940	fwprg52@mt.gov	Region 6	(Glasgow)	(406) 228-3700	fwprg62@mt.gov	Region 7	(Miles City)	(406) 234-0900	fwprg72@mt.gov
Region 1	(Kalispell)	(406) 752-5501	fwprg12@mt.gov																										
Region 2	(Missoula)	(406) 542-5500	fwprg22@mt.gov																										
Region 3	(Bozeman)	(406) 577-7900	fwprg3@mt.gov																										
Region 4	(Great Falls)	(406) 454-5840	fwprg42@mt.gov																										
Region 5	(Billings)	(406) 247-2940	fwprg52@mt.gov																										
Region 6	(Glasgow)	(406) 228-3700	fwprg62@mt.gov																										
Region 7	(Miles City)	(406) 234-0900	fwprg72@mt.gov																										

Montana Department of Agriculture

General Contact Information: <https://agr.mt.gov/About/Office-Locations/Office-Locations-and-Field-Offices>
Noxious Weeds: <https://agr.mt.gov/Noxious-Weeds>

Montana Department of Environmental Quality

Permitting and Operator Assistance for all Environmental Permits: <https://deq.mt.gov/Permitting>

Montana Department of Natural Resources and Conservation

Overview of, and contacts for, licenses and permits for state lands, water, and forested lands:
<https://dnrc.mt.gov/Permits-Services>

Stream Permitting (310 permits) and an overview of various water and stream related permits (e.g., Stream Protection Act 124, Federal Clean Water Act 404, Federal Rivers and Harbors Act Section 10, Short-term Water Quality Standard for Turbidity 318 Authorization, etc.).
<https://dnrc.mt.gov/Licenses-and-Permits/Stream-Permitting>

Wildfire Resources: <https://dnrc.mt.gov/Forestry/Wildfire>

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 Army Corps of Engineers

Montana Regulatory Office for federal permits related to construction in water and wetlands
<https://www.nwo.usace.army.mil/Missions/Regulatory-Program/Montana/> (406) 441-1375

United States Environmental Protection Agency

Environmental information, notices, permitting, and contacts <https://www.epa.gov/mt>
Gateway to state resource locators <https://www.envcap.org/srl/index.php>

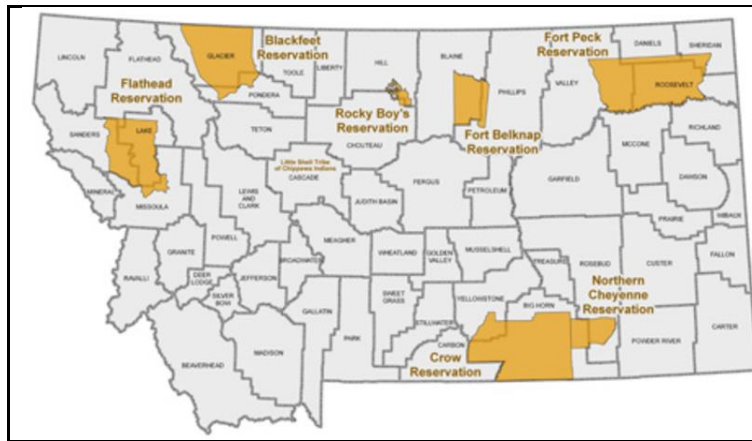
United States Fish and Wildlife Service

Information Planning and Conservation (IPAC) website: <https://ipac.ecosphere.fws.gov>
Montana Ecological Services Field Office: <https://www.fws.gov/office/montana-ecological-services> (406) 449-5225

United States Forest Service

Regional Office – Missoula, Montana Contacts			
Wildlife Program Leader	Tammy Fletcher	tammy.fletcher2@usda.gov	(406) 329-3086
Wildlife Ecologist	Cara Staab	cara.staab@usda.gov	(406) 329-3677
Aquatic Ecologist	Justin Jimenez	justin.jimenez@usda.gov	(435) 370-6830
TES Program	Lydia Allen	lydia.allen@usda.gov	(406) 329-3558
Interagency Grizzly Bear Coordinator	Scott Jackson	scott.jackson@usda.gov	(406) 329-3664
Regional Botanist	Amanda Hendrix	amanda.hendrix@usda.gov	(651) 447-3016
Regional Vegetation Ecologist	Mary Manning	marry.manning@usda.gov	(406) 329-3304
Invasive Species Program Manager	Michelle Cox	michelle.cox2@usda.gov	(406) 329-3669

Tribal Nations



[Assiniboine & Gros Ventre Tribes – Fort Belknap Reservation](#)

[Assiniboine & Sioux Tribes – Fort Peck Reservation](#)

[Blackfeet Tribe - Blackfeet Reservation](#)

[Chippewa Creek Tribe - Rocky Boy's Reservation](#)

[Crow Tribe – Crow Reservation](#)

[Little Shell Chippewa Tribe](#)

[Northern Cheyenne Tribe – Northern Cheyenne Reservation](#)

[Salish & Kootenai Tribes - Flathead Reservation](#)

Natural Heritage Programs and Conservation Data Centers 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 \(MISC\)](#)

[Western Montana Conservation Commission](#)

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](#)

[Fire Management and Invasive Plants](#)

Introduction to Native Species

Within the report area you have requested, separate summaries are provided for: (1) Species Occurrences (SO) for plant and animal Species of Concern, Special Status Species (SSS), Important Animal Habitat (IAH) and some Potential Plant Species of Concern; (2) other observed non Species of Concern or Species of Concern without suitable documentation to create Species Occurrence polygons; and (3) other non-documented species that are potentially present based on their range, predicted suitable habitat model output, or presence of associated habitats. Each of these summaries provides the following information when present for a species: (1) the number of [Species Occurrences](#) and associated delineation criteria for construction of these polygons that have long been used for considerations of documented Species of Concern in environmental reviews; (2) the number of observations of each species; (3) the geographic range polygons for each species that the report area overlaps; (4) predicted relative habitat suitability classes that are present if a predicted suitable habitat model has been created; (5) the percent of the report area that is mapped as commonly associated or occasionally associated habitat as listed for each species in the [Montana Field Guide](#); and (6) a variety of conservation status ranks and links to species accounts in the [Montana Field Guide](#). Details on each of these information categories are included under relevant section headers below or are defined on our [Species Status Codes](#) page. In presenting this information, the Montana Natural Heritage Program (MTNHP) is working towards assisting the user with rapidly determining what species have been documented and what species are potentially present in the report area. We remind users that this information is likely incomplete as surveys to document native and introduced species are lacking in many areas of the state, information on introduced species has only been tracked relatively recently, the MTNHP's staff and resources are restricted by budgets, and information is constantly being added and updated in our databases. **Thus, field verification by professional biologists of the absence or presence of species and biological communities will always be an important obligation of users of our data.**

If you are aware of observation datasets that the MTNHP is missing, please report them to the Program Botanist apipp@mt.gov or Senior Zoologist dbachen@mt.gov. If you have animal or plant observations that you would like to contribute, you can also submit them via Excel spreadsheets, geodatabases, iNaturalist, or a Survey123 form. Various methods of data submission are reviewed in this playlist of videos:

<https://www.youtube.com/playlist?list=PLRaydtZpHu2qOHPoSPq9cnM9uXGmEXACx>

Observations

The MTNHP manages information on several million animal and plant observations that have been reported by professional biologists and private citizens from across Montana. The majority of these observations are submitted in digital format from standardized databases associated with research or monitoring efforts and spreadsheets of incidental observations submitted by professional biologists and amateur naturalists. At a minimum, accepted observation records must contain a credible species identification (i.e. appropriate geographic range, date, and habitat and, if species are difficult to identify, a photograph and/or notes on key identifying features), a date or date range, observer name, locational information (ideally with latitude and longitude in decimal degrees), notes on numbers observed, and species behavior or habitat use (e.g., is the observation likely associated with reproduction). Bird records are also required to have information associated with date-appropriate breeding or overwintering status of the species observed. MTNHP reviews observation records to ensure that they are mapped correctly, occur within date ranges when the species is known to be present or detectable, occur within the known seasonal geographic range of the species, and occur in appropriate habitats. MTNHP also assigns each record a locational uncertainty value in meters to indicate the spatial precision associated with the record's mapped coordinates. Only records with locational uncertainty values of 10,000 meters or less are included in environmental summary reports and number summaries are only provided for records with locational uncertainty values of 1,000 meters or less.

Species Occurrences

The MTNHP evaluates plant and animal observation records for species of higher conservation concern to determine whether they are worthy of inclusion in the [Species Occurrence](#) (SO) layer for use in environmental reviews; observations not worthy of inclusion in this layer include long distance dispersal events, migrants observed away from key migratory stopover habitats, and winter observations. An SO is a polygon depicting what is known about a species occupancy from direct observation with a defined level of locational uncertainty and any inference that can be made about adjacent habitat use from the latest peer-reviewed science. If an observation can be associated with a map feature that can be tracked (e.g., a wetland boundary for a wetland associated plant) then this polygon feature is used to represent the SO. Areas that can be inferred as probable occupied habitat based on direct observation of a species location and what is known about the foraging area or home range size of the species may be incorporated into the SO. Species Occurrences generally belong to one of the following categories:

Plant Species Occurrences

A documented location of a specimen collection or observed plant population. In some instances, adjacent, spatially separated clusters are considered subpopulations and are grouped as one occurrence (e.g., the subpopulations occur in ecologically similar habitats, and their spatial proximity likely allows them to interbreed). Tabular information for multiple observations at the same SO location is generally linked to a single polygon. Plant SO's are only created for Species of Concern and Potential Species of Concern.

Animal Species Occurrences

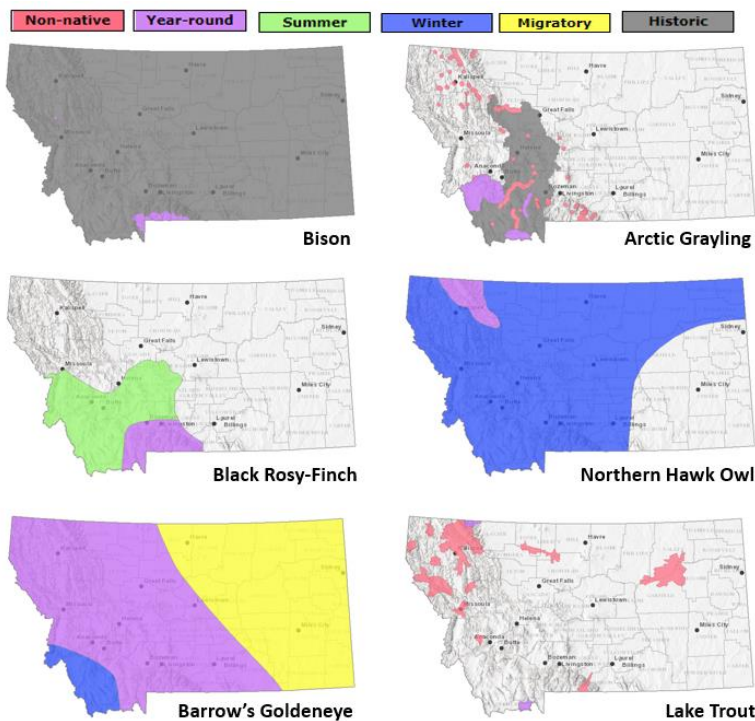
The location of a verified observation or specimen record typically known or assumed to represent a breeding population or a portion of a breeding population. Animal SO's are generally: (1) buffers of terrestrial point observations based on documented species' home range sizes; (2) buffers of stream segments to encompass occupied streams and immediate adjacent riparian habitats; (3) polygonal features encompassing known or likely breeding populations (e.g., a wetland for some amphibians or a forested portion of a mountain range for some wide-ranging carnivores); or (4) combinations of the above. Tabular information for multiple observations at the same SO location is generally linked to a single polygon. Species Occurrence polygons may encompass some unsuitable habitat in some instances in order to avoid heavy data processing associated with clipping out habitats that are readily assessed as unsuitable by the data user (e.g., a point buffer of a terrestrial species may overlap into a portion of a lake that is obviously inappropriate habitat for the species). Animal SO's are only created for Species of Concern and Special Status Species (e.g., Bald Eagle).

Other Occurrence Polygons

These include significant biological features not included in the above categories, such as Important Animal Habitats like bird rookeries and bat roosts, and peatlands or other wetland and riparian communities that support diverse plant and animal communities.

Geographic Range Polygons

Geographic range polygons are still under development for most plant and invertebrate species. Native year-round, summer, winter, migratory and historic geographic range polygons as well as polygons for introduced



populations have been defined for most vertebrate animal species for which there are enough observations, surveys, and knowledge of appropriate seasonal habitat use to define them (see examples to left). These native or introduced range polygons bound the extent of known or likely occupied habitats for non-migratory and relative sedentary species and the regular extent of known or likely occupied habitats for migratory and long-distance dispersing species; polygons may include unsuitable intervening habitats. For most species, a single polygon can represent the year-round or seasonal range, but breeding ranges of some colonial nesting water birds and some introduced species are represented more patchily when supported by data. Some ranges are mapped more broadly than actual distributions in order to be visible on statewide maps (e.g., fish).

Predicted Suitable Habitat Models

Predicted habitat suitability models have been created for plant and animal Species of Concern and are undergoing development for non-Species of Concern. For species for which models have been completed, the environmental summary report includes simple rule-based associations with streams for aquatic species and seasonal habitats for game species as well as mathematically complex Maximum Entropy models (Phillips et al. 2006, Ecological Modeling 190:231-259) constructed from a variety of statewide biotic and abiotic layers and presence only data for individual species for most terrestrial species. For the Maximum Entropy models, we reclassified 90 x 90-meter continuous model output into suitability classes (unsuitable, low, moderate, and optimal) then aggregated that into the one square mile hexagons used in the environmental summary report; this is the finest spatial scale we suggest using this information in management decisions and survey planning. Full model write ups for individual species that discuss model goals, inputs, outputs, and evaluation in much greater detail are posted on the MTNHP's [Predicted Suitable Habitat Models](#) webpage. Evaluations of predictive accuracy and specific limitations are included with the metadata for models of individual species. **Model outputs should not be used in place of on-the-ground surveys for species. Instead model outputs should be used in conjunction with habitat evaluations to determine the need for on-the-ground surveys for species.** We suggest that the percentage of predicted optimal and moderate suitable habitat within the report area be used in conjunction with geographic range polygons and the percentage of commonly associated habitats to generate lists of potential species that may occupy broader landscapes for the purposes of landscape-level planning.

Associated Habitats

Within the boundary of the intersected hexagons, we provide the approximate percentage of commonly or occasionally associated habitat for vertebrate animal species that regularly breed, overwinter, or migrate through the state; a detailed list of commonly and occasionally associated habitats is provided in individual species accounts in the [Montana Field Guide](#). We assigned common or occasional use of each of the ecological

systems mapped in Montana by: (1) using personal knowledge and reviewing literature that summarizes the breeding, overwintering, or migratory habitat requirements of each species; (2) evaluating structural characteristics and distribution of each ecological system relative to the species' range and habitat requirements; (3) examining the observation records for each species in the state-wide point observation database associated with each ecological system; and (4) calculating the percentage of observations associated with each ecological system relative to the percent of Montana covered by each ecological system to get a measure of numbers of observations versus availability of habitat. Species that breed in Montana were only evaluated for breeding habitat use, species that only overwinter in Montana were only evaluated for overwintering habitat use, and species that only migrate through Montana were only evaluated for migratory habitat use. In general, species were listed as associated with an ecological system if structural characteristics of used habitat documented in the literature were present in the ecological system or large numbers of point observations were associated with the ecological system. However, species were not listed as associated with an ecological system if there was no support in the literature for use of structural characteristics in an ecological system, even if point observations were associated with that system. Common versus occasional association with an ecological system was assigned based on the degree to which the structural characteristics of an ecological system matched the preferred structural habitat characteristics for each species as represented in the scientific literature. The percentage of observations associated with each ecological system relative to the percent of Montana covered by each ecological system was also used to guide assignment of common versus occasional association.

We suggest that the percentage of commonly associated habitat within the report area be used in conjunction with geographic range polygons and the percentage of predicted optimal and moderate suitable habitat from predictive models to generate lists of potential species that may occupy broader landscapes for the purposes of landscape-level planning. Users of this information should be aware that land cover mapping accuracy is particularly problematic when the systems occur as small patches or where the land cover types have been altered over the past decade. Thus, particular caution should be used when using the associations in assessments of smaller areas (e.g., evaluations of public land survey sections).

Introduction to Land Cover

Land Use/Land Cover is one of 15 [Montana Spatial Data Infrastructure](#) framework layers considered vital for making statewide maps of Montana and understanding its geography. The layer records all Montana natural vegetation, land cover and land use, classified from satellite and aerial imagery, mapped at a scale of 1:100,000, and interpreted with supporting ground-level data. The baseline map is adapted from the Northwest ReGAP (NWGAP) project land cover classification, which used 30m resolution multi-spectral Landsat imagery acquired between 1999 and 2001. Vegetation classes were drawn from the Ecological System Classification developed by NatureServe (Comer et al. 2003). The land cover classes were developed by Anderson et al. (1976). The NWGAP effort encompasses 12 map zones. Montana overlaps seven of these zones. The two NWGAP teams responsible for the initial land cover mapping effort in Montana were Sanborn and NWGAP at the University of Idaho. Both Sanborn and NWGAP employed a similar modeling approach in which Classification and Regression Tree (CART) models were applied to Landsat ETM+ scenes. The Spatial Analysis Lab within the Montana Natural Heritage Program was responsible for developing a seamless Montana land cover map with a consistent statewide legend from these two separate products. Additionally, the Montana land cover layer incorporates several other land cover and land use products (e.g., MSDI Structures and Transportation themes and the Montana Department of Revenue Final Land Unit classification) and reclassifications based on plot-level data and the latest NAIP imagery to improve accuracy and enhance the usability of the theme. Updates are done as partner support and funding allow, or when other MSDI datasets can be incorporated. Recent updates include fire perimeters and agricultural land use (annually), energy developments such as wind, oil and gas installations (2014), roads, structures and other impervious surfaces (various years): and local updates/improvements to specific ecological systems (e.g., central Montana grassland and sagebrush ecosystems). Current and previous versions of the Land Use/Land Cover layer with full metadata are available for download from the Montana State Library's [GIS Data List](#). More information on the land cover layer is available at: https://msl.mt.gov/geoinfo/msdi/land_use_land_cover/

Within the report area you have requested, land cover is summarized by acres of Level 1, Level 2, and Level 3 Ecological Systems.

