# Appendix B

## Uniform Environmental Checklist and Environmental Assessment

Montana Department of Commerce
Treasure State Endowment Program
**Environmental Assessment**

**STORMWATER FACILITY IMPROVEMENTS PROJECT**

**CITY OF RED LODGE, MONTANA**

**DRAFT - REVIEW**

**Proposed Action:** The stormwater facilities in the City of Red Lodge have significate deficiencies related to cross connections to the sanitary sewer, undersized mains, and localized flooding. The City proposes to replace portions of the existing system and add new infrastructure to address the cross connections (see attached table and map of problem areas). The proposed work will: reduce the risk of flooding, increase safety, and disconnect stormwater from the sanitary sewer system.

## A. Environmental Checklist:

**As the Engineer that prepared the preliminary engineering report, I Brandon Duffey, PE have reviewed the information presented in this checklist and believe that it accurately identifies the environmental resources in the area and the potential impacts that the project could have on those resources.** In addition, the required state and federal agencies were provided with the required information about the project and requested to provide comments on the proposed public facility project. Their comments have been incorporated into and attached to the Preliminary Engineering Report.

**Engineer's Signature:** 

# ENVIRONMENTAL REVIEW CHECKLIST

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|---|---|
| **NAME OF PROJECT:** | Stormwater Facility Improvements Project |
| **PROPOSED ACTION:** | Stormwater Facility Improvements |
| **LOCATION:** | City of Red Lodge, Montana |

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|---|---|---|
| **Key Letter:** | | |
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| **PHYSICAL ENVIRONMENT** | | |
| KEY | **1** | **Soil Suitability, Topographic and/or Geologic Constraints (e.g., soil slump, steep slopes, subsidence, seismic activity)** |
| | | *Response and source of information:* |
| **N** | | NRCS Soil Maps indicate that the project locations are in areas with soil composed of primarily Charlos Loams and stony loam. The maps show that the site soils have a low to moderate concern for corrosion to concrete, and a high concern for corrosion to steel. There are no identified topographical or geological constraints. Slopes across the project area vary from 0 to 8+%.<br><br>- Brandon Duffey, P.E.<br>- USDA National Cooperative Soil Survey |
| KEY | **2** | **Hazardous Facilities (e.g., power lines, EPA hazardous waste sites, acceptable distance from explosive and flammable hazards including chemical/petrochemical storage tanks, underground fuel storage tanks, and related facilities such as natural gas storage facilities & propane storage tanks)** |
| **M** | | *Response and source of information:* |
| | | A Search of the Montana Department of Environmental Quality (DEQ) State Digital Atlas indicates that the underground storage takes may be present near proposed work sites. It is possible that some of the spill and tank sites may affect some of the proposed stormwater facility improvement construction. During the design phase, DEQ spill information will be closely reviewed so that spill areas can be avoided during construction. During final design, it will be evaluated whether the use of petroleum resistant joints sealants is warranted. There are power lines and other buried utility lines in the project areas. Utility locates will be completed during design and construction phases to avoid these utilities or relocate as necessary.<br><br>- Brandon Duffey, P.E.<br>- Montana Department of Environmental Quality State Digital Atlas |

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| KEY | **3** | **Effects of Project on Surrounding Air Quality or Any Kind of Effects of Existing Air Quality on Project (e.g., dust, odors, emissions)** |
| **N** | | *Response and source of information:* |
| | | The only impacts on air quality may be temporary dust and exhaust during construction. Reasonable efforts will be taken during construction to minimize these temporary impacts.<br><br>- Brandon Duffey, P.E. |
| KEY | **4** | **Groundwater Resources & Aquifers (e.g., quantity, quality, distribution, depth to groundwater, sole source aquifers)** |
| **N/P** | | *Response and source of information:* |
| | | Information from Montana Well Log Reports in the vicinity shows that average static ground water level is 19.7 feet below the ground surface, some wells do show groundwater within 5 feet of the ground surface. Where groundwater is encountered during construction, a construction dewatering permit will be obtained through DEQ by the Contractor. Adherence to this permit will mitigate any temporary effects associated with construction. No long-term impacts to groundwater are anticipated.<br><br>- Brandon Duffey, P.E.<br>- Montana Bureau of Mines and Geology, GWIC (T07S, R20E, Sec: 15,14,21,22,23,28,27,26,33,34,35) |
| KEY | **5** | **Surface Water/Water Quality, Quantity & Distribution (e.g., streams, lakes, storm runoff, irrigation systems, canals)** |
| **N/P** | | *Response and source of information:* |
| | | Stormwater facilities that drain urban and developed areas present a threat to water quality in receiving surface water due to t he collection of contaminants along with urban runoff (e.g., sediment, oils/chemicals, nutrients/fertilizers) or illegal dumping of pollutants directly into the stormwater system. The majority of the proposed project will involve only the replacement of existing stormwater facilities, no new impacts to surface water/water quality, quantity & distribution is anticipated. The new areas added to the storm system will increase the potential for contaminates to stormwater, but new infrastructure will incorporate sumps in the inlets and manhole to help remove contaminate loading to stormwater, and new inlets will be clearly marked "no-dumping" "stormwater" or other words to help mitigate illegal dumping.<br><br>If in the design stage of the project, it is determined that more than one acre will be disturbed by project implementation then a Montana Pollutant Discharge Elimination System (MPDES) construction stormwater permit would be required. Work near the outfalls of the storm drain system will be near Rock Creek, therefore, a MPDES construction dewatering permit and 318 permits may also be required. A Clean Water Act Section 404/401 certification may also be required for the project. A formal permit determination request will be submitted at the design stage.<br><br>Water quality standards (i.e. MPDES) are not currently applicable to the City of Red Lodge's stormwater facility. |

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| | | - Brandon Duffey, P.E.<br>- Derek Fleming, MT DEQ MPDES Permitting Section<br>- Jade Metzler, US Army Corps of Engineers |
| KEY | **6** | **Floodplains & Floodplain Management (Identify any floodplains within one mile of the boundary of the project.)** |
| **N/P** | | *Response and source of information:* |
| | | A flood insurance map create by the Federal Emergency Management Agency (FEMA) shows the areas around the outfalls of the proposed project may be within the 100-year flood plain, and portions of the system adjacent to Rock Creek my be within the 500-year floodplain. A more detailed analysis of the project will be completed during the design phase to determine if a Joint Application Permit package is required.<br><br>James Caniglia had no comments on the proposed project.<br><br>- Brandon Duffey, P.E.<br>- James Caniglia Carbon County Floodplain Administrator<br>- FEMA Community Panel 30009C0692D, 30009C0703D, 30009C0711D |

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| KEY | **7** | **Wetlands Protection (Identify any wetlands within one mile of the boundary of the project.)** |
| **P/M** | | *Response and source of information:* |
| | | Based on information from the USFWS Survey National Wetlands Inventory, there appears to be riverine wetlands in the project vicinity, located through the channel corridor of Rock Creek.<br><br>A wetland delineation will be performed to document any jurisdictional wetlands at the site vicinity during the design phase of the project. The entire footprint of the proposed construction disturbance will be evaluated for the presence of wetlands and those wetlands will be delineated and mapped in accordance with the Corps 1987 Delineation Manual (and applicable Regional Supplement). Wetlands boundaries will be flagged in the field and numbered. Flag numbers and locations will be surveyed using a sub-meter GPS and depicted on the delineation map.<br><br>The Contractor will be required, to the extent feasible, to avoid wetlands in and around the project site that may be affected by construction activities. The Contract will require the Contractor to minimize wetland disturbance wherever possible and implement BMPs to avoid impacts such as material inputs and sedimentation to wetlands or Rock Creek. At this time, and based upon the preliminary information available, the City of Red Lodge anticipates that less than one-tenth of an acre of wetlands will be disturbed as a result of the proposed project. However, the potential for wetland disturbance will be evaluated in more detail during the design phase in order to determine if compensatory mitigation is required as a result of the project.<br><br>Correspondence with Jade Metzler from USACE indicates that USACE is unable to determine impact of the proposed project. They recommend completion of a joint application permit during the design phase. A joint application will be prepared and submitted for agency review during the design phase.<br>- Brandon Duffey, P.E.<br>- USFWS National Wetlands Inventory<br>- Jade Metzler, US Army Corps of Engineers<br>- Jeff Berglund, USFWS |
| KEY | **8** | **Agricultural Lands, Production, & Farmland Protection (e.g., grazing, forestry, cropland, prime or unique agricultural lands) (Identify any prime or important farm ground or forest lands within one mile of the boundary of the project.)** |
| **N** | | *Response and source of information:* |
| | | The project is located within city limits; therefore, no agricultural land will be impacted. The soils within the city and the project areas are described as farmland of statewide importance, farmland of local importance, prime farmland if irrigated, and some areas of not prime farmland (Natural Resource Conservation Service (NRCS) Soils Map), however the existing urban land use within the project area would exclude agricultural land use. Impact to these areas is not anticipated. No forest lands exist within one mile of the project.<br><br>The Federal Farmland Protection Act does not apply to the project for several reasons including the project's location within an urbanized area and the project involves the replacement/repair of an existing structure. Therefore, project permitting by the NRCS is not required. |

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| | | - Brandon Duffey, P.E.<br>- USDA National Cooperative Soil Survey |
| KEY | **9** | **Vegetation & Wildlife Species & Habitats, Including Fish and Sage Grouse (e.g., terrestrial, avian and aquatic life and habitats)** |
| **N/M** | | *Response and source of information:* |
| | | The proposed project is not expected to have any permanent effects on vegetation or terrestrial wildlife. Any effects on plant species due to construction activities will be re-seeded to promote re-vegetation and reduce erosion. No plant species of concern are listed for the project area by the Montana Natural Heritage Program (MNHP). No terrestrial habitat will be lost as a result of the project because work will be conducted within developed areas within the City of Red Lodge.<br><br>The US Fish and Wildlife Service (USFWS) states: "*The Service reviewed the project description and has no comments regarding federally-listed or proposed threatened or endangered species, critical habitat, or other trust species.*"<br><br>A database search conducted using the Montana Natural Heritage Program website found seven species of concern or potential species of concern that may occur in the region: Wolverine (Gulo gulo), Canada Lynx (Lynx canadensis), Grizzly Bear (Ursus arctos), Peregrine Faloon (Falco peregrinus), Cassin's Finah (Haemorhous cassinii), Grean tailed Towhee (Pipilo chlorurus), Yellowstone Cutthroat Trout (Oncorhynchus clarkia bouvieri). The above listed avian and aquatic species should not be affected by the proposed project because the existing systems to not support aquatic wildlife populations. Due to the developed nature of the project area, no habitat will be lost as a result of the project.<br><br>Based on a review of the Montana Sage Grouse Habitat Conservation Program Mapper (https://sagegrouse.mt.gov/projects), the proposed project is mapped in an Executive Order (EO) General Area for Sage Grouse Habitat but is located in an exempt community boundary. As such, Sage Grouse are not anticipated to be adversely affected by this work.<br><br>Temporary adverse effects to water quality are expected during project implementation. However, mitigation measures including construction Best Management Practices (BMPs) will be implemented to reduce sedimentation and downstream effects on aquatic habitat. All necessary stream permits will be acquired prior to construction, and the Contractor will be required to adhere to all guidelines outlined in these documents.<br><br>- Brandon Duffey, P.E.<br>- Jeff Berglund, USFWS<br>- Montana Natural Heritage Program |

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| KEY | **10** | **Unique, Endangered, Fragile, or Limited Environmental Resources, Including Endangered Species (e.g., plants, fish or wildlife)** |
| **N** | | *Response and source of information:* |
| | | Because the work is limited to an existing closed conduit stormwater system and proposed closed conduit systems in developed areas, the proposed project is not expected to have any effects on unique, endangered, fragile, or limited environmental resources, including endangered species.<br><br>The US Fish and Wildlife Service (USFWS) states: "*The Service reviewed the project description and has no comments regarding federally-listed or proposed threatened or endangered species, critical habitat, or other trust species.*"<br><br>A database search conducted using the Montana Natural Heritage Program website found seven species of concern or potential species of concern that may occur in the region: Wolverine (Gulo gulo), Canada Lynx (Lynx canadensis), Grizzly Bear (Ursus arctos), Peregrine Faloon (Falco peregrinus), Cassin's Finah (Haemorhous cassinii), Grean tailed Towhee (Pipilo chlorurus), Yellowstone Cutthroat Trout (Oncorhynchus clarkia bouvieri). The above listed avian and aquatic species should not be affected by the proposed project because the existing systems to not support aquatic wildlife populations. Due to the developed nature of the project area, no habitat will be lost as a result of the project.<br><br>- Brandon Duffey, P.E.<br>- Jeff Berglund, USFWS<br>- Montana Natural Heritage Program<br>- Montana Sage Grouse Habitat Conservation Program |
| KEY | **11** | **Unique Natural Features (e.g., geologic features)** |
| **N** | | *Response and source of information:* |
| | | There are no unique natural features located in the vicinity of the proposed project.<br><br>*- Brandon Duffey, P.E.* |
| KEY | **12** | **Access to, and Quality of, Recreational & Wilderness Activities, Public Lands and Waterways and Public Open Space** |
| **N** | | *Response and source of information:* |
| | | The proposed stormwater facility improvements will not affect access to, and quality of, recreational and wilderness activities, public lands and waterways.<br><br>- Brandon Duffey, P.E. |
| HUMAN POPULATION | | |
| KEY | **1** | **Visual Quality – Coherence, Diversity, Compatibility of Use and Scale, Aesthetics** |

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| **N** | | *Response and source of information:* |
| | | The proposed improvements consist of replacing existing sections and installing new sections, in developed areas, of a closed conduit stormwater infrastructure. Because this infrastructure is buried, no impact on the visual quality of the area is anticipated once work is complete.<br><br>- Brandon Duffey, P.E. |
| KEY | **2** | **Nuisances (e.g., glare, fumes)** |
| **M/B/ N** | | *Response and source of information:* |
| | | M - Mitigation would be required in the short term during project implementation. The proposed project may cause temporary nuisances such as noise and exhaust fumes from construction equipment, and traffic detours while sections beneath roadways are under construction. Efforts will be made to minimize nuisances including detours and select timing of construction work in residential areas.<br><br>Some work will be near privately-owned residential parcels. Efforts will be made to minimize nuisances associated with work near these residences.<br><br>B - Some work will be beneficial. Areas of the city experience localized flooding and surcharging of the existing stormwater system. Proposed improvements will convey the design storm without surcharging, and additional inlets will reduce localized flooding.<br><br>N – No nuisance impacts is anticipated following project implementation. The improved stormwater facility would not create any long-term nuisances.<br><br>- Brandon Duffey, P.E. |
| KEY | **3** | **Noise - suitable separation between noise sensitive activities (such as residential areas) and major noise sources (aircraft, highways & railroads).** |
| **N** | | *Response and source of information:* |
| | | M – Mitigation would be required in the short term during project implementation. Nearby residences may be temporarily affected by noise from excavation and construction work. Efforts will be made to minimize nuisances including select timing of construction equipment operation in residential areas.<br><br>N – No impact is anticipated following project implementation. The improved stormwater system will not create any long-term noise issues.<br>.<br><br>- Brandon Duffey, P.E. |

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| KEY | **4** | **Historic Properties, Cultural, and Archaeological Resources** |
| **N** | | *Response and source of information:* |
| | | Damon Murdo of the State Historical Preservation Office (SHPO) states "*As long as ground disturbance will be kept to existing disturbed areas and there will be no disturbance or alteration to structures over fifty years of age, we feel that there is a low likelihood cultural properties will be impacted*." Any water lines [Storm Drains] that would not be located within an existing roadway, which have not had previous disturbance, for these we would recommend a cultural resource inventory be conducted in order to determine whether or not sites exist and if they will be impacted.<br><br>All proposed work follows existing storm infrastructure or existing road right-of-way which have already been disturbed. Therefore, no impact to historic structures are anticipated.<br><br>- Brandon Duffey, P.E.<br>- Damon Murdo, State Historical Preservation Office |
| KEY | **5** | **Changes in Demographic (population) Characteristics (e.g., quantity, distribution, density)** |
| **N** | | *Response and source of information:* |
| | | The proposed project is not anticipated to affect any changes in demographics to the area.<br><br>- Brandon Duffey, P.E. |
| KEY | **6** | **Environmental Justice – (Does the project avoid placing lower income households in areas where environmental degradation has occurred, such as adjacent to brownfield sites?)** |
| **N** | | *Response and source of information:* |
| | | No impact to environmental justice is anticipated. Housing will not be placed as part of this project. The project will reduce the risk of flooding in existing developed and housing areas.<br><br>- Brandon Duffey, P.E. |
| KEY | **7** | **General Housing Conditions - Quality, Quantity, Affordability** |
| **B** | | *Response and source of information:* |
| | | The project will reduce the risk of failure of the stormwater facilities in the City of Red Lodge. This will reduce the risk of flooding with existing developed and housing areas. The project will also disconnect stormwater drainage basins from the sanitary sewer system, reducing the risk of sanitary sewer backups and failures.<br><br>- Brandon Duffey, P.E. |
| KEY | **8** | **Displacement or Relocation of Businesses or Residents** |
| **N** | | *Response and source of information:* |
| | | No business or residents will be relocated in conjunction with the proposed improvements. The project will reduce the risk of displacement/relocations by reducing the risk of localized flooding in existing developed and housing areas.<br><br>- Brandon Duffey, P.E. |

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| KEY | **9** | **Public Health and Safety** |
| **B** | | *Response and source of information:* |
| | | Improving the stormwater facilities in the City of Red Lodge will reduce the risk and frequency of flooding thereby benefiting public health and safety in the City by preventing interruptions to road traffic and accessibility due to localized flooding.<br><br>- Brandon Duffey, P.E. |
| KEY | **10** | **Lead Based Paint and/or Asbestos** |
| **N** | | *Response and source of information:* |
| | | There is no known lead-based paint or asbestos in the stormwater system, therefore, no lead-based paint or asbestos is anticipated to be encountered as part of the proposed improvements. However, requirements from Montana DEQ require an inspection for asbestos (performed by an accredited inspector) prior to any demolition taking place. This inspection may be waived depending on the type of the existing bridge structure and its components.<br><br>- Brandon Duffey, P.E. |
| KEY | **11** | **Local Employment & Income Patterns – Quantity and Distribution of Employment, Economic Impact** |
| **N** | | *Response and source of information:* |
| | | The proposed project may offer temporary local employment of works for the associated project, but no long-term impact to local employment and income patterns are anticipated.<br><br>- Brandon Duffey, P.E. |
| KEY | **12** | **Local & State Tax Base & Revenues** |
| **N** | | *Response and source of information:* |
| | | The proposed project should have no impact on local and state tax base and revenues.<br><br>- Brandon Duffey, P.E. |
| KEY | **13** | **Educational Facilities - Schools, Colleges, Universities** |
| **B** | | *Response and source of information:* |
| | | A section of the stormwater facility is located adjacent to schools, improved infrastructure will reduce the risk of flooding near these areas.<br><br>- Brandon Duffey, P.E. |

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| KEY | **14** | **Commercial and Industrial Facilities - Production & Activity, Growth or Decline** |
| **B** | | *Response and source of information:* |
| | | Improving the stormwater facilities in the City of Red Lodge will benefit commercial and industrial facilities in the city by reducing the frequency and risk of flooding. Reduced flooding may have an indirect benefit of encouraging commercial and industrial growth in the city<br><br>- Brandon Duffey, P.E. |
| KEY | **15** | **Health Care – Medical Services** |
| **B** | | *Response and source of information:* |
| | | Improving the stormwater facilities in the City of Red Lodge will reduce the risk and frequency of flooding thereby benefiting medical and emergency access to the City by preventing interruptions to road traffic and accessibility due to localized flooding.<br><br>- Brandon Duffey, P.E. |
| KEY | **16** | **Social Services – Governmental Services (e.g., demand on)** |
| **N** | | *Response and source of information:* |
| | | The proposed project should not have any impact on social services or governmental services.<br><br>- Brandon Duffey, P.E. |
| KEY | **17** | **Social Structures & Mores (Standards of Social Conduct/Social Conventions)** |
| **N** | | *Response and source of information:* |
| | | The proposed project should not have any impact on social structures and mores.<br><br>- Brandon Duffey, P.E. |
| KEY | **18** | **Land Use Compatibility (e.g., growth, land use change, development activity, adjacent land uses and potential conflicts)** |
| **B** | | *Response and source of information:* |
| | | The reduced risk and intensity of localized flooding, due to an improved stormwater facility, would indirectly remote the stability and growth and development within the City of Red Lodge.<br><br>- Brandon Duffey, P.E. |
| KEY | **19** | **Energy Resources - Consumption and Conservation** |
| **N** | | *Response and source of information:* |
| | | The improvements to the stormwater system will have no positive or negative impact on the consumption and conservation of energy.<br><br>- Brandon Duffey, P.E. |

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| KEY | **20** | **Solid Waste Management** |
| **N** | | *Response and source of information:* |
| | | The proposed improvements to the stormwater facilities will not impact the City's solid waste management.<br><br>- Brandon Duffey, P.E. |
| KEY | **21** | **Wastewater Treatment - Sewage System** |
| **B** | | *Response and source of information:* |
| | | The proposed improvements will remove stormwater from the sanitary sewer system reducing the hydraulic loading on the existing wastewater treatment system.<br><br>- Brandon Duffey, P.E. |
| KEY | **22** | **Storm Water – Surface Drainage** |
| **B** | | *Response and source of information:* |
| | | The proposed project would improve the existing stormwater facilities in the City of Red Lodge and reduce the risk and frequency of localized flooding.<br><br>- Brandon Duffey, P.E. |
| KEY | **23** | **Community Water Supply** |
| **N** | | *Response and source of information:* |
| | | The municipal water supply will not be impacted by the proposed project.<br><br>- Brandon Duffey, P.E. |
| KEY | **24** | **Public Safety – Police** |
| **B** | | *Response and source of information:* |
| | | Improving the stormwater facility in the City of Red Lodge will reduce the risk and frequency of flooding thereby benefiting public safety and police access to the City by preventing interruptions to road traffic and accessibility due to localized flooding<br><br>- Brandon Duffey, P.E. |
| KEY | **25** | **Fire Protection – Hazards** |
| **B** | | *Response and source of information:* |
| | | Improving the stormwater facility in the City of Red Lodge will reduce the risk and frequency of flooding thereby benefiting public safety and police access to the City by preventing interruptions to road traffic and accessibility due to localized flooding<br><br>- Brandon Duffey, P.E. |

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| KEY | **26** | **Emergency Medical Services** |
| **B** | | *Response and source of information:* |
| | | Improving the stormwater facility in the City of Red Lodge will reduce the risk and frequency of flooding thereby benefiting public safety and police access to the City by preventing interruptions to road traffic and accessibility due to localized flooding<br><br>- Brandon Duffey, P.E. |
| KEY | **27** | **Parks, Playgrounds, & Open Space** |
| **N** | | *Response and source of information:* |
| | | No adverse effects to parks, playgrounds, and open space are anticipated.<br><br>- Brandon Duffey, P.E. |
| KEY | **28** | **Cultural Facilities, Cultural Uniqueness & Diversity** |
| **N** | | *Response and source of information:* |
| | | Damon Murdo of the State Historical Preservation Office (SHPO) states "*As long as ground disturbance will be kept to existing disturbed areas and there will be no disturbance or alteration to structures over fifty years of age, we feel that there is a low likelihood cultural properties will be impacted.*" Any water lines [Storm Drains] that would not be located within an existing roadway, which have not had previous disturbance, for these we would recommend a cultural resource inventory be conducted in order to determine whether or not sites exist and if they will be impacted.<br><br>All proposed work follows existing storm infrastructure or existing road right-of-way which have already been disturbed. Therefore, no impact to historic structures are anticipated.<br><br>- Brandon Duffey, P.E.<br>- Damon Murdo, State Historical Preservation Office |
| KEY | **29** | **Transportation Networks and Traffic Flow Conflicts (e.g., rail; auto including local traffic; airport runway clear zones - avoidance of incompatible land use in airport runway clear zones)** |
| **B** | | *Response and source of information:* |
| | | The proposed project will ensure that street routes utilized by local residents and business traffic will continue to be available with reduced risk of localized flooding.<br><br>- Brandon Duffey, P.E. |
| KEY | **30** | **Consistency with Local Ordinances, Resolutions, or Plans (e.g., conformance with local comprehensive plans, zoning, or capital improvement plans)** |
| **B** | | *Response and source of information:* |

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| | | The project is in accordance wit the recommendations and priorities set forth in the City of Red Lodge 2015 Growth Policy, 2016 Zoning Regulations.<br><br>- Brandon Duffey, P.E.<br>- 2015 City of Red Lodge Growth Policy<br>- 2016 Zoning Regulations |
| KEY | **31** | **Is there a Regulatory Action on Private Property Rights as a Result of this Project? (Consider options that reduce, minimize, or eliminate the regulation of private property rights.)** |
| **N** | | *Response and source of information:* |
| | | The proposed stormwater facility improvements would be implemented in existing right-of-way.<br><br>- Brandon Duffey, P.E. |

# ENVIRONMENTAL REVIEW FORM

***[On a separate piece of paper, please answer the following as they apply to your proposed project:]***

1. **Alternatives:** Describe reasonable alternatives to the project.

   Several alternatives were explored including; no action, repair, and replacement options. The cost of replacing the entire stormwater facility is cost-prohibitive; therefore, it is in the best interest of the City to complete the projects in phases. The selected alternative(s) will provide several benefits, specifically; ease of maintenance, increased structural integrity, increased stormwater conveyance efficiency, disconnecting stormwater from sanitary sewer system, and enhanced public safety

2. **Mitigation:** Identify any enforceable measures necessary to reduce any impacts to an insignificant level.

   Contract documents will require contractors to follow the requirements of any stream permits issued to perform the work. Contract documents for construction will require contractors to follow the requirements of the permits, any specified construction window, necessary utility location and adhere to Best Management Practices (BMP's) during construction to protect natural stream and aquatic resources.

   During the design phase, if deemed necessary by the Corps of Engineers, a wetland delineation will be performed in order to map potential wetland impacts.

3. **Is an EA or Environmental Impact Statement (EIS) required?** Describe whether or not an EA or EIS is required and explain in detail why or why not.

   Based on our analysis, the EA is an adequate level of environmental review. An EIS is not required.

4. **Public Involvement:** Describe the process followed to involve the public in the proposed project and its potential environmental impacts. Identify the public meetings -- where and when -- the project was considered and discussed, and when the applicant approved the final environmental assessment.

   The public will be provided opportunities for comment prior to the TSEP deadline of August 3, 2020. Namely, a public meeting will be held in July at the City of Red Lodge Council Chambers. Written comments will also be accepted until the meeting. Notices advertising the availability of the draft Environmental Assessment and Public Meeting will be published in the Carbon County News a minimum of two weeks prior to the meeting. To date, there have been no written or verbal negative comments from the public concerning the project. The Red Lodge City Council will determine whether (or not) to adopt the EA during a regularly scheduled commission meeting on TBD.

5. **Person(s) Responsible for Preparing:** Identify the person(s) responsible for preparation of this checklist.

   Brandon Duffey, P.E. – Great West Engineering

Ty Albert – Great West Engineering

6. **Other Agencies**: List any state, local, or federal agencies that have over-lapping or additional jurisdiction or environmental review responsibility for the proposed action and the permits, licenses, and other authorizations required; and list any agencies or groups that were contacted or contributed information to this Environmental Assessment (EA).

Agencies Contacted:

- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- USDA Natural Resource and Conservation Service
- U.S. Environmental Protection Agency
- U.S. Forest Service
- U.S. Department of Transportation
- Bureau of Land Management
- Bureau of Indian Affairs
- Occupational Safety and Health Administration
- Federal Aviation Administration
- National Park Service
- Montana Department of Commerce, Census and Economic Information Center
- Montana Department of Labor and Industry
- Montana Department of Natural Resources and Conservation
- Montana Department of Environmental Quality
- Montana Department of Transportation
- Montana Nature Resource Conservation
- Montana Department of Fish, Wildlife and Parks
- Montana State Historic Preservation Office
- Montana Natural Heritage Program (via Website Database)
- Carbon County Floodplain Administration

Agencies Contributed to EA (as of 6/9/2020):

- Carbon County Floodplain Administration
- U.S. Department of Transportation
- Montana Department of Transportation
- Montana Department of Labor
- Montana Fish, Wildlife & Parks
- U.S. Army Corps of Engineers
- U.S. Fish & Wildlife Service
- Montana State Historic Preservation Office

Authorized Representative (Great West Engineering) for City of Red Lodge

June 10, 2020
Date

_____ _____

City of Red Lodge - Mayor Date

Great West Engineering prepared this Environmental Assessment on behalf of City of Red Lodge as part of a contract to assist the City in applying for Treasure State Endowment Program grant funding for the Stormwater Facility Improvements Project. The City of Red Lodge entered into a contract with Great West Engineering to prepare the Preliminary Engineering Report and assist in the grant application at a regularly scheduled Council meeting. The contract was signed on February 3, 2020.

# Appendix C

Agency Correspondence

**Brandon Duffey**

**From:** Johnson, Sam <Sam.Johnson@mt.gov>
**Sent:** Tuesday, March 31, 2020 12:57 PM
**To:** Brandon Duffey
**Subject:** RE: Stormwater System Improvements-Red Lodge, MT

Brandon,
David Larson, Resource Development Bureau Engineer, forwarded your request for review of possible environmental impacts of the planned improvements. My only comment is that the project may extend into the regulatory floodplain, and require a floodplain development permit. Please contact the City's floodplain administrator for further instruction.

Sam

Sam Johnson, PE CFM
Regional Engineering Specialist
MT DNRC-Water Resources Division
1371 Rimtop Drive
Billings, MT 59105-1978

## Brandon Duffey

**From:** Bruner, Heidy (FHWA) <heidy.bruner@dot.gov>
**Sent:** Monday, March 2, 2020 2:49 PM
**To:** Brandon Duffey
**Cc:** JSKINNER; Hasselbach, Brian (FHWA)
**Subject:** Red Lodge Montana - Storm Water System Improvements

Dear Brandon,

Thank you for your February 10, 2020 letter, which notified us of the proposed Storm Water System Improvements Project for Red Lodge, Montana. The Federal Highway Administration appreciates the opportunity to review the proposed project and offer comment.

After reviewing the proposal and the defined boundaries of the project, it appears that the proposed project, will likely impact highway infrastructure and/or right of way. If that understanding is correct, Montana Department of Transportation (MDT) approvals may be required. Please coordinate your efforts with the MDT, as appropriate. Since MDT is a large organization, I have copied Jim Skinner, Chief of the MDT Policy, Program & Performance Analysis Bureau so that you will have his contact information. That MDT Bureau coordinates the Systems Impact Analysis Process (SIAP) reviews of facilities impacting state roadways and non–MDT–initiated environmental review processes.

Thank you again for the opportunity to provide comment on this proposed project. Please contact me at (406) 441-3914 or Heidy.Bruner@dot.gov, if you wish to discuss these comments or if you have additional questions or concerns.

Kindly,
Heidy Bruner, P.E.
Federal Highway Administration – Montana Division

## Brandon Duffey

**From:** Whitaker, Brianna <brwhitaker@mt.gov>
**Sent:** Thursday, April 2, 2020 11:48 AM
**To:** Brandon Duffey
**Subject:** Stormwater System Improvements - Red Lodge

The Montana Department of Transportation (MDT) staff would like to thank you for the opportunity to provide input on the proposed stormwater system improvements in Red Lodge.

This proposal appears to have potential impact on MDT facilities (MT-78, US212, etc.) in Red Lodge; however we do not have enough information to make a determination at this time. Please contact Tom Tilzey, Billings District Maintenance Chief regarding any permits that may be necessary for the proposed improvements. Tom can be reached at (406)657-0217.

Let me know if you have any questions.

Thanks,

Brianna Whitaker | Transportation Planner | Policy, Program & Performance Analysis | Montana Department of Transportation | P.O. Box 201001 | Helena, MT | 59620-1001 | 406-444-9342 | brwhitaker@mt.gov

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
HELENA REGULATORY OFFICE
10 WEST 15TH STREET, SUITE 2200
HELENA, MONTANA 59626

REPLY TO
ATTENTION OF



Feburary 21, 2020

Regulatory Branch
Montana State Program
Corps No. **NWO-2018-00826-MTB**

Subject: City of Red Lodge (Great West Engineering) – City of Red Lodge Stormwater Facility Improvements

Brandon Duffey
Great West Engineering, Inc.
6780 Trade Center Ave.
Billings, Montana 59604

Dear Mr. Duffey:

We are responding to your request on behalf of the City of Red Lodge for comments regarding the stormwater facility improvements project in Red Lodge, Montana. The project includes proposed improvements to stormwater collection mains and new laterals infrastructure. The project is located within Sections 22/27/34, Township 07 S, Range 20 E, Red Lodge, Carbon County, Montana.

The mission of the U.S. Army Corps of Engineers (Corps) Regulatory Program is to protect the Nation's aquatic resources while allowing reasonable development through fair, flexible and balanced permit decisions. In particular, under Section 404 of the Clean Water Act, we work to protect the biological, physical, and chemical integrity of the Nation's aquatic resources. Projects are evaluated on a case-by-case basis to determine the potential benefits and detriments that may occur as a result of the proposal. In all cases an applicant must avoid and minimize impacts to aquatic resources to the greatest extent practicable.

Under the authority of Section 404 of the Clean Water Act (CWA), Department of the Army (DA) permits are required for the discharge of fill material into waters of the U.S. Waters of the U.S. include the area below the ordinary high water mark of stream channels and lakes or ponds connected to the tributary system, and wetlands adjacent to these waters. Isolated waters and wetlands, as well as man-made channels, may be waters of the U.S. in certain circumstances, which must be determined on a case-by-case basis.

Based on the information provided in your submittal, we are unable to ascertain if regulated activities are proposed or if jurisdictional waters of the U.S. are present within the project area. If your final design includes the placement of fill material in any of the jurisdictional areas described in the paragraph above, or otherwise requires authorization by a DA permit, please submit a permit application to this office prior to starting any work. The application package should include a delineation of waters of the United States and special aquatic sites, including wetlands or pool and riffle complexes within project site. Work in an aquatic site should be shown on a map identifying the Quarter Section, Township, Range and County, Latitude and Longitude, Decimal Degrees (datum NAD 83), and the dimensions of work in each aquatic site. Any loss of an aquatic site may require mitigation. Mitigation requirements will be determined during the Department of the Army permitting review. After a review of the materials submitted we will determine what type of permit, if any, will be required. In order to provide the

necessary information you may use the Montana Joint Permit Application Form, found at: http://www.dnrc.mt.gov/licenses-and-permits/stream-permitting. If you do not wish to use this form, or do not have internet access please contact our office at the address below to obtain more information.

Note that this letter is not a DA authorization to proceed. It only informs you of your need to obtain a DA permit if waters of the U.S. will be affected. If waters of the U.S. will not be affected by a jurisdictional activity a DA permit will not be required for the project.

Please refer to identification number **NWO-2018-00826-MTB** in any correspondence concerning this project. If you have any questions, please contact me at 10 W 15th Street Suite 2200, Helena, MT 59626, by email at Jade.M.Metzler@usace.army.mil, or telephone at 406-441-1365.

Sincerely,

METZLER.JADE.MARIE.1535431252

Digitally signed by METZLER.JADE.MARIE.1535431252
Date: 2020.02.21 10:59:36 -07'00'

Jade M. Metzler
Regulatory Project Manager

## Brandon Duffey

**From:** Berglund, Jeff <jeff_berglund@fws.gov>
**Sent:** Thursday, March 5, 2020 8:28 AM
**To:** Brandon Duffey
**Cc:** Davies, Jess J
**Subject:** Stormwater System Improvements – Red Lodge, MT

Dear Mr Duffey:

Thank you for your February 10, 2019, letter requesting U.S. Fish and Wildlife Service (Service) comment on the proposed subject project in Red Lodge, Montana. This email represents our official response to your inquiry for your records.

The Service reviewed the project description and has no comments regarding federally-listed or proposed threatened or endangered species, critical habitat, or other trust species. Additional information may be obtained using the Service's Information, Planning, and Consultation (IPaC) System project-planning tool, which streamlines the USFWS environmental review process, at https://ecos.fws.gov/ipac/.