Literature Cited

- Anderson, J.R. E.E. Hardy, J.T. Roach, and R.E. Witmer. 1976. A land use and land cover classification system for use with remote sensor data. U.S. Geological Survey Professional Paper 964.
- Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K. Snow, and J. Teague. 2003. Ecological systems of the United States: A working classification of U.S. terrestrial systems. NatureServe, Arlington, VA.

Introduction to Wetland and Riparian

Within the report area you have requested, wetland and riparian mapping is summarized by acres of each classification present. Summaries are only provided for modern MTNHP wetland and riparian mapping and not for outdated (NWI Legacy) or incomplete (NWI Scalable) mapping efforts; [described here](#). MTNHP has made all three of these datasets and associated metadata available for separate download on the Montana [Wetland and Riparian Framework](#) web page.

Wetland and Riparian mapping is one of 15 [Montana Spatial Data Infrastructure](#) framework layers considered vital for making statewide maps of Montana and understanding its geography. The wetland and riparian framework layer consists of spatial data representing the extent, type, and approximate location of wetlands, riparian areas, and deep water habitats in Montana.

Wetland and riparian mapping is completed through photointerpretation of 1-m resolution color infrared aerial imagery acquired from 2005 or later. A coding convention using letters and numbers is assigned to each mapped wetland. These letters and numbers describe the broad landscape context of the wetland, its vegetation type, its water regime, and the kind of alterations that may have occurred. Ancillary data layers such as topographic maps, digital elevation models, soils data, and other aerial imagery sources are also used to improve mapping accuracy. Wetland mapping follows the federal Wetland Mapping Standard and classifies wetlands according to the Cowardin classification system of the National Wetlands Inventory (NWI) (Cowardin et al. 1979, FGDC Wetlands Subcommittee 2013). Federal, State, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands differently than the NWI. Similar coding, based on U.S. Fish and Wildlife Service conventions, is applied to riparian areas (U.S. Fish and Wildlife Service 2009). These are mapped areas where vegetation composition and growth is influenced by nearby water bodies, but where soils, plant communities, and hydrology do not display true wetland characteristics. **These data are intended for use at a scale of 1:12,000 or smaller. Mapped wetland and riparian areas do not represent precise boundaries and digital wetland data cannot substitute for an on-site determination of jurisdictional wetlands.**

See detailed overviews, with examples, of both wetland and riparian classification systems and associated codes as a [storymap](#) and companion [guide](#)

Literature Cited

- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service, FWS/OBS-79/31. Washington, D.C. 103pp.
- Federal Geographic Data Committee. 2013. Classification of wetlands and deepwater habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, D.C.
- U.S. Fish and Wildlife Services. 2009. A system for mapping riparian areas in the western United States. Division of Habitat and Resource Conservation, Branch of Resource and Mapping Support, Arlington, Virginia.

Introduction to Land Management

Within the report area you have requested, land management information is summarized by acres of federal, state, and local government lands, tribal reservation boundaries, private conservation lands, and federal, state, local, and private conservation easements. Acreage for “Owned”, “Tribal”, or “Easement” categories represents non-overlapping areas that may be totaled. However, “Other Boundaries” represents managed areas such as National Forest boundaries containing private inholdings and other mixed ownership which may cause boundaries to overlap (e.g. a wilderness area within a forest). Therefore, acreages may not total in a straight-forward manner.

Because information on land stewardship is critical to effective land management, the Montana Natural Heritage Program (MTNHP) began compiling ownership and management data in 1997. The goal of the Montana Land Management Database is to manage a single, statewide digital data set that incorporates information from both public and private entities. The database assembles information on public lands, private conservation lands, and conservation easements held by state and federal agencies and land trusts and is updated on a regular basis. Since 2011, the Information Management group in the Montana State Library’s Digital Library Division has led the Montana Land Management Database in partnership with the MTNHP.

Public and private conservation land polygons are attributed with the name of the entity that owns it. The data are derived from the statewide [Montana Cadastral Parcel layer](#). Conservation easement data shows land parcels on which a public agency or qualified land trust has placed a conservation easement in cooperation with the landowner. The dataset contains no information about ownership or status of the mineral estate. For questions about the dataset or to report errors, please contact the Montana Natural Heritage Program at (406) 444-5363 or mtnhp@mt.gov. You can download various components of the Land Management Database and view associated metadata at the Montana State Library’s [GIS Data List](#) at the following links:

[Public Lands](#)

[Conservation Easements](#)

[Private Conservation Lands](#)

[Managed Areas](#)

Map features in the Montana Land Management Database or summaries provided in this report are not intended as a legal depiction of public or private surface land ownership boundaries and should not be used in place of a survey conducted by a licensed land surveyor. Similarly, map features do not imply public access to any lands. The Montana Natural Heritage Program makes no representations or warranties whatsoever with respect to the accuracy or completeness of this data and assumes no responsibility for the suitability of the data for a particular purpose. The Montana Natural Heritage Program will not be liable for any damages incurred as a result of errors displayed here. Consumers of this information should review or consult the primary data and information sources to ascertain the viability of the information for their purposes.

Introduction to Invasive and Pest Species

Within the report area you have requested, separate summaries are provided for: Aquatic Invasive Species, Noxious Weeds, Agricultural Pests, Forest Pests, and Biocontrol species that have been documented or potentially occur there based on the predicted suitability of habitat. Definitions for each of these invasive and pest species categories can be found on our [Species Status Codes](#) page.

Each of these summaries provides the following information when present for a species: (1) the number of observations of each species; (2) the geographic range polygons for each species, if developed, that the report area overlaps; (3) predicted relative habitat suitability classes that are present if a predicted suitable habitat model has been created; (4) the percent of the report area that is mapped as commonly associated or occasionally associated habitat as listed for each species in the [Montana Field Guide](#); and (5) links to species accounts in the [Montana Field Guide](#). Details on each of these information categories are included under relevant section headers under the Introduction to Native Species above or are defined on our [Species Status Codes](#) page. In presenting this information, the Montana Natural Heritage Program (MTNHP) is working towards assisting the user with rapidly determining what invasive and pest species have been documented and what species are potentially present in the report area. We remind users that this information is likely incomplete as surveys to document introduced species are lacking in many areas of the state, information on introduced species has only been tracked relatively recently, the MTNHP's staff and resources are limited, and information is constantly being added and updated in our databases. **Thus, field verification by professional biologists of the absence or presence of species will always be an important obligation of users of our data.**

If you are aware of observation or survey datasets for invasive or pest species that the MTNHP is missing, please report them to the Program Coordinator bmaxell@mt.gov Program Botanist apipp@mt.gov or Senior Zoologist dbachen@mt.gov If you have animal or plant observations that you would like to contribute, you can also submit them via Excel spreadsheets, geodatabases, iNaturalist, or a Survey123 form. Various methods of data submission are reviewed in this playlist of videos:

<https://www.youtube.com/playlist?list=PLRaydtZpHu2qOHPoSPq9cnM9uXGmEXACx>

Additional Information Resources

[MTNHP Staff Contact Information](#)

[Montana Field Guide](#)

[MTNHP Species of Concern Report - Animals and Plants](#)

[MTNHP Species Status Codes - Explanation](#)

[MTNHP Predicted Suitable Habitat Models](#) (for select Animals and Plants)

[MTNHP Request Information page](#)

[Montana Cadastral](#)

[Montana Code Annotated](#)

[Montana Fisheries Information System](#)

[Montana Fish, Wildlife, and Parks Subdivision Recommendations](#)

[Montana GIS Data Layers](#)

[Montana GIS Data Bundler](#)

[Montana Greater Sage-Grouse Project Submittal Site](#)

[Montana Ground Water Information Center](#)

[Montana Index of Environmental Permits, 21st Edition \(2018\)](#)

[Montana Environmental Policy Act \(MEPA\)](#)

[Montana Environmental Policy Act Analysis Resource List](#)

[Laws, Treaties, Regulations, and Agreements on Animals and Plants](#)

[Montana Spatial Data Infrastructure Layers](#)

[Montana State Historic Preservation Office Review and Compliance](#)

[Montana Stream Permitting: a guide for conservation district supervisors and others](#)

[Montana Water Information System](#)

[Montana Web Map Services](#)

[National Environmental Policy Act](#)

[Penalties for Misuse of Fish and Wildlife Location Data](#) (MCA 87-6-222)

[U.S. Fish and Wildlife Service Information for Planning and Consultation](#) (Section 7 Consultation)

[Web Soil Survey Tool](#)



A program of the Montana State Library's
Natural Resource Information System.

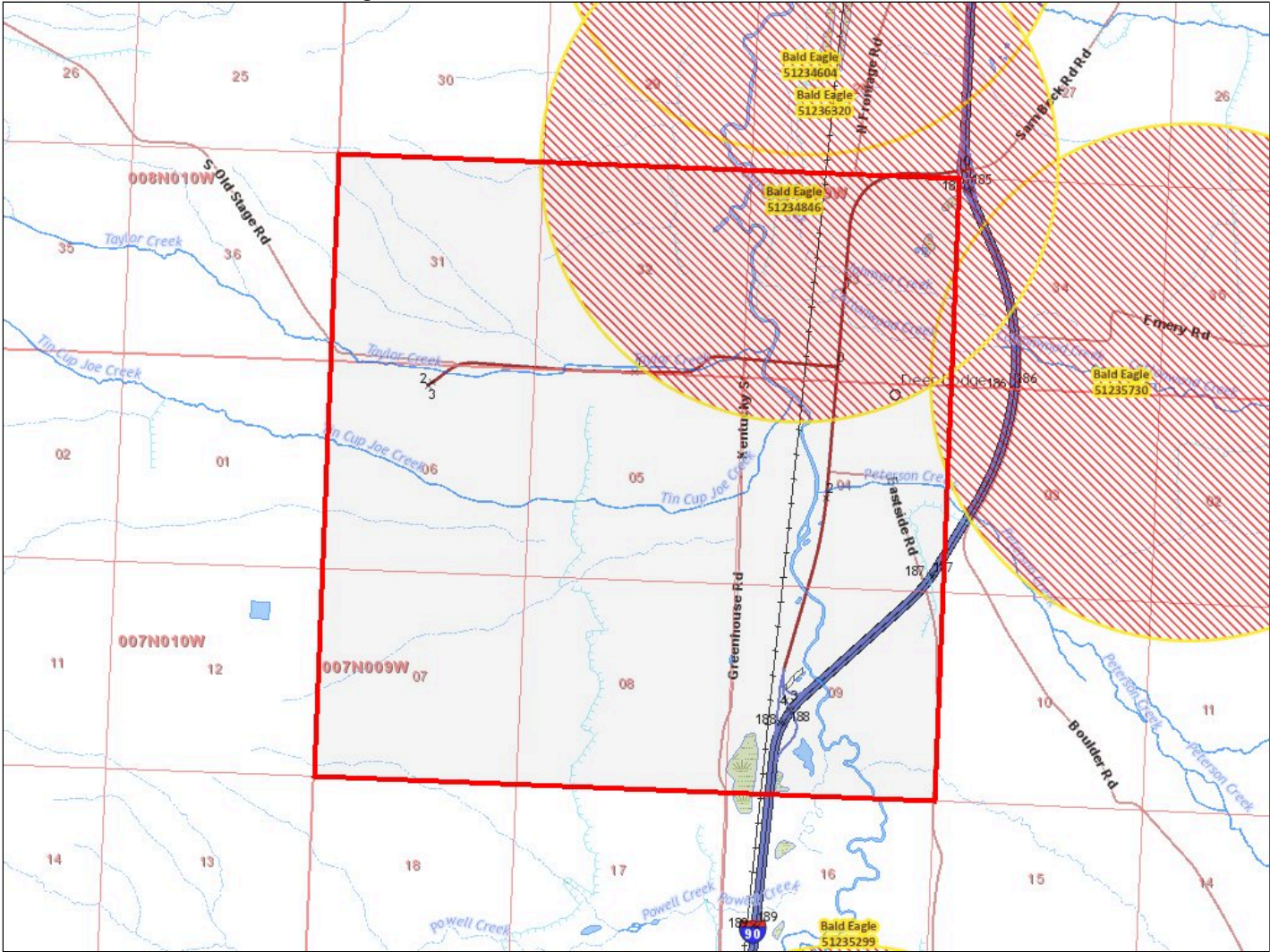
Latitude 46.34847
Longitude -112.65310
46.43077 -112.85689



Montana SOC Occurrences Report

SOC Occurrences for Birds = Bald Eagle

Report generated 5/28/2024 3:41:56 PM



Birds - Bald Eagle (<i>Haliaeetus leucocephalus</i>)		SO Count: 8	Obs Count: 37	Earliest Obs: 2003	Recent Obs: 2023
Special Status Species	Agency Status	Delineation Criteria			
Native Species	USFWS: BGEPA; MBTA	Confirmed nesting area buffered by a minimum distance of 2,000 meters in order to be conservative about encompassing the breeding territory and area commonly used for renesting. Only nesting observations with a locational uncertainty of 1,000 meters or less will be used to delineate a nesting area.			
Global Rank: G5	USFS: Sensitive - Known in Forests (LOLO)				
State Rank: S4	BLM: SENSITIVE				
	FWP SWAP:				
	PIF: 2				
		Last Updated			
		Apr 01, 2024			
SO ID: 51234604		Acres: 3,105	Obs Count: 1	Earliest Obs: 2003	Recent Obs: 2003
SO ID: 51234791		Acres: 3,105	Obs Count: 1	Earliest Obs: 2023	Recent Obs: 2023
SO ID: 51234846		Acres: 3,105	Obs Count: 1	Earliest Obs: 2009	Recent Obs: 2009
SO ID: 51235299		Acres: 3,105	Obs Count: 1	Earliest Obs: 2009	Recent Obs: 2009
SO ID: 51235525		Acres: 3,105	Obs Count: 1	Earliest Obs: 2022	Recent Obs: 2022
SO ID: 51235533		Acres: 3,095	Obs Count: 10	Earliest Obs: 2013	Recent Obs: 2023
SO ID: 51235730		Acres: 3,105	Obs Count: 1	Earliest Obs: 2023	Recent Obs: 2023
SO ID: 51236320		Acres: 3,095	Obs Count: 21	Earliest Obs: 2009	Recent Obs: 2023

Citation for this report:
Montana SOC Occurrences Report
SOC Occurrences for Birds = Bald Eagle
Within Lat/Long: (46.34847,-112.65310) to (46.43077,-112.85689)
Natural Heritage Map Viewer. Montana Natural Heritage Program.
Retrieved on May 28, 2024, from <https://mtnhp.org/MapView/SOReport.aspx>



MONTANA STATE LIBRARY

NATURAL HERITAGE PROGRAM

mtnhp.org

1201 11th Ave • P.O. Box 201800 • Helena, MT 59620-1800 • fax 406-444-0266 • phone 406-444-3989



Latitude Longitude
46.36611 -112.70292
46.41322 -112.76572

Summarized by:
007N009W004
(Buffered PLSS Section)



Suggested Citation

Montana Natural Heritage Program. Environmental Summary Report.

for Latitude 46.36611 to 46.41322 and Longitude -112.70292 to -112.76572. Retrieved on 5/28/2024.

The Montana Natural Heritage Program is part of the Montana State Library's Natural Resource Information System. Since 1985, it has served as a neutral and non-regulatory provider of easily accessible information on Montana's species and biological communities to inform all stakeholders in environmental review, permitting, and planning processes. The program is part of the NatureServe network that is composed of over 60 member programs across North America that work to provide current and comprehensive distribution and status information on species and biological communities.