Thank you for the opportunity to comment. If you have any questions or comments about this correspondence please contact Jess Davies at jess_davies@fws.gov or 406-449-5225, extension 214.

Jeff Berglund
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Montana Ecological Services Office
585 Shepard Way, Suite 1
Helena, Montana 59601
(406) 449-5225 ext 206

## Brandon Duffey

**From:** Murdo, Damon <dmurdo@mt.gov>
**Sent:** Thursday, February 13, 2020 10:36 AM
**To:** Brandon Duffey
**Subject:** RED LODGE STORMWATER SYSTEM IMPROVEMENTS
**Attachments:** CRABS.pdf; CRIS.pdf; 2020021301.pdf

Big Sky. Big Land. Big History.
Montana
Historical Society

February 13, 2020

Brandon Duffey
Great West Engineering
6780 Trade Center Ave.
Billings MT 59101

RE: RED LODGE STORMWATER SYSTEM IMPROVEMENTS. SHPO Project #: 2020021301

Dear Mr. Duffey:

I have conducted a cultural resource file search for the above-cited project located in Sections 22, 27, 34 T7S R20E. According to our records there have been a few previously recorded sites within the designated search locales. In addition to the sites there have been a few previously conducted cultural resource inventories done in the areas. I've attached a list of these sites and reports. If you would like any further information regarding these sites or reports, you may contact me at the number listed below.

It is SHPO's position that 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 prior to any disturbance taking place.

As long as ground disturbance will be kept to existing disturbed areas and there will be no disturbance or alteration to structures over fifty years of age, we feel that there is a low likelihood cultural properties will be impacted. We, therefore, feel that a recommendation for a cultural resource inventory is unwarranted at this time. However, should structures need to be altered or if cultural materials be inadvertently discovered during this project, we would ask that our office be contacted, and the site investigated.

If you have any further questions or comments, you may contact me at (406) 444-7767 or by e-mail at dmurdo@mt.gov. I have attached an invoice for the file search. Thank you for consulting with us.

Sincerely,

Damon Murdo
Cultural Records Manager
State Historic Preservation Office

File: DEQ/AWWM/2020

Big Sky. Big Land. Big History.
Montana
Historical Society

# FILE SEARCH INVOICE

**Montana State Historic Preservation Office**
1301 E. Lockey Ave, PO Box 201202
Helena, MT 59620-1202
(406)444-7715
montanahistoricalsociety.org

**DATE:** 13-Feb-20

**SHPO Invoice #:** 2020021301

**Bill To:**

| | |
|---|---|
| **Contact Name:** | Brandon Duffey |
| **Organization:** | Great West Engineering |
| **Address:** | 6780 Trade Center Ave. |
| **City/State/Zip:** | Billings MT 59101 |

| File Search Fee Structure |
|---|
| $25 / Section |

**For questions contact:**
**Damon Murdo**
dmurdo@mt.gov
**406-444-7767**

| | |
|---|---|
| Project Name: | RED LODGE STORMWATER SYSTEM IMPROVEMENTS |

| | |
|---|---|
| **Total Cost:** | **$75.00** |

| | |
|---|---|
| **Total sections searched for SHPO Project #: 2020021301** | **3** |

**Please make all checks payable to:**
Montana Historical Society
PO Box 201201
Helena, MT 59620

PAY ONLINE HERE

**Due upon receipt. Please pay within 30 days.**

# STATE HISTORIC PRESERVATION OFFICE
# Cultural Resource Information Systems

## CRIS Township, Range, Section Report

Report Date:2/13/2020

| Site # | Twp | Rng | Sec | Qs | Site Type 1 | Site Type 2 | Time Period | Owner | NR Status |
|---|---|---|---|---|---|---|---|---|---|
| 24CB0145 | 7S | 20E | 27 | | Historic Site | | Historic Period | Combination | NR Listed |
| 24CB0193 | 7S | 20E | 22 | Comb | Historic Mining | | Historic Period | Private | Eligible |
| 24CB0193 | 7S | 20E | 27 | SE | Historic Mining | | Historic Period | Private | Eligible |
| 24CB0249 | 7S | 20E | 34 | SW | Historic Irrigation System | | 1890-1899 | Private | Undetermined* |
| 24CB0452 | 7S | 20E | 34 | SW | Lithic Material Concentration | | No Indication of Time | No Data | Undetermined* |
| 24CB0714 | 7S | 20E | 34 | NE | Historic Vehicular/Foot Bridge | | Historic More Than One Decade | State Owned | Undetermined* |
| 24CB0716 | 7S | 20E | 27 | SE | Historic Commercial Development | | Historic More Than One Decade | Private | Undetermined* |
| 24CB1028 | 7S | 20E | 27 | | Historic Commercial Development | | 1900-1909 | Private | NR Listed |
| 24CB1030 | 7S | 20E | 27 | NW | Historic District | | Historic More Than One Decade | Combination | NR Listed |
| 24CB1083 | 7S | 20E | 27 | SE | Historic Religion | Historic Church | 1890-1899 | Private | Undetermined* |
| 24CB1084 | 7S | 20E | 27 | SE | Historic Religion | Historic Church | 1900-1909 | Private | NR Listed |
| 24CB1250 | 7S | 20E | 27 | comb | Historic Cemetery/Grave | | Historic More Than One Decade | Private | NR Listed |
| 24CB1283 | 7S | 20E | 22 | | Historic Railroad | | 1890-1899 | Private | Eligible |
| 24CB1283 | 7S | 20E | 27 | NW | Historic Railroad | | 1890-1899 | Private | Eligible |
| 24CB1283 | 7S | 20E | 22 | NE | Historic Railroad | | 1890-1899 | Private | Eligible |
| 24CB1516 | 7S | 20E | 34 | NW | Historic Agriculture | | Historic More Than One Decade | Private | Ineligible |
| 24CB1517 | 7S | 20E | 34 | SW | Historic Commercial Development | | Historic More Than One Decade | Private | Eligible |
| 24CB1518 | 7S | 20E | 34 | SW | Historic Railroad Bridge | | Historic More Than One Decade | Other | Unresolved |
| 24CB1695 | 7S | 20E | 22 | comb | Historic Irrigation System | | Historic More Than One Decade | Combination | Eligible |
| 24CB1695 | 7S | 20E | 27 | comb | Historic Irrigation System | | Historic More Than One Decade | Combination | Eligible |
| 24CB1819 | 7S | 20E | 27 | NE | Historic Residence | Historic Outbuildings | Historic More Than One Decade | Private | Eligible |
| 24CB1820 | 7S | 20E | 27 | NE | Historic Residence | | Historic More Than One Decade | Private | Eligible |
| 24CB1821 | 7S | 20E | 27 | NE | Historic Residence | Historic Outbuildings | Historic More Than One Decade | Private | Eligible |
| 24CB1822 | 7S | 20E | 27 | NE | Historic Residence | | Historic More Than One Decade | Private | Eligible |
| 24CB1823 | 7S | 20E | 27 | NE | Historic Residence | | Historic More Than One Decade | Private | Ineligible |
| 24CB1824 | 7S | 20E | 27 | NE | Historic Commercial Development | | 1950-1959 | Private | Ineligible |
| 24CB1825 | 7S | 20E | 27 | NE | Historic Residence | Historic Outbuildings | Historic More Than One Decade | Private | Ineligible |
| 24CB1826 | 7S | 20E | 27 | NE | Historic Residence | Historic Outbuildings | Historic More Than One Decade | Private | Ineligible |
| 24CB1827 | 7S | 20E | 27 | NE | Historic Residence | Historic Outbuildings | Historic More Than One Decade | Private | Eligible |
| 24CB1828 | 7S | 20E | 27 | NE | Historic Residence | | Historic More Than One Decade | Private | Ineligible |
| 24CB1829 | 7S | 20E | 27 | NE | Historic Commercial Development | | Historic More Than One Decade | Private | Ineligible |
| 24CB1830 | 7S | 20E | 27 | NE | Historic Grain Elevator | | Historic More Than One Decade | Private | Eligible |
| 24CB1833 | 7S | 20E | 27 | NE | Historic Commercial Development | | Historic More Than One Decade | Private | Eligible |
| 24CB1834 | 7S | 20E | 27 | NE | Historic Outbuildings | | Historic More Than One Decade | Private | Ineligible |
| 24CB1835 | 7S | 20E | 27 | NE | Historic Residence | | Historic More Than One Decade | Private | Ineligible |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 24CB1836 | 7S | 20E | 22 | SE | Historic Residence | Historic More Than One Decade | Private | Undetermined* |
| 24CB1837 | 7S | 20E | 22 | SE | Historic Outbuildings | Historic More Than One Decade | Private | Ineligible |
| 24CB1838 | 7S | 20E | 22 | SE | Historic Hotel/Motel | Historic More Than One Decade | Private | Ineligible |
| 24CB1975 | 7S | 20E | 22 | NW | Historic Irrigation System | Historic More Than One Decade | Combination | Eligible |
| 24CB2040 | 7S | 20E | 34 | SW | Historic Log Structure | 1950-1959 | MDOT Other | Ineligible |
| 24CB2044 | 7S | 20E | 22 | comb | Historic Irrigation System | Historic More Than One Decade | Private | Eligible |
| 24CB2044 | 7S | 20E | 27 | NW | Historic Irrigation System | Historic More Than One Decade | Private | Eligible |
| 24CB2098 | 7S | 20E | 27 | NW | Historic Commercial Development | Historic More Than One Decade | Private | NR Listed |
| 24CB2131 | 7S | 20E | 27 | NW | Historic Irrigation System | Historic More Than One Decade | Other | Unresolved |
| 24CB2207 | 7S | 20E | 34 | NE | Historic Commercial Development | Historic Period | Private | NR Listed |

# STATE HISTORIC PRESERVATION OFFICE
## Montana Cultural Resource Database
CRABS Township,Range,Section Results

Report Date:2/13/2020

Township:7 S Range:20 E Section: 34

**LOENDORF LAWRENCE L., ET AL.**

7/15/1985 FIELD REPORT 24CB452

CRABS Document Number: CB 6 1615 Agency Document Number:

Township:7 S Range:20 E Section: 27

**ANDERSON PAUL**

5/6/1983 CULTURAL RESOURCE INVENTORY AND EVALUATION RED LODGE EAST BENCH - WASHOE - HIGHWAY - BURNS - SMITH MINES

CRABS Document Number: CB 5 1597 Agency Document Number:

Township:7 S Range:20 E Section: 34

**LOENDORF LAWRENCE L.**

1/1/1967 A PRELIMINARY ARCHAEOLOGICAL SURVEY OF THE CLARK FORK RIVER, CARBON COUNTY, MONTANA

CRABS Document Number: CB 6 1601 Agency Document Number:

Township:7 S Range:20 E Section: 22

**THOMPSON R. WAYNE, ET AL.**

2/28/1997 REPORT OF A CULTURAL RESOURCES INVENTORY OF THE RED LODGE - NORTH CORRIDOR, ALONG HIGHWAY 212 IN CARBON COUNTY, MONTANA

CRABS Document Number: CB 4 18835 Agency Document Number: STPP 28-2(19)70

Township:7 S Range:20 E Section: 27

**JENSEN ARDYCE**

6/24/1997 ASSISTED LIVING FACILITY, RED LODGE, CB CO. MT

CRABS Document Number: CB 6 18922 Agency Document Number:

Township:7 S Range:20 E Section: 34

**BEERY DEREK**

11/1/1999 CULTURAL RESOURCE SURVEY OF THE ROCK CREEK BRIDGE REPLACEMENT AT RED LODGE, CARBON COUNTY, MONTANA

CRABS Document Number: CB 4 22459 Agency Document Number:

Township:7 S Range:20 E Section: 22

**BROWNELL JOAN L.**

2/1/2003 HISTORIC INVENTORY OF RED LODGE NORTH PROJECT, CARBON COUNTY MONTANA

CRABS Document Number: CB 4 25834 Agency Document Number: STPP28-2(25)70

Township:7 S Range:20 E Section: 27

**BROWNELL JOAN L.**

2/1/2003 HISTORIC INVENTORY OF RED LODGE NORTH PROJECT, CARBON COUNTY MONTANA

CRABS Document Number: CB 4 25834 Agency Document Number: STPP28-2(25)70

Township:7 S Range:20 E Section: 34

**LA POINT HALCYON AND MIKE W. BERGSTROM**

3/1/2004 CUSTER NATIONAL FOREST ANNUAL SUMMARY FOR THE MONTANA PROGRAMMATIC AGREEMENT - REPORT YEAR 2003 MONTANA

CRABS Document Number: ZZ 1 27063 Agency Document Number:

Township:7 S Range:20 E Section: 34

**BERGSTROM MICHAEL W. AND HALCYON LAPOINT**

3/8/2005 A CULTURAL RESOURCE INVENTORY FOR THE CUSTER NATIONAL FOREST ANNUAL SUMMARY FOR THE MONTANA PROGRAMMATIC AGREEMENT - REPORT YEAR 2004

CRABS Document Number: ZZ 1 27925 Agency Document Number:

Township:7 S Range:20 E Section: 34

**LA POINT HALCYON AND MIKE W. BERGSTROM**

2/28/2007 CUSTER NATIONAL FOREST ANNUAL SUMMARY FOR THE MONTANA PROGRAMMATIC AGREEMENT - REPORT YEAR 2006

CRABS Document Number: ZZ 1 29472 Agency Document Number:

Township:7 S Range:20 E Section: 22

**HARTY JENNIFER L**

7/27/2007 RED LODGE - NORTH (AMENDMENT)

CRABS Document Number: CB 4 29547 Agency Document Number: STPP 28-2(25)70

Township:7 S Range:20 E Section: 27

**HARTY JENNIFER L**

7/27/2007 RED LODGE - NORTH (AMENDMENT)

CRABS Document Number: CB 4 29547 Agency Document Number: STPP 28-2(25)70

Township:7 S Range:20 E Section: 22

**WAGERS SCOTT J**

9/1/2008 A CLASS III CULTURAL RESOURCE INVENTORY OF 5.1 MILES OF MONTANA HIGHWAY 78 NORTHWEST OF RED LODGE, CARBON COUNTY, MONTANA

CRABS Document Number: CB 4 30369 Agency Document Number: STPP 78-1(8) CONTROL #4890

Township:7 S Range:20 E Section: 27

**WAGERS SCOTT J**

9/1/2008 A CLASS III CULTURAL RESOURCE INVENTORY OF 5.1 MILES OF MONTANA HIGHWAY 78 NORTHWEST OF RED LODGE, CARBON COUNTY, MONTANA

CRABS Document Number: CB 4 30369 Agency Document Number: STPP 78-1(8) CONTROL #4890

Township:7 S Range:20 E Section: 34

**GREISER T. WEBER ET AL.**

12/1/2006 CULTURAL RESOURCE INVENTORY OF THE WEST FORK ROAD AND SKI RUN ROAD, CARBON COUNTY, MONTANA

CRABS Document Number: CB 6 30599 Agency Document Number: MT EM 2005(1)

Township:7 S Range:20 E Section: 34

**LA POINT HALCYON AND MIKE W. BERGSTROM**

3/2/2009 CUSTER NATIONAL FOREST ANNUAL SUMMARY FOR THE MONTANA PROGRAMMATIC AGREEMENT-REPORT YEAR 2008

CRABS Document Number: ZZ 1 30969 Agency Document Number:

Township:7 S Range:20 E Section: 34

**WOOD GARVEY C.**

7/27/2015 PILATI WASTE AREAS: NORTH AND SOUTH

CRABS Document Number: CB 4 37927 Agency Document Number:

Township:7 S Range:20 E Section: 22

**FANDRICH BLAIN**

6/5/2019 RED LODGE TO TWO MILE BRIDGE ROAD: A CLASS III CULTURAL RESOURCE INVENTORY ALONG 1.3 MILES OF US HIGHWAY 212 NORTH OR RED LODGE, CARBON COUNTY, MONTANA.

CRABS Document Number: CB 4 40008 Agency Document Number: STPP-28-2(50)71. UPN 4375006

## Brandon Duffey

**From:** Copeland, Eric <ECopeland@mt.gov>
**Sent:** Friday, February 28, 2020 12:02 PM
**To:** Brandon Duffey
**Subject:** Red Lodge, MT- Stormwater System Improvements
**Attachments:** Red Lodge Stormwater Improvement.docx

Brandon,
Find attached a letter of review for the Red Lodge, MT stormwater improvements.

Please feel free to contact me with questions or additional information requests.

Thank you

Eric Copeland
Building/Plumbing/Mechanical/Plan Review Program Manager

Montana Department of Labor & Industry
Business Standards Division
Building and Commercial Measurements Bureau
320 South Park Avenue
P.O. Box 200517
Helena, MT 59620-0517

406-841-2008w
406-437-4240c
ecopeland@mt.gov

Montana Department of
LABOR & INDUSTRY

February 21, 2020

Brandon Duffey, PE
Great West Engineering
6780 Trade Center Ave.
Billings, MT 59101

RE: Stormwater System Improvements- Red Lodge, MT

Brandon Duffey:

The Building Codes Bureau is in receipt of your letter dated February 10, 2020 requesting that the Department of Labor and Industry provide any comments or helpful information with regards to the City of Red Lodge's – Stormwater System Improvements Project.

The department has jurisdiction over all building code requirements outside the city limits of Red Lodge and any building permit work will be handled by the city. The state retains jurisdiction inside the city limits for electrical, plumbing and mechanical permitting and inspection. Generally, projects of this scope do not require plumbing permits for any individual water hookups as long there will be no plumbing work performed in the area of 2 feet from a building into the building (the department has permit jurisdiction inside any building out to 2 feet past the building line). This provision does not appear to be included in this project.

**If** the project will include any other work requiring installation of electrical, mechanical or plumbing installations to complement the project work (lift station buildings, treatment plants, etc.) those permits will be required by the department as the City of Red Lodge does not perform those permitting and inspection duties within the cities. As you progress further with your designs you may contact the department again to determine how to file for such permits for this project.

Thank you for the project notification and if you have any questions please contact myself at the email and number below.

Sincerely,

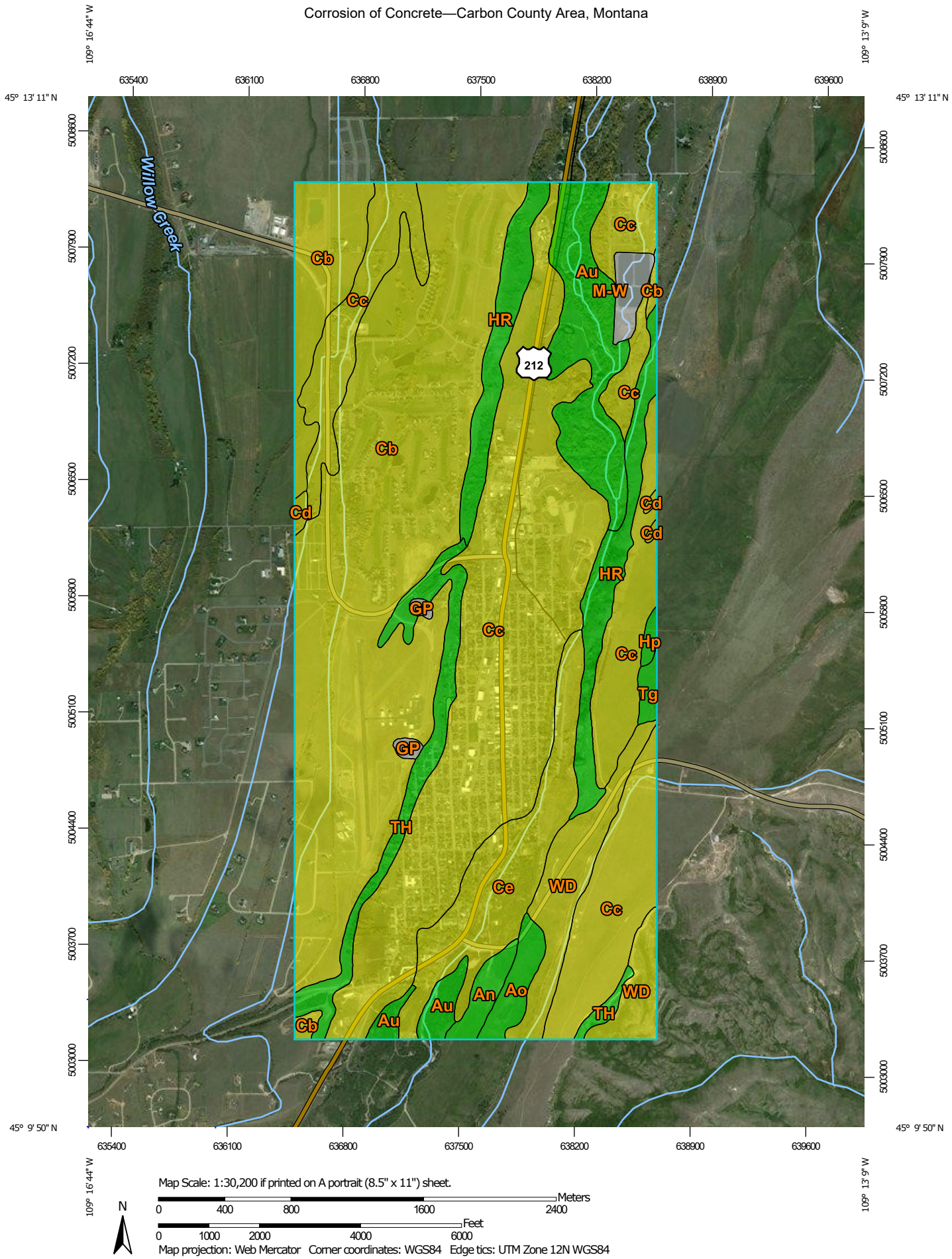
**Eric Copeland**
Building/Plumbing/Mechanical/Plan Review Program Manager

**Montana Department of Labor & Industry**
Business Standards Division
Building and Commercial Measurements Bureau
320 South Park Avenue
P.O. Box 200517
Helena, MT 59620-0517

406-841-2008w
406-437-4240c
ecopeland@mt.gov

# Appendix D

NRCS Soils Data


109° 16' 44" W
109° 13' 9" W
45° 13' 11" N
45° 9' 50" N
635400
636100
636800
637500
638200
638900
639600
5008600
5007900
5007200
5006500
5005800
5005100
5004400
5003700
5003000
Willow Creek
212
Cb
Cc
Au
M-W
HR
Cd
GP
Hp
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TH
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WD
An
Ao
Map Scale: 1:30,200 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0
400
800
1600
2400
Feet
0
1000
2000
4000
6000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

High

Moderate

Low

Not rated or not available

**Soil Rating Lines**

High

Moderate

Low

Not rated or not available

**Soil Rating Points**

High

Moderate

Low

Not rated or not available

**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: Carbon County Area, Montana
Survey Area Data: Version 15, Sep 16, 2019

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

Date(s) aerial images were photographed: Apr 26, 2011—Oct 25, 2016

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.

# Corrosion of Concrete

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| An | Adel silty clay loam, 0 to 4 percent slopes | Low | 23.5 | 0.8% |
| Ao | Adel silty clay loam, 4 to 8 percent slopes | Low | 30.4 | 1.1% |
| Au | Alluvial land | Low | 173.9 | 6.2% |
| Cb | Charlos loam, 0 to 2 percent slopes | Moderate | 946.4 | 33.7% |
| Cc | Charlos loam, 2 to 8 percent slopes | Moderate | 1,032.7 | 36.8% |
| Cd | Charlos loam, wet, 0 to 2 percent slopes | Moderate | 7.0 | 0.2% |
| Ce | Charlos stony loam, 0 to 4 percent slopes | Moderate | 170.7 | 6.1% |
| GP | Gravel pits | | 7.3 | 0.3% |
| Hp | Heath clay loam, 8 to 15 percent slopes | Low | 5.7 | 0.2% |
| HR | Heath-Bynum association, steep | Low | 152.5 | 5.4% |
| M-W | Miscellaneous water | | 22.6 | 0.8% |
| Tg | Thiel cobbly clay loam, 4 to 8 percent slopes | Low | 9.8 | 0.3% |
| TH | Thiel-Bynum association, steep | Low | 95.1 | 3.4% |
| WD | Wayden-Castner association, steep | Moderate | 128.9 | 4.6% |
| **Totals for Area of Interest** | | | **2,806.7** | **100.0%** |

## Description

"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.

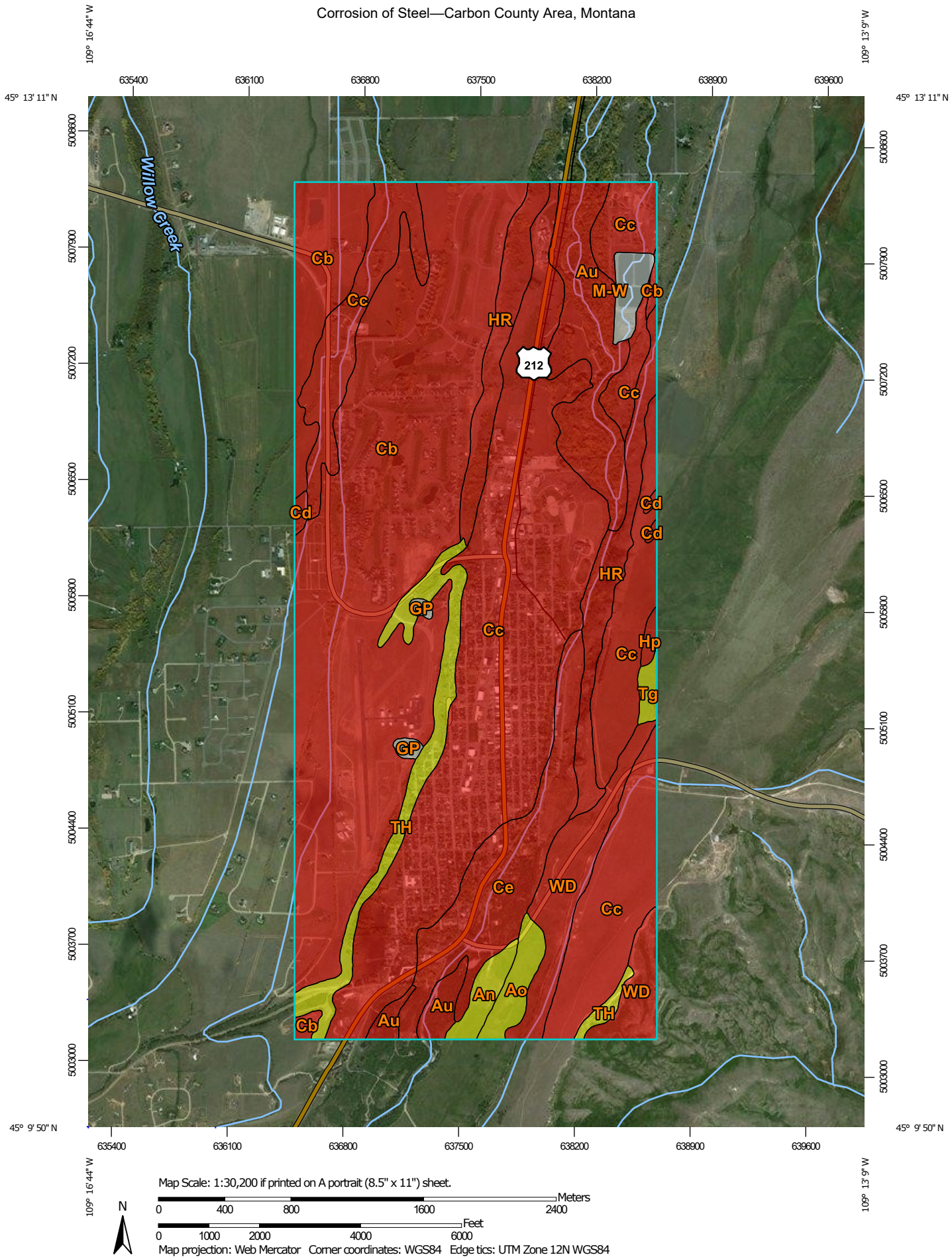
The risk of corrosion is expressed as "low," "moderate," or "high."

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher


109° 16' 44" W
109° 13' 9" W
45° 13' 11" N
45° 9' 50" N
635400
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636800
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5008600
5007900
5007200
5006500
5005800
5005100
5004400
5003700
5003000
Willow Creek
212
Cc
Cb
Au
M-W
HR
Cd
GP
Hp
Tg
TH
Ce
WD
An
Ao
Map Scale: 1:30,200 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0
400
800
1600
2400
Feet
0
1000
2000
4000
6000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

High

Moderate

Low

Not rated or not available

**Soil Rating Lines**

High

Moderate

Low

Not rated or not available

**Soil Rating Points**

High

Moderate

Low

Not rated or not available

**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: Carbon County Area, Montana
Survey Area Data: Version 15, Sep 16, 2019

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

Date(s) aerial images were photographed: Apr 26, 2011—Oct 25, 2016

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.

# Corrosion of Steel

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| An | Adel silty clay loam, 0 to 4 percent slopes | Moderate | 23.5 | 0.8% |
| Ao | Adel silty clay loam, 4 to 8 percent slopes | Moderate | 30.4 | 1.1% |
| Au | Alluvial land | High | 173.9 | 6.2% |
| Cb | Charlos loam, 0 to 2 percent slopes | High | 946.4 | 33.7% |
| Cc | Charlos loam, 2 to 8 percent slopes | High | 1,032.7 | 36.8% |
| Cd | Charlos loam, wet, 0 to 2 percent slopes | High | 7.0 | 0.2% |
| Ce | Charlos stony loam, 0 to 4 percent slopes | High | 170.7 | 6.1% |
| GP | Gravel pits | | 7.3 | 0.3% |
| Hp | Heath clay loam, 8 to 15 percent slopes | High | 5.7 | 0.2% |
| HR | Heath-Bynum association, steep | High | 152.5 | 5.4% |
| M-W | Miscellaneous water | | 22.6 | 0.8% |
| Tg | Thiel cobbly clay loam, 4 to 8 percent slopes | Moderate | 9.8 | 0.3% |
| TH | Thiel-Bynum association, steep | Moderate | 95.1 | 3.4% |
| WD | Wayden-Castner association, steep | High | 128.9 | 4.6% |
| **Totals for Area of Interest** | | | **2,806.7** | **100.0%** |

## Description

"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 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."

## Rating Options

*Aggregation Method:* Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

*Component Percent Cutoff: None Specified*

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

*Tie-break Rule:* Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

# Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

*Hydrologic soil group* is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

*Group A.* Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

*Group B.* Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

*Group C.* Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

*Group D.* Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

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

*Texture* is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

*Classification* of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

*Percentage of rock fragments* larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

*Percentage (of soil particles) passing designated sieves* is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

*Liquid limit* and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

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.

# Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

| Engineering Properties–Carbon County Area, Montana | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Map unit symbol and soil name | Pct. of map unit | Hydrologic group | Depth | USDA texture | Classification | | Pct Fragments | | Percentage passing sieve number— | | | | Liquid limit | Plasticity index |
| | | | | | Unified | AASHTO | >10 inches | 3-10 inches | 4 | 10 | 40 | 200 | | |
| | | | *In* | | | | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* |
| An—Adel silty clay loam, 0 to 4 percent slopes | | | | | | | | | | | | | | |
| Adel | 95 | B | 0-18 | Silty clay loam | CL, CL-ML | A-4, A-6 | 0- 0- 0 | 0- 3- 5 | 85-93-100 | 80-90-100 | 75-88-100 | 70-80-90 | 25-30-35 | 5-10-15 |
| | | | 18-31 | Loam, clay loam | CL, CL-ML | A-4, A-6 | 0- 0- 0 | 0- 3- 5 | 85-93-100 | 80-90-100 | 65-80-95 | 55-68-80 | 25-30-35 | 5-10-15 |
| | | | 31-60 | Clay loam, channery loam, gravelly loam | SC-SM, CL, CL-ML, GC-GM | A-4, A-6 | 0- 0- 0 | 0- 5- 10 | 70-85-100 | 60-75-90 | 55-70-85 | 40-58-75 | 25-30-35 | 5-10-15 |
| Ao—Adel silty clay loam, 4 to 8 percent slopes | | | | | | | | | | | | | | |
| Adel | 85 | B | 0-18 | Silty clay loam | CL, CL-ML | A-4, A-6 | 0- 0- 0 | 0- 3- 5 | 85-93-100 | 80-90-100 | 75-88-100 | 70-80-90 | 25-30-35 | 5-10-15 |
| | | | 18-31 | Loam, clay loam | CL, CL-ML | A-4, A-6 | 0- 0- 0 | 0- 3- 5 | 85-93-100 | 80-90-100 | 65-80-95 | 55-68-80 | 25-30-35 | 5-10-15 |
| | | | 31-60 | Clay loam, channery loam, gravelly loam | CL, CL-ML, GC-GM, SC-SM | A-4, A-6 | 0- 0- 0 | 0- 5- 10 | 70-85-100 | 60-75-90 | 55-70-85 | 40-58-75 | 25-30-35 | 5-10-15 |

| Engineering Properties–Carbon County Area, Montana | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Map unit symbol and soil name | Pct. of map unit | Hydrologic group | Depth | USDA texture | Classification | | Pct Fragments | | Percentage passing sieve number— | | | | Liquid limit | Plasticity index |
| | | | | | Unified | AASHTO | >10 inches | 3-10 inches | 4 | 10 | 40 | 200 | | |
| | | | *In* | | | | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* |
| Au—Alluvial land | | | | | | | | | | | | | | |
| Alluvial land | 80 | A/D | 0-8 | Gravelly sandy loam | SM | A-1, A-2 | 0- 0- 0 | 0- 8- 15 | 65-73-80 | 60-68-75 | 40-50-60 | 20-28-35 | 20-23-25 | NP-3 -5 |
| | | | 8-60 | Very gravelly loamy coarse sand, extremely gravelly sand, very gravelly sand | GP, GP-GM | A-1 | 0- 0- 0 | 15-23-30 | 25-40-55 | 15-30-45 | 5-15- 25 | 0- 5- 10 | — | NP |
| Lallie | 20 | C/D | 0-2 | Silty clay | CH, CL | A-7 | 0- 0- 0 | 0- 0- 0 | 100-100-100 | 95-98-100 | 90-95-100 | 85-93-100 | 40-68-95 | 20-40-60 |
| | | | 2-60 | Silty clay loam, silty clay | CH, CL | A-7 | 0- 0- 0 | 0- 0- 0 | 100-100-100 | 95-98-100 | 90-95-100 | 85-93-100 | 40-68-95 | 20-40-60 |
| Cb—Charlos loam, 0 to 2 percent slopes | | | | | | | | | | | | | | |
| Charlos | 95 | B | 0-6 | Loam | CL-ML, ML | A-4 | 0- 0- 0 | 0- 3- 5 | 90-95-100 | 90-93-95 | 85-90-95 | 60-68-75 | 20-25-30 | NP-5 -10 |
| | | | 6-17 | Clay loam, sandy clay loam, coarse sandy loam | CL, CL-ML | A-4, A-6 | 0- 0- 0 | 0- 3- 5 | 90-95-100 | 90-93-95 | 80-88-95 | 50-63-75 | 25-30-35 | 5-10-15 |
| | | | 17-30 | Very gravelly clay loam, very gravelly sandy clay loam, very gravelly sandy loam | GC, GC-GM | A-2, A-4, A-6 | 0- 0- 0 | 15-23-30 | 40-53-65 | 35-48-60 | 35-45-55 | 20-33-45 | 25-30-35 | 5-10-15 |
| | | | 30-60 | Very gravelly sand, very gravelly loamy sand | GM, GP, SM, SP | A-1 | 0- 0- 0 | 15-23-30 | 40-53-65 | 35-48-60 | 25-33-40 | 0- 8- 15 | — | NP |

| Engineering Properties–Carbon County Area, Montana | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Map unit symbol and soil name | Pct. of map unit | Hydrologic group | Depth | USDA texture | Classification | | Pct Fragments | | Percentage passing sieve number— | | | | Liquid limit | Plasticity index |
| | | | | | Unified | AASHTO | >10 inches | 3-10 inches | 4 | 10 | 40 | 200 | | |
| | | | *In* | | | | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* |
| Cc—Charlos loam, 2 to 8 percent slopes | | | | | | | | | | | | | | |
| Charlos | 85 | B | 0-6 | Loam | CL-ML, ML | A-4 | 0- 0- 0 | 0- 3- 5 | 90-95-100 | 90-93-95 | 85-90-95 | 60-68-75 | 20-25-30 | NP-5-10 |
| | | | 6-17 | Clay loam, sandy clay loam, coarse sandy loam | CL, CL-ML | A-4, A-6 | 0- 0- 0 | 0- 3- 5 | 90-95-100 | 90-93-95 | 80-88-95 | 50-63-75 | 25-30-35 | 5-10-15 |
| | | | 17-30 | Very gravelly clay loam, very gravelly sandy clay loam, very gravelly sandy loam | GC, GC-GM | A-2, A-4, A-6 | 0- 0- 0 | 15-23-30 | 40-53-65 | 35-48-60 | 35-45-55 | 20-33-45 | 25-30-35 | 5-10-15 |
| | | | 30-60 | Very gravelly sand, very gravelly loamy sand | GM, GP, SM, SP | A-1 | 0- 0- 0 | 15-23-30 | 40-53-65 | 35-48-60 | 25-33-40 | 0- 8- 15 | — | NP |
| Cd—Charlos loam, wet, 0 to 2 percent slopes | | | | | | | | | | | | | | |
| Charlos, wet | 85 | B | 0-6 | Loam | CL-ML, ML | A-4 | 0- 0- 0 | 0- 3- 5 | 90-95-100 | 90-93-95 | 85-90-95 | 60-68-75 | 20-25-30 | NP-5-10 |
| | | | 6-17 | Clay loam, sandy clay loam | CL, CL-ML | A-4, A-6 | 0- 0- 0 | 0- 3- 5 | 90-95-100 | 90-93-95 | 80-88-95 | 50-63-75 | 25-30-35 | 5-10-15 |
| | | | 17-30 | Very gravelly clay loam, very gravelly sandy clay loam | GC, GC-GM | A-2, A-4, A-6 | 0- 0- 0 | 15-25-35 | 50-58-65 | 45-53-60 | 35-45-55 | 20-33-45 | 25-30-35 | 5-10-15 |
| | | | 30-60 | Very gravelly sand | GP, GP-GM, SP, SP-SM | A-1 | 0- 0- 0 | 15-25-35 | 50-58-65 | 45-53-60 | 25-33-40 | 0- 5- 10 | — | NP |

| Engineering Properties–Carbon County Area, Montana | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Map unit symbol and soil name | Pct. of map unit | Hydrologic group | Depth | USDA texture | Classification | | Pct Fragments | | Percentage passing sieve number— | | | | Liquid limit | Plasticity index |
| | | | | | Unified | AASHTO | >10 inches | 3-10 inches | 4 | 10 | 40 | 200 | | |
| | | | *In* | | | | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* |
| Ce—Charlos stony loam, 0 to 4 percent slopes | | | | | | | | | | | | | | |
| Charlos | 85 | B | 0-6 | Stony loam | CL-ML, ML, SC-SM, SM | A-4 | 0- 0- 0 | 15-23-30 | 75-85-95 | 65-75-85 | 55-68-80 | 40-53-65 | 20-25-30 | NP-5-10 |
| | | | 6-17 | Clay loam, sandy clay loam, coarse sandy loam | CL, CL-ML | A-4, A-6 | 0- 0- 0 | 0- 3- 5 | 90-95-100 | 90-93-95 | 80-88-95 | 50-63-75 | 25-30-35 | 5-10-15 |
| | | | 17-30 | Very gravelly clay loam, very gravelly sandy clay loam, very gravelly sandy loam | GC, GC-GM | A-2, A-4, A-6 | 0- 0- 0 | 15-23-30 | 40-53-65 | 35-48-60 | 35-45-55 | 20-33-45 | 25-30-35 | 5-10-15 |
| | | | 30-60 | Very gravelly sand, very gravelly loamy sand | GM, GP, SM, SP | A-1 | 0- 0- 0 | 15-23-30 | 40-53-65 | 35-48-60 | 25-33-40 | 0- 8- 15 | — | NP |
| Hp—Heath clay loam, 8 to 15 percent slopes | | | | | | | | | | | | | | |
| Heath | 90 | C | 0-3 | Clay loam | CL, CL-ML | A-6, A-4 | 0- 0- 0 | 0- 3- 5 | 85-93-100 | 80-90-100 | 75-85-95 | 70-80-90 | 25-30-35 | 5-10-15 |
| | | | 3-16 | Clay, clay loam, silty clay | CH, CL | A-7 | 0- 0- 0 | 0- 5- 10 | 90-95-100 | 85-93-100 | 70-83-95 | 65-78-90 | 40-48-55 | 15-23-30 |
| | | | 16-62 | Clay, clay loam, silty clay | CL | A-6, A-7 | 0- 0- 0 | 0- 5- 10 | 90-95-100 | 85-93-100 | 70-83-95 | 65-78-90 | 35-43-50 | 15-20-25 |

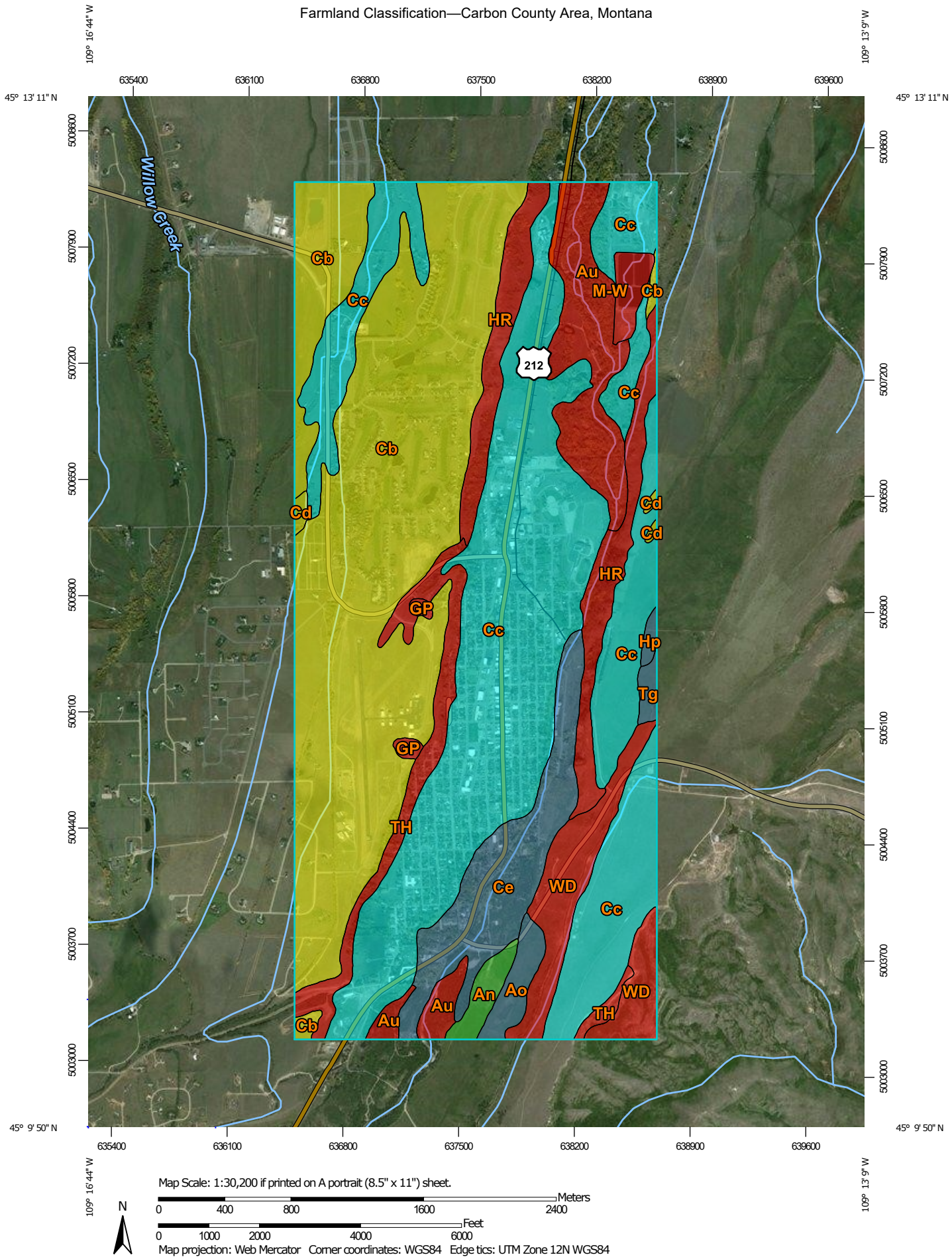
| Engineering Properties–Carbon County Area, Montana | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Map unit symbol and soil name | Pct. of map unit | Hydrologic group | Depth | USDA texture | Classification | | Pct Fragments | | Percentage passing sieve number— | | | | Liquid limit | Plasticity index |
| | | | | | Unified | AASHTO | >10 inches | 3-10 inches | 4 | 10 | 40 | 200 | | |
| | | | *In* | | | | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* |
| HR—Heath-Bynum association, steep | | | | | | | | | | | | | | |
| Heath | 75 | C | 0-3 | Clay loam | CL-ML, CL | A-4, A-6 | 0- 0- 0 | 0- 3- 5 | 85-93-100 | 80-90-100 | 75-85-95 | 70-80-90 | 25-30-35 | 5-10-15 |
| | | | 3-16 | Clay, clay loam, silty clay | CH, CL | A-7 | 0- 0- 0 | 0- 5- 10 | 90-95-100 | 85-93-100 | 70-83-95 | 65-78-90 | 40-48-55 | 15-23-30 |
| | | | 16-32 | Clay, clay loam, silty clay | CL | A-6, A-7 | 0- 0- 0 | 0- 5- 10 | 90-95-100 | 85-93-100 | 70-83-95 | 65-78-90 | 35-43-50 | 15-20-25 |
| Bynum | 20 | C | 0-17 | Sandy clay loam | CL | A-6 | 0- 0- 0 | 0- 5- 10 | 85-93-100 | 80-90-100 | 65-78-90 | 50-63-75 | 30-33-35 | 10-13-15 |
| | | | 17-30 | Silty clay loam, clay loam, loam | CL, CL-ML | A-4, A-6 | 0- 0- 0 | 0- 5- 10 | 85-93-100 | 80-90-100 | 65-78-90 | 50-68-85 | 20-28-35 | 5-10-15 |
| | | | 30-60 | Weathered bedrock | — | — | — | — | — | — | — | — | — | — |
| Tg—Thiel cobbly clay loam, 4 to 8 percent slopes | | | | | | | | | | | | | | |
| Thiel | 95 | B | 0-3 | Cobbly clay loam | CL-ML | A-4 | 0- 0- 0 | 25-30-35 | 80-83-85 | 75-78-80 | 70-73-75 | 50-55-60 | 25-28-30 | 5-8 -10 |
| | | | 3-20 | Very cobbly clay loam, very cobbly sandy clay loam, extremely cobbly clay loam | GC, GC-GM | A-2, A-4, A-6 | 0- 0- 0 | 30-40-50 | 50-63-75 | 40-55-70 | 35-50-65 | 25-38-50 | 25-30-35 | 5-10-15 |
| | | | 20-60 | Very cobbly sand | GP, SP | A-1 | 0- 0- 0 | 10-20-30 | 35-48-60 | 25-38-50 | 15-25-35 | 0- 3- 5 | — | NP |

| Engineering Properties–Carbon County Area, Montana | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Map unit symbol and soil name | Pct. of map unit | Hydrologic group | Depth | USDA texture | Classification | | Pct Fragments | | Percentage passing sieve number— | | | | Liquid limit | Plasticity index |
| | | | | | Unified | AASHTO | >10 inches | 3-10 inches | 4 | 10 | 40 | 200 | | |
| | | | *In* | | | | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* |
| TH—Thiel-Bynum association, steep | | | | | | | | | | | | | | |
| Thiel | 70 | B | 0-3 | Very cobbly clay loam | CL-ML, GC-GM | A-4 | 0- 0- 0 | 30-43-55 | 50-63-75 | 50-60-70 | 45-55-65 | 35-45-55 | 25-28-30 | 5-8 -10 |
| | | | 3-20 | Very cobbly clay loam, very cobbly sandy clay loam, extremely cobbly clay loam | GC, GC-GM | A-2, A-4, A-6 | 0- 0- 0 | 30-40-50 | 50-63-75 | 40-55-70 | 35-50-65 | 25-38-50 | 25-30-35 | 5-10-15 |
| | | | 20-60 | Very cobbly sand | GP, SP | A-1 | 0- 0- 0 | 10-20-30 | 35-48-60 | 25-38-50 | 15-25-35 | 0- 3- 5 | — | NP |
| Bynum | 25 | C | 0-17 | Clay loam | CL | A-6 | 0- 0- 0 | 0- 5- 10 | 85-93-100 | 80-90-100 | 65-78-90 | 50-63-75 | 30-33-35 | 10-13-15 |
| | | | 17-30 | Silty clay loam, clay loam, loam | CL, CL-ML | A-4, A-6 | 0- 0- 0 | 0- 5- 10 | 85-93-100 | 80-90-100 | 65-78-90 | 50-68-85 | 20-28-35 | 5-10-15 |
| | | | 30-60 | Weathered bedrock | — | — | — | — | — | — | — | — | — | — |

| Engineering Properties–Carbon County Area, Montana | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Map unit symbol and soil name | Pct. of map unit | Hydrologic group | Depth | USDA texture | Classification | | Pct Fragments | | Percentage passing sieve number— | | | | Liquid limit | Plasticity index |
| | | | | | Unified | AASHTO | >10 inches | 3-10 inches | 4 | 10 | 40 | 200 | | |
| | | | *In* | | | | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* | *L-R-H* |
| WD—Wayden-Castner association, steep | | | | | | | | | | | | | | |
| Wayden | 70 | D | 0-6 | Clay loam | CL | A-6, A-7 | 0- 0- 0 | 0- 0- 0 | 100-100-100 | 100-100-100 | 90-95-100 | 75-80-85 | 35-40-45 | 15-20-25 |
| | | | 6-14 | Clay loam, silty clay, silty clay loam | CH, CL | A-6, A-7 | 0- 0- 0 | 0- 0- 0 | 100-100-100 | 100-100-100 | 90-95-100 | 80-88-95 | 35-48-60 | 15-25-35 |
| | | | 14-60 | Weathered bedrock | — | — | — | — | — | — | — | — | — | — |
| Castner | 25 | D | 0-8 | Channery loam | CL-ML, GM, ML, SM | A-4 | 0- 0- 0 | 0- 8- 15 | 60-75-90 | 50-65-80 | 40-55-70 | 35-48-60 | 20-25-30 | NP-5-10 |
| | | | 8-18 | Extremely channery loam, very channery sandy loam, very flaggy loam | GC-GM, GM, GP-GM | A-1, A-2 | 0- 0- 0 | 25-33-40 | 25-43-60 | 15-33-50 | 10-25-40 | 5-20- 35 | 20-25-30 | NP-5-10 |
| | | | 18-60 | Unweathered bedrock | — | — | — | — | — | — | — | — | — | — |

# Data Source Information

Soil Survey Area: Carbon County Area, Montana
Survey Area Data: Version 15, Sep 16, 2019


109° 16' 44" W
109° 13' 9" W
45° 13' 11" N
45° 9' 50" N
635400
636100
636800
637500
638200
638900
639600
5008600
5007900
5007200
5006500
5005800
5005100
5004400
5003700
5003000
Willow Creek
212
Cb
Cc
Au
M-W
HR
Cd
GP
Hp
Tg
TH
Ce
WD
An
Ao
Map Scale: 1:30,200 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 400 800 1600 2400
Feet
0 1000 2000 4000 6000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

# MAP LEGEND

**Area of Interest (AOI)**

- Area of Interest (AOI)

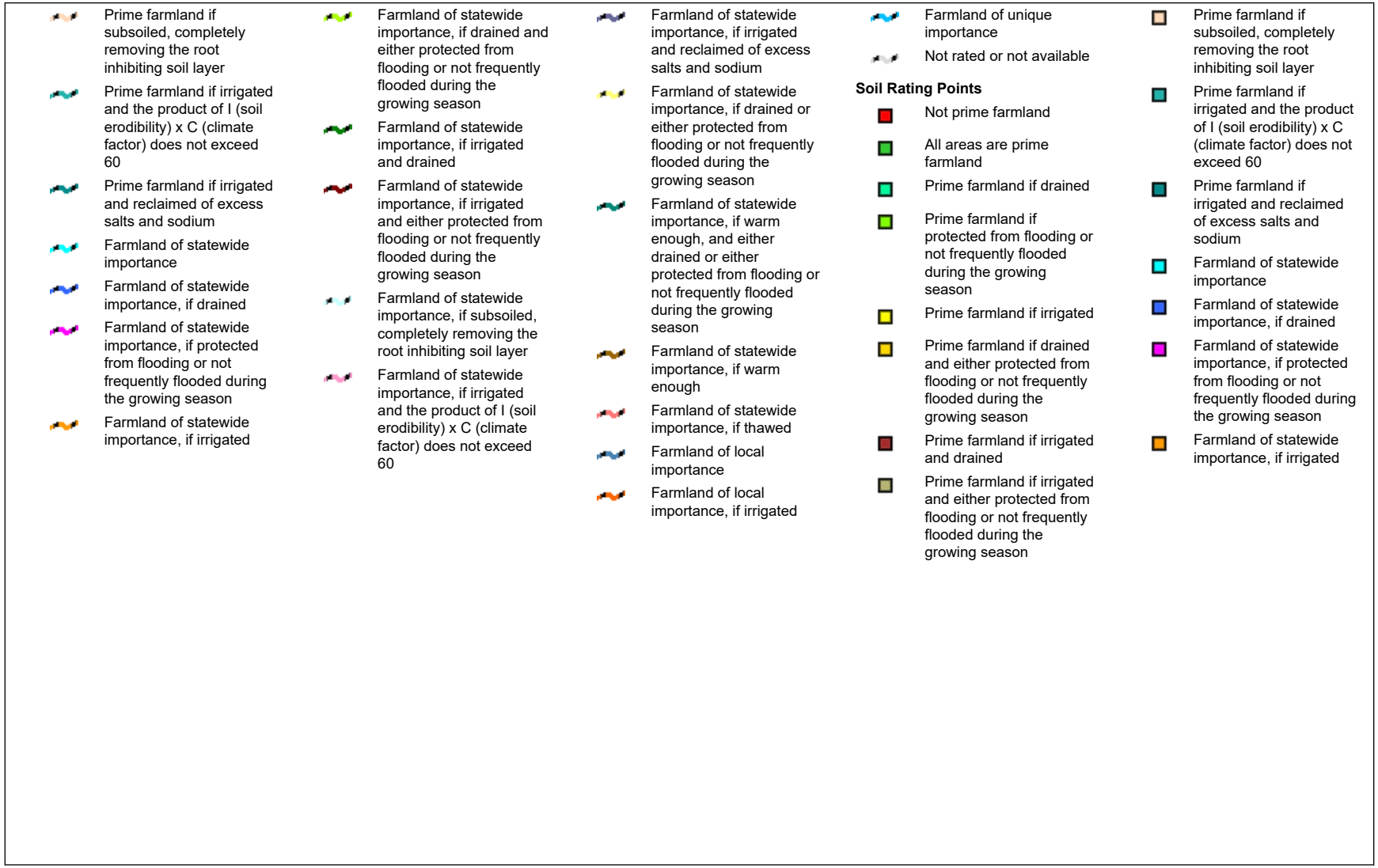
**Soils**

**Soil Rating Polygons**

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- 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
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of statewide importance, if drained
- Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated
- 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

**Soil Rating Lines**

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season


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
Prime farmland if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance
Farmland of statewide importance, if drained
Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated
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
Soil Rating Points
Not prime farmland
All areas are prime farmland
Prime farmland if drained
Prime farmland if protected from flooding or not frequently flooded during the growing season
Prime farmland if irrigated
Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
Prime farmland if irrigated and drained
Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
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
Prime farmland if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance
Farmland of statewide importance, if drained
Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated

- 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: Carbon County Area, Montana
Survey Area Data: Version 15, Sep 16, 2019

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

Date(s) aerial images were photographed: Apr 26, 2011—Oct 25, 2016

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.

# Farmland Classification

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| An | Adel silty clay loam, 0 to 4 percent slopes | All areas are prime farmland | 23.5 | 0.8% |
| Ao | Adel silty clay loam, 4 to 8 percent slopes | Farmland of local importance | 30.4 | 1.1% |
| Au | Alluvial land | Not prime farmland | 173.9 | 6.2% |
| Cb | Charlos loam, 0 to 2 percent slopes | Prime farmland if irrigated | 946.4 | 33.7% |
| Cc | Charlos loam, 2 to 8 percent slopes | Farmland of statewide importance | 1,032.7 | 36.8% |
| Cd | Charlos loam, wet, 0 to 2 percent slopes | Prime farmland if irrigated | 7.0 | 0.2% |
| Ce | Charlos stony loam, 0 to 4 percent slopes | Farmland of local importance | 170.7 | 6.1% |
| GP | Gravel pits | Not prime farmland | 7.3 | 0.3% |
| Hp | Heath clay loam, 8 to 15 percent slopes | Farmland of local importance | 5.7 | 0.2% |
| HR | Heath-Bynum association, steep | Not prime farmland | 152.5 | 5.4% |
| M-W | Miscellaneous water | Not prime farmland | 22.6 | 0.8% |
| Tg | Thiel cobbly clay loam, 4 to 8 percent slopes | Farmland of local importance | 9.8 | 0.3% |
| TH | Thiel-Bynum association, steep | Not prime farmland | 95.1 | 3.4% |
| WD | Wayden-Castner association, steep | Not prime farmland | 128.9 | 4.6% |
| **Totals for Area of Interest** | | | **2,806.7** | **100.0%** |

## Description

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, 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.

## Rating Options

*Aggregation Method:* No Aggregation Necessary

*Tie-break Rule:* Lower

# GEOLOGIC MAP OF THE

# RED LODGE AREA,

# CARBON COUNTY, MONTANA

by

David A. Lopez

Montana Bureau of Mines and Geology

Open-File Report MBMG 524

2005

This map has been reviewed for conformity with technical and editorial standards of the Montana Bureau of Mines and Geology.

Partial support has been provided by the STATEMAP component of the National Cooperative Geologic Mapping Program of the U.S. Geological Survey under Contract Number 04HQAG0079.

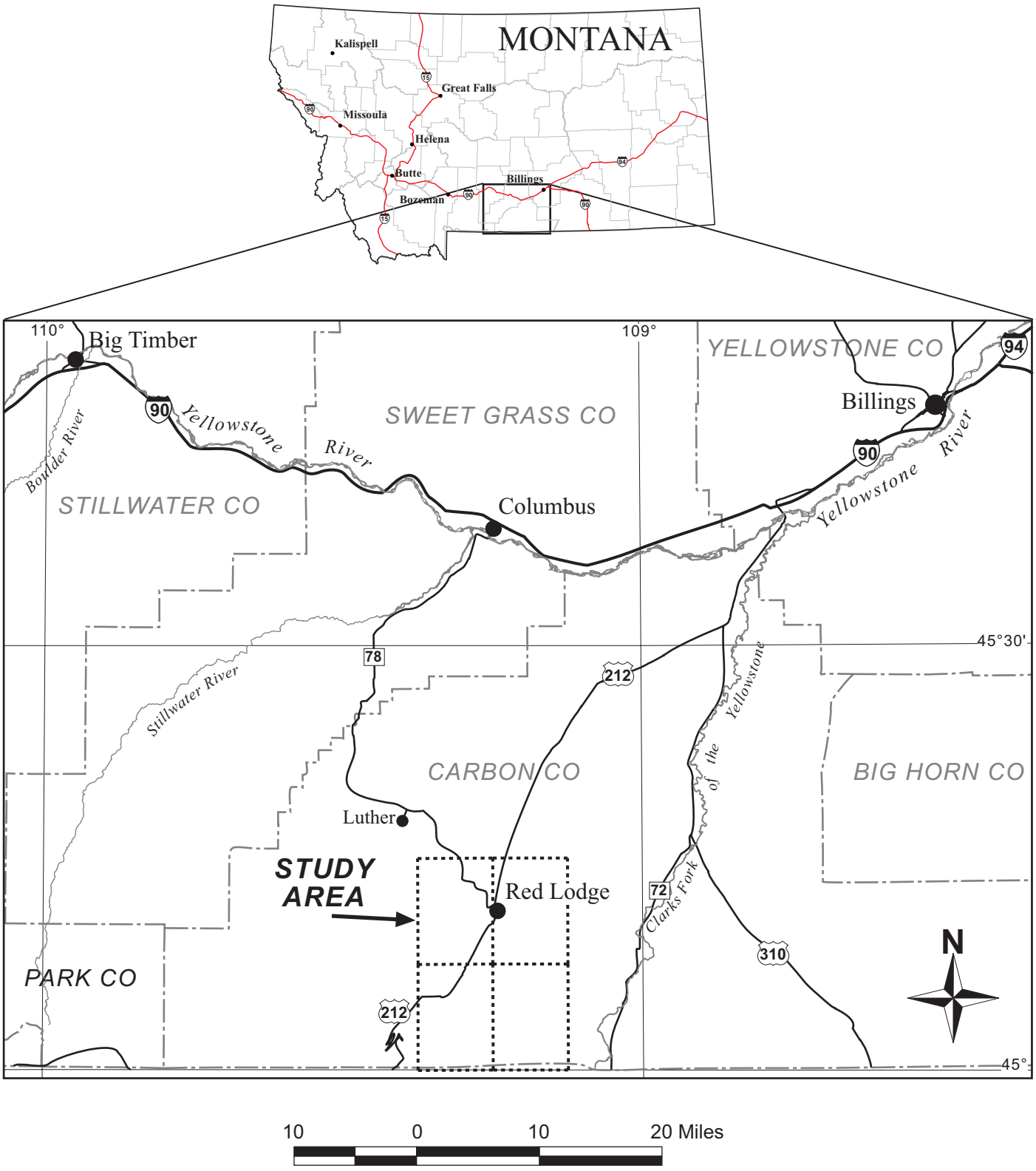
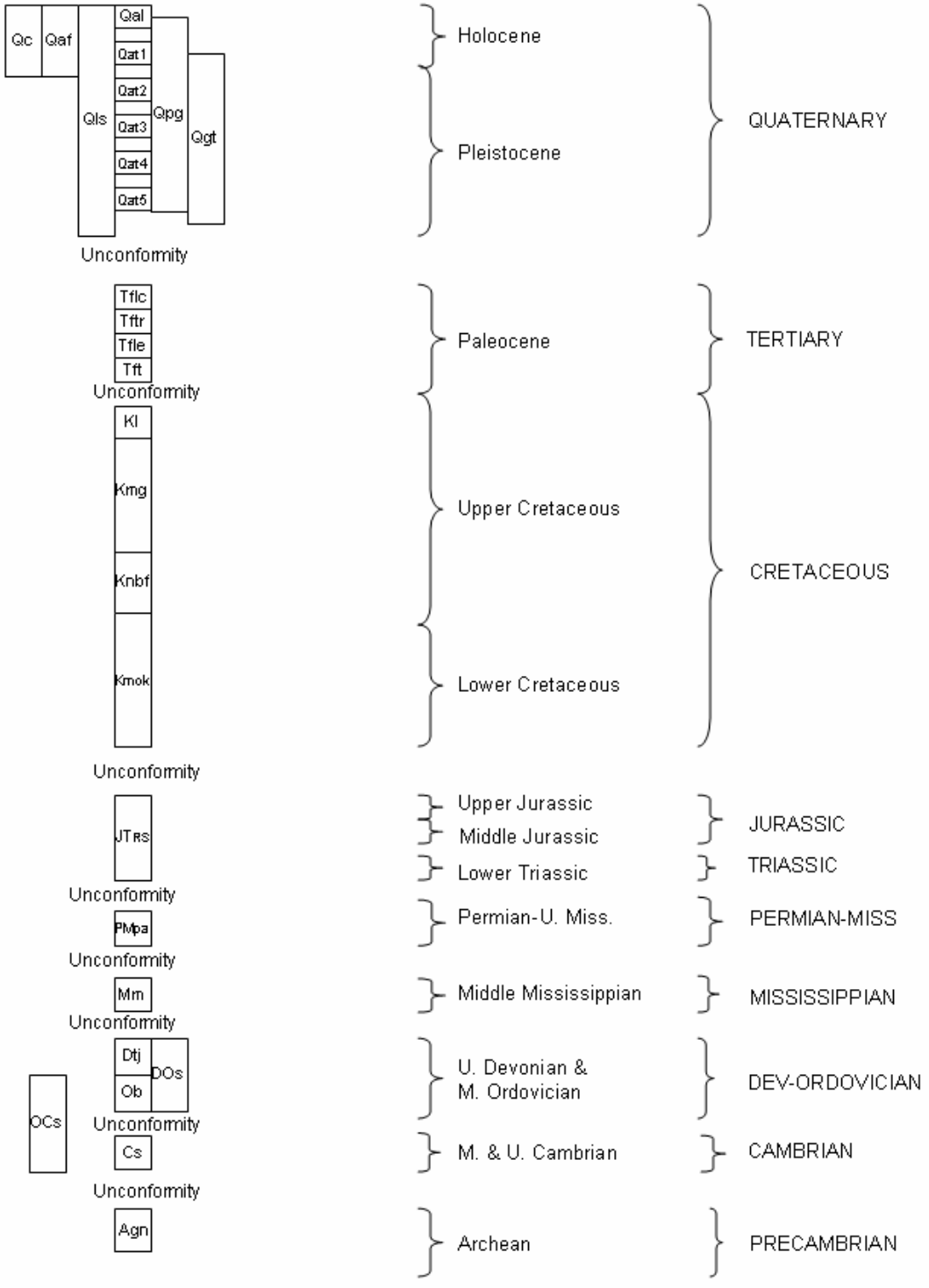



Figure 1. Location map of the study area.

## CORRELATION OF MAP UNITS



## DESCRIPTION OF MAP UNITS

## SURFICIAL DEPOSITS

**af** **Artificial fill—**Mine tailings and fill in the Rock Creek valley in northern part of the town of Red Lodge.

**Qal** **Alluvium (Holocene)**—Gravel, sand, silt, and clay along active stream channels.

**Qc** **Colluvium (Holocene and Pleistocene)**—Locally derived slope-wash depositsmainly of sand, silt, and clay. Typically thin veneer concealing bedrock, but locally as thick as 30 ft (9 m). Commonly grades into Qal. Locally contains well-rounded cobbles derived from alluvial terrace gravel. May also contain glacial lake deposits behind end moraines.

**Qaf** **Alluvial fan deposits (Holocene and Pleistocene)**—Gravel, sand, silt, and clay deposited in fans being formed by modern streams along major valley margins. Display characteristic fan-shaped map pattern and convex upward profile. Typically grade upstream into Qal. Thickness ranges from very thin at toe to as much as 50 ft (15 m) at heads of fans.

**Qls** **Landslide deposits (Holocene and Pleistocene)**—Unconsolidated mixture ofsoil and blocks of bedrock transported down steep slopes by mass wasting. Characteristic hummocky surface with concentric swales and ridges near down-slope limits. Common along steep slopes below resistant rocks but can occur where steep slopes and moisture content produce unstable conditions. Large landslides are common in glacial moraines along the Beartooth mountain front.

**Qpg** **Pediment gravel deposits (Holocene and Pleistocene?)**—Angular and subangular, coarse gravel derived from local bedrock; gravel deposits occur beneath smooth, concave-upward, pediment surfaces sloping away from the Beartooth Mountains. About 10 ft (3 m) thick.

**Qgt** **Glacial deposits, undivided (Holocene and Pleistocene)**—Unsorted clay- to boulder-size material transported and deposited by glaciers. Characteristic hummocky surface. Occur in valleys along the mountain front. Clasts are predominantly Archean metamorphic rocks with lesser amounts of quartzite, igneous rocks, dolomite, and limestone.

## ALLUVIAL TERRACE GRAVELS

**Qat1** **Alluvial gravel, terrace level 1 (Holocene)**—Gravel underlying terraces 10 to 20 ft (3-6 m) above altitude of Qal (present altitude of rivers). Mostly cobbles and pebbles with minor amounts of sand and silt. Clasts are mainly granitic igneous rocks, granitic gneiss, schist, and quartzite, with much less limestone and sandstone. Ten to 40 ft (3-12 m) thick.

**Qat2** **Alluvial gravel, terrace level 2 (Pleistocene)**—Gravel underlying terraces 20 to 40 ft (6-12 m) above Qal. Mostly cobbles and pebbles with minor amounts of sand and silt. Clasts mainly granitic igneous rocks, granitic gneiss, schist, and quartzite, with much less limestone and sandstone. Ten to 40 ft (3-12 m) thick.

**Qat3** **Alluvial gravel, terrace level 3 (Pleistocene)**—Gravel underlying terraces 50 to 90 ft (15-27 m) above present altitude of rivers. Mostly cobbles and pebbles and minor amounts of sand and silt. Clasts are mainly granitic igneous rocks, granitic gneiss, schist, and quartzite, with much less limestone and sandstone. Ten to 30 ft (3-9 m) thick.

**Qat4** **Alluvial gravel, terrace level 4 (Pleistocene)**—Gravel underlying terraces 200 to 300 ft (60-90 m) above present altitude of rivers. Cobble- and pebble-size clasts are mainly granite, granitic gneiss, schist, and quartzite. Thickness as much as 20 ft (6 m).

**Qat5** **Alluvial gravel, terrace level 5 (Pleistocene)**—Gravel underlying terraces 400 to 600 ft (120-185 m) above present altitude of rivers. Occurs mainly as small discontinuous erosional remnants. Cobble- and pebble-size clasts are mainly granite, granitic gneiss, schist, and quartzite. Calcite cement locally present, especially at base. Thickness from a very thin remnant to about 20 ft (6 m).

## BEDROCK MAP UNITS

**Tflc** **Linley Conglomerate Member, Fort Union Formation (Paleocene?)**—Unit named by Calvert (1916) after exposures near the community of Linley (Linley no longer exists but was about 1 mile east-southeast of Luther). These rocks occur along the northern mountain front of the Beartooth Uplift (Calvert, 1916; Jobling, 1974; DeCelles and others, 1991) and are considered to be Laramide synorogenic deposits. Similar rocks occur along the eastern front of the Beartooth Uplift (Laramide synorogenic deposits of Flueckinger (1970) and Beartooth Conglomerate of DeCelles and others (1991)), and are included here with the Linley Conglomerate. Unconformably overlies the Tongue River Member of the Fort Union Formation, but also overlies an erosional unconformity cut into Upper Cretaceous rocks just south of the map area in Wyoming (DeCelles and others, 1991). The unit consists of mainly reddish-brown to gray- brown, interbedded conglomerate, coarse-grained sandstone, siltstone, and mudstone; the coarsest facies is generally nearest the mountain front. Conglomerate cobbles are mostly less than 6 inches in diameter and composed mainly of limestone, andesite porphyry, black chert, metamorphic rocks, and granitic rocks. Paleontologic data indicate the deposits are Paleocene (Flueckinger, 1970; Jobling, 1974; DeCelles and others, 1991). Changes in clast composition in the conglomerates record the unroofing of the Beartooth Uplift; clasts of younger stratigraphic units generally occur near the base and clasts of older rocks occur higher in the section (Flueckinger, 1970; Jobling, 1974; DeCelles and others, 1991). Thickness is about 600 ft (185 m) along the north front of the Beartooth

Uplift (Jobling, 1974). Flueckinger (1970) reports a total thickness of the section along the east front, including exposures in Wyoming, of about 4,200 ft (1,280 m), but exposures in the Red Lodge area and just to the west appear to be about 2,000 ft (610 m) thick. DeCelles and others (1991) report a thickness of more than 2,300 ft (700 m).