Environmental Summary

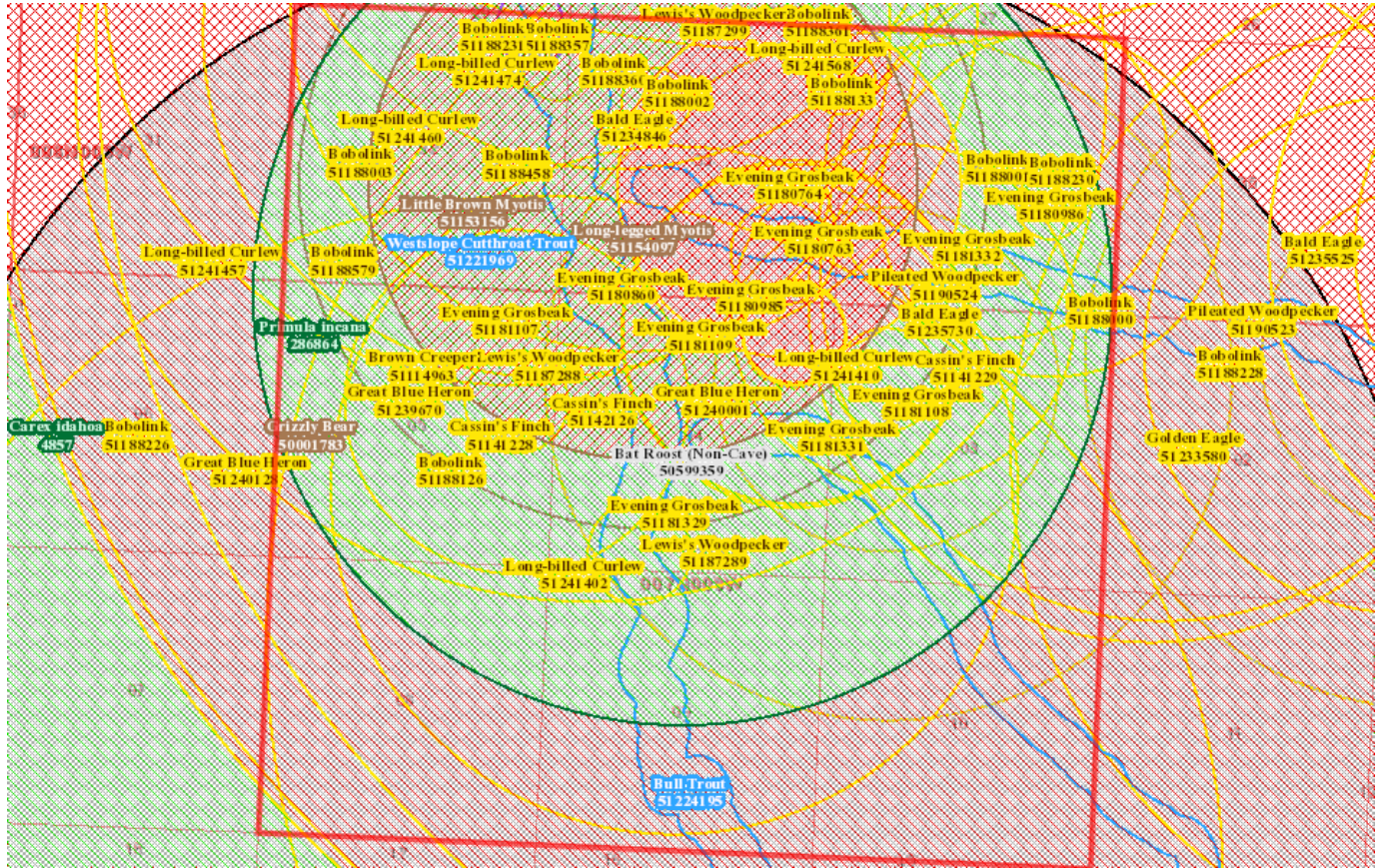
Table of Contents

- [Species Report](#)
- [Structured Surveys](#)
- [Land Cover](#)
- [Wetland and Riparian](#)
- [Land Management](#)
- [Biological Reports](#)
- [Invasive and Pest Species](#)
- [Introduction to Montana Natural Heritage Program](#)
- [Data Use Terms and Conditions](#)
- [Suggested Contacts for Natural Resource Agencies](#)
- [Introduction to Native Species](#)
- [Introduction to Land Cover](#)
- [Introduction to Wetland and Riparian](#)
- [Introduction to Land Management](#)
- [Introduction to Invasive and Pest Species](#)
- [Additional Information Resources](#)

Introduction to Environmental Summary Report

Environmental Summary Reports from the Montana Natural Heritage Program (MTNHP) provide information on species and biological communities to inform all stakeholders in environmental review, permitting, and planning processes. For information on environmental permits in Montana, please see permitting overviews by the [Montana Department of Environmental Quality](#), the [Montana Department of Natural Resources and Conservation](#), the [Index of Environmental Permits for Montana](#) and our [Suggested Contacts for Natural Resource Management Agencies](#). The report for your area of interest consists of introductory and related materials in this PDF and an Excel workbook with worksheets summarizing information managed in the MTNHP databases for: (1) species occurrences; (2) other observed species without species occurrences; (3) other species potentially present based on their range, presence of associated habitats, or predictive distribution model output if available; (4) structured surveys that follow a protocol capable of detecting one or more species; (5) land cover mapped as ecological systems; (6) wetland and riparian mapping; (7) land management categories; and (8) biological reports associated with plant and animal observations. If your area of interest corresponds to a statewide polygon layer (e.g., watersheds, counties, or public land survey sections) information summaries in your report will exactly match those boundaries. However, if your report is for a custom area, users should be aware that summaries do not correspond to the exact boundaries of the polygon they have specified, but instead are a summary across a layer of hexagons intersected by the polygon they specified as shown on the report cover. Summarizing by these hexagons which are one square mile in area and approximately one kilometer in length on each side allows for consistent and rapid delivery of summaries based on a uniform grid that has been used for planning efforts across North America.

In presenting this information, MTNHP is working towards assisting the user with rapidly assessing the known or potential species and biological communities, land management categories, and biological reports associated with the report area. Users are reminded that this information is likely incomplete and may be inaccurate as surveys to document species are lacking in many areas of the state, species' range polygons often include regions of unsuitable habitat, methods of predicting the presence of species or communities are constantly improving, and information is constantly being added and updated in our databases. **Field verification by professional biologists of the absence or presence of species and biological communities in a report area will always be an important obligation of users of our data. Users are encouraged to only use this environmental summary report as a starting point for more in depth analyses and are encouraged to contact state, federal, and tribal resource management agencies for additional data or management guidelines relevant to your efforts. Please see the Appendix for introductory materials to each section of the report, additional information resources, and a list of relevant agency contacts.**



F - Westslope Cutthroat Trout (<i>Oncorhynchus clarkii lewisi</i>) SOC	USFWS Sec7	# SO	# Obs	Predicted Model	Range
		1	1		
View in Field Guide View Predicted Models View Range Maps					
Species of Concern - Native/Non-native Species - (depends on location or taxa) Global: G5T4 State: S2					
USFS: Sensitive - Known in Forests (BD, BRT, KOOT, LOLO) Species of Conservation Concern in Forests (CG, HLC)					
BLM: SENSITIVE FWP SWAP: SGCN2					
Delineation Criteria Stream reaches and standing water bodies where the species presence has been confirmed through direct capture or where they are believed to be present based on the professional judgement of a fisheries biologist due to confirmed presence in adjacent areas. In order to reflect the importance of adjacent terrestrial habitats to survival, stream reaches are buffered 100 meters, standing water bodies greater than 1 acre are buffered 50 meters, and standing water bodies less than 1 acre are buffered 30 meters into the terrestrial habitat based on PACFISH/INFISH Riparian Conservation Area standards. (Last Updated: Mar 08, 2024)					
Predicted Models: 77% Suitable (native range) (deductive)					
F - Bull Trout (<i>Salvelinus confluentus</i>) SOC					
View in Field Guide View Predicted Models View Range Maps					
Species of Concern - Native Species Global: G5 State: S2 USFWS: LT; CH BLM: THREATENED FWP SWAP: SGCN2					
Delineation Criteria Stream reaches and standing water bodies where the species is believed to be present based on the professional judgement of a fisheries biologist, potentially supported by habitat assessment, direct capture, or confirmed presence in adjacent areas. In order to reflect the importance of adjacent terrestrial habitats to survival, stream reaches are buffered 100 meters, standing water bodies greater than 1 acre are buffered 50 meters, and standing water bodies less than 1 acre are buffered 30 meters into the terrestrial habitat based on PACFISH/INFISH Riparian Conservation Area standards. (Last Updated: Mar 19, 2024)					
Predicted Models: 45% Suitable (native range) (deductive)					
V - Primula incana (<i>Mealy Primrose</i>) SOC					
View in Field Guide View Predicted Models View Range Maps					
Species of Concern - Native Species Global: G5 State: S3 Plant Threat Score: High CCVI: Highly Vulnerable					
Delineation Criteria Individual occurrences are predominantly based upon a discretely mapped area provided by an observer and are not separated by any pre-defined distance. Individual clusters of plants mapped at fine spatial scales (separated by less than approximately 25-50 meters) may be grouped together into one occurrence if they are not separated by distinct areas of habitat or terrain features. Point observations are buffered to encompass any locational uncertainty associated with the observation. (Last Updated: Mar 14, 2024)					
Predicted Models: 2% Optimal (inductive). 17% Moderate (inductive). 79% Low (inductive)					

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** FWP SWAP: **SGCN3**

Predicted Models: 70% Moderate (inductive), 26% Low (inductive)

15 11  S M

Species of Concern - Native Species Global: **G5** State: **S3B** USFWS: **MBTA; BCC10; BCC11; BCC17** FWP SWAP: **SGCN3** PIF: **3**

Predicted Models: 64% Moderate (inductive), 36% Low (inductive)

4 2 S M

Species of Concern - Native Species Global: **G4** State: **S2B** USFWS: **MBTA; BCC10; BCC17** USFS: **Species of Conservation Concern in Forests (HLC)**

Predicted Models: 43% Moderate (inductive), 52% Low (inductive)

2 38 Y

Special Status Species - Native Species Global: **G5** State: **S4** USFWS: **BGEPA; MBTA** USFS: **Sensitive - Known in Forests (LOLO)** BLM: **SENSITIVE** PIF: **2**

Predicted Models: 37% Moderate (inductive), 58% Low (inductive)

6 5   

Species of Concern - Native Species Global: **G4** State: **S3B** USFWS: **MBTA; BCC11** BLM: **SENSITIVE** FWP SWAP: **SGCN3** PIF: **2**

Predicted Models: 35% Moderate (inductive), 65% Low (inductive)

11 37   

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA; BCC10** FWP SWAP: **SGCN3**

Predicted Models: 22% Moderate (inductive), 27% Low (inductive)

1 2

Species of Concern - Native Species Global: **G3G4** State: **S3** USFS: **Sensitive - Known in Forests (BD, BRT, KOOT)** FWP SWAP: **SGCN3**

Predicted Models: 13% Moderate (inductive), 87% Low (inductive)

1 1 1 Y

Species of Concern - Native Species Global: **G4G5** State: **S3**

Predicted Models: M 11% Moderate (inductive), L 88% Low (inductive)

1	2		Y
---	---	--	---

Species of Concern - Native Species Global: **G4** State: **S2** USFS: **Sensitive - Known in Forests (BD, BRT, KOOT, LOLO)** BLM: **SENSITIVE** FWP SWAP: **SGCN2**

Predicted Models: L 95% Low (inductive)

[illegible]

Species of Concern - Native Species Global: **G5** State: **S3** USFWS: **MBTA** FWP SWAP: **SGCN3** PIF: **2**

Predicted Models: L 67% Low (inductive)

[View in Field Guide](#)[View Predicted Models](#)[View Range Maps](#)

[Species of Concern - Native Species](#)Global: **G5**State: **S3**USFWS: **MBTA; BCC10**FWP SWAP: **SGCN3**PIF: **3**

Delineation Criteria Observations with evidence of breeding activity buffered by a minimum distance of 300 meters in order to be conservative about encompassing the courtship and foraging distance from nesting areas and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.
(Last Updated: Jun 30, 2023)

Predicted Models: 61% Low (inductive)

B - Golden Eagle (*Aquila chrysaetos*) **SOC**

15

Y

[View in Field Guide](#)[View Predicted Models](#)[View Range Maps](#)

[Species of Concern - Native Species](#)Global: **G5**State: **S3**USFWS: **BGEPA; MBTA**BLM: **SENSITIVE**FWP SWAP: **SGCN3**

Delineation Criteria Confirmed nesting area buffered by a minimum distance of 3,000 meters in order to be conservative about encompassing the entire breeding territory and area commonly used for reneesting and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.
(Last Updated: Mar 25, 2024)

Predicted Models: 21% Low (inductive)

M - Grizzly Bear (*Ursus arctos*) **SOC**

71

Not Assessed

Y

H

[View in Field Guide](#)[View Range Maps](#)

[Species of Concern - Native Species](#)Global: **G4**State: **S2S3**USFWS: **LT**BLM: **THREATENED**FWP SWAP: **SGCN2-3**

Delineation Criteria Species Occurrence polygons represent areas delineated by the U.S. Fish and Wildlife Service (USFWS) that encompass both home ranges and potential transitory movements based on verified sightings. Within these areas, the USFWS wants project proponents to consider whether the species “may be present” when evaluating the potential impacts of a project and to work with the USFWS to develop and implement best management practices to minimize or eliminate project effects on the species.
(Last Updated: Dec 22, 2023)

B - Brown Creeper (*Certhia americana*) **SOC**

110

Not Assessed

Y

[View in Field Guide](#)[View Range Maps](#)

[Species of Concern - Native Species](#)Global: **G5**State: **S3**USFWS: **MBTA**FWP SWAP: **SGCN3**PIF: **1**

Delineation Criteria Observations with evidence of breeding activity buffered by a minimum distance of 300 meters in order to be conservative about encompassing home ranges and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Jun 29, 2023)

V - Carex idaho (*Idaho Sedge*) **SOC**

1

Not Assessed

Y

[View in Field Guide](#)[View Range Maps](#)

[Species of Concern - Native Species](#)Global: **G3**State: **S3**USFS: **Sensitive - Known in Forests (BD)**BLM: **SENSITIVE**Plant Threat Score: **High**
CCVI: **Highly Vulnerable**

Delineation Criteria Individual occurrences are generally based upon a discretely mapped area provided by an observer and are not separated by any pre-defined distance. Individual clusters of plants mapped at fine spatial scales (separated by less than approximately 25-50 meters) may be grouped together into one occurrence if they are not separated by distinct areas of habitat or terrain features. Point observations are buffered to encompass any locational uncertainty associated with the observation. (Last Updated: Mar 17, 2023)

O - Bat Roost (Non-Cave) (*Bat Roost (Non-Cave)*) **IAH**

1

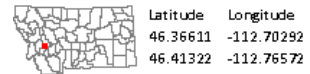
Not Assessed

[View in Field Guide](#)

[Important Animal Habitat - Native Species](#)Global: **GNR**State: **SNR**

Delineation Criteria Confirmed area of occupancy based on the documented presence of adults or juveniles of any bat species at non-cave natural roost sites (e.g. rock outcrops, trees), below ground human created roost sites (e.g. mines), and above ground human created roost sites (e.g., bridges, buildings). Point observation locations are buffered by a distance of 4,500 meters in order to encompass the 95% confidence interval for nightly foraging distance reported for Townsend’s Big-eared Bat (a resident Montana bat Species of Concern) and otherwise by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters. (Last Updated: Oct 22, 2019)

Legend			
Model Icons	Habitat Icons	Range Icons	Num Obs
Suitable (native range)	Common	Native / Year-round	Count of obs with 'good precision' (<=1000m) + indicates additional 'poor precision' obs (1001m-10,000m)
Optimal Suitability	Occasional	Summer	
Moderate Suitability		Winter	
Low Suitability		Migratory	
Suitable (introduced range)		Non-native	
		Historical	



Native Species

Summarized by: **007N009W004** (*Buffered PLSS Section*)
Filtered by:
Native Species reports are filtered for Species with MT Status = Species of Concern, Special Status, Important Animal Habitat, Potential SOC

Other Observed Species

B - Hooded Merganser (<i>Lophodytes cucullatus</i>) PSOC	USFWS Sec7	# Obs	Predicted Model	Range
10				
View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G5 State: S4 USFWS: MBTA FWP SWAP: SGIN PIF: 2 Predicted Models: 52% Optimal (inductive), 18% Moderate (inductive), 29% Low (inductive)				
M - North American Porcupine (<i>Erethizon dorsatum</i>) PSOC		1		
View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G5 State: S3S4 FWP SWAP: SGIN Predicted Models: 93% Moderate (inductive), 7% Low (inductive)				
B - Barrow's Goldeneye (<i>Bucephala islandica</i>) PSOC		5		
View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G5 State: S4 USFWS: MBTA FWP SWAP: SGIN PIF: 2 Predicted Models: 64% Moderate (inductive), 31% Low (inductive)				
B - Rufous Hummingbird (<i>Selasphorus rufus</i>) PSOC		15		
View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G4 State: S4B USFWS: MBTA; BCC10 PIF: 3 Predicted Models: 59% Moderate (inductive), 40% Low (inductive)				
B - American White Pelican (<i>Pelecanus erythrorhynchos</i>) SOC		8		
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4 State: S3B USFWS: MBTA FWP SWAP: SGCN3 PIF: 3 Predicted Models: 46% Moderate (inductive), 53% Low (inductive)				
B - White-faced Ibis (<i>Plegadis chihi</i>) SOC		6		
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S3B USFWS: MBTA BLM: SENSITIVE FWP SWAP: SGCN3 PIF: 2 Predicted Models: 46% Moderate (inductive), 52% Low (inductive)				
B - Veery (<i>Catharus fuscescens</i>) SOC		1		
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S3B USFWS: MBTA BLM: SENSITIVE FWP SWAP: SGCN3 PIF: 2 Predicted Models: 21% Moderate (inductive), 62% Low (inductive)				
B - Short-eared Owl (<i>Asio flammeus</i>) PSOC		1		
View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G5 State: S4 USFWS: MBTA; BCC11; BCC17 PIF: 3 Predicted Models: 16% Moderate (inductive), 48% Low (inductive)				
B - Trumpeter Swan (<i>Cygnus buccinator</i>) SOC		8		
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4 State: S3 USFWS: MBTA BLM: SENSITIVE FWP SWAP: SGCN3 PIF: 1 Predicted Models: 13% Moderate (inductive), 85% Low (inductive)				
B - Western Screech-Owl (<i>Megascops kennicottii</i>) PSOC		2		
View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G4G5 State: S3S4 USFWS: MBTA FWP SWAP: SGIN PIF: 3 Predicted Models: 54% Low (inductive)				
B - Clark's Nutcracker (<i>Nucifraga columbiana</i>) SOC		12		
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S3 USFWS: MBTA USFS: Species of Conservation Concern in Forests (FLAT) FWP SWAP: SGCN3 PIF: 3 Predicted Models: 44% Low (inductive)				
B - Black-necked Stilt (<i>Himantopus mexicanus</i>) SOC		9		
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S3B USFWS: MBTA FWP SWAP: SGCN3 PIF: 3 Predicted Models: 21% Low (inductive)				

Predicted Models: L 21% Low (inductive)

S **M**

Predicted Models: L 14% Low (inductive)

WM

Predicted Models: L 1% Low (inductive)

WM

S M

M

M

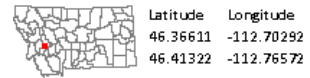
M

M

M

Global: **G5** State: **S3S4B** USFWS: **MBTA**

Legend			
Model Icons	Habitat Icons	Range Icons	Num Obs
Suitable (native range)	Common	Native / Year-round	Count of obs with 'good precision' (<=1000m) + indicates additional 'poor precision' obs (1001m-10,000m)
Optimal Suitability	Occasional	Summer	
Moderate Suitability		Winter	
Low Suitability		Migratory	
Suitable (introduced range)		Non-native	
		Historical	



Native Species

Summarized by: **007N009W004** (*Buffered PLSS Section*)
Filtered by:
Native Species reports are filtered for Species with MT Status = Species of Concern, Special Status, Important Animal Habitat, Potential SOC

Other Potential Species

	USFWS Sec7	Predicted Model	Range
V - <i>Atriplex truncata</i> (<i>Wedge-leaf Saltbush</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S3 Plant Threat Score: Unknown Predicted Models: 99% Moderate (inductive), 1% Low (inductive)			
V - <i>Utricularia intermedia</i> (<i>Flatleaf Bladderwort</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S2 USFS: Sensitive - Known in Forests (KOOT) Plant Threat Score: No Known Threats Predicted Models: 85% Moderate (inductive), 15% Low (inductive)			
I - <i>Bombus suckleyi</i> (<i>Suckley Cuckoo Bumble Bee</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G2G3 State: S1 Predicted Models: 82% Moderate (inductive), 18% Low (inductive)			
V - <i>Carex crawei</i> (<i>Crawe's Sedge</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S2S3 Plant Threat Score: Low Predicted Models: 79% Moderate (inductive), 21% Low (inductive)			
V - <i>Stellaria crassifolia</i> (<i>Fleshy Stitchwort</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S2 Plant Threat Score: No Known Threats Predicted Models: 79% Moderate (inductive), 20% Low (inductive)			
M - <i>Western Spotted Skunk</i> (<i>Spilogale gracilis</i>) View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G5 State: SU FWP SWAP: SGIN Predicted Models: 73% Moderate (inductive), 26% Low (inductive)			
M - <i>Hoary Bat</i> (<i>Lasiurus cinereus</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G3G4 State: S3B BLM: SENSITIVE FWP SWAP: SGCN3 Predicted Models: 63% Moderate (inductive), 37% Low (inductive)			
V - <i>Potentilla plattensis</i> (<i>Platte Cinquefoil</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4 State: S3 Plant Threat Score: No Known Threats CCVI: Highly Vulnerable Predicted Models: 57% Moderate (inductive), 41% Low (inductive)			
B - <i>Broad-tailed Hummingbird</i> (<i>Selasphorus platycercus</i>) View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G5 State: S4B USFWS: MBTA; BCC10 FWP SWAP: SGIN Predicted Models: 52% Moderate (inductive), 46% Low (inductive)			
I - <i>Margaritifera falcata</i> (<i>Western Pearlshell</i>) View in Field Guide View Predicted Models View Range Maps USFS: Sensitive - Known in Forests (BD, BRT, KOOT, LOLO) Species of Concern - Native Species Global: G5 State: S2 Species of Conservation Concern in Forests (CG, HLC) BLM: SENSITIVE FWP SWAP: SGCN2 Predicted Models: 46% Moderate (inductive), 47% Low (inductive)			
I - <i>Oreohelix carinifera</i> (<i>Keelred Mountainsnail</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G1 State: S1 Predicted Models: 45% Moderate (inductive), 35% Low (inductive)			
B - <i>Ferruginous Hawk</i> (<i>Buteo regalis</i>) View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4 State: S3B USFWS: MBTA; BCC17 BLM: SENSITIVE FWP SWAP: SGCN3 PIF: 2 Predicted Models: 37% Moderate (inductive), 58% Low (inductive)			

View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4 State: S2S3 USFWS: C USFS: Sensitive - Migratory in Forests (BD, BRT, KOOT) Predicted Models: 32% Moderate (inductive), 60% Low (inductive)	
M - Western Pygmy Shrew (<i>Sorex eximius</i>) SOC	Y
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4 State: S3 FWP SWAP: SGCN3 Predicted Models: 31% Moderate (inductive), 42% Low (inductive)	
M - Spotted Bat (<i>Euderma maculatum</i>) SOC	S M
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4 State: S3 BLM: SENSITIVE FWP SWAP: SGCN3, SGIN Predicted Models: 22% Moderate (inductive), 77% Low (inductive)	
V - Dichanthelium acuminatum (<i>Panic Grass</i>) SOC	Y
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S2S3 Plant Threat Score: Unknown Predicted Models: 22% Moderate (inductive), 43% Low (inductive)	
M - Silver-haired Bat (<i>Lasionycteris noctivagans</i>) PSOC	Y
View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G3G4 State: S4 Predicted Models: 13% Moderate (inductive), 85% Low (inductive)	
V - Ranunculus hyperboreus (<i>High Northern Buttercup</i>) PSOC	Y
View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G5 State: S3S4 Plant Threat Score: No Known Threats Predicted Models: 13% Moderate (inductive), 80% Low (inductive)	
B - Black Tern (<i>Chlidonias niger</i>) SOC	S M
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4G5 State: S3B USFWS: MBTA; BCC10; BCC11; BCC17 BLM: SENSITIVE FWP SWAP: SGCN3 PIF: 2 Predicted Models: 13% Moderate (inductive), 61% Low (inductive)	
M - Fringed Myotis (<i>Myotis thysanodes</i>) SOC	Y
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4 State: S3 BLM: SENSITIVE FWP SWAP: SGCN3 Predicted Models: 13% Moderate (inductive), 43% Low (inductive)	
B - Black-crowned Night-Heron (<i>Nycticorax nycticorax</i>) SOC	S M
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S3B USFWS: MBTA FWP SWAP: SGCN3 PIF: 3 Predicted Models: 10% Moderate (inductive), 77% Low (inductive)	
M - Dwarf Shrew (<i>Sorex nanus</i>) SOC	Y
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4 State: S2S3 FWP SWAP: SGCN2-3 Predicted Models: 10% Moderate (inductive), 71% Low (inductive)	
M - Preble's Shrew (<i>Sorex preblei</i>) SOC	Y
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4 State: S3 FWP SWAP: SGCN3 Predicted Models: 9% Moderate (inductive), 39% Low (inductive)	
M - Townsend's Big-eared Bat (<i>Corynorhinus townsendii</i>) SOC	Y
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G4 State: S3 USFS: Sensitive - Known in Forests (LOLO) BLM: SENSITIVE FWP SWAP: SGCN3 Predicted Models: 8% Moderate (inductive), 18% Low (inductive)	
V - Erigeron linearis (<i>Linear-leaf Fleabane</i>) SOC	Y
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S2 Plant Threat Score: Low CCVI: Less Vulnerable Predicted Models: 5% Moderate (inductive), 84% Low (inductive)	
V - Oxytropis lagopus var. conjugans (<i>Hare's-foot Locoweed</i>) PSOC	Y
View in Field Guide View Predicted Models View Range Maps Potential Species of Concern - Native Species Global: G4G5T3T4 State: S3S4 Predicted Models: 5% Moderate (inductive), 19% Low (inductive)	
M - Long-eared Myotis (<i>Myotis evotis</i>) SOC	Y
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S3 Predicted Models: 2% Moderate (inductive), 87% Low (inductive)	
V - Eleocharis rostellata (<i>Beaked Spikerush</i>) SOC	Y
View in Field Guide View Predicted Models View Range Maps Species of Concern - Native Species Global: G5 State: S3 USFS: Species of Conservation Concern in Forests (CG, FLAT, HLC) Plant Threat Score: Unknown CCVI: Less Vulnerable Predicted Models: 2% Moderate (inductive), 23% Low (inductive)	

Predicted Models:  100% Low (inductive)

Predicted Models: 97% Low (inductive)

Predicted Models: 78% Low (inductive)

A diagram showing a 2x2 grid. The top-left cell is yellow, the top-right cell is grey, and the bottom two cells are empty.

Predicted Models:  57% Low (inductive)

A diagram showing a 100% bar chart. The bar is divided into two sections: a yellow section on the left and a grey section on the right. To the right of the bar is a legend with two items: a green square labeled 'S' and a yellow square labeled 'M'.

Predicted Models: L 52% Low (inductive)

A diagram showing a 2x2 grid. The top-left cell is yellow, and the bottom-right cell is grey. To the right of the grid is a purple box containing the letter 'Y'.

Predicted Models: L 48% Low (inductive)

A 2x2 grid with the following cells: (1,1) is yellow, (1,2) is grey, (2,1) is green with a black 'S', and (2,2) is yellow with a black 'M'.

Predicted Models: 37% Low (inductive)

Predicted Models: 33% Low (inductive)

Predicted Models: L 28% Low (inductive)

7 Y

Predicted Models:  27% Low (inductive)

A diagram of a 2D array with 3 rows and 4 columns. The first row is highlighted in yellow. The first column is highlighted in purple. The intersection of the first row and first column is highlighted in a darker purple.

Predicted Models: L 26% Low (inductive)

7 | S M

Predicted Models: 8% Low (inductive)

7 Not Assessed Y

Global: **G5** State: **S3** USFWS: **LT; CH** BLM: **THREATENED** FWP SWAP: **SGCN3**

Structured Surveys

Summarized by: **007N009W004** (*Buffered PLSS Section*)

The Montana Natural Heritage Program (MTNHP) records information on the locations where more than 80 different types of well-defined repeatable survey protocols capable of detecting an animal species or suite of animal species have been conducted by state, federal, tribal, university, or private consulting biologists. Examples of structured survey protocols tracked by MTNHP include: visual encounter and dip net surveys for pond breeding amphibians, point counts for birds, call playback surveys for selected bird species, visual surveys of migrating raptors, kick net stream reach surveys for macroinvertebrates, visual encounter cover object surveys for terrestrial mollusks, bat acoustic or mist net surveys, pitfall and/or snap trap surveys for small terrestrial mammals, track or camera trap surveys for large mammals, and trap surveys for turtles. Whenever possible, photographs of survey locations are stored in MTNHP databases.

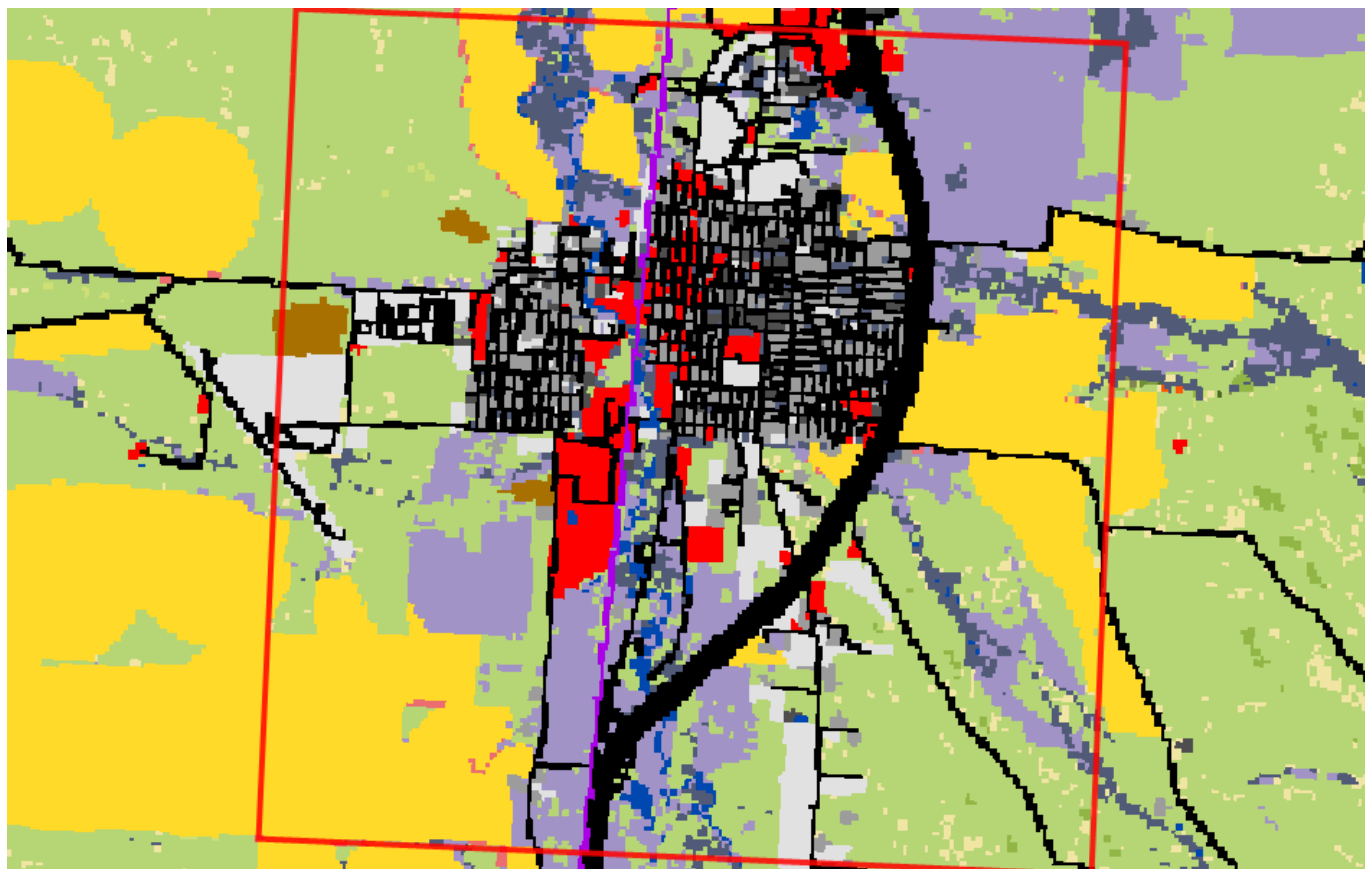
MTNHP does not typically manage information on structured surveys for plants; surveys for invasive species may be a future exception.

Within the report area you have requested, structured surveys are summarized by the number of each type of structured survey protocol that has been conducted, the number of species detections/observations resulting from these surveys, and the most recent year a survey has been conducted.

B-Bald Eagle Nest (<i>Bald Eagle Nest Survey</i>)	Survey Count: 1	Obs Count: 1	Recent Survey: 2009
B-Waterbird/Shorebird (<i>Colonial-nesting Waterbird/Shorebird/Waterfowl Surveys</i>)	Survey Count: 2	Obs Count:	Recent Survey: 2011
B-Winter Breeding Owl (<i>Late Winter Breeding Owl Survey</i>)	Survey Count: 1	Obs Count:	Recent Survey: 2014
E-Eastern Heath Snail (<i>Eastern Heath Snail Survey</i>)	Survey Count: 1	Obs Count:	Recent Survey: 2012
E-Invasive Mussel Plankton Tow (<i>Plankton tows for veligers of Invasive Mussels</i>)	Survey Count: 3	Obs Count:	Recent Survey: 2023
E-Kicknet (<i>Kicknet Collection Survey for Invasive Mussels and Snails</i>)	Survey Count: 3	Obs Count:	Recent Survey: 2023
E-Noxious Weed, Road-based (<i>Noxious Weed Road-based Visual Surveys</i>)	Survey Count: 17	Obs Count: 39	Recent Survey: 2003
E-Visual Aquatic Invasives (<i>Visual Encounter Surveys for Aquatic Invasives on Shorelines or Underwater</i>)	Survey Count: 4	Obs Count: 7	Recent Survey: 2023
F-Fish Electrofishing (<i>Fish Electrofishing Surveys</i>)	Survey Count: 4	Obs Count: 8	Recent Survey: 2020
M-Bat Acoustic (<i>Bat Acoustic Survey</i>)	Survey Count: 1	Obs Count: 1	Recent Survey: 2005
M-Bat Mistnet (<i>Bat Mistnet Survey</i>)	Survey Count: 3	Obs Count: 5	Recent Survey: 2006
M-Bat Roost (Active Season) (<i>Bat Roost (Active Season) Survey</i>)	Survey Count: 3	Obs Count: 5	Recent Survey: 2019
M-Beaver Sign (<i>Field survey for beaver or beaver sign.</i>)	Survey Count: 1	Obs Count:	Recent Survey: 2013
P-Algal scraping (<i>Algal Scraping</i>)	Survey Count: 10	Obs Count: 586	Recent Survey: 2018

Land Cover

Summarized by: **007N009W004** (Buffered PLSS Section)



Grassland Systems Montane Grassland

29% (1,656 Acres)

Rocky Mountain Lower Montane, Foothill, and Valley Grassland

This grassland system of the northern Rocky Mountains is found at lower montane to foothill elevations in mountains and valleys throughout Montana. These grasslands are floristically similar to Big Sagebrush Steppe but are defined by shorter summers, colder winters, and young soils derived from recent glacial and alluvial material. They are found at elevations from 548 - 1,650 meters (1,800-5,413 feet). In the lower montane zone, they range from small meadows to large open parks surrounded by conifers; below the lower treeline, they occur as extensive foothill and valley grasslands. Soils are relatively deep, fine-textured, often with coarse fragments, and non-saline. Microphytic crust may be present in high-quality occurrences. This system is typified by cool-season perennial bunch grasses and forbs (>25%) cover, with a sparse shrub cover (<10%). Rough fescue (*Festuca campestris*) is dominant in the northwestern portion of the state and Idaho fescue (*Festuca idahoensis*) is dominant or co-dominant throughout the range of the system. Bluebunch wheatgrass (*Pseudoroegneria spicata*) occurs as a co-dominant throughout the range as well, especially on xeric sites. Western wheatgrass (*Pascopyrum smithii*) is consistently present, often with appreciable coverage (>10%) in lower elevation occurrences in western Montana and virtually always present, with relatively high coverages (>25%), on the edge of the Northwestern Great Plains region. Species diversity ranges from a high of more than 50 per 400 square meter plot on mesic sites to 15 (or fewer) on xeric and disturbed sites. Most occurrences have at least 25 vascular species present. Farmland conversion, noxious species invasion, fire suppression, heavy grazing and oil and gas development are major threats to this system.