**Tftr** **Tongue River Member, Fort Union Formation (Paleocene)**—Gray to grayish-yellow, fine- to medium-grained sandstone, cross-bedded. Interbedded with brownish-gray carbonaceous shale and siltstone and coal beds. Sandstones ledge-forming, commonly support growths of pine trees. Thickness is variable but is as much as 2,800 ft (850 m) (Rawlins, 1986).

**Tfle** **Lebo Member, Fort Union Formation (Paleocene)**—Predominantly dark-gray to olive shale, and thin, interbedded, yellowish-gray sandstone and siltstone, locally includes yellowish-gray claystone. Typically forms smooth grassy slopes below the Tongue River Member. Thickness 200 to 500 ft (60-150 m).

**Tft** **Tullock Member, Fort Union Formation (Paleocene)**—Yellowish-gray, fine- to medium-grained, ledge-forming sandstone, cross-bedded in part. Interbedded with gray to greenish-gray claystone, siltstone, and minor carbonaceous shale. Supports growths of pine trees. Thickness is variable; from about 400 ft (120 m) to as much as 1,500 ft (460 m) in the Bear Creek area (Rawlins, 1986).

**TKi** **Intermediate and felsic intrusive rocks (Tertiary or Late Cretaceous)**—Laccoliths, plugs, dikes, sills and irregular-shaped bodies of fine-grained and porphyritic rhyolite, dacite, quartz latite, andesite, and diorite (Van Gosen and others, 2000).

**Kl** **Lance Formation (Upper Cretaceous)**—Interbedded light-brownish-gray, cliff- and ledge-forming, fine-grained, thick-bedded to massive sandstone, and medium-gray, fissile shale. Sandstone beds are much thicker and more

continuous than sandstone beds in the Hell Creek. Sandstone beds support growths of pine trees. Occurs only in the southeast part of the quadrangle, interfingers with and changes facies into Hell Creek lithologies in the Joliet area; the name Lance is used in the Red Lodge area. Total thickness of the formation is about 350 ft (105 m).

**Kmg** **Montana Group (Upper Cretaceous)**—Bearpaw Shale, Judth River Formation, Claggett Shale, Eagle Sandstone, and Telegraph Creek Formation. Shown only on cross section.

**Knbf** **Niobrara, Carlile, Greenhorn, and Belle Fourche Formations, undivided (Upper Cretaceous)**—Shown only on cross section.

**Kmok** **Mowry Shale, Thermopolis Shale, Fall River Sandstone, and Kootenai Formation,undivided (Upper and Lower Cretaceous)**—Shown only on cross section.

**JTRs** **Sedimentary rocks, undivided (Jurassic and Triassic)**—Includes Morrison Formation, Ellis Group, and Chugwater Formation.

**PMpa** **Phosphoria, Tensleep, and Amsden Formations, undivided (Permian, Pennsylvanian, and Upper Mississippian)**—Formations not mapped separately because of narrow outcrop width. Phosphoria is light-gray limestone, sandstone and quartzite, commonly grayish-pink, cherty; thickness is 50 to 75 ft (15-23 m). The Tensleep Sandstone is light-brown to very pale-orange sandstone, fine-grained, well sorted, well rounded, cross-bedded. Locally contains thin limestone beds, locally cherty near the top, and locally silicified to form quartzite; about 250 ft (75 m) thick. The Amsden Formation is interbedded grayish-pink to light-red mudstone, limestone, and siltstone. Limestones are commonly cherty. Unconformably overlies karst surface developed on limestone of the Madison Group. Characteristically produces pink stain on underlying cliffs of Madison Group; thickness about 200 ft (60 m) but locally tectonically thinned

to only a few feet along mountain front. Total thickness of lumped unit is about 500 ft (150 m).

**Mm** **Madison Group, undivided (Middle Mississippian)**—Limestone and dolomitic limestone, light-gray to light-brownish-gray. Thick-bedded to massive in the upper part (Mission Canyon Limestone) and thin-bedded to thick-bedded in the lower part (Lodgepole Limestone). Also contains thin, interbedded, gray shales. Fossiliferous and cherty beds are present throughout. Collapse features and caves are common at the upper karst surface. Thickness of the Madison is 800 to 1,000 ft (240-305 m).

**Dtj** **Three Forks and Jefferson Formations, undivided (Upper Devonian)**—The Jefferson is dolomitic limestone, light-brownish-gray, fetid, poorly exposed; locally occurs as float only. The Three Forks is mainly yellowish-weathering, argillaceous limestone and medium-gray shale, very poorly exposed.

**DOs** **Sedimentary rocks, undivided (Upper Devonian and Ordovician)**—Includes Jefferson and Three Forks Formations, and Big Horn Dolomite. The Jefferson and Three Forks Formations as described above. The Big Horn Dolomite is cliff-forming dolomite and dolomitic limestone, very light gray to very pale orange, lower part massive, thin- to thick-bedded in upper part. Has characteristic pock-marked surface due to differential weathering. Total thickness of this interval is about 600 ft (185 m).

**OЄs** **Sedimentary rocks, undivided (Ordovician and Cambrian)**

**Ob** **Bighorn Dolomite (Middle Ordovician)**—Cliff-forming dolomite and dolomitic limestone, very light gray to very pale orange, lower part massive, thin- to thick-bedded in upper part. Has characteristic pock-marked surface due to differential weathering. Thickness about 400 ft (120 m).

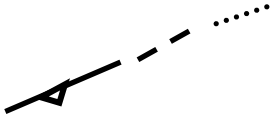
**Ꞓs** **Sedimentary rocks, undivided (Middle and Upper Cambrian)**—Light-reddish sandstone and quartzite, greenish-gray shale and sandy shale, gray, thin-bedded limestone, and greenish-gray flat-pebble limestone conglomerate. Includes the Flathead, Wolsey, Meagher, Park, and Pilgrim Formations. Thickness is 600 to 800 ft (180-245 m).

**Agn** **Gneissic rocks (Archean)**–-Predominantly granitic gneiss and migmatite; commonly consists of alternating bands of more felsic and more mafic gneiss; contains inclusions of metasedimentary rocks (granitic gneiss of Van Gosen and others, 2000).

## MAP SYMBOLS

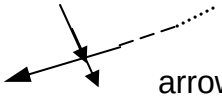
**Contact—**Dotted where concealed.

**Fault—**Dotted where concealed. Bar and ball on down-thrown side, where known.



**Reverse Fault—**Dashed where approximately located; dotted where concealed. Teeth on upper plate or up-thrown block.

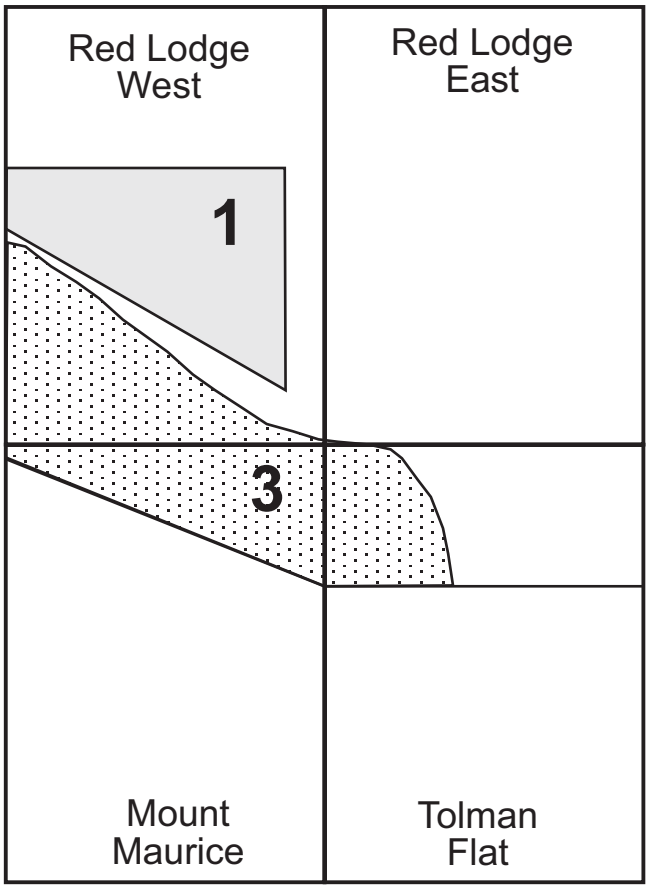
**Strike slip fault**--Dashed where approximately located; dotted where concealed. Arrows indicate relative sense of movement.



**Monocline—**Showing trace of axial plane and direction of plunge; longest arrow indicates steepest limb of monocline; dashed where approximately located; dotted where concealed.


**Strike and dip of beds**


**Strike and dip of overturned beds**




## SOURCES OF GEOLOGIC MAPPING

1. Flueckinger, L.A., 1970, Stratigraphy, petrography, and origin of Tertiary sediments off the front of the Beartooth Mountains, Montana-Wyoming: State College, Pennsylvania State University, Ph.D. dissertation, 249 p. Plate 1, scale 1:62,500.

2. Lopez, D.A., 2001, Geologic map of the Red Lodge 30' x 60' quadrangle, south-central Montana: Montana Bureau of Mines and Geology Open File Report MBMG-423, scale 1:100,000. ***(Covers entire map area)***

3. Van Gosen, B.S., Elliott, J.E., LaRock, E.J., duBray, E.A., Carlson, R.R., and Zientek, M.L., 2000, Generalized geologic map of the Absaroka-Beartooth study area, south-central Montana: U.S. Geological Survey Miscellaneous Field Studies Map MF-2338, scale 1:126,720.

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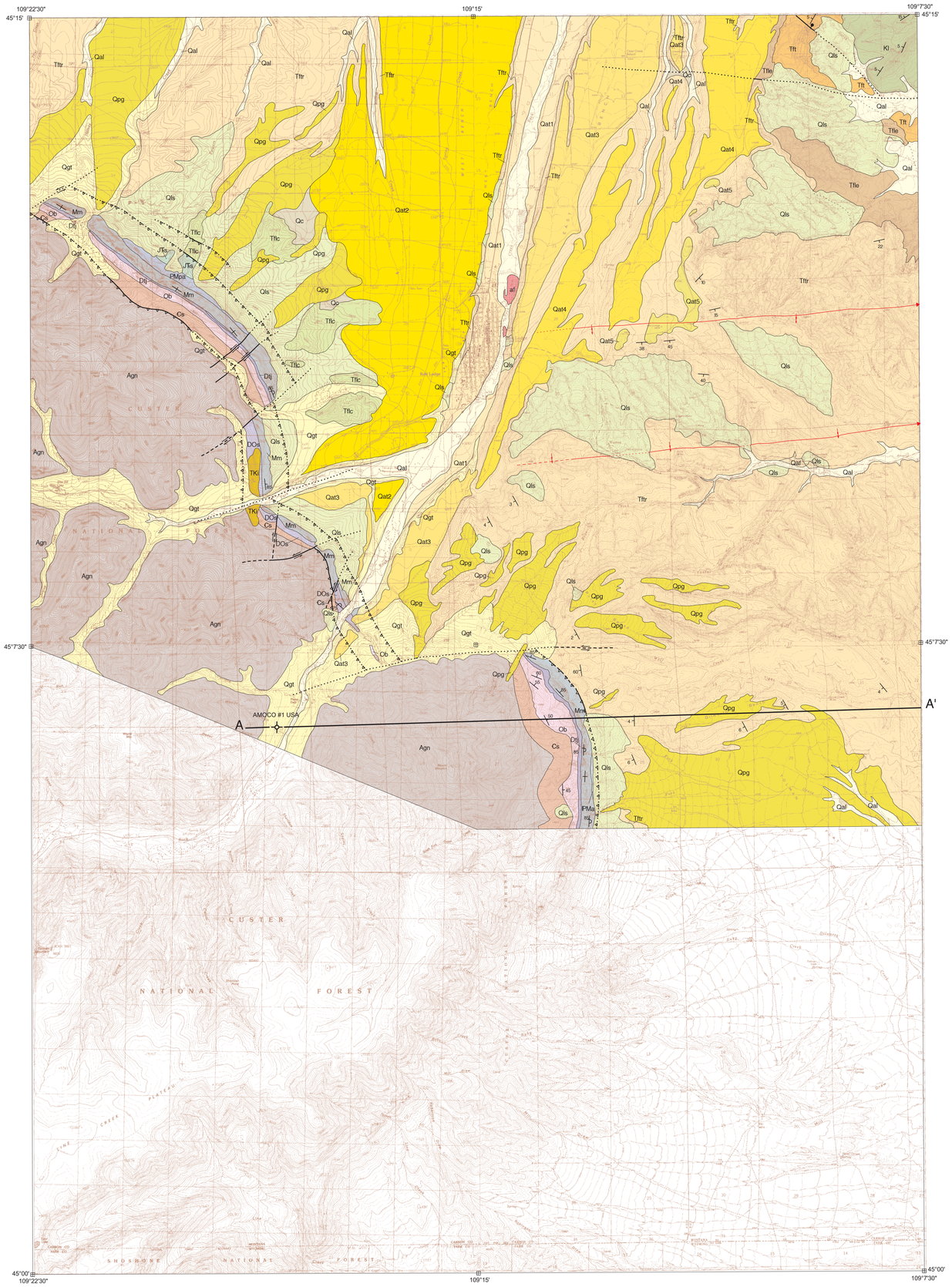



1 0 1 2 miles

1:48,000 scale

N

Montana Bureau of Mines and Geology
Earth Science Information
Since 1919

Maps may be obtained from: Publications Office
Montana Bureau of Mines and Geology
1300 West Park Street
Butte, Montana 59701-8997
Phone: (406) 496-4167
Fax: (406) 496-4451
http://www.mbmg.mtech.edu

Partial support has been provided by the STATEMAP component of the National Cooperative Geologic Mapping Program of the U.S.Geological Survey under Contract Number 04HQAG0079.

GIS production: Ken Sandau and Paul Thale, MBMG. Map layout: Susan Smith, MBMG.

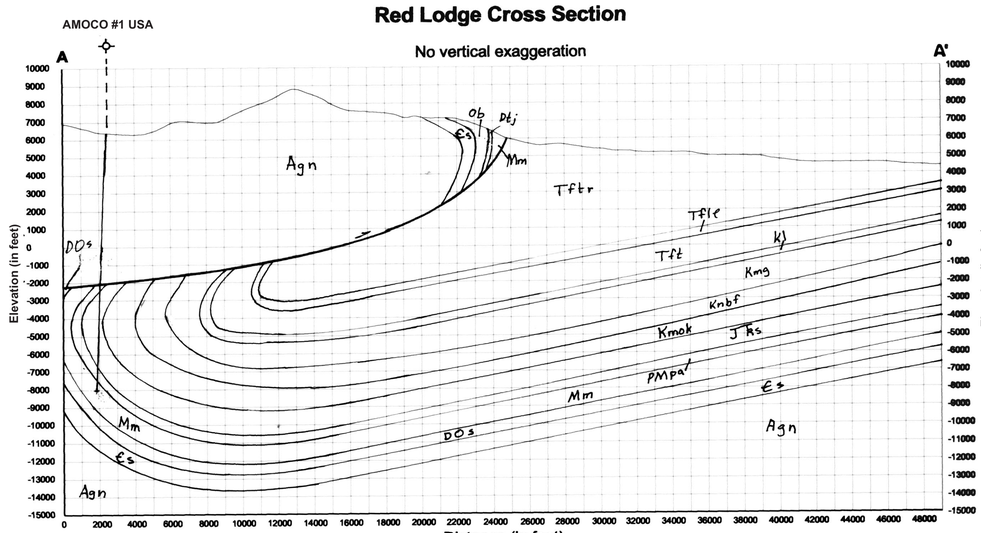
## MAP UNITS

- Qal — Alluvium of modern channels and flood plains
- Qc — Colluvium
- Qaf — Alluvial fan deposit
- Qls — Landslide deposit
- Qpg — Pediment gravel deposit
- Qat1 — Alluvium of youngest alluvial terrace
- Qgt — Glacial till
- Qat2 — Alluvium of second youngest alluvial terrace
- Qat3 — Alluvium of third youngest alluvial terrace
- Qat4 — Alluvium of fourth youngest alluvial terrace
- Qat5 — Alluvium of fifth youngest alluvial terrace, oldest
- Tflc — Linley Conglomerate Member of Fort Union Formation
- Tftr — Tongue River Member of Fort Union Formation
- Tft — Tullock Member of Fort Union Formation
- Tfle — Lebo Member of Fort Union Formation
- TKi — Intrusive rocks, undivided
- Kl — Lance Formation
- JTs — Sedimentary rocks, undivided
- PMpa — Phosphoria, Quadrant, and Amsden Formations, undivided
- PMa — Amsden Formation
- Mm — Madison Group, undivided
- Dlj — Three Forks and Jefferson Formations, undivided
- DOs — Sedimentary rocks, undivided
- Ob — Bighorn Dolomite
- Cs — Sedimentary rocks, undivided
- Agn — Gneissic rocks
- af — Artificial fill - mine tailings

## MAP SYMBOLS

- **Contact:** dotted where concealed
- **Fault:** dotted where concealed; bar and ball on downthrown side where known
- **Reverse fault:** dashed where approximately located; dotted where concealed; teeth on upper plate or upthrown block
- **Strike slip fault:** dashed where approximately located; dotted where concealed
- **Monocline:** Showing axial plane and direction of plunge; dashed where approximately located, dotted where concealed; longest arrow indicates steepest limb of monocline
- 30 — **Strike and dip of beds**
- 80 — **Strike and dip of overturned beds**


## Red Lodge Cross Section




**Datum: Mean sea level**
**Surficial deposits are not shown**

**Amoco #1 USA was not drilled straight; trace of well bore on profile is approximate and penetrations of formation are shown at approximately true depths.**

**Structure in sub-thrust fold is undoubtedly much more complex than shown, but data are not sufficient to identify other smaller faults and structures. Approximate elevation of stratigraphic units interpreted from data from Amoco well shown (Compare with Wise, 1997).**

**Archean rocks in upper plate are characterized by brittle deformation along numerous small faults and fractures; these rocks are not folded like the overlying Paleozoic stratigraphic section.**

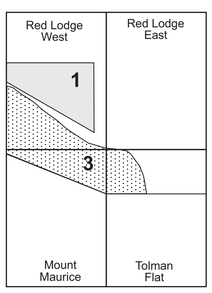
Base map from USGS 7.5' quadrangles 1:24,000 scale reduced by 50% to 1:48,000 scale:

Red Lodge East 7.5' topographic quadrangle
Map date: 1969, revised 1985
Projection: polyconic
UTM zone 12; 1927 NAD

Red Lodge West 7.5' topographic quadrangle
Map date: 1986
Projection: Lambert Conformal Conic
UTM zone 12; 1927 NAD

Tolman Flat 7.5' topographic quadrangle
Map date: 1969, revised 1985
Projection: polyconic
UTM zone 12; 1927 NAD

Mount Maurice 7.5' topographic quadrangle
Map date: 1986
Projection: Lambert Conformal Conic
UTM zone 12; 1927 NAD

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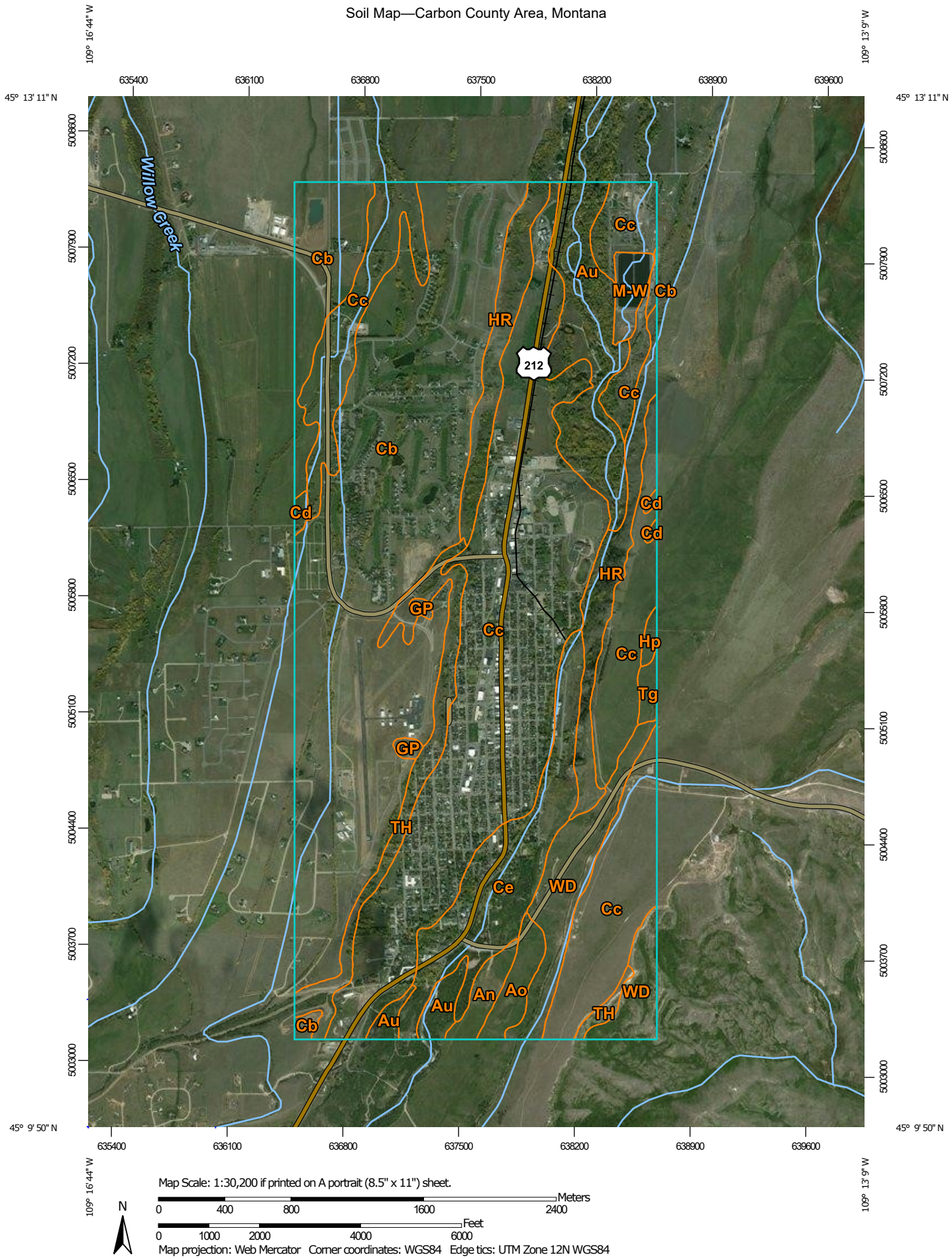
MBMG Open File 524

# Geologic Map of the Red Lodge Area Carbon County, Montana

David A. Lopez

2005


109° 16' 44" W
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45° 13' 11" N
45° 9' 50" N
635400
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5007200
5006500
5005800
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5004400
5003700
5003000
Willow Creek
212
Cb
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Au
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Map Scale: 1:30,200 if printed on A portrait (8.5" x 11") sheet.
N
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2400
Meters
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Feet
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

## 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: Carbon County Area, Montana
Survey Area Data: Version 15, Sep 16, 2019

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

Date(s) aerial images were photographed: Apr 26, 2011—Oct 25, 2016

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.

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| An | Adel silty clay loam, 0 to 4 percent slopes | 23.5 | 0.8% |
| Ao | Adel silty clay loam, 4 to 8 percent slopes | 30.4 | 1.1% |
| Au | Alluvial land | 173.9 | 6.2% |
| Cb | Charlos loam, 0 to 2 percent slopes | 946.4 | 33.7% |
| Cc | Charlos loam, 2 to 8 percent slopes | 1,032.7 | 36.8% |
| Cd | Charlos loam, wet, 0 to 2 percent slopes | 7.0 | 0.2% |
| Ce | Charlos stony loam, 0 to 4 percent slopes | 170.7 | 6.1% |
| GP | Gravel pits | 7.3 | 0.3% |
| Hp | Heath clay loam, 8 to 15 percent slopes | 5.7 | 0.2% |
| HR | Heath-Bynum association, steep | 152.5 | 5.4% |
| M-W | Miscellaneous water | 22.6 | 0.8% |
| Tg | Thiel cobbly clay loam, 4 to 8 percent slopes | 9.8 | 0.3% |
| TH | Thiel-Bynum association, steep | 95.1 | 3.4% |
| WD | Wayden-Castner association, steep | 128.9 | 4.6% |
| **Totals for Area of Interest** | | **2,806.7** | **100.0%** |

# Appendix E

Groundwater Data

**Ground Water Information Center** | **MBMG Data Center**
**Montana Bureau of Mines and Geology**
**Montana Technological University**
1300 West Park Street - Natural Resources Building Room 329
Butte Montana 59701-8997
Ph: (406) 496-4336 Fx: (406) 496-4343



**GWIC Data > Well Construction Data > Township: 07S Range: 20E Sec: 15, 14, 21, 22, 23, 28, 27, 26, 33, 34, 35**

The following data were returned from the GWIC databases for the area you requested. For a more detailed description of the data view the GWIC Metadata report. If you notice data entry errors or have questions please let us know by sending us an Email at **GWIC@mtech.edu**. If you wish to view a one page report for a particular site, click the hyperlinked **Gwic Id** for that well. Scroll to the right of your screen to view all the data. All data displayed on the screen may not show up when printed.

Retrieval Statistics*

| Field | Max | Min | Avg |
|---|---|---|---|
| Total Depth (ft) | 330.00 | 6.00 | 53.58 |
| Static Water Level (ft) | 160.00 | 2.00 | 19.69 |
| Yield (gpm) | 900.00 | 1.00 | 53.81 |

* These statistics do not take any geographic, topographic, or geologic factors into consideration. Negative swl values are reported for water levels that are above land surface.

Did you know about...

Other GWIC data

**GWIC has 43 water quality sample(s) for this area.**
**GWIC has 87 field visit(s) for this request area.**
**GWIC has 338351 water level(s) for this request area.**

**Thanks, Just take me back to the menu.**

Other MBMG data

**MBMG has 394 publications available for CARBON county.**
**MBMG has 3 abandoned mine record(s) for this request area.**

| Gwic Id | PDF | DNRC WR | Site Name | Twn | Rng | Sec | Q Sec | Ver? | Type | Td | Swl | Pwl | Rwl | Yield | Test | Date | Use |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 282590 | | | BAILEY, BEN & LAURA | 07S | 20E | 14 | | No | WELL | 39.00 | 21.00 | | 21.00 | 40.00 | AIR | 5/6/2015 | DOMESTIC |
| 277361 | | | WHITNEY, RICH AND DEBBIE | 07S | 20E | 14 | | No | WELL | 38.50 | 5.00 | | 5.00 | 100.00 | AIR | 4/21/2014 | DOMESTIC |
| 206260 | | | SPERO BOB | 07S | 20E | 14 | AAB | No | WELL | 50.00 | 14.00 | | 14.00 | 40.00 | AIR | 8/17/2003 | DOMESTIC |
| 199495 | | | NICHOLS, KEVIN | 07S | 20E | 14 | AABC | Yes | WELL | 70.00 | | | | 45.00 | AIR | 12/16/2001 | DOMESTIC |
| 243798 | | | HENSON DENISE | 07S | 20E | 14 | AC | No | WELL | 300.00 | 85.00 | | 85.00 | 10.00 | AIR | 1/31/2008 | DOMESTIC |
| 223137 | | | PRATER JEAN | 07S | 20E | 14 | AC | No | WELL | 160.00 | 15.00 | | 15.00 | 50.00 | AIR | 7/7/2005 | DOMESTIC |
| 189951 | | | CITY OF RED LODGE * EAST BENCH MONITORING WELL | 07S | 20E | 14 | ACDC | Yes | WELL | 21.00 | 16.00 | | 16.00 | 1.00 | AIR | 6/14/2001 | MONITORING |
| 170623 | | | GREET RICK | 07S | 20E | 14 | AD | No | WELL | 160.00 | | 160.00 | 80.00 | 30.00 | AIR | 7/3/1998 | DOMESTIC |
| 157947 | | C099306-00 | HENRY TOM & LYNN | 07S | 20E | 14 | AD | No | WELL | 70.00 | 16.00 | 70.00 | 16.00 | 30.00 | AIR | 6/11/1996 | DOMESTIC |
| 172595 | | | MCGREGOR JAMES | 07S | 20E | 14 | ADC | No | WELL | 200.00 | 58.00 | | 58.00 | 12.00 | AIR | 6/23/1998 | DOMESTIC |
| 247584 | | | BROWN BILL AND AMY | 07S | 20E | 14 | ADD | No | WELL | 39.00 | 5.00 | | 5.00 | 80.00 | AIR | 7/14/2008 | DOMESTIC |
| 104667 | | | HOFFMAN JIM | 07S | 20E | 14 | BA | No | WELL | 42.00 | 22.00 | 25.00 | | 40.00 | BAILER | 5/25/1974 | DOMESTIC |
| 253524 | | | VON ROHR DAVID | 07S | 20E | 14 | BAC | No | WELL | 39.00 | 5.50 | | 5.50 | 60.00 | AIR | 8/4/2009 | DOMESTIC |
| 183506 | | C30043615 | STENSONT, RAYNOLD/RUZICH, PATRICIA | 07S | 20E | 14 | BAD | No | WELL | 40.00 | 24.00 | | 24.00 | 30.00 | AIR | 5/22/2000 | DOMESTIC |
| 144949 | | | BESEL ALEX | 07S | 20E | 14 | BB | No | WELL | 38.00 | 5.00 | 35.00 | 5.00 | 40.00 | AIR | 8/5/1991 | DOMESTIC |
| 209851 | | | LASFLEN ALBERT | 07S | 20E | 14 | BB | No | WELL | 40.00 | 10.00 | | 9.00 | 40.00 | AIR | 9/15/2003 | DOMESTIC |
| 241639 | | | MARYOTT JOHN R. | 07S | 20E | 14 | BB | No | WELL | 60.00 | 3.00 | | 3.00 | 80.00 | AIR | 8/2/2003 | DOMESTIC |
| 189160 | | C116882-00 | DOOM WALT | 07S | 20E | 14 | BBA | No | WELL | 36.00 | 26.00 | | 26.00 | 40.00 | AIR | 4/4/2001 | DOMESTIC |
| 104668 | | | KASTELITZ TOM | 07S | 20E | 14 | BBBB | No | WELL | 38.00 | 11.00 | 20.00 | | 30.00 | AIR | 9/24/1979 | STOCKWATER |
| 144250 | | | KUCHERA LOUIS | 07S | 20E | 14 | BBD | No | WELL | 29.00 | 9.50 | 22.00 | 10.00 | 30.00 | PUMP | 10/14/1991 | DOMESTIC |
| 214213 | | | DOWNING DAVID | 07S | 20E | 14 | BC | No | WELL | 40.00 | 12.00 | | 12.00 | 70.00 | AIR | 7/26/2004 | DOMESTIC |
| 161393 | | | MEGERTH MARK A. | 07S | 20E | 14 | BC | No | WELL | 38.00 | 9.00 | | 9.00 | 70.00 | AIR | 4/4/1996 | DOMESTIC |
| 104670 | | | MILLER WILLIAM | 07S | 20E | 14 | BC | No | WELL | 62.00 | 10.00 | 60.00 | | 40.00 | AIR | 7/6/1979 | DOMESTIC |
| 104669 | | | REPAC-GREENLEAF | 07S | 20E | 14 | BC | No | WELL | 24.00 | | | | 20.00 | PUMP | 8/12/1974 | DOMESTIC |
| 216384 | | | MARANCIK JOHN | 07S | 20E | 14 | BCA | No | WELL | 39.00 | 17.00 | | 17.00 | 40.00 | AIR | 10/27/2004 | DOMESTIC |
| 302488 | | | MORGAN, ED | 07S | 20E | 14 | BCA | No | WELL | 39.00 | 10.50 | | 10.50 | 100.00 | AIR | 7/29/2019 | DOMESTIC |
| 104673 | | | FRIZE RONALD L. | 07S | 20E | 14 | BCB | No | WELL | 29.00 | 12.00 | | 12.00 | 30.00 | PUMP | 7/30/1988 | DOMESTIC |
| 169882 | | C105943-00 | GATHJE DAN | 07S | 20E | 14 | BCB | No | WELL | 76.00 | 13.00 | | | 100.00 | AIR | 9/1/1998 | DOMESTIC |
| 104671 | | C016774-00 | KENT, ARMAS | 07S | 20E | 14 | BCB | No | WELL | 25.00 | 4.00 | 22.00 | | 25.00 | OTHER | 10/21/1977 | DOMESTIC |
| 161392 | | | MCDONNELL SHANE | 07S | 20E | 14 | BCC | No | WELL | 25.00 | 4.50 | 25.00 | 4.50 | 30.00 | AIR | 8/3/1994 | DOMESTIC |
| 302490 | | | MORGAN, ED | 07S | 20E | 14 | BCC | No | WELL | 39.00 | 10.50 | | 10.50 | 100.00 | AIR | 7/30/2019 | DOMESTIC |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 192982 | | CLENNEY CLANCY | 07S | 20E | 14 | BCD | No | WELL | 80.00 | 16.00 | | 16.00 | 100.00 | AIR | 9/24/2001 | DOMESTIC |
| 162756 | C101451-00 | HENSON DENISE | 07S | 20E | 14 | BDDA | Yes | WELL | 180.00 | 122.00 | 175.00 | 122.00 | 16.00 | AIR | 5/7/1997 | DOMESTIC |
| 282588 | | SPERO, BOB | 07S | 20E | 14 | C | No | WELL | 39.00 | 18.00 | | 18.00 | 60.00 | AIR | 5/5/2015 | DOMESTIC |
| 205957 | 30007536 | BECKER GARY | 07S | 20E | 14 | CB | No | WELL | 40.00 | 8.00 | | 8.00 | 85.00 | AIR | 5/30/2003 | DOMESTIC |
| 205956 | C30007537 | BECKER GARY* WELL #2 | 07S | 20E | 14 | CB | No | WELL | 40.00 | 8.00 | | 8.00 | 70.00 | AIR | 5/30/2003 | DOMESTIC |
| 161380 | | DICKHAUSEN MARK | 07S | 20E | 14 | CBA | No | WELL | 38.00 | 7.00 | 35.00 | 7.00 | 60.00 | AIR | 10/30/1996 | DOMESTIC |
| 126440 | | DORSETT JAMES H | 07S | 20E | 14 | CBC | No | WELL | 140.00 | 9.00 | 135.00 | 9.00 | 18.00 | AIR | 9/25/1991 | DOMESTIC |
| 214216 | | IRISH RUSSEL | 07S | 20E | 14 | CC | No | WELL | 40.00 | 16.00 | | 16.00 | 30.00 | AIR | 9/7/2004 | DOMESTIC |
| 268462 | | RONNING, KELLY WAYNE | 07S | 20E | 14 | CC | No | WELL | 40.00 | 12.00 | | 12.00 | 30.00 | AIR | 12/16/2010 | DOMESTIC |
| 258562 | | STOUT DICK | 07S | 20E | 14 | CC | No | WELL | 40.00 | 10.00 | | 10.00 | 40.00 | AIR | 11/1/2009 | DOMESTIC |
| 275617 | | STOUT, DICK | 07S | 20E | 14 | CC | No | WELL | 40.00 | 12.00 | | 12.00 | 30.00 | AIR | 1/31/2013 | DOMESTIC |
| 283041 | | STOUT, DICK | 07S | 20E | 14 | CC | No | WELL | 39.00 | 11.50 | | 11.50 | 60.00 | AIR | 6/15/2015 | DOMESTIC |
| 258486 | | WOODLANDS ON ROCK CREEK LLC | 07S | 20E | 14 | CC | No | WELL | 31.00 | 5.00 | | 5.00 | 100.00 | AIR | 7/14/2009 | DOMESTIC |
| 104674 | | SCHENK GALE | 07S | 20E | 14 | CCB | No | WELL | 41.00 | 9.00 | 20.00 | | 50.00 | BAILER | 8/25/1975 | DOMESTIC |
| 285347 | | STOUT, DICK | 07S | 20E | 14 | CCB | No | WELL | 39.00 | 15.00 | | 15.00 | 100.00 | AIR | 11/2/2015 | DOMESTIC |
| 285348 | | STOUT, DICK | 07S | 20E | 14 | CCB | No | WELL | 39.00 | 13.00 | | 13.00 | 100.00 | AIR | 11/2/2015 | DOMESTIC |
| 289166 | | STOUT, DICK | 07S | 20E | 14 | CCB | No | WELL | 39.00 | 14.50 | | 14.50 | 100.00 | AIR | 9/21/2016 | DOMESTIC |
| 242555 | | MCDOWELL AARON AND TAM | 07S | 20E | 14 | CCC | No | WELL | 40.00 | 17.00 | | 17.00 | 60.00 | AIR | 3/4/2008 | DOMESTIC |
| 283314 | | SPERO, BOB | 07S | 20E | 14 | CCC | No | WELL | 38.50 | 8.00 | | 8.00 | 100.00 | AIR | 7/9/2015 | DOMESTIC |
| 192983 | | THE CITY OF RED LODGE | 07S | 20E | 14 | CCC | No | WELL | 60.00 | 9.00 | 10.00 | 9.00 | 30.00 | PUMP | 8/10/2001 | OTHER |
| 268454 | | STOUT, RICHARD O | 07S | 20E | 14 | CD | No | WELL | 40.00 | 10.00 | | 10.00 | 30.00 | AIR | 12/13/2010 | DOMESTIC |
| 268463 | | STOUT, RICHARD O. | 07S | 20E | 14 | CD | No | WELL | 40.00 | 10.00 | | 10.00 | 30.00 | AIR | 12/13/2010 | DOMESTIC |
| 104675 | | SANQUIST LLOYD R. | 07S | 20E | 14 | DABB | No | WELL | 25.00 | | | | 5.00 | OTHER | 7/15/1944 | DOMESTIC |
| 276659 | | DELONO, TEDDY BONLEY | 07S | 20E | 15 | | No | WELL | 25.00 | 4.00 | | 4.00 | 15.00 | AIR | 5/27/2003 | DOMESTIC |
| 167891 | C101341-00 | ROUND BARN RESTAURANT | 07S | 20E | 15 | ADCD | No | WELL | 81.00 | 2.00 | 18.00 | 2.00 | 25.00 | PUMP | 6/17/1995 | PUBLIC WATER SUPPLY |
| 142585 | | LUOMA RON | 07S | 20E | 15 | BB | No | WELL | 58.00 | 9.00 | 55.00 | 9.00 | 50.00 | AIR | 10/12/1993 | DOMESTIC |
| 192984 | | WHITE ARNIE | 07S | 20E | 15 | BBD | No | WELL | 37.00 | 9.00 | | 9.00 | 30.00 | AIR | 8/21/2001 | DOMESTIC |
| 201846 | | LANTTA CARL D | 07S | 20E | 15 | BCD | No | WELL | 38.00 | 10.00 | | 10.00 | 50.00 | AIR | 11/14/2002 | DOMESTIC |
| 295911 | | CARROL, DON/TRAUTE, PARRIE | 07S | 20E | 15 | CBD | No | WELL | 39.00 | 11.00 | | 11.00 | 50.00 | AIR | 1/30/2018 | DOMESTIC |
| 144251 | | WALTERS TOM | 07S | 20E | 15 | CCC | No | WELL | 20.00 | 2.00 | 15.00 | | 25.00 | AIR | 7/31/1984 | DOMESTIC |
| 104676 | | PRATHER JACK | 07S | 20E | 15 | CCCC | Yes | WELL | 59.00 | 3.00 | 59.00 | | 50.00 | AIR | 5/22/1981 | |
| 285099 | | BEARTOOTH BILLINGS CLINIC SPRING | 07S | 20E | 15 | CDD | Yes | SPRING | | | | | | | | |
| 241057 | | GRIZZLY PEAK ANIMAL HOSPITAL | 07S | 20E | 15 | D | No | WELL | 60.00 | 24.00 | | 24.00 | 20.00 | AIR | 11/5/2007 | DOMESTIC |
| 252443 | | GRIZZLY PEAK ANIMAL HOSPITAL MOUNTAIN LLC | 07S | 20E | 15 | D | No | WELL | 60.00 | 24.00 | | 16.00 | 25.00 | AIR | 11/5/2007 | DOMESTIC |
| 136039 | | FOX GREGORY M. | 07S | 20E | 15 | DA | No | WELL | 34.00 | 5.00 | 30.00 | 5.00 | 60.00 | AIR | 6/21/1993 | DOMESTIC |
| 142586 | | WRIGHT HARRY | 07S | 20E | 15 | DA | No | WELL | 70.00 | 6.00 | 65.00 | 6.00 | 40.00 | AIR | 12/16/1993 | DOMESTIC |
| 140287 | | FAVID FRED | 07S | 20E | 15 | DAA | No | WELL | 29.00 | 9.00 | 29.00 | 9.00 | 25.00 | AIR | 5/28/1993 | DOMESTIC |
| 161375 | | MARYOTT MANFRED & MARY LOU | 07S | 20E | 15 | DAC | No | WELL | 31.00 | 13.00 | 31.00 | 13.00 | 20.00 | AIR | 9/4/1995 | DOMESTIC |
| 298648 | | RUE, DENNY & MARIE | 07S | 20E | 15 | DAC | No | WELL | 38.00 | 6.00 | | 6.00 | 100.00 | AIR | 9/13/2018 | DOMESTIC |
| 104678 | | FANSHAWE JOHN R. | 07S | 20E | 15 | DAD | No | WELL | 30.00 | 5.00 | 9.00 | | 40.00 | BAILER | 6/3/1974 | DOMESTIC |
| 282862 | | GRAY, ROBERT | 07S | 20E | 15 | DC | No | WELL | 45.00 | 27.00 | | 27.00 | 50.00 | AIR | 6/3/2015 | DOMESTIC |
| 253500 | | BEARTOOTH HOSPITAL AND HEALTH CENTER | 07S | 20E | 15 | DCA | No | WELL | 29.50 | 17.70 | | 17.70 | 30.00 | AIR | 9/17/2009 | GEOTHERMAL-INJECTION |
| 253503 | | BEARTOOTH HOSPITAL AND HEALTH CENTER | 07S | 20E | 15 | DCA | No | WELL | 32.50 | 18.00 | | 18.00 | 60.00 | AIR | 9/15/2009 | GEOTHERMAL-INJECTION |
| 258203 | | BEARTOOTH HOSPITAL AND HEALTH CENTER | 07S | 20E | 15 | DCA | No | WELL | 34.00 | 13.00 | | 13.00 | 80.00 | AIR | 6/2/2010 | IRRIGATION |
| 293843 | | MYERS, DEAN | 07S | 20E | 15 | DCB | No | WELL | 39.00 | 20.00 | | 20.00 | 35.00 | AIR | 8/16/2017 | IRRIGATION |
| 283964 | | TYPOLT, TY AND JEAN | 07S | 20E | 15 | DCC | No | WELL | 42.00 | 26.00 | | 26.00 | 40.00 | AIR | 8/12/2015 | DOMESTIC |
| 104679 | | PATES SEABROOK | 07S | 20E | 15 | DD | No | WELL | 28.00 | 5.50 | | 5.50 | 35.00 | PUMP | 10/4/1988 | DOMESTIC |
| 240135 | | TETRA TECH | 07S | 20E | 15 | DD | No | WELL | 44.00 | 13.67 | | 13.67 | 40.00 | AIR | 11/9/2007 | OTHER |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 136038 | | | KUNGAS PATRICIA | 07S | 20E | 15 | DDA | No | WELL | 90.00 | 33.00 | 85.00 | 15.00 | 15.00 | AIR | 6/18/1993 | DOMESTIC |
| 253502 | | | BEARTOOTH HOSPITAL AND HEALTH CENTER | 07S | 20E | 15 | DDB | No | WELL | 33.00 | 14.50 | | 14.50 | 100.00 | AIR | 9/18/2009 | GEOTHERMAL-INJECTION |
| 274823 | | | BEARTOOTH BILLINGS CLINIC - HOSPITAL | 07S | 20E | 15 | DDBC | No | WELL | 38.00 | 13.00 | | 13.00 | 60.00 | AIR | 9/3/2013 | IRRIGATION |
| 104681 | | | FANSHAWE JOHN R. | 07S | 20E | 15 | DDD | No | WELL | 38.00 | 4.00 | 35.00 | | 35.00 | AIR | 8/27/1985 | DOMESTIC |
| 104680 | | | FANSHAWE JOHN R. | 07S | 20E | 15 | DDD | No | WELL | 30.00 | 5.00 | 10.00 | | 40.00 | BAILER | 6/4/1974 | DOMESTIC |
| 104716 | | | FRANK JOHN G | 07S | 20E | 21 | | No | WELL | 30.00 | 28.00 | | | 10.00 | OTHER | 1/1/1928 | DOMESTIC |
| 104717 | | | FRANK JOHN G | 07S | 20E | 21 | | No | WELL | 30.00 | | | | 10.00 | OTHER | | DOMESTIC |
| 290187 | | | BEUG, JOHN | 07S | 20E | 21 | AAC | No | WELL | 60.00 | 13.00 | | 13.00 | 64.00 | AIR | 3/29/2002 | STOCKWATER |
| 196857 | | | ROE TK | 07S | 20E | 21 | ADA | No | WELL | 60.00 | 21.00 | | 21.00 | 60.00 | AIR | 3/28/2002 | IRRIGATION |
| 290017 | | | BRATTON, NEIL A. | 07S | 20E | 21 | BAA | No | WELL | 50.00 | 8.00 | | 8.00 | 60.00 | AIR | 5/25/2000 | DOMESTIC |
| 172603 | | | FLECK KURT | 07S | 20E | 21 | BAA | No | WELL | 30.00 | | 28.00 | | 20.00 | AIR | 5/15/1998 | IRRIGATION |
| 251314 | | | BILL AND MARGERT KARAS RC-14 | 07S | 20E | 21 | BBCD | Yes | WELL | 41.00 | 12.00 | | 12.00 | 50.00 | PUMP | 7/15/2009 | MONITORING |
| 241618 | | | MARTINS KIM | 07S | 20E | 21 | CA | No | WELL | 60.00 | 10.00 | | 10.00 | 25.00 | AIR | 11/29/2007 | IRRIGATION |
| 290059 | | | RATTIN, HUGO | 07S | 20E | 21 | CA | No | WELL | 40.00 | 7.00 | | 6.00 | 75.00 | AIR | 6/24/2000 | DOMESTIC |
| 104718 | | 15389 | RANCH KARAS | 07S | 20E | 21 | CBB | No | WELL | 40.00 | 20.00 | 40.00 | | 50.00 | AIR | 1/1/1977 | STOCKWATER |
| 104719 | | | KINGMAN HENRY AND MARILYN | 07S | 20E | 21 | DBCD | Yes | WELL | 37.00 | 9.00 | 20.00 | | 40.00 | BAILER | 1/1/1966 | DOMESTIC |
| 253817 | | | DRAPES RANCH CO. | 07S | 20E | 21 | DDA | No | WELL | 50.00 | 10.53 | | | | | 10/23/2009 | MONITORING |
| 290094 | | | LINDKE, BOB | 07S | 20E | 22 | | No | WELL | 60.00 | 6.00 | | | | | 8/7/2001 | DOMESTIC |
| 247364 | | | NIENABER FRANK | 07S | 20E | 22 | | No | WELL | 49.00 | 40.00 | | | | | 1/15/2008 | IRRIGATION |
| 290076 | | | SMITH, ROD | 07S | 20E | 22 | | No | WELL | 60.00 | 18.00 | | 18.00 | 100.00 | AIR | 5/24/2001 | IRRIGATION |
| 290092 | | | WALMSLEY, JOHN | 07S | 20E | 22 | | No | WELL | 60.00 | 24.00 | | 24.00 | 30.00 | AIR | 8/9/2001 | DOMESTIC |
| 274822 | | | BEARTOOTH BILLINGS CLINC - WILLOWS | 07S | 20E | 22 | AAB | No | WELL | 39.00 | 17.00 | | 17.00 | 60.00 | AIR | 9/3/2013 | IRRIGATION |
| 253501 | | | BEARTOOTH HOSPITAL AND HEALTH CENTER | 07S | 20E | 22 | AAB | No | WELL | 63.00 | 13.60 | | 13.60 | 300.00 | AIR | 9/9/2009 | GEOTHERMAL-EXTRACTION |
| 253499 | | | BEARTOOTH HOSPITAL AND HEALTH CENTER | 07S | 20E | 22 | AAB | No | WELL | 63.00 | 15.00 | | 15.00 | 300.00 | AIR | 9/9/2009 | GEOTHERMAL-EXTRACTION |
| 104720 | | | AVERILL TOM | 07S | 20E | 22 | AAC | No | WELL | 30.00 | 10.00 | 29.00 | | 30.00 | AIR | 1/30/1978 | DOMESTIC |
| 101607 | | | AVERILL, TOM | 07S | 20E | 22 | AAC | No | WELL | 30.00 | 12.00 | 29.00 | | 35.00 | AIR | 2/3/1978 | DOMESTIC |
| 204597 | | | ROSE ELLON | 07S | 20E | 22 | ABC | No | WELL | 45.00 | 18.00 | | 18.00 | 50.00 | AIR | 6/23/2003 | DOMESTIC |
| 290122 | | | HAAR, JIM | 07S | 20E | 22 | ABCB | No | WELL | 60.00 | 19.00 | | 19.00 | 60.00 | AIR | 5/4/2001 | DOMESTIC |
| 243799 | | | JACKSON GENE | 07S | 20E | 22 | AC | No | WELL | 57.00 | 22.00 | | 22.00 | 25.00 | AIR | 3/17/2008 | IRRIGATION |
| 237227 | | | OLDS WALLY | 07S | 20E | 22 | AC | No | WELL | 50.00 | 18.00 | | 18.00 | 30.00 | AIR | 2/23/2007 | IRRIGATION |
| 293845 | | | BERNHART, GORDON | 07S | 20E | 22 | ACC | No | WELL | 46.00 | 22.00 | | 22.00 | 20.00 | AIR | 8/16/2017 | IRRIGATION |
| 218534 | | | NORBY ALLEN | 07S | 20E | 22 | ACCB | No | WELL | 55.00 | 35.00 | | 35.00 | 25.00 | AIR | 2/16/2005 | IRRIGATION |
| 171073 | | | MOORE MARK | 07S | 20E | 22 | ACD | No | WELL | 33.00 | 11.00 | | 11.00 | 80.00 | AIR | 9/29/1997 | DOMESTIC |
| 104721 | | | CASTAGNE BROS. | 07S | 20E | 22 | AD | No | WELL | 10.00 | 7.00 | | | 5.00 | OTHER | 1/1/1910 | DOMESTIC |
| 172605 | | | REITZ TOM | 07S | 20E | 22 | ADD | No | WELL | 25.00 | 10.00 | 22.00 | 10.00 | 15.00 | AIR | 11/12/1998 | DOMESTIC |
| 221842 | | | LANGLAS HOMES | 07S | 20E | 22 | B | No | WELL | 52.00 | 4.00 | | 4.00 | 50.00 | AIR | 6/1/2005 | IRRIGATION |
| 234572 | | | RICHARDS COURT | 07S | 20E | 22 | BA | No | WELL | 40.00 | 6.00 | | 6.00 | 50.00 | AIR | 6/29/2006 | IRRIGATION |
| 268082 | | | NEIBAUER, JEREMY | 07S | 20E | 22 | BAB | No | WELL | 44.00 | 15.00 | | 15.00 | 50.00 | AIR | 6/8/2012 | DOMESTIC |
| 172606 | | | URBAN ART | 07S | 20E | 22 | BAB | No | WELL | 28.50 | 5.00 | | 5.00 | 60.00 | AIR | 10/30/1998 | DOMESTIC |
| 298001 | | | WYSS, CURT | 07S | 20E | 22 | BAC | No | WELL | 39.00 | 9.00 | | 9.00 | 60.00 | AIR | 7/30/2018 | IRRIGATION |
| 164281 | | 102151 | EVANS LEWY JR | 07S | 20E | 22 | BACD | Yes | WELL | 38.50 | 9.00 | | | 60.00 | AIR | 9/10/1997 | IRRIGATION |
| 301954 | | | LORD, RUSSELL | 07S | 20E | 22 | BAD | No | WELL | 38.50 | 21.00 | | 21.00 | 40.00 | AIR | 7/2/2019 | DOMESTIC |
| 240136 | | | TETRA TECH INC. | 07S | 20E | 22 | BB | No | WELL | 43.50 | 20.00 | | 20.00 | 40.00 | AIR | 11/8/2007 | OTHER |
| 274271 | | | CRELLIN, RANDY AND LEE | 07S | 20E | 22 | BBB | No | WELL | 39.00 | 18.00 | | 18.00 | 25.00 | AIR | 4/4/2013 | DOMESTIC |
| 274266 | | | MACKAY, HELEN | 07S | 20E | 22 | BBB | No | WELL | 39.00 | 18.00 | | 18.00 | 25.00 | AIR | 4/4/2013 | DOMESTIC |
| 274265 | | | LINDE, BRIAN | 07S | 20E | 22 | BBC | No | WELL | 39.00 | 21.00 | | 21.00 | 25.00 | AIR | 4/4/2013 | DOMESTIC |
| 104722 | | C021752-00 | URBAN, ARTHUR | 07S | 20E | 22 | BBC | No | WELL | 32.00 | 6.00 | 32.00 | | 20.00 | AIR | 9/16/1978 | DOMESTIC |
| 243800 | | | CANHAM BILL | 07S | 20E | 22 | BC | No | WELL | 57.00 | 20.00 | | 20.00 | 25.00 | AIR | 3/18/2008 | IRRIGATION |
| 226427 | | | GOLDBERG CLYDE | 07S | 20E | 22 | BC | No | WELL | 44.00 | 8.00 | | | 35.00 | AIR | 11/2/2005 | DOMESTIC |
| 201848 | | C30007510 | ROE TK | 07S | 20E | 22 | BC | No | WELL | 60.00 | 21.00 | | | 60.00 | AIR | 3/28/2002 | IRRIGATION |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 298647 | | PETERSON, DEAN | 07S | 20E | 22 | BCA | No | WELL | 39.00 | 5.00 | 5.00 | 100.00 | AIR | 9/12/2018 | IRRIGATION |
| 284684 | | WILLIAMS, KAY | 07S | 20E | 22 | BCA | No | WELL | 39.00 | 5.50 | 5.50 | 100.00 | AIR | 10/1/2015 | DOMESTIC |
| 196635 | | SACKS BARBARA L. | 07S | 20E | 22 | BCB | No | WELL | 38.00 | 8.00 | 8.00 | 60.00 | AIR | 6/13/2002 | DOMESTIC |
| 196858 | C30003036 | BEUG JOHN | 07S | 20E | 22 | BCBB | Yes | WELL | 60.00 | 13.00 | 13.00 | 64.00 | AIR | 4/3/2008 | STOCKWATER |
| 172607 | C108084-00 | CREEKSIDE TOWNHOMES ASSN | 07S | 20E | 22 | BCC | No | WELL | 48.00 | 8.00 | 8.00 | 50.00 | AIR | 7/15/1997 | IRRIGATION |
| 301699 | | SOUDERS, CAROL | 07S | 20E | 22 | BCC | No | WELL | 39.00 | 9.00 | 9.00 | 100.00 | AIR | 6/14/2019 | DOMESTIC |
| 290077 | | ECKHOF, LINDA | 07S | 20E | 22 | BD | No | WELL | 60.00 | 12.00 | 12.00 | 40.00 | AIR | 6/6/2001 | DOMESTIC |
| 201849 | | KELLY DARCY | 07S | 20E | 22 | BD | No | WELL | 60.00 | 14.00 | 14.00 | 45.00 | AIR | 6/25/2002 | IRRIGATION |
| 251943 | | KICKNESS RD | 07S | 20E | 22 | BD | No | WELL | 50.00 | 20.00 | 20.00 | 20.00 | AIR | 4/24/2008 | IRRIGATION |
| 258398 | | LANGLAS STEVE | 07S | 20E | 22 | BD | No | WELL | 40.00 | 4.00 | 4.00 | 40.00 | AIR | 9/14/2010 | IRRIGATION |
| 243770 | | LINDALL JUDY | 07S | 20E | 22 | BD | No | WELL | 53.00 | 25.00 | 25.00 | 25.00 | AIR | 4/30/2008 | IRRIGATION |
| 258255 | | RONGLAS STEVE | 07S | 20E | 22 | BD | No | WELL | 40.00 | 4.00 | 4.00 | 40.00 | AIR | 9/14/2010 | IRRIGATION |
| 243755 | | STREET JUDY | 07S | 20E | 22 | BD | No | WELL | 56.00 | 10.00 | 10.00 | 30.00 | AIR | 2/11/2008 | IRRIGATION |
| 285873 | | JOHNSON, JASEN | 07S | 20E | 22 | BDA | No | WELL | 39.00 | 25.00 | 20.00 | 20.00 | AIR | 1/22/2016 | DOMESTIC |
| 295912 | | MONAHAN, BRIAN | 07S | 20E | 22 | BDC | No | WELL | 39.00 | 22.00 | 22.00 | 30.00 | AIR | 1/30/2018 | DOMESTIC |
| 247574 | | SMITH PEGGY | 07S | 20E | 22 | BDD | No | WELL | 47.00 | 23.00 | 23.00 | 25.00 | AIR | 8/6/2008 | IRRIGATION |
| 289851 | | WALTER, KELLY | 07S | 20E | 22 | BDD | No | WELL | 40.00 | 16.00 | 16.00 | 40.00 | AIR | 8/22/2000 | IRRIGATION |
| 246936 | | KEEFE WILLIAM AND CALLIE | 07S | 20E | 22 | BDDD | No | WELL | 60.00 | 28.00 | 28.00 | 40.00 | AIR | 2/18/2004 | DOMESTIC |
| 278349 | | FIVELAND, TERRILL | 07S | 20E | 22 | C | No | WELL | 39.00 | 17.00 | 17.00 | 40.00 | AIR | 6/5/2014 | DOMESTIC |
| 234554 | | HAAR JIM | 07S | 20E | 22 | CA | No | WELL | 60.00 | 8.00 | 8.00 | 60.00 | AIR | 6/8/2006 | IRRIGATION |
| 249848 | | JACKSON GENE | 07S | 20E | 22 | CA | No | WELL | 57.00 | 22.00 | 22.00 | 75.00 | AIR | 3/17/2008 | IRRIGATION |
| 258594 | | LANGLAS DAVE | 07S | 20E | 22 | CA | No | WELL | 60.00 | 10.00 | 10.00 | 60.00 | AIR | 7/7/2010 | IRRIGATION |
| 241654 | | LINTON BUD | 07S | 20E | 22 | CA | No | WELL | 60.00 | 10.00 | 10.00 | 40.00 | AIR | 1/7/2008 | IRRIGATION |
| 241655 | | LOHMEYER/PILATI | 07S | 20E | 22 | CA | No | WELL | 60.00 | 10.00 | 10.00 | 40.00 | AIR | 1/3/2007 | IRRIGATION |
| 275618 | | OKIMOTO, MYRON | 07S | 20E | 22 | CA | No | WELL | 52.00 | 31.00 | 31.00 | 20.00 | AIR | 8/22/2013 | IRRIGATION |
| 201850 | | RESELAND JO | 07S | 20E | 22 | CA | No | WELL | 60.00 | 8.50 | 8.50 | 85.00 | AIR | 7/18/2002 | IRRIGATION |
| 243756 | | WALLENDER JUDY | 07S | 20E | 22 | CA | No | WELL | 60.00 | 10.00 | 10.00 | 30.00 | AIR | 2/12/2008 | IRRIGATION |
| 247649 | | BRINKER MARY | 07S | 20E | 22 | CAA | No | WELL | 47.00 | 25.00 | 25.00 | 40.00 | AIR | 6/20/2008 | DOMESTIC |
| 207483 | | COTLER IAN | 07S | 20E | 22 | CAA | No | WELL | 38.00 | 8.00 | 8.00 | 60.00 | AIR | 9/24/2003 | DOMESTIC |
| 204264 | | OSTLAND SCOTT AND TRACI | 07S | 20E | 22 | CAA | No | WELL | 51.00 | 11.00 | 11.00 | 70.00 | AIR | 6/25/2003 | IRRIGATION |
| 239554 | | ROLLER DAN AND KATHY | 07S | 20E | 22 | CAA | No | WELL | 39.00 | 19.00 | 19.00 | 40.00 | AIR | 8/6/2007 | DOMESTIC |
| 252237 | | SZCZUTKOWSKI, PEGGY | 07S | 20E | 22 | CAA | No | WELL | 50.00 | 32.00 | 32.00 | 25.00 | AIR | 8/20/2009 | DOMESTIC |
| 258210 | | CHRISTENSEN JODIE, JUDY, BRYCE AND CHRISTINE | 07S | 20E | 22 | CAB | No | WELL | 39.00 | 16.00 | 16.00 | 40.00 | AIR | 7/12/2010 | DOMESTIC |
| 212666 | | HEINESS JIM AND KAREN | 07S | 20E | 22 | CAB | No | WELL | 35.00 | 16.00 | 16.00 | 50.00 | AIR | 5/26/2004 | DOMESTIC |
| 274287 | | JOHNSON, JOE | 07S | 20E | 22 | CAB | No | WELL | 39.00 | 8.50 | 8.50 | 40.00 | AIR | 6/28/2013 | DOMESTIC |
| 284686 | | MINER, BOB | 07S | 20E | 22 | CAB | No | WELL | 39.00 | 17.00 | 17.00 | 40.00 | AIR | 10/6/2015 | DOMESTIC |
| 302487 | | PETERSON, ROY | 07S | 20E | 22 | CAB | No | WELL | 39.00 | 11.50 | 11.50 | 60.00 | AIR | 7/29/2019 | DOMESTIC |
| 258233 | | RICHARDS JAMES | 07S | 20E | 22 | CAB | No | WELL | 39.00 | 18.00 | 18.00 | 40.00 | AIR | 5/18/2010 | DOMESTIC |
| 297942 | | SMITH, RHETT | 07S | 20E | 22 | CAC | No | WELL | 39.00 | 13.00 | 13.00 | 40.00 | AIR | 7/26/2018 | IRRIGATION |
| 291457 | | WESTWOOD, DAVID E. | 07S | 20E | 22 | CAC | No | WELL | 39.00 | 28.00 | 28.00 | 20.00 | AIR | 3/3/2017 | DOMESTIC |
| 291456 | | ZWIENER, TERRY | 07S | 20E | 22 | CAC | No | WELL | 39.00 | 27.00 | 27.00 | 20.00 | AIR | 3/2/2017 | DOMESTIC |
| 258208 | | ANDERSON WALLY | 07S | 20E | 22 | CAD | No | WELL | 50.00 | 34.00 | 34.00 | 30.00 | AIR | 7/26/2010 | DOMESTIC |
| 242570 | | BAIRD JIM | 07S | 20E | 22 | CAD | No | WELL | 50.00 | 34.00 | 34.00 | 20.00 | AIR | 3/3/2008 | DOMESTIC |
| 242535 | | FLAHERTY TOM | 07S | 20E | 22 | CAD | No | WELL | 52.00 | 34.00 | 34.00 | 30.00 | AIR | 2/29/2008 | DOMESTIC |
| 286182 | | GRAY, LONNA | 07S | 20E | 22 | CAD | No | WELL | 53.00 | 40.00 | 40.00 | 20.00 | AIR | 2/16/2016 | DOMESTIC |
| 293426 | | HOSSNER, LLOYD | 07S | 20E | 22 | CAD | No | WELL | 39.00 | 24.00 | 24.00 | 20.00 | AIR | 7/24/2017 | IRRIGATION |
| 242556 | | KANE GARY S. | 07S | 20E | 22 | CAD | No | WELL | 50.00 | 36.50 | 36.50 | 20.00 | AIR | 3/5/2008 | DOMESTIC |
| 223110 | | ALEKSICH SKIP | 07S | 20E | 22 | CB | No | WELL | 60.00 | 8.00 | 8.00 | 60.00 | AIR | 9/20/2005 | IRRIGATION |
| 243757 | | BOOTH, MAUREEN | 07S | 20E | 22 | CB | No | WELL | 60.00 | 10.00 | 10.00 | 30.00 | AIR | 2/14/2008 | IRRIGATION |