Human Land Use Agriculture

17% (999 Acres)

Cultivated Crops

These areas used for the production of crops, such as corn, soybeans, small grains, sunflowers, vegetables, and cotton, typically on an annual cycle. Agricultural plant cover is variable depending on season and type of farming. Other areas include more stable land cover of orchards and vineyards.

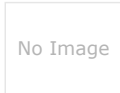


16% (911 Acres)

Wet meadow

Alpine-Montane Wet Meadow

These moderate-to-high-elevation systems are found throughout the Rocky Mountains, dominated by herbaceous species found on wetter sites with very low-velocity surface and subsurface flows. Occurrences range in elevation from montane to alpine at 1,000 to 3,353 meters (3,280-11,000 feet). This system typically occurs in cold, moist basins, seeps and alluvial terraces of headwater streams or as a narrow strip adjacent to alpine lakes (Hansen et al., 1996). Wet meadows are typically found on flat areas or gentle slopes, but may also occur on sub-irrigated sites with slopes up to 10 percent. In alpine regions, sites are typically small depressions located below late-melting snow patches or on snowbeds. The growing season may only last for one to two months. Soils of this system may be mineral or organic. In either case, soils show typical hydric soil characteristics, including high organic content and/or low chroma and redoximorphic features. This system often occurs as a mosaic of several plant associations, often dominated by graminoids such as tufted hairgrass (*Deschampsia caespitosa*), and a diversity of montane or alpine sedges such as small-head sedge (*Carex illota*), small-winged sedge (*Carex microptera*), black alpine sedge (*Carex nigricans*), Holm’s Rocky Mountain sedge (*Carex scopulorum*) shortstalk sedge (*Carex podocarpa*) and Payson’s sedge (*Carex paysonis*). Drummond’s rush (*Juncus drummondii*), Merten’s rush (*Juncus mertensianus*), and high elevation bluegrasses (*Poa arctica* and *Poa alpina*) are often present. Forbs such as arrow-leaf groundsel (*Senecio triangularis*), slender-sepal marsh marigold (*Caltha leptosepala*), and spreading globeflower (*Trollius laxus*) often form high cover in higher elevation meadows. Wet meadows are associated with snowmelt and are usually not subjected to high disturbance events such as flooding.



12% (666 Acres)

Human Land Use Developed

Other Roads

County, city and or rural roads generally open to motor vehicles.



5% (316 Acres)

Human Land Use Developed

Developed, Open Space

Vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes. Impervious surfaces account for less than 20% of total cover. This category often includes highway and railway rights of way and graveled rural roads.



4% (259 Acres)

Human Land Use Developed

Low Intensity Residential

Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-50% of total cover. These areas most commonly include single-family housing units in rural and suburban areas. Paved roadways may be classified into this category.

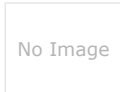


4% (250 Acres)

Wetland and Riparian Systems Floodplain and Riparian

Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland

This ecological system is found throughout the Rocky Mountain and Colorado Plateau regions. In Montana, sites occur at elevations of 609-1,219 meters (2,000-4,000 feet) west of the Continental Divide. East of the Continental Divide, this system ranges up to 1,676 meters (5,500 feet). It generally comprises a mosaic of multiple communities that are tree-dominated with a diverse shrub component. It is dependent on a natural hydrologic regime with annual to episodic flooding, so it is usually found within the flood zone of rivers, on islands, sand or cobble bars, and along streambanks. It can form large, wide occurrences on mid-channel islands in larger rivers, or narrow bands on small, rocky canyon tributaries and well-drained benches. It is also typically found in backwater channels and other perennially wet but less scoured sites, such as floodplains, swales and irrigation ditches. In some locations, occurrences extend into moderately high intermountain basins where the adjacent vegetation is sage steppe. Black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) is the key indicator species. Other dominant trees may include boxelder maple (*Acer negundo*), narrowleaf cottonwood (*Populus angustifolia*), eastern cottonwood (*Populus deltoides*), Douglas-fir (*Pseudotsuga menziesii*), peachleaf willow (*Salix amygdaloides*), or Rocky Mountain juniper (*Juniperus scopulorum*). Dominant shrubs include Rocky Mountain maple (*Acer glabrum*), thinleaf alder (*Alnus incana*), river birch (*Betula occidentalis*), redbud (*Cornus sericea*), hawthorne (*Crataegus* species), chokecherry (*Prunus virginiana*), skunkbush sumac (*Rhus trilobata*), willows (*Salix* species), rose (*Rosa* species), silver buffaloberry (*Shepherdia argentea*), or snowberry (*Symphoricarpos* species).

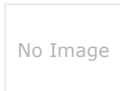


3% (196 Acres)

Human Land Use Developed

Interstate

National Highway System (NHS) limited access highways and their shoulders and rights of way.



3% (186 Acres)

Human Land Use Developed

Commercial / Industrial

Businesses, industrial parks, hospitals, airports; utilities in commercial/industrial areas.

Additional Limited Land Cover

- 1% (68 Acres) Open Water
- 1% (56 Acres) Montane Sagebrush Steppe
- 1% (55 Acres) Major Roads
- 1% (44 Acres) Quarries, Strip Mines and Gravel Pits
- 1% (41 Acres) High Intensity Residential
- 1% (39 Acres) Railroad
- <1% (15 Acres) Introduced Upland Vegetation - Annual and Biennial Forbland
- <1% (6 Acres) Rocky Mountain Montane-Foothill Deciduous Shrubland
- <1% (3 Acres) Rocky Mountain Subalpine-Montane Mesic Meadow
- <1% (0 Acres) Insect-Killed Forest

Wetland and Riparian

Summarized by: **007N009W004** (Buffered PLSS Section)


Wetland and Riparian Mapping

P - Palustrine

AB - Aquatic Bed

F - Semipermanently Flooded	20 Acres
(no modifier)	5 Acres PABF
b - Beaver	1 Acres PABFb
h - Diked/Impounded	<1 Acres PABFh
x - Excavated	14 Acres PABFx

P - Palustrine, AB - Aquatic Bed

Wetlands with vegetation growing on or below the water surface for most of the growing season.

EM - Emergent

A - Temporarily Flooded	463 Acres
(no modifier)	463 Acres PEMA
C - Seasonally Flooded	66 Acres
(no modifier)	50 Acres PEMC
f - Farmed	16 Acres PEMCf

P - Palustrine, EM - Emergent

Wetlands with erect, rooted herbaceous vegetation present during most of the growing season.

SS - Scrub-Shrub

A - Temporarily Flooded	64 Acres
(no modifier)	64 Acres PSSA
C - Seasonally Flooded	1 Acres
(no modifier)	1 Acres PSSC

P - Palustrine, SS - Scrub-Shrub

Wetlands dominated by woody vegetation less than 6 meters (20 feet) tall. Woody vegetation includes tree saplings and trees that are stunted due to environmental conditions.

R - Riverine (Rivers)

2 - Lower Perennial

UB - Unconsolidated Bottom

H - Permanently Flooded	31 Acres
(no modifier)	31 Acres R2UBH

R - Riverine (Rivers), 2 - Lower Perennial, UB - Unconsolidated Bottom

Stream channels where the substrate is at least 25% mud, silt or other fine particles.

US - Unconsolidated Shore

A - Temporarily Flooded	13 Acres
(no modifier)	13 Acres R2USA

R - Riverine (Rivers), 2 - Lower Perennial, US - Unconsolidated Shore

Shorelines with less than 75% areal cover of stones, boulders, or bedrock and less than 30% vegetation cover. The area is also irregularly exposed due to seasonal or irregular flooding and subsequent drying.

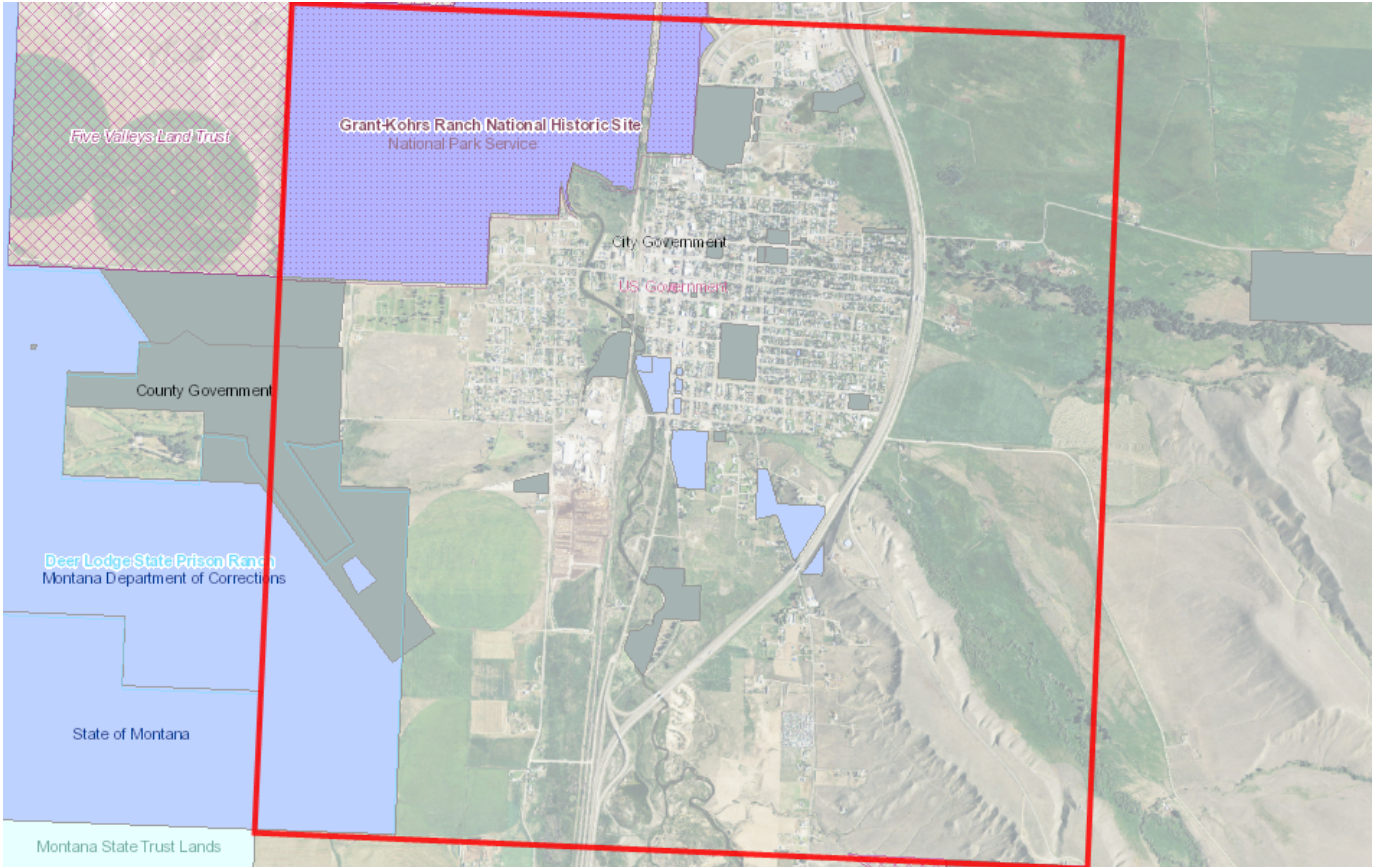
■ SB - Stream Bed		R - Riverine (Rivers), 4 - Intermittent, SB - Stream Bed Active channel that contains periodic water flow.	
C - Seasonally Flooded		4 Acres	
(no modifier)		3 Acres	R4SBC
x - Excavated		1 Acres	R4SBCx

Rp - Riparian
1 - Lotic

■ SS - Scrub-Shrub (no modifier)	89 Acres	Rp1SS	Rp - Riparian, 1 - Lotic, SS - Scrub-Shrub This type of riparian area is dominated by woody vegetation that is less than 6 meters (20 feet) tall. Woody vegetation includes tree saplings and trees that are stunted due to environmental conditions.
■ FO - Forested (no modifier)	46 Acres	Rp1FO	Rp - Riparian, 1 - Lotic, FO - Forested This riparian class has woody vegetation that is greater than 6 meters (20 feet) tall.
■ EM - Emergent (no modifier)	<1 Acres	Rp1EM	Rp - Riparian, 1 - Lotic, EM - Emergent Riparian areas that have erect, rooted herbaceous vegetation during most of the growing season.

Land Management

Summarized by: 007N009W004 (Buffered PLSS Section)



Land Management Summary		Ownership	Tribal	Easements	Other Boundaries (possible overlap)
Public Lands		1,458 Acres (25%)			
Federal		754 Acres (13%)			
National Parks		753 Acres (13%)			
National Park Service Owned		753 Acres (13%)			
National Historic Sites					773 Acres
Grant-Kohrs Ranch National Historic Site					773 Acres
US Government		1 Acres (<1%)			
US Government Owned		1 Acres (<1%)			
State		350 Acres (6%)			
Montana Department of Corrections		323 Acres (6%)			
MTDOC Owned		323 Acres (6%)			
MTDOC Experimental Areas					392 Acres
Deer Lodge State Prison Ranch					392 Acres
State of Montana		27 Acres (<1%)			
State of Montana Owned		27 Acres (<1%)			
Local		354 Acres (6%)			
Local Government		354 Acres (6%)			
Local Government Owned		354 Acres (6%)			
Conservation Easements				4 Acres (<1%)	
Private				4 Acres (<1%)	
Five Valleys Land Trust				4 Acres (<1%)	
Private Lands or Unknown Ownership		4,304 Acres (75%)			



Biological Reports

Summarized by: **007N009W004** (*Buffered PLSS Section*)

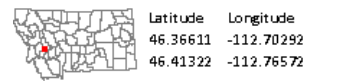
Within the report area you have requested, citations for all reports and publications associated with plant or animal observations in Montana Natural Heritage Program (MTNHP) databases are listed and, where possible, links to the documents are included.

The MTNHP plans to include reports associated with terrestrial and aquatic communities in the future as allowed for by staff resources. If you know of reports or publications associated with species or biological communities within the report area that are not shown in this report, please let us know: mtnhp@mt.gov

- Hossack, B., D. Pilliod, and P.S. Corn. 2001a. ***Reptile and amphibian inventory at Grant-Kohrs Ranch National Historic Site and Little Bighorn Battlefield National Monument***. USGS Northern Rocky Mountain Science Center, Aldo Leopold Wilderness Research Institute, Missoula, MT. 6 p.
-  Wolfe, M.L. and A. Kozlowski. 2006. ***Bat inventories at Grant-Kohrs Ranch National Historic Site and Little Bighorn Battlefield National Monument, Final Report***. Rocky Mountains Cooperative Ecosystems Studies Unit. Utah State University. Logan, UT. 26 pp.