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| 226255 | | | DILLON DEVELOPMENT | 07S | 20E | 22 | CB | No | WELL | 60.00 | 10.00 | | 10.00 | 60.00 | AIR | 9/20/2005 | DOMESTIC |
| 243772 | | C30042946 | KOSKOVICH, JERRY | 07S | 20E | 22 | CB | No | WELL | 60.00 | 20.00 | | 20.00 | 30.00 | AIR | 4/28/2008 | IRRIGATION |
| 243763 | | | MILLER WARD | 07S | 20E | 22 | CB | No | WELL | 60.00 | 10.00 | | 10.00 | 35.00 | AIR | 2/5/2008 | IRRIGATION |
| 243759 | | | SPIRES @ RED LODGE HOME OWNERS ASSOC | 07S | 20E | 22 | CB | No | WELL | 60.00 | 10.00 | | 10.00 | 40.00 | AIR | 2/4/2008 | IRRIGATION |
| 104723 | | | CANFIELD TINY | 07S | 20E | 22 | CBB | No | WELL | 35.00 | 20.00 | 35.00 | | 25.00 | OTHER | 1/1/1978 | UNKNOWN |
| 265694 | | | MARTIN, LARRY AND RUTH | 07S | 20E | 22 | CBC | No | WELL | 39.00 | 23.00 | | 23.00 | 25.00 | AIR | 2/17/2012 | DOMESTIC |
| 247538 | | | ELK PARK I / ANDERSON, CATHY | 07S | 20E | 22 | CBD | No | WELL | 40.00 | 5.00 | | 5.00 | 60.00 | AIR | 7/12/2008 | DOMESTIC |
| 104724 | | | BARANKO LEON | 07S | 20E | 22 | CC | No | WELL | 38.00 | 8.00 | 38.00 | | 30.00 | AIR | 6/29/1983 | DOMESTIC |
| 131620 | | | BLANCH TED | 07S | 20E | 22 | CC | No | WELL | 45.00 | 20.00 | | 20.00 | 50.00 | AIR | 5/17/1989 | IRRIGATION |
| 268903 | | | WYSS, DIANNE | 07S | 20E | 22 | CCA | No | WELL | 39.00 | 8.00 | | 8.00 | 40.00 | AIR | 8/17/2012 | DOMESTIC |
| 258234 | | | BLAIR LESLIE | 07S | 20E | 22 | CCB | No | WELL | 39.00 | 10.00 | | 10.00 | 60.00 | AIR | 6/2/2010 | DOMESTIC |
| 176386 | | C108067-00 | COFFMAN WILLIS M | 07S | 20E | 22 | CCB | No | WELL | 40.00 | 30.00 | 32.00 | 32.00 | 20.00 | AIR | 5/6/1999 | IRRIGATION |
| 244778 | | | DANIEL DREW | 07S | 20E | 22 | CCB | No | WELL | 40.00 | 14.00 | | 14.00 | 60.00 | AIR | 5/29/2008 | DOMESTIC |
| 250706 | | | NEFF DENNIS B. | 07S | 20E | 22 | CCB | No | WELL | 39.00 | 13.00 | | 13.00 | 50.00 | AIR | 5/26/2009 | DOMESTIC |
| 244790 | | C30042943 | SORENSON CAROL LYN | 07S | 20E | 22 | CCB | No | WELL | 40.00 | 20.00 | | 20.00 | 25.00 | AIR | 5/20/2008 | DOMESTIC |
| 290101 | | | NORDSTROM, TIM | 07S | 20E | 22 | CCBB | No | WELL | 58.00 | 16.00 | | 16.00 | 60.00 | AIR | 7/12/2001 | DOMESTIC |
| 247576 | | | CLARK JIM AND MARTIE | 07S | 20E | 22 | CCC | No | WELL | 39.00 | 7.50 | | 7.50 | 100.00 | AIR | 7/23/2008 | DOMESTIC |
| 245396 | | | CLEPPER JAMES W | 07S | 20E | 22 | CCC | No | WELL | 40.00 | 9.00 | | 9.00 | 30.00 | AIR | 2/27/2008 | DOMESTIC |
| 242573 | | | CLEPPER JAMES, AND JIM CLARK | 07S | 20E | 22 | CCC | No | WELL | 40.00 | 9.00 | | 9.00 | 30.00 | AIR | 2/27/2008 | DOMESTIC |
| 248966 | | | CLUTTER VAUGHN & MARIE | 07S | 20E | 22 | CCC | No | WELL | 40.00 | 8.00 | | 8.00 | 40.00 | AIR | 6/20/2008 | DOMESTIC |
| 242537 | | C30042930 | EXLEY, JACK/OSMUN, CATHIE | 07S | 20E | 22 | CCC | No | WELL | 40.00 | 19.00 | | 19.00 | 30.00 | AIR | 2/27/2008 | DOMESTIC |
| 255018 | | | STANAWAY DON F. | 07S | 20E | 22 | CCC | No | WELL | 40.00 | 19.00 | | 19.00 | 40.00 | AIR | 1/18/2010 | DOMESTIC |
| 250701 | | | STEVENS MAC | 07S | 20E | 22 | CCC | No | WELL | 39.00 | 12.00 | | 12.00 | 40.00 | AIR | 5/27/2009 | DOMESTIC |
| 269651 | | | TATE, WALLY | 07S | 20E | 22 | CCD | No | WELL | 45.00 | 23.00 | | 23.00 | 30.00 | AIR | 9/25/2012 | DOMESTIC |
| 212140 | | | WALTER DELBERT | 07S | 20E | 22 | CCD | No | WELL | 60.00 | 34.00 | | 34.00 | 50.00 | AIR | 5/13/2004 | IRRIGATION |
| 201852 | | | BEAUMONT TRACY | 07S | 20E | 22 | CD | No | WELL | 60.00 | 19.50 | | 19.50 | 100.00 | AIR | 6/21/2002 | IRRIGATION |
| 268436 | | | CLAQUE , MARTY | 07S | 20E | 22 | CD | No | WELL | 60.00 | 34.00 | | 34.00 | 60.00 | AIR | 6/17/2011 | STOCKWATER |
| 243802 | | | ELK PARK TOWN HOMES | 07S | 20E | 22 | CD | No | WELL | 60.00 | 10.00 | | 10.00 | 30.00 | AIR | 2/15/2008 | IRRIGATION |
| 243774 | | | KIRK NANCY | 07S | 20E | 22 | CD | No | WELL | 60.00 | 15.00 | | 15.00 | 25.00 | AIR | 3/26/2008 | IRRIGATION |
| 209852 | | | L AND L BUILDERS | 07S | 20E | 22 | CD | No | WELL | 50.00 | 25.00 | | 15.00 | 20.00 | AIR | 2/25/2004 | IRRIGATION |
| 268425 | | | MCCLUSKEY, TODD AND DONNA | 07S | 20E | 22 | CD | No | WELL | 60.00 | 22.00 | | 22.00 | 60.00 | AIR | 8/3/2011 | IRRIGATION |
| 289774 | | | MCQUILLAN, JIM | 07S | 20E | 22 | CD | No | WELL | 40.00 | 12.00 | | 12.00 | 30.00 | AIR | 11/22/1999 | DOMESTIC |
| 243795 | | | OCHILTREE JIM | 07S | 20E | 22 | CD | No | WELL | 60.00 | 25.00 | | 25.00 | 20.00 | AIR | 3/16/2008 | IRRIGATION |
| 243775 | | C30043169 | POTTER WENDY | 07S | 20E | 22 | CD | No | WELL | 60.00 | 30.00 | | 30.00 | 20.00 | AIR | 3/27/2008 | IRRIGATION |
| 251938 | | | RED LODGE HOME OWNERS | 07S | 20E | 22 | CD | No | WELL | 60.00 | 15.00 | | 15.00 | 40.00 | AIR | 4/25/2008 | IRRIGATION |
| 268418 | | | ROI, STEVEN | 07S | 20E | 22 | CD | No | WELL | 60.00 | 37.00 | | 37.00 | 25.00 | AIR | 9/6/2011 | IRRIGATION |
| 268422 | | | SHUCK, MIKE | 07S | 20E | 22 | CD | No | WELL | 60.00 | 22.00 | | 22.00 | 60.00 | AIR | 9/3/2011 | IRRIGATION |
| 242552 | | | COLLINS JENNIFER | 07S | 20E | 22 | CDA | No | WELL | 48.00 | 36.00 | | 36.00 | 25.00 | AIR | 3/7/2008 | DOMESTIC |
| 242536 | | C30042929 | ERKENS JAMES A. | 07S | 20E | 22 | CDA | No | WELL | 50.00 | 36.00 | | 36.00 | 20.00 | AIR | 2/28/2008 | DOMESTIC |
| 247664 | | C300431580 | PETRY GEORGE | 07S | 20E | 22 | CDA | No | WELL | 50.00 | 39.00 | | 39.00 | 20.00 | AIR | 4/3/2008 | DOMESTIC |
| 242505 | | | PETRY GEORGE | 07S | 20E | 22 | CDA | No | WELL | 50.00 | 39.00 | | 39.00 | 20.00 | AIR | 4/3/2008 | DOMESTIC |
| 242504 | | C30043148 | PETRY, GEORGE | 07S | 20E | 22 | CDA | No | WELL | 53.00 | 41.00 | | 41.00 | 20.00 | AIR | 4/4/2008 | DOMESTIC |
| 289804 | | | MOORE, JERRY | 07S | 20E | 22 | CDB | No | WELL | 40.00 | | | 23.00 | 20.00 | AIR | 5/5/1999 | DOMESTIC |
| 216758 | | | RUFFIERS EMILE AND LUTITIA | 07S | 20E | 22 | CDBB | Yes | WELL | 55.00 | 31.66 | | | | OTHER | 4/3/2008 | COMMERCIAL |
| 268886 | | | BROWN, JIM AND DIANE | 07S | 20E | 22 | CDC | No | WELL | 39.00 | 15.00 | | 15.00 | 50.00 | AIR | 8/17/2012 | DOMESTIC |
| 291455 | | | HASH, CRAIG AND DENISE | 07S | 20E | 22 | CDC | No | WELL | 39.00 | 30.00 | | 30.00 | 15.00 | AIR | 3/1/2017 | DOMESTIC |
| 247552 | | | WILLIAMS, EDWARD / HEBERT, HOWARD | 07S | 20E | 22 | CDC | No | WELL | 46.00 | 17.00 | | 17.00 | 60.00 | AIR | 7/11/2008 | DOMESTIC |
| 250704 | | | AREND DAVE | 07S | 20E | 22 | CDD | No | WELL | 56.00 | 37.00 | | 37.00 | 30.00 | AIR | 5/26/2009 | COMMERCIAL |
| 244800 | | | FISHER JIM | 07S | 20E | 22 | CDD | No | WELL | 49.00 | 37.00 | | 37.00 | 30.00 | AIR | 5/21/2008 | DOMESTIC |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 283696 | | ROI, STEVE | 07S | 20E | 22 | CDD | No | WELL | 60.00 | 33.00 | | 33.00 | 40.00 | AIR | 7/27/2015 | DOMESTIC |
| 248942 | | SMITH TIM & MARLA | 07S | 20E | 22 | CDD | No | WELL | 48.00 | 29.00 | | 26.00 | 40.00 | AIR | 11/26/2008 | DOMESTIC |
| 156962 | 99193 | KANE GARY | 07S | 20E | 22 | D | No | WELL | 45.00 | 26.00 | 45.00 | 26.00 | 40.00 | AIR | 8/28/1995 | IRRIGATION |
| 104725 | 11525 | COBETTI FRANK | 07S | 20E | 22 | DA | No | WELL | 31.00 | 6.00 | 10.00 | | 20.00 | BAILER | 1/20/1977 | DOMESTIC |
| 223223 | | HICKS TIM | 07S | 20E | 22 | DA | No | WELL | 40.00 | 6.00 | | 6.00 | 30.00 | AIR | 11/22/2005 | DOMESTIC |
| 205959 | | HICKS TIM | 07S | 20E | 22 | DA | No | WELL | 40.00 | 5.00 | | 5.00 | 105.00 | AIR | 5/29/2003 | DOMESTIC |
| 290225 | | LEGNINI, ROBERT | 07S | 20E | 22 | DA | No | WELL | 40.00 | 5.00 | | 5.00 | 105.00 | AIR | 5/29/2003 | DOMESTIC |
| 258573 | | CADWELL LINDSEY | 07S | 20E | 22 | DB | No | WELL | 20.00 | 10.00 | | 10.00 | 30.00 | AIR | 4/22/2010 | IRRIGATION |
| 226240 | | CLINE MIKE | 07S | 20E | 22 | DB | No | WELL | 60.00 | 38.00 | | 38.00 | 30.00 | AIR | 5/18/2006 | IRRIGATION |
| 131622 | | CVC JOINT VENTURE * HANK CANNING TRAILER | 07S | 20E | 22 | DB | No | WELL | 40.00 | 7.00 | 38.00 | | 35.00 | AIR | 8/28/1986 | DOMESTIC |
| 131621 | | CVC JOINT VENTURE * SKIPS WELL | 07S | 20E | 22 | DB | No | WELL | 40.00 | 4.00 | 38.00 | | 35.00 | AIR | 6/28/1986 | DOMESTIC |
| 158423 | 99930 | STEVENSON MEL | 07S | 20E | 22 | DBC | No | WELL | 41.00 | 24.00 | 35.00 | | 40.00 | AIR | 9/5/1996 | DOMESTIC |
| 204556 | | CRAWFORD, BRIAN AND JENNIFER | 07S | 20E | 22 | DBCB | Yes | WELL | 44.00 | 28.00 | | 28.00 | 31.00 | AIR | 3/31/2000 | DOMESTIC |
| 163127 | | HUNTINGDON * TRL-7 | 07S | 20E | 22 | DC | No | WELL | 19.20 | | | | | OTHER | 12/5/1996 | MONITORING |
| 163129 | | HUNTINGDON * TRL-8 | 07S | 20E | 22 | DC | No | WELL | 18.90 | | | | | OTHER | 12/5/1996 | MONITORING |
| 163128 | | HUNTINGDON * TRL-9 | 07S | 20E | 22 | DC | No | WELL | 19.00 | | | | | OTHER | 12/5/1996 | MONITORING |
| 268424 | | LACKMAN, MARC | 07S | 20E | 22 | DC | No | WELL | 50.00 | 36.00 | | 36.00 | 5.00 | AIR | 4/19/2011 | IRRIGATION |
| 104728 | | MARTIN, CHARLES A. | 07S | 20E | 22 | DC | No | WELL | 39.00 | 9.00 | 12.00 | | 50.00 | AIR | 5/24/1985 | DOMESTIC |
| 144253 | | METZSCH ROBERT | 07S | 20E | 22 | DC | No | WELL | 30.00 | 5.00 | 25.00 | 5.00 | 50.00 | AIR | 9/16/1992 | DOMESTIC |
| 104726 | | MEYER DONALD E. | 07S | 20E | 22 | DC | No | WELL | 13.00 | 7.00 | 12.00 | | 29.00 | OTHER | 1/1/1972 | DOMESTIC |
| 104727 | 14744 | MOORE, MARK | 07S | 20E | 22 | DC | No | WELL | 28.00 | 7.00 | | | 70.00 | AIR | 5/25/1977 | UNKNOWN |
| 247663 | C30043164 | MOOS, GARY | 07S | 20E | 22 | DC | No | WELL | 60.00 | 35.00 | | 35.00 | 20.00 | AIR | 4/4/2008 | IRRIGATION |
| 149924 | | BREWER FRED & PEGGY | 07S | 20E | 22 | DCC | No | WELL | 35.00 | 9.00 | 25.00 | 9.00 | 40.00 | AIR | 10/21/1993 | DOMESTIC |
| 204140 | C30007590 | DIANE K MEYER TRUST | 07S | 20E | 22 | DCC | No | WELL | 38.50 | 12.00 | | 12.00 | 80.00 | AIR | 6/4/2003 | DOMESTIC |
| 204141 | | YOUNG LARRY AND PATRICA | 07S | 20E | 22 | DCC | No | WELL | 38.50 | 11.00 | | 11.00 | 80.00 | AIR | 6/3/2003 | DOMESTIC |
| 291994 | | HAUGE PROPERTIES LLC | 07S | 20E | 22 | DCD | No | WELL | 39.00 | 13.00 | | 13.00 | 100.00 | AIR | 4/14/2017 | IRRIGATION |
| 172608 | | JOHN LADVOHA ENTERPRISES | 07S | 20E | 22 | DCD | No | WELL | 37.00 | 13.00 | | 13.00 | 60.00 | AIR | 5/18/1998 | DOMESTIC |
| 132631 | 82777 | MEYER DON*WELL #1 | 07S | 20E | 22 | DCD | No | WELL | 41.00 | 11.00 | 39.00 | | 60.00 | AIR | 10/10/1992 | COMMERCIAL |
| 132670 | 82777 | MEYER DON*WELL #2 | 07S | 20E | 22 | DCD | No | WELL | 40.00 | 10.00 | 39.00 | 10.00 | 40.00 | AIR | 10/9/1992 | DOMESTIC |
| 218535 | | BEARTOOTH HOSPITAL | 07S | 20E | 22 | DD | No | WELL | 20.00 | 6.00 | 6.00 | 6.00 | 12.00 | PUMP | 2/11/2005 | MONITORING |
| 104729 | | CITY OF RED LODGE | 07S | 20E | 22 | DD | No | WELL | 77.00 | 25.00 | | 25.00 | 100.00 | PUMP | 8/1/1989 | IRRIGATION |
| 161371 | | CITY OF RED LODGE | 07S | 20E | 22 | DDC | No | WELL | 78.00 | 25.00 | 75.00 | 25.00 | 100.00 | AIR | 6/7/1994 | IRRIGATION |
| 290119 | | DOUGLAS, JEFF | 07S | 20E | 22 | DDDD | No | WELL | 40.00 | 13.00 | | | | | 5/16/2001 | IRRIGATION |
| 104730 | | YOUNG RALPH | 07S | 20E | 23 | ADBA | No | WELL | 16.00 | 4.00 | | | 450.00 | OTHER | 1/1/1890 | DOMESTIC |
| 898366 | | BARKR OCLOT-FOARD234 | 07S | 20E | 23 | BBAC | No | PETWELL | | | | | | | | |
| 179776 | | CITY OF RED LODGE * MW14 | 07S | 20E | 23 | BBB | No | WELL | 36.50 | 26.50 | 26.80 | 26.50 | 20.00 | PUMP | 12/10/1999 | MONITORING |
| 179777 | | CITY OF RED LODGE * MW15 | 07S | 20E | 23 | BBB | No | WELL | 40.00 | 28.00 | | | | PUMP | 12/10/1999 | MONITORING |
| 179778 | | CITY OF RED LODGE * MW12 | 07S | 20E | 23 | BBC | No | WELL | 40.00 | 29.00 | 29.30 | 29.00 | 20.00 | PUMP | 12/10/1999 | MONITORING |
| 179779 | | CITY OF RED LODGE * MW13 | 07S | 20E | 23 | BBC | No | WELL | 40.00 | 26.00 | 26.30 | | 20.00 | PUMP | 12/10/1999 | MONITORING |
| 258519 | | WOLF RON | 07S | 20E | 26 | CC | No | WELL | 120.00 | 36.00 | | 34.00 | 8.00 | AIR | 10/21/2009 | DOMESTIC |
| 104744 | | ANDERSON GEORGE | 07S | 20E | 27 | | No | WELL | 39.00 | 7.00 | 35.00 | | 60.00 | AIR | 1/1/1985 | DOMESTIC |
| 253497 | | BEARTOOTH HOSPITAL AND HEALTH CENTER | 07S | 20E | 27 | | No | WELL | 63.50 | 15.00 | | 15.00 | 300.00 | AIR | 9/11/2009 | GEOTHERMAL-INJECTION |
| 104732 | | CITY OF RED LODGE | 07S | 20E | 27 | | No | WELL | 74.00 | | | | 760.00 | OTHER | 1/1/1961 | PUBLIC WATER SUPPLY |
| 301918 | | CITY OF RED LODGE | 07S | 20E | 27 | | No | WELL | 59.00 | 28.00 | | 28.00 | 100.00 | AIR | 6/28/2019 | DOMESTIC |
| 104741 | | CITY OF RED LODGE | 07S | 20E | 27 | | No | WELL | 74.00 | | | | | OTHER | 1/1/1961 | DOMESTIC |
| 104731 | | DUKE JAMES | 07S | 20E | 27 | | No | WELL | 37.00 | 22.00 | 30.00 | | 35.00 | BAILER | 1/1/1962 | DOMESTIC |
| 104738 | | GERONDALE JACK | 07S | 20E | 27 | | No | WELL | 45.00 | 9.00 | 30.00 | | 30.00 | BAILER | 1/1/1960 | INDUSTRIAL |
| 290091 | | GOSS, MATT | 07S | 20E | 27 | | No | WELL | 40.00 | 12.00 | | 12.00 | 100.00 | AIR | 9/25/2001 | IRRIGATION |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 104743 | | | HANSON HILMAR | 07S | 20E | 27 | | No | WELL | 58.00 | 28.00 | 58.00 | | 30.00 | AIR | 1/1/1983 | DOMESTIC |
| 104745 | | | HILL DOROTHY H | 07S | 20E | 27 | | No | WELL | 39.00 | 12.00 | 35.00 | | 50.00 | AIR | 1/1/1984 | IRRIGATION |
| 104742 | | | KANE JAMES | 07S | 20E | 27 | | No | WELL | 35.00 | 20.00 | | | 25.00 | AIR | 1/1/1977 | DOMESTIC |
| 104735 | | | KANE JAMES J. | 07S | 20E | 27 | | No | WELL | 29.00 | 29.00 | | | 100.00 | OTHER | 1/1/1954 | DOMESTIC |
| 187959 | | | KIELY CONSTRUCTION * MW-1 | 07S | 20E | 27 | | No | WELL | 15.20 | 9.27 | | | | OTHER | 9/26/1997 | MONITORING |
| 187950 | | | KIELY CONSTRUCTION * MW-2 | 07S | 20E | 27 | | No | WELL | 15.50 | 11.04 | | | 10.00 | BAILER | 9/26/1997 | MONITORING |
| 187951 | | | KIELY CONSTRUCTION * MW-3 | 07S | 20E | 27 | | No | WELL | 15.50 | 9.75 | | | 10.00 | BAILER | 9/26/1997 | MONITORING |
| 104733 | | | LONG SAM JOSEPH | 07S | 20E | 27 | | No | WELL | | | | | 25.00 | OTHER | 1/1/1900 | DOMESTIC |
| 104737 | | | LOUMA BEN | 07S | 20E | 27 | | No | WELL | 60.00 | 13.00 | 48.00 | | 15.00 | BAILER | 1/1/1960 | DOMESTIC |
| 104747 | | | PASQUEN LUE M | 07S | 20E | 27 | | No | WELL | 30.00 | 10.00 | 30.00 | | 25.00 | AIR | 1/1/1980 | UNKNOWN |
| 104739 | | | PITCHER BOB | 07S | 20E | 27 | | No | WELL | 98.00 | 48.00 | 80.00 | | 8.00 | OTHER | 1/1/1972 | DOMESTIC |
| 104746 | | | RED LODGE LAUNDRY | 07S | 20E | 27 | | No | WELL | 60.00 | 20.00 | 50.00 | | 60.00 | AIR | 1/1/1985 | DOMESTIC |
| 144254 | | | REPACD JOE | 07S | 20E | 27 | | No | WELL | 39.00 | 14.00 | 35.00 | | 50.00 | AIR | 5/31/1985 | IRRIGATION |
| 145199 | | | RICHARDSON JOSEPHINE | 07S | 20E | 27 | | No | WELL | 31.00 | 10.00 | | 12.00 | 35.00 | PUMP | 9/22/1989 | DOMESTIC |
| 104748 | | | SANDRETTO BRENT | 07S | 20E | 27 | | No | WELL | 38.00 | 7.00 | 35.00 | | 50.00 | AIR | 1/1/1985 | DOMESTIC |
| 104749 | | | SANDRETTO LARRY | 07S | 20E | 27 | | No | WELL | 50.00 | 20.00 | 50.00 | | 40.00 | AIR | 1/1/1985 | DOMESTIC |
| 104734 | | | STRINGARI JOE | 07S | 20E | 27 | | No | WELL | 20.00 | | | | 15.00 | OTHER | | DOMESTIC |
| 104736 | | | TRUNER JESS | 07S | 20E | 27 | | No | WELL | 75.00 | 26.00 | 65.00 | | 6.00 | BAILER | 1/1/1964 | DOMESTIC |
| 104740 | | | WYER STEPHEN C | 07S | 20E | 27 | | No | WELL | 86.00 | 25.00 | 75.00 | | 6.00 | BAILER | 1/1/1971 | DOMESTIC |
| 157948 | | | RED LODGE SCHOOL DISTRICT NO 1 | 07S | 20E | 27 | | No | WELL | 60.00 | | | | | OTHER | 8/14/1996 | |
| 104750 | | | ANDERSON DAVID B. | 07S | 20E | 27 | A | No | WELL | 39.00 | 7.00 | | | 50.00 | OTHER | 1/1/1982 | DOMESTIC |
| 144255 | | | RED LODGE LIONS CLUB | 07S | 20E | 27 | A | No | WELL | 38.00 | | 35.00 | | 35.00 | AIR | 6/19/1992 | IRRIGATION |
| 231524 | | | BEARTOOTH NATURE CENTER | 07S | 20E | 27 | AAA | No | WELL | 88.00 | 33.00 | | 33.00 | 125.00 | AIR | 9/14/2006 | DOMESTIC |
| 266255 | | | RED LODGE PUBLIC SCHOOL | 07S | 20E | 27 | AAA | No | WELL | 59.00 | 35.00 | | 35.00 | 100.00 | AIR | 5/4/2012 | IRRIGATION |
| 290111 | | | RONNING, JERRY | 07S | 20E | 27 | AAAA | No | WELL | 40.00 | 9.00 | | 9.00 | 60.00 | AIR | 5/8/2001 | IRRIGATION |
| 247582 | | | CITY OF RED LODGE | 07S | 20E | 27 | AAB | No | WELL | 49.00 | 21.00 | | 21.00 | 80.00 | AIR | 7/14/2008 | PUBLIC WATER SUPPLY |
| 291293 | | | LYALL, SUSAN | 07S | 20E | 27 | AAC | No | WELL | 34.00 | 7.50 | | 7.50 | 100.00 | AIR | 2/14/2017 | DOMESTIC |
| 290118 | | | DIMICH, LES | 07S | 20E | 27 | AACD | No | WELL | 40.00 | 12.00 | | 12.00 | 100.00 | AIR | 5/22/2001 | IRRIGATION |
| 247545 | | | RED LODGE PUBLIC SCHOOL | 07S | 20E | 27 | AAD | No | WELL | 65.00 | 25.00 | | 25.00 | 300.00 | AIR | 7/12/2008 | DOMESTIC |
| 294028 | | | RED LODGE SCHOOLS | 07S | 20E | 27 | AAD | No | WELL | 49.00 | 30.00 | | 30.00 | 30.00 | AIR | 8/31/2017 | DOMESTIC |
| 131623 | | | COUTTS DON | 07S | 20E | 27 | AB | No | WELL | 18.00 | 4.00 | 15.00 | 4.00 | 25.00 | AIR | 10/10/1990 | STOCKWATER |
| 104751 | | | CRANS JAMES L | 07S | 20E | 27 | AB | No | WELL | 26.00 | 12.00 | 21.00 | | 20.00 | PUMP | 1/1/1984 | IRRIGATION |
| 219544 | | | GM PETROLEUM * MW-01 | 07S | 20E | 27 | AB | No | WELL | 20.00 | 9.50 | | | | | 6/8/2005 | MONITORING |
| 262833 | | | GM PETROLEUM * MW-01 | 07S | 20E | 27 | AB | No | WELL | | | | | | | 8/8/2006 | UNUSED |
| 219545 | | | GM PETROLEUM * MW-02 | 07S | 20E | 27 | AB | No | WELL | 20.00 | 10.00 | | | | | 6/6/2005 | MONITORING |
| 262834 | | | GM PETROLEUM * MW-02 | 07S | 20E | 27 | AB | No | WELL | | | | | | | 8/8/2006 | UNUSED |
| 219546 | | | GM PETROLEUM * MW-03 | 07S | 20E | 27 | AB | No | WELL | 20.00 | 9.00 | | | | | 6/6/2005 | MONITORING |
| 262835 | | | GM PETROLEUM * MW-03 | 07S | 20E | 27 | AB | No | WELL | | | | | | | 8/8/2006 | UNUSED |
| 262836 | | | GM PETROLEUM * MW-04 | 07S | 20E | 27 | AB | No | WELL | | | | | | | 8/8/2006 | UNUSED |
| 219547 | | | GM PETROLEUM * MW-04 | 07S | 20E | 27 | AB | No | WELL | 20.00 | 10.50 | | | | | 6/6/2005 | MONITORING |
| 234513 | | | PALMER BILL | 07S | 20E | 27 | AB | No | WELL | 40.00 | 8.00 | | 8.00 | 60.00 | AIR | 10/4/2006 | IRRIGATION |
| 201855 | | | RED LODGE CHEVROLET | 07S | 20E | 27 | AB | No | WELL | 40.00 | 10.00 | | 10.00 | 45.00 | AIR | 8/26/2002 | IRRIGATION |
| 289776 | | | RONNING, JERRY | 07S | 20E | 27 | AB | No | WELL | 40.00 | 12.00 | | 12.00 | 30.00 | AIR | 11/19/1999 | IRRIGATION |
| 212293 | | | BEAM CRAIG | 07S | 20E | 27 | ABD | No | WELL | 32.00 | 10.00 | | 10.00 | 35.00 | AIR | 3/31/2004 | IRRIGATION |
| 161370 | | | COLEMAN MERV | 07S | 20E | 27 | ABD | No | WELL | 38.50 | 12.00 | 38.00 | 12.00 | 60.00 | AIR | 6/8/1994 | IRRIGATION |
| 289800 | | | DIMICH, LESLIE | 07S | 20E | 27 | ABD | No | WELL | 25.00 | 15.00 | | 12.00 | 20.00 | AIR | 5/15/1999 | DOMESTIC |
| 247533 | | | MOLLRING TOM | 07S | 20E | 27 | ABD | No | WELL | 32.00 | 7.50 | | 7.50 | 50.00 | AIR | 7/10/2008 | DOMESTIC |
| 161381 | | | UNITED STATES NATIONAL BANK | 07S | 20E | 27 | ABD | No | WELL | 37.00 | 13.00 | 37.00 | 10.00 | 45.00 | AIR | 10/22/1996 | IRRIGATION |
| 243781 | | C30043791 | ALISON GARY | 07S | 20E | 27 | AC | No | WELL | 40.00 | 15.00 | | 15.00 | 30.00 | AIR | 4/30/2008 | IRRIGATION |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 212024 | | | CAPY MARLYNN | 07S | 20E | 27 | AC | No | WELL | 40.00 | 12.00 | | 12.00 | 80.00 | AIR | 6/5/2004 | DOMESTIC |
| 919946 | | | DIAMOND DRILL-1 | 07S | 20E | 27 | AC | No | PETWELL | | | | | | | | |
| 247570 | | | KINNE, SCOTT | 07S | 20E | 27 | AC | No | WELL | 18.00 | 11.80 | | | | | 9/18/2008 | MONITORING |
| 201856 | | C30006275 | NEIL, ALBERT/CARVER, ALICE | 07S | 20E | 27 | AC | No | WELL | 40.00 | 10.00 | | 10.00 | 45.00 | AIR | 10/5/2002 | IRRIGATION |
| 243803 | | | O'NIEL GREG | 07S | 20E | 27 | AC | No | WELL | 60.00 | 30.00 | | 30.00 | 10.00 | AIR | 12/5/2007 | UNKNOWN |
| 195811 | | | MODEL BOB | 07S | 20E | 27 | ACB | No | WELL | 40.00 | 14.00 | | 14.00 | 75.00 | AIR | 4/10/2002 | IRRIGATION |
| 142587 | | | CRTALIC WILLIAM | 07S | 20E | 27 | ACC | No | WELL | 40.00 | 18.00 | 35.00 | 18.00 | 50.00 | AIR | 12/31/1993 | IRRIGATION |
| 104752 | | | GRADDOCK AL | 07S | 20E | 27 | ACC | No | WELL | 40.00 | | 35.00 | | 40.00 | BAILER | 1/1/1983 | DOMESTIC |
| 161384 | | | WISE JEFF | 07S | 20E | 27 | ACC | No | WELL | 38.00 | 10.00 | 35.00 | 10.00 | 50.00 | AIR | 9/25/1996 | IRRIGATION |
| 104763 | | | ADAMS, JOEL * NEXT TO STAIRS | 07S | 20E | 27 | ACCA | Yes | WELL | 38.00 | 13.00 | 35.00 | | 50.00 | AIR | 1/1/1985 | DOMESTIC |
| 295913 | | | ANDERSON, SUSAN & DONALD MUELLER | 07S | 20E | 27 | ACD | No | WELL | 39.00 | 10.50 | | 10.50 | 50.00 | AIR | 1/30/2018 | DOMESTIC |
| 164282 | | 102176 | DAVEY GERALDINE L | 07S | 20E | 27 | ACD | No | WELL | 28.00 | 12.00 | | | 12.00 | AIR | 9/26/1997 | IRRIGATION |
| 296047 | | | WHITCOMB, DAVID | 07S | 20E | 27 | ACD | No | WELL | 32.00 | 13.00 | | 13.00 | 40.00 | AIR | 2/14/2018 | DOMESTIC |
| 104754 | | | BEAR CREEK LAND | 07S | 20E | 27 | AD | No | WELL | 101.00 | 48.00 | 48.00 | | 5.00 | BAILER | 1/1/1979 | DOMESTIC |
| 144138 | | | MARVIN MARY | 07S | 20E | 27 | AD | No | WELL | 38.00 | 6.00 | 35.00 | 6.00 | 50.00 | AIR | 8/22/1991 | IRRIGATION |
| 104753 | | | PALMER, BILL BEAR CK | 07S | 20E | 27 | AD | No | WELL | 101.00 | 35.00 | 70.00 | | 50.00 | BAILER | 1/1/1979 | DOMESTIC |
| 144140 | | | THAYER BETTY | 07S | 20E | 27 | AD | No | WELL | 30.00 | 14.00 | 25.00 | 14.00 | 40.00 | AIR | 8/3/1991 | IRRIGATION |
| 274627 | | 30067309 | KILBANE, JIM | 07S | 20E | 27 | ADA | No | WELL | 39.00 | 14.00 | | 14.00 | 35.00 | AIR | 8/14/2013 | DOMESTIC |
| 288020 | | | BROKAW, GORDON | 07S | 20E | 27 | ADB | No | WELL | 26.50 | 9.00 | | 9.00 | 30.00 | AIR | 6/27/2016 | IRRIGATION |
| 302492 | | | KILBANE, JIM | 07S | 20E | 27 | ADB | No | WELL | 29.00 | 8.67 | | 8.67 | 60.00 | AIR | 7/31/2019 | DOMESTIC |
| 302491 | | | KILBANE, JIM | 07S | 20E | 27 | ADB | No | WELL | 29.00 | 7.00 | | 29.00 | 60.00 | AIR | 7/31/2019 | DOMESTIC |
| 289829 | | | WOLF, DON | 07S | 20E | 27 | ADC | No | WELL | 40.00 | 6.00 | | 6.00 | 100.00 | AIR | 9/25/2000 | IRRIGATION |
| 104755 | | | PATTEN J H | 07S | 20E | 27 | B | No | WELL | 38.00 | 9.00 | 38.00 | | 50.00 | AIR | 1/1/1983 | DOMESTIC |
| 219732 | | | PARKER DAVE *PILATI MIKE | 07S | 20E | 27 | BA | No | WELL | 60.00 | 26.00 | | 26.00 | 25.00 | AIR | 6/10/2005 | IRRIGATION |
| 290032 | | | JENKINS, JIM | 07S | 20E | 27 | BAA | No | WELL | 48.00 | 14.00 | | 12.00 | 100.00 | AIR | 9/29/2000 | IRRIGATION |
| 274286 | | | MONTGOMERY, BOB | 07S | 20E | 27 | BAA | No | WELL | 44.00 | 23.50 | | 23.50 | 40.00 | AIR | 7/13/2013 | DOMESTIC |
| 242554 | | | BARTHEL BOB | 07S | 20E | 27 | BAB | No | WELL | 48.00 | 36.00 | | 36.00 | 20.00 | AIR | 3/6/2008 | DOMESTIC |
| 212300 | | | BRISHAN MIKE | 07S | 20E | 27 | BAB | No | WELL | 60.00 | 42.00 | | 42.00 | 60.00 | AIR | 4/21/2004 | IRRIGATION |
| 278350 | | | ZIMMERMAN, LYLE AND LEITA | 07S | 20E | 27 | BB | No | WELL | 53.00 | 38.00 | | 38.00 | 25.00 | AIR | 6/6/2014 | DOMESTIC |
| 161386 | | 101450 | JANSSEN ROY | 07S | 20E | 27 | BBA | No | WELL | 57.00 | 26.00 | 55.00 | 26.00 | 60.00 | AIR | 9/30/1996 | IRRIGATION |
| 157348 | | 97609 | MATRIARCH CONSTRUCTION | 07S | 20E | 27 | BBC | No | WELL | 58.00 | 34.00 | 55.00 | 34.00 | 60.00 | AIR | 4/19/1996 | STOCKWATER |
| 293923 | | | QUINN, DAVE | 07S | 20E | 27 | BBD | No | WELL | 59.00 | 30.00 | | 30.00 | 30.00 | AIR | 8/25/2017 | IRRIGATION |
| 189163 | | | DILLION MANG. AND CONST. INC | 07S | 20E | 27 | BCB | No | WELL | 58.00 | 40.00 | | 40.00 | 40.00 | AIR | 5/4/2001 | IRRIGATION |
| 192987 | | C30003594 | PINE RIDGE CREEK OWNERS ASSOC | 07S | 20E | 27 | BCB | No | WELL | 58.00 | 7.00 | | 7.00 | 75.00 | AIR | 9/19/2001 | IRRIGATION |
| 104756 | | | BISCHOFF W.H.&FHELMA | 07S | 20E | 27 | BD | No | WELL | 40.00 | 15.00 | 40.00 | | 30.00 | AIR | 1/1/1980 | UNKNOWN |
| 251767 | | | BUENING, NANCY | 07S | 20E | 27 | BD | No | WELL | 40.00 | 10.00 | | 10.00 | 30.00 | AIR | 1/6/2009 | IRRIGATION |
| 251951 | | | OWENS, JACK | 07S | 20E | 27 | BD | No | WELL | 40.00 | | | | 40.00 | AIR | 7/15/2008 | IRRIGATION |
| 237202 | | | SPERRY NANNETTE | 07S | 20E | 27 | BD | No | WELL | 39.00 | 10.00 | | 10.00 | 60.00 | AIR | 7/10/2007 | IRRIGATION |
| 228261 | | | ANDERSON DAVID | 07S | 20E | 27 | BDA | No | WELL | 39.00 | 17.50 | | 17.50 | 100.00 | AIR | 7/14/2006 | OTHER |
| 228341 | | | ANDERSON DAVID | 07S | 20E | 27 | BDA | No | WELL | 39.00 | 18.50 | | 18.50 | 100.00 | AIR | 7/14/2006 | OTHER |
| 171661 | | | MTN VIEW APTS/CHARECTA BUILDERS INC | 07S | 20E | 27 | BDA | No | WELL | 58.00 | 41.00 | | 41.00 | 60.00 | AIR | 5/3/1999 | IRRIGATION |
| 149925 | | | GAVIN INTERESTS LLC * ROCK WELL | 07S | 20E | 27 | BDAB | Yes | WELL | 150.00 | 68.00 | 145.00 | 68.00 | 12.00 | AIR | 6/22/1993 | DOMESTIC |
| 176387 | | | GAVIN INTERESTS LLC * SPRUCE LODGE -NEAR ROAD | 07S | 20E | 27 | BDBA | Yes | WELL | 59.00 | 35.00 | | 35.00 | 60.00 | AIR | 7/26/1999 | IRRIGATION |
| 294678 | | | LYMAN, TOM | 07S | 20E | 27 | BDD | No | WELL | 39.00 | 25.00 | | 25.00 | 20.00 | AIR | 10/14/2017 | IRRIGATION |
| 196636 | | C3002662 | NEWMAN ROGER AND BERYL | 07S | 20E | 27 | BDD | No | WELL | 39.00 | 21.00 | | 21.00 | 40.00 | AIR | 6/19/2002 | DOMESTIC |
| 104757 | | | HUDAK MIKE | 07S | 20E | 27 | C | No | WELL | 6.00 | 6.00 | | | 20.00 | OTHER | 1/1/1968 | DOMESTIC |
| 196856 | | | TRUE VALUE (KEN) | 07S | 20E | 27 | CAAD | No | WELL | 40.00 | 21.00 | | 21.00 | 60.00 | AIR | 3/27/2002 | IRRIGATION |
| 126441 | | | YURKOVICH MRS FRANK | 07S | 20E | 27 | CAD | No | WELL | 58.00 | 34.00 | 55.00 | 34.00 | 50.00 | AIR | 8/9/1991 | IRRIGATION |
| 239934 | | | FISHER KEN | 07S | 20E | 27 | CB | No | WELL | 51.00 | 20.00 | | 20.00 | 35.00 | AIR | 4/24/2007 | IRRIGATION |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 104759 | | | RINTALA TOIVO * WELL #3 | 07S | 20E | 27 | CB | No | WELL | 16.00 | 6.00 | | | 500.00 | OTHER | 1/1/1925 | STOCKWATER |
| 104760 | | | RINTALA TOIVO * WELL 1 | 07S | 20E | 27 | CB | No | WELL | 6.00 | | | | 500.00 | OTHER | 1/1/1925 | STOCKWATER |
| 104758 | | | RINTALA TOIVO * WELL 1 | 07S | 20E | 27 | CB | No | WELL | 16.00 | 6.00 | | | 500.00 | OTHER | 1/1/1925 | DOMESTIC |
| 161382 | | | HICKS JASON F. | 07S | 20E | 27 | CBD | No | WELL | 75.00 | 51.00 | 70.00 | 51.00 | 60.00 | AIR | 10/2/1996 | DOMESTIC |
| 211973 | | | ZOOK WALLY | 07S | 20E | 27 | CBDC | Yes | WELL | 104.00 | 74.00 | | 74.00 | 15.00 | AIR | 5/5/2004 | DOMESTIC |
| 205961 | | | BEARTOOTH FLIGHT CENTER | 07S | 20E | 27 | CC | No | WELL | 240.00 | 98.00 | | 93.00 | 18.00 | AIR | 7/23/2003 | DOMESTIC |
| 124988 | | | MICHELCIC JOHN | 07S | 20E | 27 | CC | No | WELL | 35.00 | 22.50 | 29.00 | 23.00 | 38.00 | PUMP | 6/14/1991 | IRRIGATION |
| 219735 | | | RED LODGE RODEO ASSOCIATION | 07S | 20E | 27 | CC | No | WELL | 94.00 | 45.00 | | | | OTHER | 6/7/2005 | DOMESTIC |
| 138848 | | | JARDINE JOHN | 07S | 20E | 27 | CCA | No | WELL | 80.00 | 57.00 | 80.00 | 57.00 | 50.00 | AIR | 6/24/1993 | DOMESTIC |
| 144141 | | | RED LODGE RODEO ASSOC. | 07S | 20E | 27 | CCC | No | WELL | 60.00 | 19.00 | 55.00 | 19.00 | 50.00 | AIR | 6/8/1992 | DOMESTIC |
| 104761 | | | YURKOVICH FRANK | 07S | 20E | 27 | CCC | No | WELL | 58.00 | 30.00 | 58.00 | | 30.00 | AIR | 1/1/1981 | DOMESTIC |
| 290116 | | | ANDERSON, DAVID | 07S | 20E | 27 | CCCB | No | WELL | 40.00 | 7.00 | | 7.00 | 60.00 | AIR | 5/10/2001 | DOMESTIC |
| 289875 | | | FARGO, KENNETH | 07S | 20E | 27 | CDA | No | WELL | 40.00 | 8.00 | | 8.00 | 50.00 | AIR | 8/25/2000 | DOMESTIC |
| 158424 | | C052343-00 | RED LODGE SCHOOL DISTRICT | 07S | 20E | 27 | CDA | No | WELL | 58.00 | 20.00 | 55.00 | 20.00 | 50.00 | AIR | 8/23/1996 | IRRIGATION |
| 104762 | | | CLARK AMOS | 07S | 20E | 27 | CDB | No | WELL | 220.00 | 60.00 | 220.00 | | 8.00 | AIR | 1/1/1978 | DOMESTIC |
| 289798 | | | KENNEY, DON | 07S | 20E | 27 | CDB | No | WELL | 200.00 | 160.00 | | 23.00 | 7.00 | AIR | 3/28/1999 | DOMESTIC |
| 298012 | | | BANONIS, JOHN | 07S | 20E | 27 | CDC | No | WELL | 50.00 | 27.00 | | 27.00 | 40.00 | AIR | 8/3/2018 | IRRIGATION |
| 290073 | | | DEBOURG, JOHN | 07S | 20E | 27 | CDD | No | WELL | 40.00 | 19.00 | | 19.00 | 60.00 | AIR | 5/24/2001 | DOMESTIC |
| 196859 | | | GROUP REGIS | 07S | 20E | 27 | CDD | No | WELL | 40.00 | 2.00 | | 2.00 | 80.00 | AIR | 5/14/2002 | IRRIGATION |
| 247579 | | | RED LODGE PUBLIC SCHOOL | 07S | 20E | 27 | CDD | No | WELL | 44.00 | 22.00 | | 22.00 | 50.00 | AIR | 8/4/2008 | PUBLIC WATER SUPPLY |
| 252187 | | | RUTHERFORD, CHARLES AND LINDA | 07S | 20E | 27 | CDD | No | WELL | 43.00 | 23.00 | | 23.00 | 50.00 | AIR | 5/27/2009 | DOMESTIC |
| 124989 | | | RILEY MRS. JACK | 07S | 20E | 27 | D | No | WELL | 60.00 | 17.00 | 55.00 | 17.00 | 15.00 | AIR | 8/6/1991 | IRRIGATION |
| 251765 | | | DANE, ELIZABETH | 07S | 20E | 27 | DA | No | WELL | 40.00 | 9.00 | | 9.00 | 30.00 | AIR | 1/8/2009 | IRRIGATION |
| 124990 | | | JARVI TAIMI | 07S | 20E | 27 | DA | No | WELL | 30.00 | 11.00 | 25.00 | 11.00 | 40.00 | AIR | 8/12/1991 | IRRIGATION |
| 919820 | | | DIAMOND DRILL -2 | 07S | 20E | 27 | DAC | No | PETWELL | | | | | | | | |
| 211966 | | | BERTRAM KELLY | 07S | 20E | 27 | DB | No | WELL | 40.00 | 22.00 | | 22.00 | 60.00 | OTHER | 5/3/2004 | DOMESTIC |
| 131624 | | | HOINES EVERETT | 07S | 20E | 27 | DB | No | WELL | 40.00 | 9.00 | 37.00 | | 50.00 | AIR | 6/6/1986 | IRRIGATION |
| 122490 | | | KANE JAMES | 07S | 20E | 27 | DB | No | WELL | 35.00 | 20.00 | | | 25.00 | AIR | 5/27/1977 | DOMESTIC |
| 279956 | | | KILBANE, PAT | 07S | 20E | 27 | DB | No | WELL | 29.00 | 12.00 | | 12.00 | 40.00 | AIR | 9/24/2014 | DOMESTIC |
| 124991 | | | MALLIN RICHARD | 07S | 20E | 27 | DB | No | WELL | 30.00 | 15.00 | 25.00 | 15.00 | 50.00 | AIR | 8/7/1991 | IRRIGATION |
| 258565 | | | MILLARD, JULIE | 07S | 20E | 27 | DB | No | WELL | 40.00 | 10.00 | | 10.00 | 30.00 | AIR | 12/15/2009 | IRRIGATION |
| 275605 | | | MOUNTAIN SPRINGS LIVING | 07S | 20E | 27 | DB | No | WELL | 40.00 | 10.00 | | 10.00 | 60.00 | AIR | 5/30/2013 | IRRIGATION |
| 223129 | | | SALLADE CHARLES | 07S | 20E | 27 | DB | No | WELL | 40.00 | 26.00 | | 26.00 | 30.00 | AIR | 11/22/2005 | IRRIGATION |
| 189953 | | | RAY JUDD FORD INC | 07S | 20E | 27 | DBB | No | WELL | 20.00 | 15.00 | | | | OTHER | 4/26/2001 | MONITORING |
| 244817 | | | PORTH ARCHITECTS | 07S | 20E | 27 | DBC | No | WELL | 40.00 | 20.00 | | 20.00 | 60.00 | AIR | 5/28/2008 | DOMESTIC |
| 244816 | | | PORTH ARCHITECTS | 07S | 20E | 27 | DBD | No | WELL | 40.00 | 20.00 | | 20.00 | 60.00 | AIR | 5/28/2008 | DOMESTIC |
| 122491 | | 60328 | ANDERSON GEORGE | 07S | 20E | 27 | DC | No | WELL | 39.00 | 20.00 | 35.00 | | 30.00 | AIR | 5/31/1985 | IRRIGATION |
| 243779 | | | JORDAN LINDA | 07S | 20E | 27 | DC | No | WELL | 40.00 | 15.00 | | 15.00 | 20.00 | AIR | 3/31/2008 | IRRIGATION |
| 243777 | | | JORDEN LINDA | 07S | 20E | 27 | DC | No | WELL | 37.00 | 10.00 | | 10.00 | 30.00 | AIR | 3/31/2008 | IRRIGATION |
| 104764 | | | RED LODGE SCHOOL DISTRICT NO 1 | 07S | 20E | 27 | DC | No | WELL | 60.00 | 22.00 | 40.00 | | 90.00 | PUMP | 1/1/1983 | IRRIGATION |
| 201857 | | | RONNING TRACY | 07S | 20E | 27 | DC | No | WELL | 40.00 | 6.00 | | 6.00 | 40.00 | AIR | 12/6/2002 | IRRIGATION |
| 251942 | | | SCHUBERT, DIANA | 07S | 20E | 27 | DC | No | WELL | 40.00 | 12.00 | | 12.00 | 25.00 | AIR | 4/8/2008 | IRRIGATION |
| 275602 | | | SCHWIN, THOMAS J. | 07S | 20E | 27 | DC | No | WELL | 60.00 | 12.00 | | 12.00 | 20.00 | AIR | 5/28/2013 | IRRIGATION |
| 104765 | | | UZELAC MARY & D | 07S | 20E | 27 | DC | No | WELL | 40.00 | 9.00 | 38.00 | | 50.00 | AIR | 1/1/1986 | IRRIGATION |
| 251952 | | | WEBINGER DRAKE | 07S | 20E | 27 | DC | No | WELL | 60.00 | 22.00 | | 22.00 | 35.00 | AIR | 7/14/2008 | IRRIGATION |
| 253522 | | | GREER RICK | 07S | 20E | 27 | DCC | No | WELL | 40.00 | 18.00 | | 18.00 | 50.00 | AIR | 10/20/2009 | GEOTECH |
| 252183 | | | GREER, RICK | 07S | 20E | 27 | DCC | No | WELL | 39.00 | 17.00 | | 17.00 | 50.00 | AIR | 5/28/2009 | DOMESTIC |
| 104766 | | | LOCKRIDGE DORIS M. | 07S | 20E | 27 | DCC | No | WELL | 38.00 | 9.00 | 38.00 | | 50.00 | AIR | 1/1/1983 | UNKNOWN |
| 226280 | | | MICHEAL JEFF | 07S | 20E | 27 | DCD | No | WELL | 19.00 | 9.00 | | 9.00 | 30.00 | AIR | 5/11/2006 | DOMESTIC |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 104767 | | | LAUDON CLARENCE | 07S | 20E | 27 | DDC | No | WELL | 38.00 | 6.00 | 38.00 | | 30.00 | OTHER | 1/1/1982 | DOMESTIC |
| 247616 | | | SWENSON RANDY | 07S | 20E | 27 | DDC | No | WELL | 22.00 | 7.00 | | 7.00 | 25.00 | AIR | 7/10/2008 | DOMESTIC |
| 172609 | | | BEARTOOTH NATURE CENTER | 07S | 20E | 27 | DDCB | Yes | WELL | 39.00 | 26.00 | | 26.00 | 40.00 | AIR | 5/9/1998 | OTHER |
| 290115 | | | LADVALA, JOHN | 07S | 20E | 27 | DDDA | No | WELL | 40.00 | 8.00 | | 8.00 | 20.00 | AIR | 5/9/2001 | IRRIGATION |
| 290110 | | | RONNING, JERRY | 07S | 20E | 27 | DDDA | No | WELL | 40.00 | 12.00 | | 12.00 | 60.00 | AIR | 5/8/2001 | IRRIGATION |
| 252419 | | | TERRY ROB AND KATHY | 07S | 20E | 28 | | No | WELL | 60.00 | 16.00 | | 16.00 | 50.00 | AIR | 5/19/2009 | DOMESTIC |
| 268423 | | | GOSS, STEVE | 07S | 20E | 28 | AA | No | WELL | 60.00 | 4.00 | | 4.00 | 60.00 | AIR | 8/3/2011 | DOMESTIC |
| 216522 | | | HENRY RON | 07S | 20E | 28 | AA | No | WELL | 60.00 | 6.00 | | 6.00 | 65.00 | AIR | 11/10/2004 | DOMESTIC |
| 212189 | | | MONTANA LEGEND | 07S | 20E | 28 | AAB | No | WELL | 38.00 | 17.00 | | 17.00 | 50.00 | AIR | 5/6/2004 | OTHER |
| 164283 | | C102182-00 | RED LODGE BEVERAGES | 07S | 20E | 28 | AAB | No | WELL | 53.00 | 8.00 | 45.00 | | 50.00 | AIR | 5/22/1997 | DOMESTIC |
| 170571 | | C105059-00 | KINGS CUPBOARD | 07S | 20E | 28 | AACB | Yes | WELL | 58.00 | 6.00 | 53.00 | | 75.00 | AIR | 9/3/1997 | DOMESTIC |
| 241647 | | | JEROME KLIN & HAZEL L | 07S | 20E | 28 | AB | No | WELL | 60.00 | 6.00 | | 6.00 | 40.00 | AIR | 1/8/2007 | DOMESTIC |
| 241648 | | | KLIN JERRY | 07S | 20E | 28 | AB | No | WELL | 60.00 | 6.00 | | 6.00 | 40.00 | AIR | 1/8/2007 | DOMESTIC |
| 241652 | | | ROAT PAUL | 07S | 20E | 28 | AB | No | WELL | 60.00 | 6.00 | | 10.00 | 40.00 | AIR | 1/9/2008 | DOMESTIC |
| 144142 | | | WEST GRANT | 07S | 20E | 28 | AB | No | WELL | 35.00 | 7.00 | 30.00 | | 50.00 | AIR | 3/25/1987 | DOMESTIC |
| 293852 | | | RLB HOLDINGS INC | 07S | 20E | 28 | ABA | No | WELL | 36.50 | 6.00 | | 6.00 | 100.00 | AIR | 8/18/2017 | DOMESTIC |
| 216176 | | | KOHLEY KAREN | 07S | 20E | 28 | ABBB | Yes | WELL | 37.00 | 11.15 | | | | OTHER | 4/3/2008 | |
| 258517 | | | BECK SHIRLEY | 07S | 20E | 28 | AC | No | WELL | 60.00 | 15.00 | | 15.00 | 40.00 | AIR | 9/17/2009 | DOMESTIC |
| 237200 | | | CANTWELL, BILL | 07S | 20E | 28 | AC | No | WELL | 60.00 | 20.00 | | 20.00 | 40.00 | AIR | 4/22/2007 | DOMESTIC |
| 234514 | | | COUNTZ VICKIE | 07S | 20E | 28 | AC | No | WELL | 60.00 | 12.00 | | 12.00 | 60.00 | AIR | 10/25/2006 | DOMESTIC |
| 216521 | | | HENERY RON | 07S | 20E | 28 | AC | No | WELL | 60.00 | 8.00 | | 8.00 | 25.00 | AIR | 11/10/2004 | DOMESTIC |
| 218536 | | | HENRY RON | 07S | 20E | 28 | AC | No | WELL | 102.00 | 35.00 | 35.00 | 35.00 | 350.00 | PUMP | 3/8/2005 | DOMESTIC |