Legend			
Model Icons	Habitat Icons	Range Icons	Num Obs
Suitable (native range)	Common	Non-native	Count of obs with 'good precision' (<=1000m) + indicates additional 'poor precision' obs (1001m-10,000m)
Optimal Suitability	Occasional		
Moderate Suitability			
Low Suitability			
Suitable (introduced range)			



Invasive and Pest Species

Summarized by: 007N009W004 (Buffered PLSS Section)

		# Obs	Predicted Model	Range
Aquatic Invasive Species				
☐ V - Iris pseudacorus (Yellowflag Iris) N2A/AIS				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 2A - Aquatic Invasive Species - Non-native Species Global: GNR State: SNA Predicted Models: 43% Moderate (inductive), 50% Low (inductive)				
☐ V - Nymphaea odorata (American Water-lily) AIS				
View in Field Guide View Predicted Models View Range Maps Aquatic Invasive Species - Non-native Species Global: G5 State: SNA Predicted Models: 57% Suitable (introduced range) (deductive)				
Noxious Weeds: Priority 1A				
☐ V - Centaurea solstitialis (Yellow Starthistle) N1A		1		
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1A - Non-native Species Global: GNR State: SNA Predicted Models: 66% Optimal (inductive), 32% Moderate (inductive), 1% Low (inductive)				
☐ V - Isatis tinctoria (Dyer's Woad) N1A				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1A - Non-native Species Global: GNR State: SNA Predicted Models: 51% Optimal (inductive), 46% Moderate (inductive), 3% Low (inductive)				
☐ V - Taeniatherum caput-medusae (Medusahead) N1A				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1A - Non-native Species Global: G4G5 State: SNA Predicted Models: 70% Low (inductive)				
☐ V - Phragmites australis ssp. australis (European Common Reed) N1A				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1A - Non-native Species Global: G5T5 State: SNA Predicted Models: 38% Low (inductive)				
Noxious Weeds: Priority 1B				
☐ V - Lythrum salicaria (Purple Loosestrife) N1B				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1B - Non-native Species Global: G5 State: SNA Predicted Models: 65% Optimal (inductive), 33% Moderate (inductive), 2% Low (inductive)				
☐ V - Polygonum cuspidatum (Japanese Knotweed) N1B				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1B - Non-native Species Global: GNRTNR State: SNA Predicted Models: 22% Optimal (inductive), 55% Moderate (inductive), 17% Low (inductive)				
☐ V - Polygonum x bohemicum (Bohemian Knotweed) N1B				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1B - Non-native Species Global: GNA State: SNA Predicted Models: 32% Moderate (inductive), 13% Low (inductive)				
☐ V - Echium vulgare (Blueweed) N1B				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1B - Non-native Species Global: GNR State: SNA Predicted Models: 74% Low (inductive)				
☐ V - Cytisus scoparius (Scotch Broom) N1B				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 1B - Non-native Species Global: GNR State: SNA Predicted Models: 54% Low (inductive)				
Noxious Weeds: Priority 2A				
☐ V - Lepidium latifolium (Perennial Pepperweed) N2A		19		
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 2A - Non-native Species Global: GNR State: SNA Predicted Models: 66% Optimal (inductive), 21% Moderate (inductive), 12% Low (inductive)				
☐ V - Rhamnus cathartica (Common Buckthorn) N2A				
View in Field Guide View Predicted Models View Range Maps Noxious Weed: Priority 2A - Non-native Species Global: GNR State: SNA Predicted Models: 54% Optimal (inductive), 44% Moderate (inductive), 1% Low (inductive)				

Global: **G5** State: **SNA**

Global: **GNR** State: **SNA**

Global: **GNR** State: **SNA**

Global: **GNR** State: **SNA**

N

Global: **GNR** State: **SNA**Global: **GNR** State: **SNA**

N

Global: **GNR** State: **SNA**Global: **GNR** State: **SNA**Global: **GNR** State: **SNA**Global: **GNR** State: **SNA**Global: **GNR** State: **SNA**Global: **GNR** State: **SNA**

Predicted Models: L 44% Low (inductive)

Introduction to Montana Natural Heritage Program



PO Box 201800 • 1201 11th Avenue • Helena, MT 59620-1800 • fax 406.444.0266 • phone 406.444.3989 • mtnhp.org

INTRODUCTION

The Montana Natural Heritage Program (MTNHP) is Montana's source for reliable and objective information on Montana's native species and habitats, emphasizing those of conservation concern. MTNHP was created by the Montana legislature in 1983 as part of the Natural Resource Information System (NRIS) at the Montana State Library (MSL). MTNHP is "a program of information acquisition, storage, and retrieval for data relating to the flora, fauna, and biological community types of Montana" (MCA 90-15-102). MTNHP's activities are guided by statute as well as through ongoing interaction with, and feedback from, principal data source agencies such as Montana Fish, Wildlife, and Parks, the Montana Department of Environmental Quality, the Montana Department of Natural Resources and Conservation, the Montana University System, the US Forest Service, and the US Bureau of Land Management. Since the first staff was hired in 1985, the Program has logged a long record of success, and developed into a highly respected, service-oriented program. MTNHP is widely recognized as one of the most advanced and effective of over 60 natural heritage programs that are distributed across North America.

VISION

Our vision is that public agencies, the private sector, the education sector, and the general public will trust and rely upon MTNHP as the source for information and expertise on Montana's species and habitats, especially those of conservation concern. We strive to provide easy access to our information to allow users to save time and money, speed environmental reviews, and make informed decisions.

CORE VALUES

- We endeavor to be a single statewide source of accurate and up-to-date information on Montana's plants, animals, and aquatic and terrestrial biological communities.
- We actively listen to our data users and work responsively to meet their information and training needs.
- We strive to provide neutral, trusted, timely, and equitable service to all of our information users.
- We make every effort to be transparent to our data users in setting work priorities and providing data products.

CONFIDENTIALITY

All information requests made to the Montana Natural Heritage Program are considered library records and are protected from disclosure by the Montana Library Records Confidentiality Act (MCA 22-1-11).

INFORMATION MANAGED

Information managed at the Montana Natural Heritage Program is botanical, zoological, and ecological information that describes the distribution (e.g., observations, structured surveys, range polygons, predicted habitat suitability models), conservation status (e.g., global and state conservation status ranks, including threats), and other supporting information (e.g., accounts and references) on the biology and ecology of species and biological communities.

Data Use Terms and Conditions

- Montana Natural Heritage Program (MTNHP) products and services are based on biological data and the objective interpretation of those data by professional scientists. MTNHP does not advocate any particular philosophy of natural resource protection, management, development, or public policy.
- MTNHP has no natural resource management or regulatory authority. Products, statements, and services from MTNHP are intended to inform parties as to the state of scientific knowledge about certain natural resources, and to further develop that knowledge. The information is not intended as natural resource management guidelines or prescriptions or a determination of environmental impacts. MTNHP recommends consultation with appropriate state, federal, and tribal resource management agencies and authorities in the area where your project is located.
- Information on the status and spatial distribution of biological resources produced by MTNHP are intended to inform parties of the state-wide status, known occurrence, or the likelihood of the presence of those resources. **These products are not intended to substitute for field-collected data, nor are they intended to be the sole basis for natural resource management decisions.**
- MTNHP does not portray its data as exhaustive or comprehensive inventories of rare species or biological communities. **Field verification of the absence or presence of sensitive species and biological communities will always be an important obligation of users of our data.**
- MTNHP responds equally to all requests for products and services, regardless of the purpose or identity of the requester.
- Because MTNHP constantly updates and revises its databases with new data and information, products will become outdated over time. Interested parties are encouraged to obtain the most current information possible from MTNHP, rather than using older products. We add, review, update, and delete records on a daily basis. Consequently, we strongly advise that you update your MTNHP data sets at a minimum of every four months for most applications of our information.
- MTNHP data require a certain degree of biological expertise for proper analysis, interpretation, and application. Our staff is available to advise you on questions regarding the interpretation or appropriate use of the data that we provide. See [Contact Information for MTNHP Staff](#)
- The information provided to you by MTNHP may include sensitive data that if publicly released might jeopardize the welfare of threatened, endangered, or sensitive species or biological communities. This information is intended for distribution or use only within your department, agency, or business. Subcontractors may have access to the data during the course of any given project, but should not be given a copy for their use on subsequent, unrelated work.
- MTNHP data are made freely available. Duplication of hard-copy or digital MTNHP products with the intent to sell is prohibited without written consent by MTNHP. Should you be asked by individuals outside your organization for the type of data that we provide, please refer them to MTNHP.
- MTNHP and appropriate staff members should be appropriately acknowledged as an information source in any third-party product involving MTNHP data, reports, papers, publications, or in maps that incorporate MTNHP graphic elements.
- Sources of our data include museum specimens, published and unpublished scientific literature, field surveys by state and federal agencies and private contractors, and reports from knowledgeable individuals. MTNHP actively solicits and encourages additions, corrections and updates, new observations or collections, and comments on any of the data we provide.
- MTNHP staff and contractors do not enter or cross privately-owned lands without express permission from the landowner. However, the program cannot guarantee that information provided to us by others was obtained under adherence to this policy.

Suggested Contacts for Natural Resource Management 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 permitting and planning processes and management decisions. We encourage you to contact state, federal, and tribal resource management agencies in the area where your project is located and review the permitting overviews by the [Montana Department of Environmental Quality](#), the [Montana Department of Natural Resources and Conservation](#) and the [Index of Environmental Permits for Montana](#) for 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 Consultation \(IPAC\) website 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:

Montana Fish, Wildlife, and Parks

Fish Species	Zachary Shattuck zshattuck@mt.gov (406) 444-1231 or Eric Roberts eroberts@mt.gov (406) 444-5334																												
American Bison Black-footed Ferret Black-tailed Prairie Dog Bald Eagle Golden Eagle Common Loon Least Tern Piping Plover Whooping Crane	Kristina Smucker KSmucker@mt.gov (406) 444-5209																												
Grizzly Bear Greater Sage Grouse Trumpeter Swan Big Game Upland Game Birds Furbearers	Brian Wakeling brian.wakeling@mt.gov (406) 444-3940																												
Managed Terrestrial Game Data	Adam Messer – MFWP GIS Coordinator amesser@mt.gov (406) 444-0095																												
Fisheries Data and Nongame Animal Data	Adam Messer – MFWP GIS Coordinator amesser@mt.gov (406) 444-0095																												
Wildlife and Fisheries Scientific Collector’s Permits	https://fwp.mt.gov/buyandapply/commercialwildlifeandscientificpermits/scientific Kristina Smucker for Wildlife ksmucker@mt.gov (406) 444-5209 Dave Schmetterling for Fisheries dschmetterling@mt.gov (406) 542-5514																												
Fish and Wildlife Recommendations for Subdivision Development	Stevie Burton stevie.burton@mt.gov (406) 594-7354 See https://fwp.mt.gov/conservation/living-with-wildlife/subdivision-recommendations																												
Regional Contacts 	<table><tr><td>Region 1</td><td>(Kalispell)</td><td>(406) 752-5501</td><td>fwprg12@mt.gov</td></tr><tr><td>Region 2</td><td>(Missoula)</td><td>(406) 542-5500</td><td>fwprg22@mt.gov</td></tr><tr><td>Region 3</td><td>(Bozeman)</td><td>(406) 577-7900</td><td>fwprg3@mt.gov</td></tr><tr><td>Region 4</td><td>(Great Falls)</td><td>(406) 454-5840</td><td>fwprg42@mt.gov</td></tr><tr><td>Region 5</td><td>(Billings)</td><td>(406) 247-2940</td><td>fwprg52@mt.gov</td></tr><tr><td>Region 6</td><td>(Glasgow)</td><td>(406) 228-3700</td><td>fwprg62@mt.gov</td></tr><tr><td>Region 7</td><td>(Miles City)</td><td>(406) 234-0900</td><td>fwprg72@mt.gov</td></tr></table>	Region 1	(Kalispell)	(406) 752-5501	fwprg12@mt.gov	Region 2	(Missoula)	(406) 542-5500	fwprg22@mt.gov	Region 3	(Bozeman)	(406) 577-7900	fwprg3@mt.gov	Region 4	(Great Falls)	(406) 454-5840	fwprg42@mt.gov	Region 5	(Billings)	(406) 247-2940	fwprg52@mt.gov	Region 6	(Glasgow)	(406) 228-3700	fwprg62@mt.gov	Region 7	(Miles City)	(406) 234-0900	fwprg72@mt.gov
Region 1	(Kalispell)	(406) 752-5501	fwprg12@mt.gov																										
Region 2	(Missoula)	(406) 542-5500	fwprg22@mt.gov																										
Region 3	(Bozeman)	(406) 577-7900	fwprg3@mt.gov																										
Region 4	(Great Falls)	(406) 454-5840	fwprg42@mt.gov																										
Region 5	(Billings)	(406) 247-2940	fwprg52@mt.gov																										
Region 6	(Glasgow)	(406) 228-3700	fwprg62@mt.gov																										
Region 7	(Miles City)	(406) 234-0900	fwprg72@mt.gov																										

Montana Department of Agriculture

General Contact Information: <https://agr.mt.gov/About/Office-Locations/Office-Locations-and-Field-Offices>

Noxious Weeds: <https://agr.mt.gov/Noxious-Weeds>

Montana Department of Environmental Quality

Permitting and Operator Assistance for all Environmental Permits: <https://deq.mt.gov/Permitting>

Montana Department of Natural Resources and Conservation

Overview of, and contacts for, licenses and permits for state lands, water, and forested lands:

<https://dnrc.mt.gov/Permits-Services>

Stream Permitting (310 permits) and an overview of various water and stream related permits (e.g., Stream Protection Act 124, Federal Clean Water Act 404, Federal Rivers and Harbors Act Section 10, Short-term Water Quality Standard for Turbidity 318 Authorization, etc.).

<https://dnrc.mt.gov/Licenses-and-Permits/Stream-Permitting>

Wildfire Resources: <https://dnrc.mt.gov/Forestry/Wildfire>

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 Army Corps of Engineers

Montana Regulatory Office for federal permits related to construction in water and wetlands

<https://www.nwo.usace.army.mil/Missions/Regulatory-Program/Montana/> (406) 441-1375

United States Environmental Protection Agency

Environmental information, notices, permitting, and contacts <https://www.epa.gov/mt>

Gateway to state resource locators <https://www.envcap.org/srl/index.php>

United States Fish and Wildlife Service

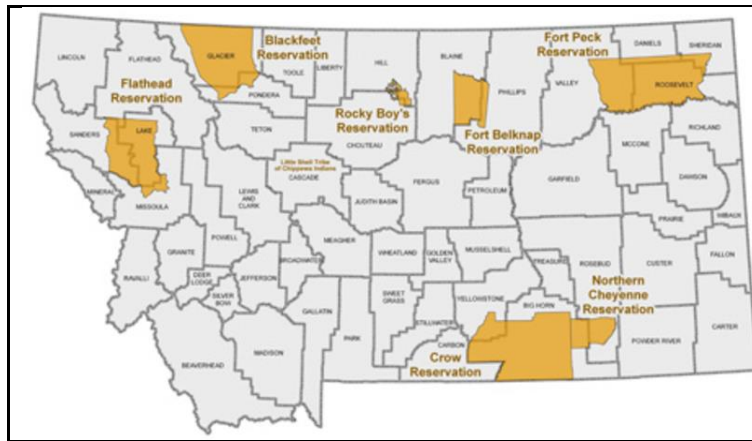
Information Planning and Conservation (IPAC) website: <https://ipac.ecosphere.fws.gov>

Montana Ecological Services Field Office: <https://www.fws.gov/office/montana-ecological-services> (406) 449-5225

United States Forest Service

Regional Office – Missoula, Montana Contacts			
Wildlife Program Leader	Tammy Fletcher	tammy.fletcher2@usda.gov	(406) 329-3086
Wildlife Ecologist	Cara Staab	cara.staab@usda.gov	(406) 329-3677
Aquatic Ecologist	Justin Jimenez	justin.jimenez@usda.gov	(435) 370-6830
TES Program	Lydia Allen	lydia.allen@usda.gov	(406) 329-3558
Interagency Grizzly Bear Coordinator	Scott Jackson	scott.jackson@usda.gov	(406) 329-3664
Regional Botanist	Amanda Hendrix	amanda.hendrix@usda.gov	(651) 447-3016
Regional Vegetation Ecologist	Mary Manning	marry.manning@usda.gov	(406) 329-3304
Invasive Species Program Manager	Michelle Cox	michelle.cox2@usda.gov	(406) 329-3669

Tribal Nations



[Assiniboine & Gros Ventre Tribes – Fort Belknap Reservation](#)

[Assiniboine & Sioux Tribes – Fort Peck Reservation](#)

[Blackfeet Tribe - Blackfeet Reservation](#)

[Chippewa Creek Tribe - Rocky Boy's Reservation](#)

[Crow Tribe – Crow Reservation](#)

[Little Shell Chippewa Tribe](#)

[Northern Cheyenne Tribe – Northern Cheyenne Reservation](#)

[Salish & Kootenai Tribes - Flathead Reservation](#)

Natural Heritage Programs and Conservation Data Centers 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 \(MISC\)](#)

[Western Montana Conservation Commission](#)

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](#)

[Fire Management and Invasive Plants](#)

Introduction to Native Species

Within the report area you have requested, separate summaries are provided for: (1) Species Occurrences (SO) for plant and animal Species of Concern, Special Status Species (SSS), Important Animal Habitat (IAH) and some Potential Plant Species of Concern; (2) other observed non Species of Concern or Species of Concern without suitable documentation to create Species Occurrence polygons; and (3) other non-documented species that are potentially present based on their range, predicted suitable habitat model output, or presence of associated habitats. Each of these summaries provides the following information when present for a species: (1) the number of [Species Occurrences](#) and associated delineation criteria for construction of these polygons that have long been used for considerations of documented Species of Concern in environmental reviews; (2) the number of observations of each species; (3) the geographic range polygons for each species that the report area overlaps; (4) predicted relative habitat suitability classes that are present if a predicted suitable habitat model has been created; (5) the percent of the report area that is mapped as commonly associated or occasionally associated habitat as listed for each species in the [Montana Field Guide](#); and (6) a variety of conservation status ranks and links to species accounts in the [Montana Field Guide](#). Details on each of these information categories are included under relevant section headers below or are defined on our [Species Status Codes](#) page. In presenting this information, the Montana Natural Heritage Program (MTNHP) is working towards assisting the user with rapidly determining what species have been documented and what species are potentially present in the report area. We remind users that this information is likely incomplete as surveys to document native and introduced species are lacking in many areas of the state, information on introduced species has only been tracked relatively recently, the MTNHP's staff and resources are restricted by budgets, and information is constantly being added and updated in our databases. **Thus, field verification by professional biologists of the absence or presence of species and biological communities will always be an important obligation of users of our data.**

If you are aware of observation datasets that the MTNHP is missing, please report them to the Program Botanist apipp@mt.gov or Senior Zoologist dbachen@mt.gov. If you have animal or plant observations that you would like to contribute, you can also submit them via Excel spreadsheets, geodatabases, iNaturalist, or a Survey123 form. Various methods of data submission are reviewed in this playlist of videos: <https://www.youtube.com/playlist?list=PLRaydtZpHu2qOHPoSPq9cnM9uXGmEXACx>

Observations

The MTNHP manages information on several million animal and plant observations that have been reported by professional biologists and private citizens from across Montana. The majority of these observations are submitted in digital format from standardized databases associated with research or monitoring efforts and spreadsheets of incidental observations submitted by professional biologists and amateur naturalists. At a minimum, accepted observation records must contain a credible species identification (i.e. appropriate geographic range, date, and habitat and, if species are difficult to identify, a photograph and/or notes on key identifying features), a date or date range, observer name, locational information (ideally with latitude and longitude in decimal degrees), notes on numbers observed, and species behavior or habitat use (e.g., is the observation likely associated with reproduction). Bird records are also required to have information associated with date-appropriate breeding or overwintering status of the species observed. MTNHP reviews observation records to ensure that they are mapped correctly, occur within date ranges when the species is known to be present or detectable, occur within the known seasonal geographic range of the species, and occur in appropriate habitats. MTNHP also assigns each record a locational uncertainty value in meters to indicate the spatial precision associated with the record's mapped coordinates. Only records with locational uncertainty values of 10,000 meters or less are included in environmental summary reports and number summaries are only provided for records with locational uncertainty values of 1,000 meters or less.

Species Occurrences

The MTNHP evaluates plant and animal observation records for species of higher conservation concern to determine whether they are worthy of inclusion in the [Species Occurrence](#) (SO) layer for use in environmental reviews; observations not worthy of inclusion in this layer include long distance dispersal events, migrants observed away from key migratory stopover habitats, and winter observations. An SO is a polygon depicting what is known about a species occupancy from direct observation with a defined level of locational uncertainty and any inference that can be made about adjacent habitat use from the latest peer-reviewed science. If an observation can be associated with a map feature that can be tracked (e.g., a wetland boundary for a wetland associated plant) then this polygon feature is used to represent the SO. Areas that can be inferred as probable occupied habitat based on direct observation of a species location and what is known about the foraging area or home range size of the species may be incorporated into the SO. Species Occurrences generally belong to one of the following categories:

Plant Species Occurrences

A documented location of a specimen collection or observed plant population. In some instances, adjacent, spatially separated clusters are considered subpopulations and are grouped as one occurrence (e.g., the subpopulations occur in ecologically similar habitats, and their spatial proximity likely allows them to interbreed). Tabular information for multiple observations at the same SO location is generally linked to a single polygon. Plant SO's are only created for Species of Concern and Potential Species of Concern.

Animal Species Occurrences

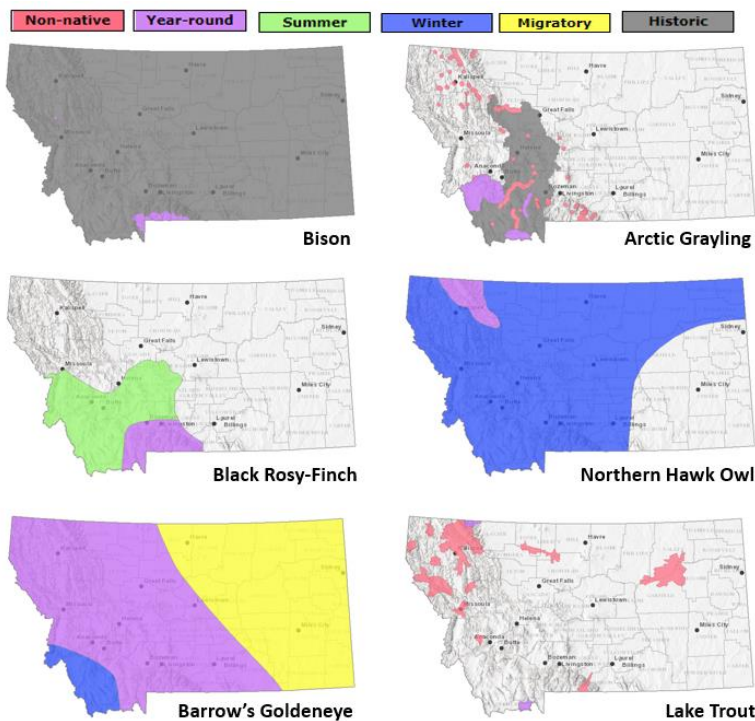
The location of a verified observation or specimen record typically known or assumed to represent a breeding population or a portion of a breeding population. Animal SO's are generally: (1) buffers of terrestrial point observations based on documented species' home range sizes; (2) buffers of stream segments to encompass occupied streams and immediate adjacent riparian habitats; (3) polygonal features encompassing known or likely breeding populations (e.g., a wetland for some amphibians or a forested portion of a mountain range for some wide-ranging carnivores); or (4) combinations of the above. Tabular information for multiple observations at the same SO location is generally linked to a single polygon. Species Occurrence polygons may encompass some unsuitable habitat in some instances in order to avoid heavy data processing associated with clipping out habitats that are readily assessed as unsuitable by the data user (e.g., a point buffer of a terrestrial species may overlap into a portion of a lake that is obviously inappropriate habitat for the species). Animal SO's are only created for Species of Concern and Special Status Species (e.g., Bald Eagle).

Other Occurrence Polygons

These include significant biological features not included in the above categories, such as Important Animal Habitats like bird rookeries and bat roosts, and peatlands or other wetland and riparian communities that support diverse plant and animal communities.

Geographic Range Polygons

Geographic range polygons are still under development for most plant and invertebrate species. Native year-round, summer, winter, migratory and historic geographic range polygons as well as polygons for introduced



populations have been defined for most vertebrate animal species for which there are enough observations, surveys, and knowledge of appropriate seasonal habitat use to define them (see examples to left). These native or introduced range polygons bound the extent of known or likely occupied habitats for non-migratory and relative sedentary species and the regular extent of known or likely occupied habitats for migratory and long-distance dispersing species; polygons may include unsuitable intervening habitats. For most species, a single polygon can represent the year-round or seasonal range, but breeding ranges of some colonial nesting water birds and some introduced species are represented more patchily when supported by data. Some ranges are mapped more broadly than actual distributions in order to be visible on statewide maps (e.g., fish).

Predicted Suitable Habitat Models

Predicted habitat suitability models have been created for plant and animal Species of Concern and are undergoing development for non-Species of Concern. For species for which models have been completed, the environmental summary report includes simple rule-based associations with streams for aquatic species and seasonal habitats for game species as well as mathematically complex Maximum Entropy models (Phillips et al. 2006, Ecological Modeling 190:231-259) constructed from a variety of statewide biotic and abiotic layers and presence only data for individual species for most terrestrial species. For the Maximum Entropy models, we reclassified 90 x 90-meter continuous model output into suitability classes (unsuitable, low, moderate, and optimal) then aggregated that into the one square mile hexagons used in the environmental summary report; this is the finest spatial scale we suggest using this information in management decisions and survey planning. Full model write ups for individual species that discuss model goals, inputs, outputs, and evaluation in much greater detail are posted on the MTNHP's [Predicted Suitable Habitat Models](#) webpage. Evaluations of predictive accuracy and specific limitations are included with the metadata for models of individual species. **Model outputs should not be used in place of on-the-ground surveys for species. Instead model outputs should be used in conjunction with habitat evaluations to determine the need for on-the-ground surveys for species.** We suggest that the percentage of predicted optimal and moderate suitable habitat within the report area be used in conjunction with geographic range polygons and the percentage of commonly associated habitats to generate lists of potential species that may occupy broader landscapes for the purposes of landscape-level planning.

Associated Habitats

Within the boundary of the intersected hexagons, we provide the approximate percentage of commonly or occasionally associated habitat for vertebrate animal species that regularly breed, overwinter, or migrate through the state; a detailed list of commonly and occasionally associated habitats is provided in individual species accounts in the [Montana Field Guide](#). We assigned common or occasional use of each of the ecological

systems mapped in Montana by: (1) using personal knowledge and reviewing literature that summarizes the breeding, overwintering, or migratory habitat requirements of each species; (2) evaluating structural characteristics and distribution of each ecological system relative to the species' range and habitat requirements; (3) examining the observation records for each species in the state-wide point observation database associated with each ecological system; and (4) calculating the percentage of observations associated with each ecological system relative to the percent of Montana covered by each ecological system to get a measure of numbers of observations versus availability of habitat. Species that breed in Montana were only evaluated for breeding habitat use, species that only overwinter in Montana were only evaluated for overwintering habitat use, and species that only migrate through Montana were only evaluated for migratory habitat use. In general, species were listed as associated with an ecological system if structural characteristics of used habitat documented in the literature were present in the ecological system or large numbers of point observations were associated with the ecological system. However, species were not listed as associated with an ecological system if there was no support in the literature for use of structural characteristics in an ecological system, even if point observations were associated with that system. Common versus occasional association with an ecological system was assigned based on the degree to which the structural characteristics of an ecological system matched the preferred structural habitat characteristics for each species as represented in the scientific literature. The percentage of observations associated with each ecological system relative to the percent of Montana covered by each ecological system was also used to guide assignment of common versus occasional association.

We suggest that the percentage of commonly associated habitat within the report area be used in conjunction with geographic range polygons and the percentage of predicted optimal and moderate suitable habitat from predictive models to generate lists of potential species that may occupy broader landscapes for the purposes of landscape-level planning. Users of this information should be aware that land cover mapping accuracy is particularly problematic when the systems occur as small patches or where the land cover types have been altered over the past decade. Thus, particular caution should be used when using the associations in assessments of smaller areas (e.g., evaluations of public land survey sections).

Introduction to Land Cover

Land Use/Land Cover is one of 15 [Montana Spatial Data Infrastructure](#) framework layers considered vital for making statewide maps of Montana and understanding its geography. The layer records all Montana natural vegetation, land cover and land use, classified from satellite and aerial imagery, mapped at a scale of 1:100,000, and interpreted with supporting ground-level data. The baseline map is adapted from the Northwest ReGAP (NWGAP) project land cover classification, which used 30m resolution multi-spectral Landsat imagery acquired between 1999 and 2001. Vegetation classes were drawn from the Ecological System Classification developed by NatureServe (Comer et al. 2003). The land cover classes were developed by Anderson et al. (1976). The NWGAP effort encompasses 12 map zones. Montana overlaps seven of these zones. The two NWGAP teams responsible for the initial land cover mapping effort in Montana were Sanborn and NWGAP at the University of Idaho. Both Sanborn and NWGAP employed a similar modeling approach in which Classification and Regression Tree (CART) models were applied to Landsat ETM+ scenes. The Spatial Analysis Lab within the Montana Natural Heritage Program was responsible for developing a seamless Montana land cover map with a consistent statewide legend from these two separate products. Additionally, the Montana land cover layer incorporates several other land cover and land use products (e.g., MSDI Structures and Transportation themes and the Montana Department of Revenue Final Land Unit classification) and reclassifications based on plot-level data and the latest NAIP imagery to improve accuracy and enhance the usability of the theme. Updates are done as partner support and funding allow, or when other MSDI datasets can be incorporated. Recent updates include fire perimeters and agricultural land use (annually), energy developments such as wind, oil and gas installations (2014), roads, structures and other impervious surfaces (various years): and local updates/improvements to specific ecological systems (e.g., central Montana grassland and sagebrush ecosystems). Current and previous versions of the Land Use/Land Cover layer with full metadata are available for download from the Montana State Library's [GIS Data List](#). More information on the land cover layer is available at: https://msl.mt.gov/geoinfo/msdi/land_use_land_cover/

Within the report area you have requested, land cover is summarized by acres of Level 1, Level 2, and Level 3 Ecological Systems.

Literature Cited

- Anderson, J.R. E.E. Hardy, J.T. Roach, and R.E. Witmer. 1976. A land use and land cover classification system for use with remote sensor data. U.S. Geological Survey Professional Paper 964.
- Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K. Snow, and J. Teague. 2003. Ecological systems of the United States: A working classification of U.S. terrestrial systems. NatureServe, Arlington, VA.

Introduction to Wetland and Riparian

Within the report area you have requested, wetland and riparian mapping is summarized by acres of each classification present. Summaries are only provided for modern MTNHP wetland and riparian mapping and not for outdated (NWI Legacy) or incomplete (NWI Scalable) mapping efforts; [described here](#). MTNHP has made all three of these datasets and associated metadata available for separate download on the Montana [Wetland and Riparian Framework](#) web page.

Wetland and Riparian mapping is one of 15 [Montana Spatial Data Infrastructure](#) framework layers considered vital for making statewide maps of Montana and understanding its geography. The wetland and riparian framework layer consists of spatial data representing the extent, type, and approximate location of wetlands, riparian areas, and deep water habitats in Montana.

Wetland and riparian mapping is completed through photointerpretation of 1-m resolution color infrared aerial imagery acquired from 2005 or later. A coding convention using letters and numbers is assigned to each mapped wetland. These letters and numbers describe the broad landscape context of the wetland, its vegetation type, its water regime, and the kind of alterations that may have occurred. Ancillary data layers such as topographic maps, digital elevation models, soils data, and other aerial imagery sources are also used to improve mapping accuracy. Wetland mapping follows the federal Wetland Mapping Standard and classifies wetlands according to the Cowardin classification system of the National Wetlands Inventory (NWI) (Cowardin et al. 1979, FGDC Wetlands Subcommittee 2013). Federal, State, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands differently than the NWI. Similar coding, based on U.S. Fish and Wildlife Service conventions, is applied to riparian areas (U.S. Fish and Wildlife Service 2009). These are mapped areas where vegetation composition and growth is influenced by nearby water bodies, but where soils, plant communities, and hydrology do not display true wetland characteristics. **These data are intended for use at a scale of 1:12,000 or smaller. Mapped wetland and riparian areas do not represent precise boundaries and digital wetland data cannot substitute for an on-site determination of jurisdictional wetlands.**

See detailed overviews, with examples, of both wetland and riparian classification systems and associated codes as a [storymap](#) and companion [guide](#)

Literature Cited

- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service, FWS/OBS-79/31. Washington, D.C. 103pp.
- Federal Geographic Data Committee. 2013. Classification of wetlands and deepwater habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, D.C.
- U.S. Fish and Wildlife Services. 2009. A system for mapping riparian areas in the western United States. Division of Habitat and Resource Conservation, Branch of Resource and Mapping Support, Arlington, Virginia.

Introduction to Land Management

Within the report area you have requested, land management information is summarized by acres of federal, state, and local government lands, tribal reservation boundaries, private conservation lands, and federal, state, local, and private conservation easements. Acreage for “Owned”, “Tribal”, or “Easement” categories represents non-overlapping areas that may be totaled. However, “Other Boundaries” represents managed areas such as National Forest boundaries containing private inholdings and other mixed ownership which may cause boundaries to overlap (e.g. a wilderness area within a forest). Therefore, acreages may not total in a straight-forward manner.

Because information on land stewardship is critical to effective land management, the Montana Natural Heritage Program (MTNHP) began compiling ownership and management data in 1997. The goal of the Montana Land Management Database is to manage a single, statewide digital data set that incorporates information from both public and private entities. The database assembles information on public lands, private conservation lands, and conservation easements held by state and federal agencies and land trusts and is updated on a regular basis. Since 2011, the Information Management group in the Montana State Library’s Digital Library Division has led the Montana Land Management Database in partnership with the MTNHP.

Public and private conservation land polygons are attributed with the name of the entity that owns it. The data are derived from the statewide [Montana Cadastral Parcel layer](#). Conservation easement data shows land parcels on which a public agency or qualified land trust has placed a conservation easement in cooperation with the landowner. The dataset contains no information about ownership or status of the mineral estate. For questions about the dataset or to report errors, please contact the Montana Natural Heritage Program at (406) 444-5363 or mtnhp@mt.gov. You can download various components of the Land Management Database and view associated metadata at the Montana State Library’s [GIS Data List](#) at the following links:

[Public Lands](#)

[Conservation Easements](#)

[Private Conservation Lands](#)

[Managed Areas](#)

Map features in the Montana Land Management Database or summaries provided in this report are not intended as a legal depiction of public or private surface land ownership boundaries and should not be used in place of a survey conducted by a licensed land surveyor. Similarly, map features do not imply public access to any lands. The Montana Natural Heritage Program makes no representations or warranties whatsoever with respect to the accuracy or completeness of this data and assumes no responsibility for the suitability of the data for a particular purpose. The Montana Natural Heritage Program will not be liable for any damages incurred as a result of errors displayed here. Consumers of this information should review or consult the primary data and information sources to ascertain the viability of the information for their purposes.

Introduction to Invasive and Pest Species

Within the report area you have requested, separate summaries are provided for: Aquatic Invasive Species, Noxious Weeds, Agricultural Pests, Forest Pests, and Biocontrol species that have been documented or potentially occur there based on the predicted suitability of habitat. Definitions for each of these invasive and pest species categories can be found on our [Species Status Codes](#) page.