| 223900 | | | LACAPA DICK | 07S | 20E | 28 | AC | No | WELL | 60.00 | 17.00 | | 17.00 | 40.00 | AIR | 11/29/2005 | DOMESTIC |
| 282967 | | | THEADE, COBEY | 07S | 20E | 28 | AC | No | WELL | 44.00 | 22.00 | | 22.00 | 60.00 | AIR | 6/12/2015 | DOMESTIC |
| 282965 | | | THEADE, COBEY | 07S | 20E | 28 | AC | No | WELL | 44.00 | 21.00 | | 21.00 | 40.00 | AIR | 6/12/2015 | DOMESTIC |
| 282966 | | | THEADE, COBEY | 07S | 20E | 28 | AC | No | WELL | 44.00 | 21.00 | | 21.00 | 60.00 | AIR | 6/12/2015 | DOMESTIC |
| 223133 | | | TUCKER, MARK | 07S | 20E | 28 | AC | No | WELL | 60.00 | 17.00 | | 17.00 | 40.00 | AIR | 11/28/2005 | DOMESTIC |
| 304714 | | | HERMAN, JAY | 07S | 20E | 28 | ACA | No | WELL | 39.00 | 15.00 | | 15.00 | 60.00 | AIR | 1/8/2020 | DOMESTIC |
| 239553 | | | SULLIVAN MIKE AND DIANE | 07S | 20E | 28 | ACA | No | WELL | 39.00 | 5.50 | | 5.50 | 75.00 | AIR | 8/6/2007 | DOMESTIC |
| 219341 | | | HENRY LOT 74N | 07S | 20E | 28 | ACAC | Yes | WELL | 68.00 | | | | | OTHER | | MONITORING |
| 304659 | | | ANDERSON, KEVIN | 07S | 20E | 28 | ACB | No | WELL | 39.00 | 13.00 | | 13.00 | 60.00 | AIR | 1/8/2020 | DOMESTIC |
| 283958 | | | LAMASTUS, LES AND SUSAN | 07S | 20E | 28 | ACB | No | WELL | 39.00 | 8.00 | | 8.00 | 100.00 | AIR | 8/12/2015 | DOMESTIC |
| 303526 | | | ZUMPANO, PATRICIA LYNN | 07S | 20E | 28 | ACB | No | WELL | 39.00 | 7.00 | | 7.00 | 100.00 | AIR | 10/4/2019 | DOMESTIC |
| 279965 | | | HANSEN, LISA | 07S | 20E | 28 | ACD | No | WELL | 39.00 | 10.00 | | 10.00 | 60.00 | AIR | 9/23/2014 | DOMESTIC |
| 225273 | | | WACASER TODD | 07S | 20E | 28 | ACD | No | WELL | 40.00 | 19.00 | | 19.00 | 40.00 | AIR | 12/28/2005 | DOMESTIC |
| 157950 | | | RED LODGE WEST LLP | 07S | 20E | 28 | ACDA | Yes | WELL | 41.00 | 20.00 | 35.00 | 20.00 | 60.00 | AIR | 5/8/1996 | MONITORING |
| 157949 | | | RED LODGE WEST LLP | 07S | 20E | 28 | ACDA | Yes | WELL | 67.00 | 11.00 | 29.00 | 11.00 | 340.00 | PUMP | 6/20/1996 | TEST WELL |
| 231962 | | | HUNT JOEL | 07S | 20E | 28 | AD | No | WELL | 100.00 | 9.00 | | 9.00 | 20.00 | AIR | 6/2/2006 | DOMESTIC |
| 283965 | | | HERDT, BARRY | 07S | 20E | 28 | ADB | No | WELL | 39.00 | 7.50 | | 7.50 | 100.00 | AIR | 8/13/2015 | DOMESTIC |
| 238079 | | | SPERO BOB | 07S | 20E | 28 | ADC | No | WELL | 39.00 | 10.00 | | 10.00 | 60.00 | AIR | 6/2/2007 | DOMESTIC |
| 223184 | | C30042927 | SPERO ROB | 07S | 20E | 28 | ADC | No | WELL | 40.00 | 7.00 | | 7.00 | 60.00 | AIR | 9/17/2005 | DOMESTIC |
| 222522 | | | SPERO BOB | 07S | 20E | 28 | ADC | No | WELL | 40.00 | 15.00 | | 15.00 | 60.00 | AIR | 6/29/2005 | DOMESTIC |
| 223227 | | | SPERO BOB | 07S | 20E | 28 | ADC | No | WELL | 40.00 | 8.00 | | 7.00 | 60.00 | AIR | 9/26/2005 | DOMESTIC |
| 157349 | | C099129-00 | OLSON TRUDIE | 07S | 20E | 28 | BAA | No | WELL | 39.00 | 10.00 | 38.00 | 10.00 | 30.00 | AIR | 11/1/1994 | DOMESTIC |
| 188452 | | | FOX JAKE *WELL #1 | 07S | 20E | 28 | BABB | No | WELL | 55.00 | 15.25 | | | 10.00 | OTHER | 1/1/1926 | DOMESTIC |
| 188453 | | | FOX JAKE *WELL #2 | 07S | 20E | 28 | BABB | No | WELL | 25.00 | 14.00 | | | 20.00 | OTHER | 12/15/1961 | DOMESTIC |
| 231471 | | | GOLDBERG BRUCE | 07S | 20E | 28 | BAD | No | WELL | 60.00 | 6.50 | | 6.50 | 125.00 | AIR | 9/13/2006 | DOMESTIC |
| 268470 | | | GAMIL, RON | 07S | 20E | 28 | BB | No | WELL | 120.00 | 8.00 | | 8.00 | 22.00 | AIR | 8/15/2006 | DOMESTIC |
| 201858 | | | JOHNSON ROBERT | 07S | 20E | 28 | BB | No | WELL | 130.00 | 27.00 | | 27.00 | 9.00 | AIR | 7/19/2002 | DOMESTIC |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 138850 | | NEARPASS BRENT & MARJORIE | 07S | 20E | 28 | BB | No | WELL | 60.00 | 26.00 | 55.00 | 26.00 | 12.00 | AIR | 4/7/1993 | UNKNOWN |
| 138849 | | FOX JAKE | 07S | 20E | 28 | BBAA | Yes | WELL | 120.00 | 15.00 | 115.00 | 15.00 | 12.00 | AIR | 6/17/1993 | DOMESTIC |
| 212584 | | NEARPASS BRENT | 07S | 20E | 28 | BBC | No | WELL | 90.00 | 33.00 | | 33.00 | 15.00 | AIR | 6/4/2004 | DOMESTIC |
| 152468 | C094686-00 | GEORGE DR. WILLIAM | 07S | 20E | 28 | BC | No | WELL | 160.00 | 23.00 | 155.00 | 23.00 | 8.00 | AIR | 12/21/1993 | DOMESTIC |
| 289773 | | BECK, PAUL | 07S | 20E | 28 | BD | No | WELL | 35.00 | 4.50 | | 4.50 | 100.00 | AIR | 11/5/1998 | DOMESTIC |
| 277123 | | COHEILL, JACQUELIN | 07S | 20E | 28 | BD | No | WELL | 60.00 | 17.00 | | 17.00 | 40.00 | AIR | 1/8/2014 | DOMESTIC |
| 251837 | | JAEGER, GALEN AND KAY | 07S | 20E | 28 | BD | No | WELL | 60.00 | 18.00 | | 18.00 | 40.00 | AIR | 7/15/2009 | DOMESTIC |
| 301950 | | HARTMAN, EMANUEL IV | 07S | 20E | 28 | BDA | No | WELL | 39.00 | 6.50 | | 6.50 | 100.00 | AIR | 7/1/2019 | DOMESTIC |
| 298682 | | PROPP, THOMAS | 07S | 20E | 28 | BDA | No | WELL | 39.00 | 11.00 | | 11.00 | 100.00 | AIR | 9/11/2018 | DOMESTIC |
| 170967 | C106504-00 | BECK PAUL | 07S | 20E | 28 | BDBD | Yes | WELL | 38.00 | 5.00 | 35.00 | 5.00 | 50.00 | AIR | 10/14/1997 | DOMESTIC |
| 204552 | | ZANDT GEORGE | 07S | 20E | 28 | BDBD | Yes | WELL | 35.00 | | | | | OTHER | | |
| 298645 | | LEVEAUX, RENE | 07S | 20E | 28 | BDD | No | WELL | 40.00 | 11.00 | | 11.00 | 100.00 | AIR | 9/11/2018 | DOMESTIC |
| 241653 | | CHADWICH TOM | 07S | 20E | 28 | CA | No | WELL | 60.00 | 18.00 | | 18.00 | 30.00 | AIR | 8/28/2007 | DOMESTIC |
| 241622 | | HEMON SCOTT | 07S | 20E | 28 | CA | No | WELL | 60.00 | 12.00 | | 12.00 | 60.00 | AIR | 8/30/2007 | DOMESTIC |
| 201861 | | SUKIT GLEN | 07S | 20E | 28 | CA | No | WELL | 140.00 | 39.00 | | 39.00 | 8.00 | AIR | 3/26/2002 | DOMESTIC |
| 301951 | | GILLESPIE, DARRELL | 07S | 20E | 28 | CAA | No | WELL | 39.00 | 16.83 | | 16.83 | 100.00 | AIR | 7/1/2019 | DOMESTIC |
| 176388 | | MCNAMARA MIKE AND ANNIE | 07S | 20E | 28 | CABB | Yes | WELL | 50.00 | 2.00 | | 2.00 | 24.00 | AIR | 7/22/1999 | DOMESTIC |
| 302484 | | O'NEIL, THOMAS | 07S | 20E | 28 | CAD | No | WELL | 49.00 | 18.00 | | 18.00 | 100.00 | AIR | 7/29/2019 | DOMESTIC |
| 240059 | | ROLLMAN JOHN AND DONNA | 07S | 20E | 28 | CB | No | WELL | 60.00 | | | | 50.00 | AIR | 9/26/2007 | DOMESTIC |
| 301613 | | LARR, ANN | 07S | 20E | 28 | CBA | No | WELL | 39.00 | 20.50 | | 20.50 | 50.00 | AIR | 6/7/2019 | DOMESTIC |
| 150239 | C094687-00 | GEORGE DR. WILLIAM | 07S | 20E | 28 | CBBB | Yes | WELL | 330.00 | 40.00 | 325.00 | 40.00 | 5.00 | AIR | 7/1/1994 | DOMESTIC |
| 201859 | | GAMILL RON | 07S | 20E | 28 | CBC | No | WELL | 97.00 | 6.50 | | 6.50 | 30.00 | AIR | 10/21/2002 | DOMESTIC |
| 290178 | | GAMMILL, RON | 07S | 20E | 28 | CBC | No | WELL | 50.00 | 18.00 | | 18.00 | 15.00 | AIR | 5/23/2002 | DOMESTIC |
| 282285 | | SMED, MARK | 07S | 20E | 28 | CBC | No | WELL | 59.00 | 39.00 | | 39.00 | 40.00 | AIR | 4/14/2015 | DOMESTIC |
| 192989 | | RICHARD COURTNEY R. AND KATHERINE | 07S | 20E | 28 | CC | No | WELL | 90.00 | 10.00 | | 10.00 | 25.00 | AIR | 8/13/2001 | DOMESTIC |
| 177460 | | TUELL HANK LINDA | 07S | 20E | 28 | CC | No | WELL | 118.00 | 11.00 | | 11.00 | 15.00 | AIR | 9/15/1999 | DOMESTIC |
| 197262 | | LEMOINE, DAVID | 07S | 20E | 28 | CCDB | Yes | WELL | 80.00 | 12.00 | | 12.00 | 35.00 | AIR | 7/10/2002 | DOMESTIC |
| 223139 | | KNUTSON MARVIN * L&L BUILDERS | 07S | 20E | 28 | CD | No | WELL | 100.00 | 36.00 | | 36.00 | 20.00 | AIR | 7/11/2005 | DOMESTIC |
| 204142 | | DISSEL LANCE AND MARY KAY | 07S | 20E | 28 | CDB | No | WELL | 28.00 | 8.00 | | 8.00 | 25.00 | AIR | 6/4/2003 | DOMESTIC |
| 201860 | | ALEX LAKE AND ANDREA MOHAMMADI | 07S | 20E | 28 | CDDB | Yes | WELL | 80.00 | 32.00 | | 32.00 | 65.00 | AIR | 11/22/2002 | DOMESTIC |
| 290014 | | HARTER, HERSCHEL | 07S | 20E | 28 | D | No | WELL | 62.00 | 40.00 | | 40.00 | 25.00 | AIR | 4/17/2000 | DOMESTIC |
| 201862 | | GILDEHAUS JEFF | 07S | 20E | 28 | DA | No | WELL | 85.00 | 35.00 | | 35.00 | 40.00 | AIR | 11/20/2002 | DOMESTIC |
| 247330 | | JEFF JUNKERT CONSTRUCTION | 07S | 20E | 28 | DA | No | WELL | 67.00 | 17.00 | | 17.00 | 35.00 | AIR | 10/28/2007 | DOMESTIC |
| 247331 | | JEFF JUNKERT CONSTRUCTION | 07S | 20E | 28 | DA | No | WELL | 80.00 | 17.00 | | 17.00 | 35.00 | AIR | 10/30/2007 | DOMESTIC |
| 218537 | | HENRY RON | 07S | 20E | 28 | DB | No | WELL | 105.00 | 32.00 | | 32.00 | 100.00 | AIR | 3/15/2005 | DOMESTIC |
| 234515 | | HENRY RON | 07S | 20E | 28 | DB | No | WELL | 60.00 | 8.00 | | 8.00 | 50.00 | AIR | 8/21/2006 | IRRIGATION |
| 301611 | | GIOVETTI, JOSEPH AND SARAH | 07S | 20E | 28 | DBA | No | WELL | 39.00 | 21.00 | | 21.00 | 50.00 | AIR | 6/7/2019 | DOMESTIC |
| 298424 | | WEAMER, TIM | 07S | 20E | 28 | DBA | No | WELL | 44.00 | 11.00 | | 11.00 | 70.00 | AIR | 8/30/2018 | DOMESTIC |
| 283968 | | KOSTAL, HANS | 07S | 20E | 28 | DBB | No | WELL | 47.00 | 18.00 | | 18.00 | 80.00 | AIR | 8/14/2015 | DOMESTIC |
| 282866 | | MCCARTNEY, MANDY | 07S | 20E | 28 | DBB | No | WELL | 44.00 | 23.00 | | 23.00 | 60.00 | AIR | 6/5/2015 | DOMESTIC |
| 293850 | | DEWITT, DENNIS | 07S | 20E | 28 | DBC | No | WELL | 52.00 | 21.00 | | 21.00 | 100.00 | AIR | 8/17/2017 | DOMESTIC |
| 301210 | | MATZENBACHER, KELLY | 07S | 20E | 28 | DBC | No | WELL | 59.00 | 34.50 | | 34.50 | 50.00 | AIR | 5/7/2019 | DOMESTIC |
| 304657 | | MIKE, ALYSON | 07S | 20E | 28 | DBC | No | WELL | 59.00 | 33.00 | | 33.00 | 40.00 | AIR | 1/6/2020 | DOMESTIC |
| 304658 | | MIKE, ALYSON | 07S | 20E | 28 | DBC | No | WELL | 59.00 | 33.00 | | 33.00 | 40.00 | AIR | 1/7/2020 | DOMESTIC |
| 219340 | | HENRY LOT 38 | 07S | 20E | 28 | DBCD | Yes | WELL | 104.00 | | | | | OTHER | | MONITORING |
| 298423 | | HAYNES, JR., LYNDEN | 07S | 20E | 28 | DBD | No | WELL | 53.00 | 12.00 | | 12.00 | 70.00 | AIR | 8/30/2018 | DOMESTIC |
| 282865 | | MCCARTNEY, JUDY | 07S | 20E | 28 | DBD | No | WELL | 59.00 | 35.00 | | 35.00 | 40.00 | AIR | 6/4/2015 | DOMESTIC |
| 282864 | | MCCARTNEY, JUDY | 07S | 20E | 28 | DBD | No | WELL | 59.00 | 37.00 | | 37.00 | 40.00 | AIR | 6/3/2015 | DOMESTIC |
| 161388 | | RED LODGE WEST LLP | 07S | 20E | 28 | DBD | No | WELL | 250.00 | 35.00 | | | | PUMP | 6/27/1996 | DOMESTIC |
| 223122 | | AL & VICKIE | 07S | 20E | 28 | DC | No | WELL | 80.00 | 24.00 | | 24.00 | 40.00 | AIR | 8/4/2005 | DOMESTIC |
| 252172 | | JAEGER, GALEN AND KAY * WELL 2 | 07S | 20E | 28 | DC | No | WELL | 60.00 | 18.00 | | 10.00 | 40.00 | AIR | 8/20/2009 | DOMESTIC |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 297315 | | PAULSON, TIM * GRANITE PEAK BUILDERS LLC | 07S | 20E | 28 | DC | No | WELL | 65.00 | 51.00 | | 51.00 | 15.00 | AIR | 3/10/2018 | DOMESTIC |
| 297315 | | PAULSON, TIM * GRANITE PEAK BUILDERS LLC | 07S | 20E | 28 | DC | No | WELL | 65.00 | 51.00 | | 51.00 | 15.00 | PUMP | 3/10/2018 | DOMESTIC |
| 301209 | | BRIGGS, BILL | 07S | 20E | 28 | DCB | No | WELL | 65.00 | 44.00 | | 44.00 | 50.00 | AIR | 5/6/2019 | DOMESTIC |
| 298328 | | DAVIS, KYLE | 07S | 20E | 28 | DCB | No | WELL | 59.00 | 22.50 | | 22.50 | 100.00 | AIR | 8/24/2018 | DOMESTIC |
| 301957 | | POLINKO, TOM | 07S | 20E | 28 | DCC | No | WELL | 79.00 | 30.00 | | 30.00 | 100.00 | AIR | 7/3/2019 | DOMESTIC |
| 182773 | | GLENNON | 07S | 20E | 28 | DDCD | Yes | WELL | 60.00 | 45.84 | | 18.00 | 38.00 | AIR | 9/11/1999 | DOMESTIC |
| 122492 | | LARSON E.F. | 07S | 20E | 33 | | No | WELL | 39.00 | 18.00 | 39.00 | | 50.00 | AIR | 6/13/1983 | DOMESTIC |
| 258596 | | U.S. FOREST SERVICE * BEARTOOTH DIST. | 07S | 20E | 33 | AA | No | WELL | 80.00 | 18.00 | | 18.00 | 80.00 | AIR | 7/15/2009 | IRRIGATION |
| 297028 | | QUICK, SAM | 07S | 20E | 33 | AAB | No | WELL | 130.00 | 45.00 | | 45.00 | 22.00 | AIR | 5/30/2018 | DOMESTIC |
| 157951 | | RED LODGE WEST LLP | 07S | 20E | 33 | AAC | No | WELL | 85.00 | 60.00 | 70.00 | 60.00 | 40.00 | PUMP | 6/27/1996 | TEST WELL |
| 211964 | | HENRY RON | 07S | 20E | 33 | AB | No | WELL | 125.00 | 68.00 | | 62.00 | 100.00 | AIR | 4/24/2004 | IRRIGATION |
| 218538 | | MCKAY DOUG | 07S | 20E | 33 | AB | No | WELL | 100.00 | 53.00 | | | 40.00 | AIR | 12/9/2004 | DOMESTIC |
| 296644 | | THOMAS, BOB | 07S | 20E | 33 | ABA | No | WELL | 85.00 | 50.00 | | 50.00 | 100.00 | AIR | 4/18/2018 | DOMESTIC |
| 187234 | | RED LODGE WEST LLP * PALMER BILL | 07S | 20E | 33 | ABB | No | WELL | 79.00 | 52.00 | | 52.00 | 35.00 | AIR | 1/18/2001 | FIRE PROTECTION |
| 247578 | | BERES ANDY | 07S | 20E | 33 | ABD | No | WELL | 79.00 | 21.00 | | 21.00 | 75.00 | AIR | 8/5/2008 | DOMESTIC |
| 297032 | | WILHELM, ANTON & KATHRYN | 07S | 20E | 33 | ABD | No | WELL | 83.00 | 53.00 | | 53.00 | 35.00 | AIR | 5/31/2018 | DOMESTIC |
| 198119 | C117926-00 | TISTHAMMER JOHN | 07S | 20E | 33 | ABDD | No | WELL | 80.00 | 35.00 | | 35.00 | 60.00 | AIR | 8/20/2001 | DOMESTIC |
| 247577 | | BULLOCK RICHARD | 07S | 20E | 33 | ACA | No | WELL | 79.00 | 20.00 | | 20.00 | 75.00 | AIR | 8/6/2008 | DOMESTIC |
| 274274 | | PRATAER, JEFF | 07S | 20E | 33 | ACB | No | WELL | 290.00 | 77.00 | | 77.00 | 18.00 | AIR | 5/13/2013 | DOMESTIC |
| 187236 | | SHELDON JERRY | 07S | 20E | 33 | ACB | No | WELL | 79.00 | 53.00 | | 53.00 | 35.00 | AIR | 1/16/2001 | DOMESTIC |
| 284685 | | PIRTZ, NATE | 07S | 20E | 33 | ACC | No | WELL | 99.00 | 48.00 | | 48.00 | 80.00 | AIR | 10/1/2015 | DOMESTIC |
| 191002 | C116119-00 | DEHIO, PETER AND KELLY | 07S | 20E | 33 | ACCA | Yes | WELL | 105.00 | 45.00 | | 45.00 | 40.00 | AIR | 4/12/2001 | DOMESTIC |
| 298488 | | CRUZ, DAVID | 07S | 20E | 33 | ACD | No | WELL | 100.00 | 42.00 | | 42.00 | 60.00 | AIR | 8/29/2018 | DOMESTIC |
| 263999 | | HERTZ, CHRIS | 07S | 20E | 33 | ADC | No | WELL | 130.00 | 52.00 | | 52.00 | 17.00 | AIR | 9/15/2011 | DOMESTIC |
| 171061 | | LEGNINI ROBERT | 07S | 20E | 33 | ADC | Yes | WELL | 95.00 | 60.00 | 85.00 | 60.00 | 50.00 | AIR | 5/12/1997 | DOMESTIC |
| 255013 | | MATTER BOB | 07S | 20E | 33 | ADD | No | WELL | 121.00 | 90.00 | | 90.00 | 25.00 | AIR | 1/21/2010 | DOMESTIC |
| 252178 | | MATTER, BOB | 07S | 20E | 33 | ADD | No | WELL | 93.00 | 64.00 | | 64.00 | 50.00 | AIR | 7/7/2009 | DOMESTIC |
| 216386 | | RUSSELL GARY | 07S | 20E | 33 | ADD | No | WELL | 80.00 | 44.00 | | 44.00 | 25.00 | AIR | 10/25/2004 | DOMESTIC |
| 104802 | | JORGENSON GLORIA E. | 07S | 20E | 33 | B | No | WELL | 52.00 | 30.00 | 42.00 | | 30.00 | BAILER | 7/13/1965 | DOMESTIC |
| 231470 | | ABESSIO JOE AND ANNE MARIE | 07S | 20E | 33 | BAA | No | WELL | 38.50 | 28.00 | | 28.00 | 60.00 | AIR | 8/29/2006 | DOMESTIC |
| 291378 | | VOMUND, MARK | 07S | 20E | 33 | BAA | No | WELL | 79.00 | 52.00 | | 79.00 | 25.00 | AIR | 2/15/2017 | DOMESTIC |
| 219737 | | MCCONE PAUL | 07S | 20E | 33 | BAAD | Yes | WELL | 76.00 | 34.00 | | 34.00 | 50.00 | AIR | 6/10/2005 | DOMESTIC |
| 290160 | | SUKIT, GLEN | 07S | 20E | 33 | BABA | No | WELL | 105.00 | 45.00 | | 45.00 | 40.00 | AIR | 4/12/2001 | DOMESTIC |
| 290160 | | SUKIT, GLEN | 07S | 20E | 33 | BABA | No | WELL | 105.00 | 45.00 | | 45.00 | 40.00 | AIR | 4/12/2001 | DOMESTIC |
| 201870 | | CARPENTER ANDY | 07S | 20E | 33 | BAD | No | WELL | 83.00 | 31.00 | | 31.00 | 30.00 | AIR | 6/11/2002 | DOMESTIC |
| 231519 | | LINDALL DON AND LINDA | 07S | 20E | 33 | BBA | No | WELL | 70.00 | 23.00 | | 23.00 | 25.00 | AIR | 11/26/2006 | DOMESTIC |
| 165328 | C102224-00 | LINDALL DON | 07S | 20E | 33 | BBAA | Yes | WELL | 72.00 | 12.00 | 34.00 | 12.00 | 12.00 | PUMP | 7/25/1997 | DOMESTIC |
| 188455 | | CASTAGNE BROS. INC. | 07S | 20E | 33 | BBDA | No | WELL | 39.00 | 23.00 | | | 5.00 | OTHER | 1/1/1953 | DOMESTIC |
| 138852 | | FARLEY MIKE & SHIRLEE | 07S | 20E | 33 | BBDD | Yes | WELL | 50.00 | 21.00 | 35.00 | 21.00 | 36.00 | AIR | 4/28/1993 | DOMESTIC |
| 243744 | | DODDY TOM (DON WOLF) | 07S | 20E | 33 | BC | No | WELL | 160.00 | 32.00 | | 32.00 | 10.00 | AIR | 6/27/2005 | DOMESTIC |
| 241644 | | PHILIPSBORN ANITA | 07S | 20E | 33 | BC | No | WELL | 60.00 | 15.00 | | 15.00 | 30.00 | AIR | 8/15/2006 | DOMESTIC |
| 290075 | | HENERY, RON | 07S | 20E | 33 | BD | No | WELL | 80.00 | 38.00 | | 38.00 | 60.00 | AIR | 8/13/2001 | DOMESTIC |
| 228338 | | TIPTON RON | 07S | 20E | 33 | BDC | No | WELL | 90.00 | 50.00 | | 50.00 | 60.00 | AIR | 6/16/2006 | DOMESTIC |
| 104803 | | CROSS MICHAEL | 07S | 20E | 33 | CCA | No | WELL | 100.00 | 15.00 | 85.00 | | 13.00 | BAILER | 8/11/1983 | DOMESTIC |
| 172613 | | KRAFT DOUG | 07S | 20E | 33 | CCA | No | WELL | 90.00 | 3.00 | 85.00 | 3.00 | 5.00 | AIR | 12/30/1998 | DOMESTIC |
| 226239 | | TINNES GARY | 07S | 20E | 33 | CD | No | WELL | 84.00 | 58.00 | | 50.00 | 20.00 | AIR | 5/3/2006 | DOMESTIC |
| 263109 | | LAMBERT, PHIL | 07S | 20E | 33 | DAB | No | WELL | 102.00 | 50.00 | | 50.00 | 40.00 | AIR | 6/29/2011 | DOMESTIC |
| 204265 | | RUSSELL | 07S | 20E | 33 | DABC | Yes | WELL | 83.00 | 48.00 | | 48.00 | 36.00 | AIR | 6/23/2003 | DOMESTIC |
| 176391 | C109233-00 | KAISER PETER | 07S | 20E | 33 | DAC | No | WELL | 110.00 | 62.00 | | | 12.00 | AIR | 5/21/1999 | DOMESTIC |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 216387 | | KOVACH STEVE | 07S | 20E | 33 | DAC | No | WELL | 95.00 | 61.00 | | 61.00 | 20.00 | AIR | 10/21/2004 | DOMESTIC |
| 153455 | C096473-00 | DANIELS PATRICA AND ROBERT | 07S | 20E | 33 | DACA | Yes | WELL | 105.00 | 60.00 | 105.00 | 60.00 | 40.00 | AIR | 7/20/1995 | DOMESTIC |
| 298425 | | ERICKSON, CASEY | 07S | 20E | 33 | DAD | No | WELL | 103.00 | 72.00 | | 72.00 | 40.00 | AIR | 8/31/2018 | DOMESTIC |
| 201871 | | HUSKINS GARY | 07S | 20E | 33 | DB | No | WELL | 60.00 | 12.00 | | 12.00 | 180.00 | AIR | 12/1/2002 | DOMESTIC |
| 295000 | | WHITTAMORE, BYRON & DENA | 07S | 20E | 33 | DBD | No | WELL | 96.00 | 51.00 | | 51.00 | 60.00 | AIR | 10/25/2017 | DOMESTIC |
| 161389 | | PILATI MICHAEL | 07S | 20E | 33 | DCC | No | WELL | 98.00 | 45.00 | 95.00 | 45.00 | 60.00 | AIR | 10/3/1996 | DOMESTIC |
| 104804 | | PILATI RICHARD | 07S | 20E | 33 | DD | No | WELL | 50.00 | 9.00 | 15.00 | | 40.00 | BAILER | 10/20/1965 | DOMESTIC |
| 289853 | | PILATI, JULIUS | 07S | 20E | 33 | DDB | No | WELL | 57.00 | | | | 30.00 | AIR | 9/27/2000 | DOMESTIC |
| 172610 | C108078-00 | GILLETTE RUSSELL | 07S | 20E | 33 | DDC | No | WELL | 78.00 | 17.00 | | 17.00 | 75.00 | AIR | 9/16/1998 | DOMESTIC |
| 284601 | | LEACH AUTO AND CYCLE | 07S | 20E | 33 | DDD | No | WELL | 54.00 | 32.00 | | 32.00 | 45.00 | AIR | 9/30/2015 | DOMESTIC |
| 219742 | | LEFEBVRE JOE | 07S | 20E | 34 | | No | WELL | 40.00 | | | | 60.00 | AIR | 6/2/2005 | IRRIGATION |
| 290097 | | ZUPAN, TONY | 07S | 20E | 34 | | No | WELL | 40.00 | 12.00 | | 12.00 | 60.00 | AIR | 7/7/2001 | IRRIGATION |
| 104805 | | CASTOGNE VIC | 07S | 20E | 34 | | No | WELL | 38.00 | 9.00 | 38.00 | | 50.00 | AIR | 5/6/1983 | UNKNOWN |
| 104806 | | MARTIN CHUCK | 07S | 20E | 34 | | No | WELL | 38.00 | 11.00 | 38.00 | | 50.00 | AIR | 5/5/1983 | DOMESTIC |
| 142588 | | STEWERT SHAWN | 07S | 20E | 34 | AA | No | WELL | 100.00 | 10.00 | 95.00 | 10.00 | 12.00 | AIR | 10/27/1993 | DOMESTIC |
| 173021 | | RAUMER FRED | 07S | 20E | 34 | AAA | No | WELL | 110.00 | 45.00 | 110.00 | 45.00 | 10.00 | AIR | 10/23/1997 | DOMESTIC |
| 290109 | | SIDDLE FAMILY TRUST | 07S | 20E | 34 | AAC | No | WELL | 31.00 | 2.00 | | 2.00 | 35.00 | AIR | 7/27/2001 | DOMESTIC |
| 183960 | | THE SIDDLE FAMILY TRUST | 07S | 20E | 34 | AAC | No | WELL | 35.00 | 4.00 | | 4.00 | 75.00 | AIR | 9/24/1999 | DOMESTIC |
| 183961 | | THE SIDDLE FAMILY TRUST | 07S | 20E | 34 | AAC | No | WELL | 34.00 | 6.00 | | 6.00 | 75.00 | AIR | 9/26/1999 | DOMESTIC |
| 251736 | | ARNDT, GRETCHEN | 07S | 20E | 34 | AB | No | WELL | 40.00 | 5.00 | | 5.00 | 30.00 | AIR | 5/26/2008 | IRRIGATION |
| 220605 | | CLARKS BUS SERVICE *WELL 1 | 07S | 20E | 34 | AB | No | WELL | 8.00 | 5.00 | | | | OTHER | 6/2/2005 | OTHER |
| 219740 | | CLARKS BUS SERVICE *WELL 1 | 07S | 20E | 34 | AB | No | WELL | 8.00 | 5.00 | | | | OTHER | 6/2/2005 | TEST WELL |
| 219745 | | CLARKS BUS SERVICE *WELL 2 | 07S | 20E | 34 | AB | No | WELL | 8.00 | 5.00 | | | | OTHER | 6/2/2005 | MONITORING |
| 219747 | | CLARKS BUS SERVICE *WELL 3 | 07S | 20E | 34 | AB | No | WELL | 8.00 | 4.00 | | | | OTHER | 6/2/2005 | MONITORING |
| 240541 | | COOPER RUSSEL | 07S | 20E | 34 | AB | No | WELL | 40.00 | 15.00 | | 15.00 | 22.00 | AIR | 11/1/2007 | IRRIGATION |
| 219749 | | FINSTAD, ERIC/PILATI, MIKE | 07S | 20E | 34 | AB | No | WELL | 40.00 | | | | 38.00 | AIR | 6/5/2005 | IRRIGATION |
| 104807 | | FOUNTAIN PARK | 07S | 20E | 34 | AB | No | WELL | 58.00 | 7.00 | 20.00 | | 70.00 | PUMP | 6/2/1984 | IRRIGATION |
| 149927 | | NORBY, H. LEE | 07S | 20E | 34 | AB | No | WELL | 80.00 | 10.00 | 75.00 | 10.00 | 20.00 | AIR | 10/29/1993 | DOMESTIC |
| 216524 | | SOMMERFELD ANTHONY | 07S | 20E | 34 | AB | No | WELL | 60.00 | 10.00 | | 10.00 | 20.00 | AIR | 11/2/2004 | DOMESTIC |
| 104808 | | AMUNDSON DUKE | 07S | 20E | 34 | ABA | No | WELL | 45.00 | 17.00 | 25.00 | | 17.00 | BAILER | 9/13/1974 | DOMESTIC |
| 173022 | | BROWN, VERNETTA | 07S | 20E | 34 | ABA | No | WELL | 25.00 | 7.00 | | 7.00 | 60.00 | AIR | 8/6/1996 | IRRIGATION |
| 239572 | | COLT COMMUNICATIONS L.L.P. | 07S | 20E | 34 | ABA | No | WELL | 40.00 | 6.00 | | 6.00 | 75.00 | AIR | 8/8/2007 | DOMESTIC |
| 164284 | C102172-00 | JARVI, CLARA T. | 07S | 20E | 34 | ABA | No | WELL | 25.00 | 6.00 | | 6.00 | 6.00 | AIR | 8/5/1997 | IRRIGATION |
| 183507 | | MOUNTAIN LOG Y SEDOR | 07S | 20E | 34 | ABA | No | WELL | 50.00 | 14.50 | | | 11.00 | AIR | 5/27/2000 | DOMESTIC |
| 104809 | | SCHUBERT, JACK | 07S | 20E | 34 | ABA | No | WELL | 110.00 | 10.00 | 100.00 | | 10.00 | BAILER | 9/7/1984 | DOMESTIC |
| 104810 | | LAMPI, HUGO | 07S | 20E | 34 | ABB | No | WELL | 39.00 | 12.00 | 38.00 | | 100.00 | AIR | 1/15/1983 | DOMESTIC |
| 128247 | | SLANTZ, RUSSELL | 07S | 20E | 34 | ABB | No | WELL | 28.50 | 11.00 | 28.00 | 11.50 | 30.00 | AIR | 10/7/1991 | DOMESTIC |
| 173023 | C109238-00 | MARTIN, DON | 07S | 20E | 34 | ABD | No | WELL | 100.00 | 14.00 | | 14.00 | 18.00 | AIR | 7/16/1998 | DOMESTIC |
| 155748 | C097579-00 | BRIEN, JIM | 07S | 20E | 34 | ABDA | Yes | WELL | 180.00 | 62.00 | 140.00 | 62.00 | 10.00 | PUMP | 10/18/1995 | DOMESTIC |
| 203331 | | BULLOCK BILL | 07S | 20E | 34 | ABDD | Yes | WELL | 101.00 | | | | | OTHER | | |
| 241643 | | DOEDEN KATHY | 07S | 20E | 34 | AC | No | WELL | 40.00 | 10.00 | | 10.00 | 30.00 | AIR | 1/2/2008 | IRRIGATION |
| 104811 | | KARAS, BENJAMIN K. | 07S | 20E | 34 | AC | No | WELL | 30.00 | 8.00 | | | 200.00 | OTHER | 8/1/1959 | DOMESTIC |
| 231468 | | COLT COMUNICATIONS LLC MPPP | 07S | 20E | 34 | ACA | No | WELL | 25.00 | 6.00 | | 6.00 | 60.00 | AIR | 9/11/2006 | DOMESTIC |
| 289797 | | BEAUMONT, SCOTT | 07S | 20E | 34 | ACB | No | WELL | 29.00 | 8.00 | | 8.00 | 12.00 | AIR | 8/30/1999 | DOMESTIC |
| 126442 | | WHITTEN, R.P. | 07S | 20E | 34 | ACB | No | WELL | 28.00 | 11.00 | 28.00 | 11.00 | 20.00 | AIR | 10/4/1991 | DOMESTIC |
| 274621 | | WILLIAMS, HAL | 07S | 20E | 34 | ACCA | No | WELL | 38.00 | 6.00 | | 6.00 | 100.00 | AIR | 8/5/2013 | DOMESTIC |
| 282592 | | CARBON COUNTY FAIR BOARD | 07S | 20E | 34 | B | No | WELL | 210.00 | 83.00 | | 83.00 | 15.00 | AIR | 5/7/2015 | DOMESTIC |
| 258484 | | GRANT SUSAN | 07S | 20E | 34 | BA | No | WELL | 40.00 | 12.00 | | 12.00 | 40.00 | AIR | 9/2/2009 | IRRIGATION |
| 142744 | | JUDD, DAVE | 07S | 20E | 34 | BA | No | WELL | 38.00 | 19.00 | 35.00 | 19.00 | 50.00 | AIR | 12/30/1993 | IRRIGATION |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 275510 | | | WRIGHT, DARYL | 07S | 20E | 34 | BA | No | WELL | 40.00 | 10.00 | | 10.00 | 40.00 | AIR | 12/14/2012 | IRRIGATION |
| 189170 | | | BREMER, DARREH | 07S | 20E | 34 | BAA | No | WELL | 39.00 | 21.00 | | 21.00 | 40.00 | AIR | 5/17/2001 | DOMESTIC |
| 164285 | | C102171-00 | TIMONEN, SIGRID S. | 07S | 20E | 34 | BAA | No | WELL | 24.00 | 6.00 | | 6.00 | 40.00 | AIR | 8/5/1997 | IRRIGATION |
| 132671 | | W045736-00 | CITY OF RED LODGE - WELL 1 SOURCE 2 | 07S | 20E | 34 | BAACC | No | WELL | 74.00 | 20.00 | | | 900.00 | OTHER | 9/17/1961 | PUBLIC WATER SUPPLY |
| 298649 | | | GIOVETTI, MARIE | 07S | 20E | 34 | BAB | No | WELL | 44.00 | 31.00 | | 31.00 | 40.00 | AIR | 9/14/2018 | IRRIGATION |
| 155408 | | C097573-00 | HUDAK EXCAVATION & CONSTRUCTION | 07S | 20E | 34 | BAB | No | WELL | 180.00 | 57.00 | 175.00 | 57.00 | 8.00 | AIR | 4/1/1996 | DOMESTIC |
| 132672 | | | NOGLICH, MIKE VIRGINIA K. & PATRICK | 07S | 20E | 34 | BAB | No | WELL | 39.00 | 18.00 | 39.00 | 18.00 | 35.00 | AIR | 9/1/1992 | IRRIGATION |
| 161390 | | | PILATI, MICHAEL | 07S | 20E | 34 | BAB | No | WELL | 38.00 | 17.00 | 35.00 | 17.00 | 40.00 | AIR | 10/1/1996 | IRRIGATION |
| 301610 | | | POORE, JOHN | 07S | 20E | 34 | BAB | No | WELL | 39.00 | 19.00 | | 19.00 | 40.00 | AIR | 6/6/2019 | DOMESTIC |
| 207153 | | | WISE, JEFF | 07S | 20E | 34 | BAB | No | WELL | 48.00 | 29.00 | | 29.00 | 36.00 | AIR | 9/5/2003 | DOMESTIC |
| 293427 | | | BRAME, JEFF | 07S | 20E | 34 | BAC | No | WELL | 39.00 | 19.00 | | 19.00 | 40.00 | AIR | 7/26/2017 | IRRIGATION |
| 187237 | | | ENGLER, ED | 07S | 20E | 34 | BAC | No | WELL | 58.00 | 18.00 | | 18.00 | 75.00 | AIR | 12/6/2000 | IRRIGATION |
| 158425 | | C099249-00 | JURKOVICK, RAY | 07S | 20E | 34 | BAC | No | WELL | 38.00 | 27.00 | 30.00 | | 18.00 | AIR | 9/23/1996 | DOMESTIC |
| 187291 | | C112916-00 | MARCHELLO, GUIDO/ MARY | 07S | 20E | 34 | BAC | No | WELL | 33.00 | 14.00 | 33.00 | 12.00 | 30.00 | AIR | 8/11/1999 | IRRIGATION |
| 189172 | | | MCBRIDE, BARBRA | 07S | 20E | 34 | BAC | No | WELL | 40.00 | 22.00 | | 22.00 | | AIR | 4/25/2001 | IRRIGATION |
| 176392 | | C109271-00 | THORMATTLEN, WALLACE | 07S | 20E | 34 | BAC | No | WELL | 40.00 | 14.00 | 38.00 | 14.00 | 30.00 | AIR | 8/5/1999 | IRRIGATION |
| 161385 | | | WISE JEFF | 07S | 20E | 34 | BAC | No | WELL | 40.00 | 25.00 | 35.00 | | 15.00 | PUMP | 8/21/1996 | DOMESTIC |
| 104812 | | | BECKL RANDY | 07S | 20E | 34 | BAD | No | WELL | 39.00 | 18.00 | 38.00 | | 25.00 | AIR | 4/9/1985 | DOMESTIC |
| 192991 | | | EDWARDS KEITH | 07S | 20E | 34 | BAD | No | WELL | 38.00 | 14.00 | | 14.00 | 100.00 | AIR | 6/15/2001 | IRRIGATION |
| 212138 | | | JAQUITH, PHILLIP | 07S | 20E | 34 | BAD | No | WELL | 40.00 | 20.00 | | 20.00 | 50.00 | AIR | 5/14/2004 | IRRIGATION |
| 158426 | | C099934-00 | THOKE, WILLIAM P. | 07S | 20E | 34 | BAD | No | WELL | 38.00 | 16.00 | 35.00 | 16.00 | 40.00 | AIR | 10/1/1996 | IRRIGATION |
| 284586 | | | TOMICICH, WAYNE | 07S | 20E | 34 | BAD | No | WELL | 39.00 | 21.50 | | 21.50 | 40.00 | AIR | 9/25/2015 | DOMESTIC |
| 192990 | | | WESTER MIKE AND NANCY | 07S | 20E | 34 | BAD | No | WELL | 38.00 | 12.00 | | 14.00 | 100.00 | AIR | 6/15/2001 | IRRIGATION |
| 212018 | | | RUDSTROM BOB | 07S | 20E | 34 | BB | No | WELL | 40.00 | 10.00 | | 10.00 | 60.00 | AIR | 6/28/2004 | IRRIGATION |
| 184621 | | C103525-00 | JADWIN GENE W | 07S | 20E | 34 | BBA | No | WELL | 160.00 | 50.00 | | 50.00 | 8.00 | AIR | 1/14/1998 | DOMESTIC |
| 268428 | | | JADWIN, GENE | 07S | 20E | 34 | BBD | No | WELL | 102.00 | 41.00 | | 41.00 | 15.00 | AIR | 6/30/2011 | DOMESTIC |
| 297155 | | | JADWIN, GENE W. | 07S | 20E | 34 | BBD | No | WELL | 70.00 | 42.00 | | 42.00 | 7.50 | AIR | 6/4/2018 | DOMESTIC |
| 268453 | | | CARBON COUNTY | 07S | 20E | 34 | BC | No | WELL | 60.00 | 22.00 | | 22.00 | 100.00 | AIR | 9/24/2010 | OTHER |
| 268451 | | | CARBON COUNTY | 07S | 20E | 34 | BC | No | WELL | 60.00 | 22.00 | | 22.00 | 50.00 | AIR | 9/24/2010 | OTHER |
| 205963 | | | PILATI PAUL | 07S | 20E | 34 | BC | No | WELL | 40.00 | 22.00 | | 22.00 | 30.00 | AIR | 5/27/2003 | IRRIGATION |
| 228262 | | | CARBON COUNTRY FAIR BOARD | 07S | 20E | 34 | BCB | No | WELL | 83.00 | 59.00 | | 59.00 | 30.00 | AIR | 5/25/2006 | DOMESTIC |
| 104813 | | | MACKAY WILLIAM SR. | 07S | 20E | 34 | BCCD | No | WELL | 38.00 | 14.00 | 35.00 | | 50.00 | AIR | 9/19/1984 | DOMESTIC |
| 167905 | | C104929-00 | OREDNICK RICHARD | 07S | 20E | 34 | BCD | No | WELL | 38.00 | 16.00 | 35.00 | 16.00 | 50.00 | AIR | 10/13/1997 | IRRIGATION |
| 104814 | | | PILATI RICHARD L. | 07S | 20E | 34 | BCD | No | WELL | 39.00 | 14.00 | 35.00 | 50.00 | | OTHER | 9/17/1984 | DOMESTIC |
| 258470 | | | BRYNGELSON MARY | 07S | 20E | 34 | BD | No | WELL | 40.00 | 6.00 | | 6.00 | 40.00 | AIR | 7/29/2009 | IRRIGATION |
| 214190 | | | DOWNING GALE | 07S | 20E | 34 | BD | No | WELL | 40.00 | 6.00 | | 6.00 | 60.00 | AIR | 7/23/2002 | IRRIGATION |
| 144956 | | | FRONTIER COMMUNITIES INC. | 07S | 20E | 34 | BD | No | WELL | 33.00 | 13.00 | 30.00 | 13.00 | 50.00 | AIR | 8/27/1992 | IRRIGATION |
| 144958 | | | FRONTIER COMMUNITIES INC. | 07S | 20E | 34 | BD | No | WELL | 37.00 | 13.00 | 35.00 | 13.00 | 50.00 | AIR | 8/27/1992 | IRRIGATION |
| 211991 | | | GRIBBLE KANDACE | 07S | 20E | 34 | BD | No | WELL | 40.00 | 23.00 | | 23.00 | 45.00 | AIR | 4/7/2004 | IRRIGATION |
| 144954 | | | HAUGE LEE | 07S | 20E | 34 | BD | No | WELL | 35.00 | 15.00 | 30.00 | 15.00 | 35.00 | AIR | 6/15/1992 | IRRIGATION |
| 124992 | | | KLESSONS DAVE | 07S | 20E | 34 | BD | No | WELL | 40.00 | 6.00 | 36.00 | 6.00 | 40.00 | AIR | 10/9/1990 | IRRIGATION |
| 243804 | | | KYNER JAMES | 07S | 20E | 34 | BD | No | WELL | 40.00 | 8.00 | | 8.00 | 20.00 | AIR | 8/25/2006 | IRRIGATION |
| 275624 | | | LADVALA, MATT | 07S | 20E | 34 | BD | No | WELL | 40.00 | 15.00 | | 15.00 | 60.00 | AIR | 8/30/2013 | IRRIGATION |
| 275663 | | | LADVALA, MATT | 07S | 20E | 34 | BD | No | WELL | 40.00 | 15.00 | | 15.00 | 60.00 | AIR | 8/30/2013 | IRRIGATION |
| 201872 | | | LUOMA OLIVER | 07S | 20E | 34 | BD | No | WELL | 40.00 | 6.00 | | 6.00 | 90.00 | AIR | 7/10/2002 | IRRIGATION |
| 201873 | | | NEARPASS BAYARD | 07S | 20E | 34 | BD | No | WELL | 40.00 | 6.00 | | 6.00 | 40.00 | AIR | 7/9/2002 | IRRIGATION |
| 292687 | | | ROCKIN J INC. * MW-1 | 07S | 20E | 34 | BD | No | WELL | 15.00 | 8.00 | | | | | 5/23/2017 | MONITORING |
| 292689 | | | ROCKIN J INC. * MW-2 | 07S | 20E | 34 | BD | No | WELL | 15.00 | 8.00 | | | | | 5/23/2017 | MONITORING |
| 292688 | | | ROCKIN J INC. - MW3 * MW-3 | 07S | 20E | 34 | BD | No | WELL | 15.00 | 8.00 | | | | | 5/22/2017 | MONITORING |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 104816 | | SPENCER VER | 07S | 20E | 34 | BD | No | WELL | 38.00 | 8.00 | 35.00 | | 50.00 | AIR | 5/14/1987 | IRRIGATION |
| 128248 | | WILLIAMS DONALD E. | 07S | 20E | 34 | BD | No | WELL | 38.00 | 18.00 | 35.00 | 18.00 | 35.00 | AIR | 6/11/1992 | IRRIGATION |
| 104815 | | ZUMBRUN LLOYD & GLADYS | 07S | 20E | 34 | BD | No | WELL | 30.00 | 5.00 | | 5.00 | 50.00 | AIR | 6/2/1988 | IRRIGATION |
| 268080 | | BECKER, CAMRON | 07S | 20E | 34 | BDA | No | WELL | 39.00 | 15.00 | | 15.00 | 60.00 | AIR | 7/7/2012 | DOMESTIC |
| 268073 | | EWTON, DAVID | 07S | 20E | 34 | BDA | No | WELL | 39.00 | 19.50 | | 19.50 | 60.00 | AIR | 7/6/2012 | DOMESTIC |
| 124993 | C049523-00 | FORMANACK ROBERT W. | 07S | 20E | 34 | BDA | No | WELL | 39.00 | 12.00 | 38.00 | | 50.00 | AIR | 1/20/1983 | DOMESTIC |
| 120251 | | KLEPICH GEORGE | 07S | 20E | 34 | BDA | No | WELL | 39.00 | 13.00 | 35.00 | | 50.00 | AIR | 5/24/1985 | DOMESTIC |
| 222195 | | MEIER RYAN AND JONI | 07S | 20E | 34 | BDA | No | WELL | 77.00 | 41.00 | | 41.00 | 20.00 | AIR | 8/8/2005 | DOMESTIC |
| 173024 | | PARK BRETTNER | 07S | 20E | 34 | BDA | No | WELL | 38.00 | 9.00 | | 9.00 | 70.00 | AIR | 9/23/1998 | DOMESTIC |
| 292529 | 30111556 | MAJERUS, MARY | 07S | 20E | 34 | BDC | No | WELL | 39.00 | 16.00 | | 39.00 | 50.00 | AIR | 5/30/2017 | IRRIGATION |
| 195848 | | OLSON ED | 07S | 20E | 34 | BDC | No | WELL | 38.00 | 21.00 | | 21.00 | 50.00 | AIR | 5/15/2002 | IRRIGATION |
| 128249 | | THOMPSON JANET | 07S | 20E | 34 | BDC | No | WELL | 30.00 | 17.00 | 25.00 | 17.00 | 20.00 | AIR | 6/2/1992 | IRRIGATION |
| 212299 | | DOUTHIT BERT | 07S | 20E | 34 | BDD | No | WELL | 40.00 | 12.00 | | 12.00 | 60.00 | AIR | 4/26/2004 | IRRIGATION |
| 104817 | | NOE JAMES A. | 07S | 20E | 34 | BDD | No | WELL | 38.00 | 9.00 | | | 50.00 | AIR | 6/23/1988 | IRRIGATION |
| 293424 | | YATES, JOHN | 07S | 20E | 34 | BDD | No | WELL | 39.00 | 9.00 | | 9.00 | 80.00 | AIR | 7/24/2017 | IRRIGATION |
| 104819 | | CLARK AMOS | 07S | 20E | 34 | CA | No | WELL | 32.00 | 15.00 | 30.00 | | 30.00 | AIR | 3/15/1985 | DOMESTIC |
| 104818 | | WOLFE RON | 07S | 20E | 34 | CA | No | WELL | 35.00 | | 35.00 | | 20.00 | AIR | 10/9/1984 | DOMESTIC |
| 179782 | C109687-00 | WOLFE RONALD A. | 07S | 20E | 34 | CAA | No | WELL | 41.00 | 10.00 | | 10.00 | 40.00 | AIR | 9/2/1999 | DOMESTIC |
| 154735 | C096594-00 | BEARTOOTH MOUNTAIN GUIDES | 07S | 20E | 34 | CAB | No | WELL | 39.00 | | 39.00 | | 40.00 | AIR | 11/3/1995 | DOMESTIC |
| 253520 | | FERGUSON MIKE | 07S | 20E | 34 | CAB | No | WELL | 40.00 | 17.00 | | 17.00 | 60.00 | AIR | 9/20/2009 | DOMESTIC |
| 253519 | | FERGUSON MIKE | 07S | 20E | 34 | CAB | No | WELL | 40.00 | 18.00 | | 18.00 | 50.00 | AIR | 10/20/2009 | GEOTHERMAL-EXTRACTION |
| 203330 | | CRAZY CREEK CHAIRS | 07S | 20E | 34 | CABB | Yes | WELL | 32.00 | | | | | OTHER | | |
| 274628 | | SALLADE, CHUCK | 07S | 20E | 34 | CB | No | WELL | 39.00 | 18.00 | | 18.00 | 40.00 | AIR | 8/14/2013 | DOMESTIC |
| 161379 | | KLEIN GAYLEN & JO ANN | 07S | 20E | 34 | CBA | No | WELL | 39.00 | 15.00 | 39.00 | 39.00 | 45.00 | AIR | 8/23/1996 | IRRIGATION |
| 231467 | | BRENNE KURT AND MARTHA | 07S | 20E | 34 | CBD | No | WELL | 39.00 | 21.00 | | 21.00 | 40.00 | AIR | 9/1/2006 | DOMESTIC |
| 104820 | C035709-00 | HEREM AL | 07S | 20E | 34 | CBD | No | WELL | 39.00 | 11.00 | 30.00 | | 25.00 | AIR | 9/1/1981 | DOMESTIC |
| 225274 | | LDS CHURCH | 07S | 20E | 34 | CBD | No | WELL | | | | | | OTHER | 4/2/2006 | DOMESTIC |
| 225392 | | LDS CHURCH | 07S | 20E | 34 | CBD | No | WELL | 58.00 | 28.30 | | | | OTHER | 4/2/2006 | IRRIGATION |
| 104821 | | HAMLIN CONSTRUCTION | 07S | 20E | 34 | CBDB | No | WELL | 59.00 | 22.00 | 58.00 | | 75.00 | AIR | 10/29/1981 | |
| 104822 | | MCALPINE WILLIAM | 07S | 20E | 34 | CCA | No | WELL | 30.00 | 4.00 | | 4.50 | 25.00 | AIR | 5/29/1988 | DOMESTIC |
| 278679 | | SHANK, GREG | 07S | 20E | 34 | CCC | No | WELL | 39.00 | 15.00 | | 15.00 | 60.00 | AIR | 6/25/2014 | DOMESTIC |
| 173027 | | UNCLE MILTYS DRIVE-IN *MW-1 | 07S | 20E | 34 | DB | No | WELL | 10.00 | | | | | OTHER | 9/23/1997 | MONITORING |
| 173025 | | UNCLE MILTYS DRIVE-IN *MW-2 | 07S | 20E | 34 | DB | No | WELL | 6.00 | | | | | OTHER | 9/24/1997 | MONITORING |
| 173026 | | UNCLE MILTYS DRIVE-IN *MW-3 | 07S | 20E | 34 | DB | No | WELL | 6.00 | | | | | OTHER | 9/24/1997 | MONITORING |
| 231464 | | COLT COMMUNICATIONS LLC MPPP | 07S | 20E | 34 | DBA | No | WELL | 130.00 | 43.00 | | 43.00 | 11.00 | AIR | 9/8/2006 | DOMESTIC |
| 104823 | C016122-00 | KANE JAMES | 07S | 20E | 34 | DBA | No | WELL | 27.00 | 4.00 | 27.00 | | 100.00 | AIR | 8/4/1977 | DOMESTIC |
| 104824 | C033647-00 | CHAPMAN ALLEN | 07S | 20E | 34 | DBC | No | WELL | 38.00 | 7.00 | 12.00 | | 30.00 | AIR | 4/1/1981 | |
| 104827 | | HYVONEN ONNI | 07S | 20E | 35 | BB | No | WELL | 35.00 | 20.00 | | | 15.00 | OTHER | 2/10/1957 | DOMESTIC |
| 104825 | | HYVONEN ONNI | 07S | 20E | 35 | BB | No | WELL | | 20.00 | | | | OTHER | 1/1/1905 | DOMESTIC |
| 104826 | | HYVONEN ONNI | 07S | 20E | 35 | BB | No | WELL | 40.00 | 20.00 | | | 800.00 | OTHER | 11/8/1947 | IRRIGATION |
| 258518 | | WOLF RON | 07S | 20E | 35 | BB | No | WELL | 37.00 | 34.00 | | 34.00 | 1.00 | AIR | 10/20/2009 | IRRIGATION |
| 258560 | | WOLF RON * 03 | 07S | 20E | 35 | BB | No | WELL | 240.00 | 32.00 | | 32.00 | 30.00 | AIR | 10/23/2009 | DOMESTIC |
| 919972 | | DIAMOND DRILL -3 | 07S | 20E | 35 | DDD | No | PETWELL | | | | | | | | |