Each of these summaries provides the following information when present for a species: (1) the number of observations of each species; (2) the geographic range polygons for each species, if developed, that the report area overlaps; (3) predicted relative habitat suitability classes that are present if a predicted suitable habitat model has been created; (4) the percent of the report area that is mapped as commonly associated or occasionally associated habitat as listed for each species in the [Montana Field Guide](#); and (5) links to species accounts in the [Montana Field Guide](#). Details on each of these information categories are included under relevant section headers under the Introduction to Native Species above or are defined on our [Species Status Codes](#) page. In presenting this information, the Montana Natural Heritage Program (MTNHP) is working towards assisting the user with rapidly determining what invasive and pest species have been documented and what species are potentially present in the report area. We remind users that this information is likely incomplete as surveys to document introduced species are lacking in many areas of the state, information on introduced species has only been tracked relatively recently, the MTNHP's staff and resources are limited, and information is constantly being added and updated in our databases. **Thus, field verification by professional biologists of the absence or presence of species will always be an important obligation of users of our data.**

If you are aware of observation or survey datasets for invasive or pest species that the MTNHP is missing, please report them to the Program Coordinator bmaxell@mt.gov Program Botanist apipp@mt.gov or Senior Zoologist dbachen@mt.gov. If you have animal or plant observations that you would like to contribute, you can also submit them via Excel spreadsheets, geodatabases, iNaturalist, or a Survey123 form. Various methods of data submission are reviewed in this playlist of videos:

<https://www.youtube.com/playlist?list=PLRaydtZpHu2qOHPoSPq9cnM9uXGmEXACx>

Additional Information Resources

[MTNHP Staff Contact Information](#)

[Montana Field Guide](#)

[MTNHP Species of Concern Report - Animals and Plants](#)

[MTNHP Species Status Codes - Explanation](#)

[MTNHP Predicted Suitable Habitat Models](#) (for select Animals and Plants)

[MTNHP Request Information page](#)

[Montana Cadastral](#)

[Montana Code Annotated](#)

[Montana Fisheries Information System](#)

[Montana Fish, Wildlife, and Parks Subdivision Recommendations](#)

[Montana GIS Data Layers](#)

[Montana GIS Data Bundler](#)

[Montana Greater Sage-Grouse Project Submittal Site](#)

[Montana Ground Water Information Center](#)

[Montana Index of Environmental Permits, 21st Edition \(2018\)](#)

[Montana Environmental Policy Act \(MEPA\)](#)

[Montana Environmental Policy Act Analysis Resource List](#)

[Laws, Treaties, Regulations, and Agreements on Animals and Plants](#)

[Montana Spatial Data Infrastructure Layers](#)

[Montana State Historic Preservation Office Review and Compliance](#)

[Montana Stream Permitting: a guide for conservation district supervisors and others](#)

[Montana Water Information System](#)

[Montana Web Map Services](#)

[National Environmental Policy Act](#)

[Penalties for Misuse of Fish and Wildlife Location Data](#) (MCA 87-6-222)

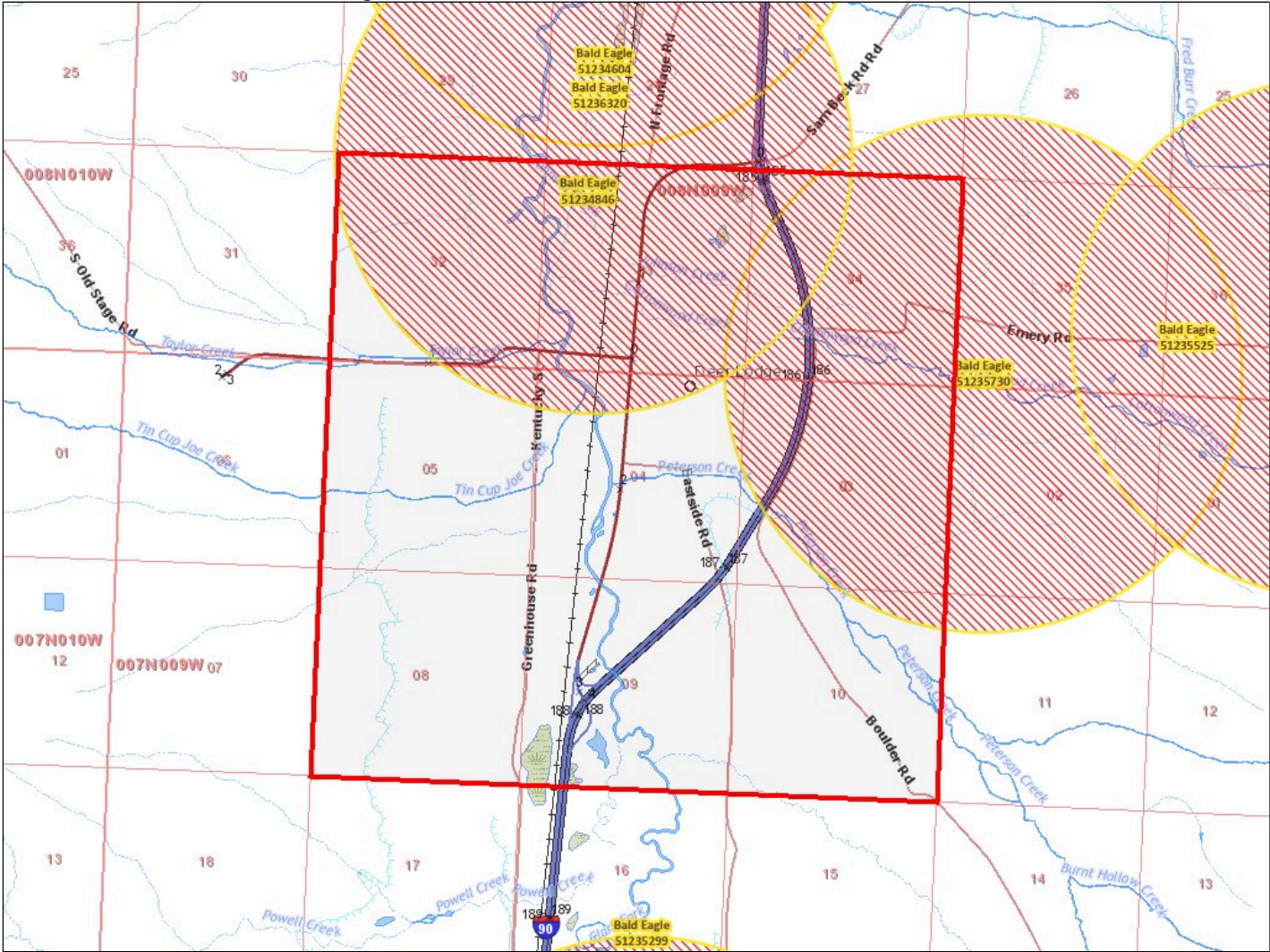
[U.S. Fish and Wildlife Service Information for Planning and Consultation](#) (Section 7 Consultation)

[Web Soil Survey Tool](#)

Montana SOC Occurrences Report

SOC Occurrences for Birds = Bald Eagle

Report generated 5/28/2024 3:43:49 PM



☐ Birds - Bald Eagle (<i>Haliaeetus leucocephalus</i>)		SO Count: 8	Obs Count: 37	Earliest Obs: 2003	Recent Obs: 2023
Special Status Species Native Species Global Rank: G5 State Rank: S4	Agency Status USFWS: BGEPA; MBTA USFS: Sensitive - Known in Forests (LOLO) BLM: SENSITIVE FWP SWAP: PIF: 2	Delineation Criteria Confirmed nesting area buffered by a minimum distance of 2,000 meters in order to be conservative about encompassing the breeding territory and area commonly used for renesting. Only nesting observations with a locational uncertainty of 1,000 meters or less will be used to delineate a nesting area.		Last Updated Apr 01, 2024	
⊕ SO ID: 51234604		Acres: 3,105	Obs Count: 1	Earliest Obs: 2003	Recent Obs: 2003
⊕ SO ID: 51234791		Acres: 3,105	Obs Count: 1	Earliest Obs: 2023	Recent Obs: 2023
⊕ SO ID: 51234846		Acres: 3,105	Obs Count: 1	Earliest Obs: 2009	Recent Obs: 2009
⊕ SO ID: 51235299		Acres: 3,105	Obs Count: 1	Earliest Obs: 2009	Recent Obs: 2009
⊕ SO ID: 51235525		Acres: 3,105	Obs Count: 1	Earliest Obs: 2022	Recent Obs: 2022
⊕ SO ID: 51235533		Acres: 3,095	Obs Count: 10	Earliest Obs: 2013	Recent Obs: 2023
⊕ SO ID: 51235730		Acres: 3,105	Obs Count: 1	Earliest Obs: 2023	Recent Obs: 2023
⊕ SO ID: 51236320		Acres: 3,095	Obs Count: 21	Earliest Obs: 2009	Recent Obs: 2023

Citation for this report:
Montana SOC Occurrences Report
SOC Occurrences for Birds = Bald Eagle
Within Lat/Long: (46.34849,-112.63235) to (46.43076,-112.83617)
Natural Heritage Map Viewer. Montana Natural Heritage Program.
Retrieved on May 28, 2024, from <https://mtnhp.org/MapView/SOReport.aspx>

 (406) 449-5339

585 Shephard Way, Suite 1
Helena, MT 59601-6287

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

-
1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Canada Lynx <i>Lynx canadensis</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/3652	Threatened
Grizzly Bear <i>Ursus arctos horribilis</i> There is proposed critical habitat for this species. https://ecos.fws.gov/ecp/species/7642	Threatened
North American Wolverine <i>Gulo gulo luscus</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5123	Threatened

Fishes

NAME	STATUS
Bull Trout <i>Salvelinus confluentus</i> There is final critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/8212	Threatened

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Bull Trout <i>Salvelinus confluentus</i> https://ecos.fws.gov/ecp/species/8212#crithab	Final

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act¹ and the Migratory Bird Treaty Act².

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats³, should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the ["Supplemental Information on Migratory Birds and Eagles"](#).

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds
<https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide conservation measures for birds
<https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC
<https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

There are likely bald eagles present in your project area. For additional information on bald eagles, refer to [Bald Eagle Nesting and Sensitivity to Human Activity](#)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
------	-----------------

Bald Eagle *Haliaeetus leucocephalus*

Breeds Jan 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1626>

Golden Eagle *Aquila chrysaetos*

Breeds Jan 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1680>

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read ["Supplemental Information on Migratory Birds and Eagles"](#), specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

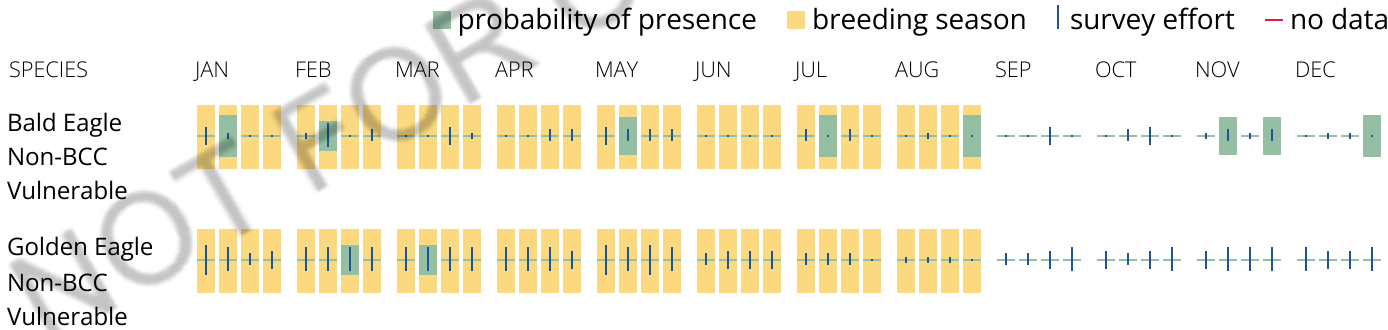
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply). To see a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the [Eagle Act](#) should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats³ should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the ["Supplemental Information on Migratory Birds and Eagles"](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31
Bobolink <i>Dolichonyx oryzivorus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
California Gull <i>Larus californicus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 1 to Jul 31
Calliope Hummingbird <i>Selasphorus calliope</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9526	Breeds May 1 to Aug 15
Cassin's Finch <i>Haemorhous cassinii</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9462	Breeds May 15 to Jul 15

Evening Grosbeak *Coccothraustes vespertinus*
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 15 to Aug 10

Flammulated Owl *Psiloscoptes flammeolus*
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
<https://ecos.fws.gov/ecp/species/7728>

Breeds May 10 to Aug 15

Franklin's Gull *Leucophaeus pipixcan*
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 1 to Jul 31

Golden Eagle *Aquila chrysaetos*
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
<https://ecos.fws.gov/ecp/species/1680>

Breeds Jan 1 to Aug 31

Lesser Yellowlegs *Tringa flavipes*
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
<https://ecos.fws.gov/ecp/species/9679>

Breeds elsewhere

Lewis's Woodpecker *Melanerpes lewis*
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
<https://ecos.fws.gov/ecp/species/9408>

Breeds Apr 20 to Sep 30

Long-eared Owl *asio otus*
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
<https://ecos.fws.gov/ecp/species/3631>

Breeds Mar 1 to Jul 15

Rufous Hummingbird *Selasphorus rufus*
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
<https://ecos.fws.gov/ecp/species/8002>

Breeds Apr 15 to Jul 15

Western Grebe *aechmophorus occidentalis*

Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/6743>

Willet *Tringa semipalmata*

Breeds Apr 20 to Aug 5

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read ["Supplemental Information on Migratory Birds and Eagles"](#), specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

probability of presence breeding season survey effort no data

SPECIES

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Bald Eagle
Non-BCC
Vulnerable

Bobolink
BCC Rangewide
(CON)

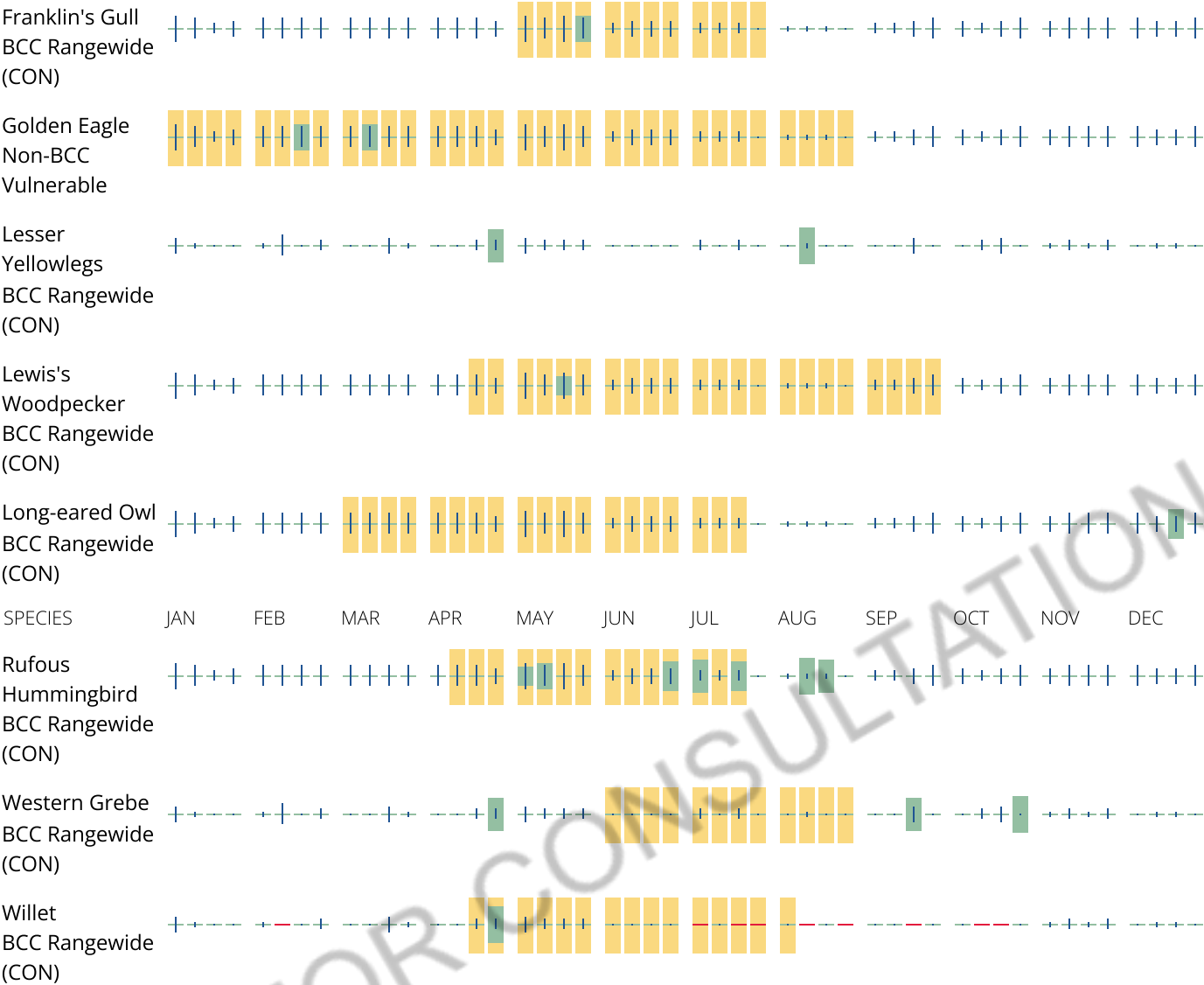
California Gull
BCC Rangewide
(CON)

Calliope
Hummingbird
BCC Rangewide
(CON)

Cassin's Finch
BCC Rangewide
(CON)

Evening
Grosbeak
BCC Rangewide
(CON)

Flammulated
Owl
BCC Rangewide
(CON)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid

cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to

you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

[PEM1Cx](#)

[PEM1C](#)

[PEM1A](#)

FRESHWATER FORESTED/SHRUB WETLAND

[PSSA](#)

FRESHWATER POND

[PABF](#)

RIVERINE

[R2UBH](#)

[R4SBC](#)

[R5UBH](#)

[R3USC](#)

A full description for each wetland code can be found at the [National Wetlands Inventory website](#)

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.