End of Report.
**712** record(s) listed.

**Items of Note:**

[1]This report is restricted to site types of **WELL, BOREHOLE, SPRING, COAL BED METHANE WELL, PETWELL, PIEZOMETER**.

[2]A single well record (a distinct GWIC Id) may be represented by more than one line in this report if more than one performance test was conducted on the well at the time of drilling.

**Explanation of Columns:**

**GWIC Id** = Key field for the GWIC database. Links to one page reports.
**PDF** = Are scanned documents available through the Document Manager?

- = Yes, click on the icon to download the PDF file.
- = No, well was submitted electronically. No paper record exists.
- = No, record does have a known well log but it is not scanned yet.
- = No, record may or may not have a document to scan. Metadata is unclear.
- = No, record was created from a source other than a well log. No paper record exists.

**DNRC WR** = Water right number assigned to this site by Department of Natural Resources and Conservation.
**Site Name** = Current owner name assigned to GWIC record.
**Location** = Location of site in Montana township, range, section, and quarter-section coordinates.
**Ver?** = Has this location been verified by field staff?
**Type** = Type of site assigned to GWIC record.
**Td** = **T**otal **d**epth of well in feet below ground.
**Swl** = **S**tatic **w**ater **l**evel in feet above/below ground - Negative values are reported for water levels that are above land surface.
**Pwl** = **P**umping **w**ater **l**evel in feet below ground.
**Rwl** = **R**ecovery **w**ater **l**evel in feet below ground.
**Yield** = Yield in gallons per minute.
**Test** = Type of performance test reported.
**Date** = Completion date of well/borehole.
**Use** = Reported use of water.

MBMG
Montana Bureau of Mines and Geology

Mapper Mai

Welcome

Welcome to the online web mapping application of the Montana Bureau of Mines and Geology.

Layers

**Basemap Layers** Basemaps

**Current Basemap:** Streets

**Map Layers**

- GWIC Sites
- MBMG Statewide Monitoring
- HUC Boundary
- Streams

Legend/Tools

**Geology:** The geology portrayed in the mapper is the 1:500,000 scale geologic geodatabase maintained by the MBMG. Click here to download a free copy of GM 62D, an information booklet that explains formation names and codes portrayed in the mapper. Note: The geologic map was originally drawn to match different base maps than those currently served on the MBMG mappers. Therefore disagreements between the geologic map and landforms will become apparent at scales larger than 1:500,000.

Geology Transparency

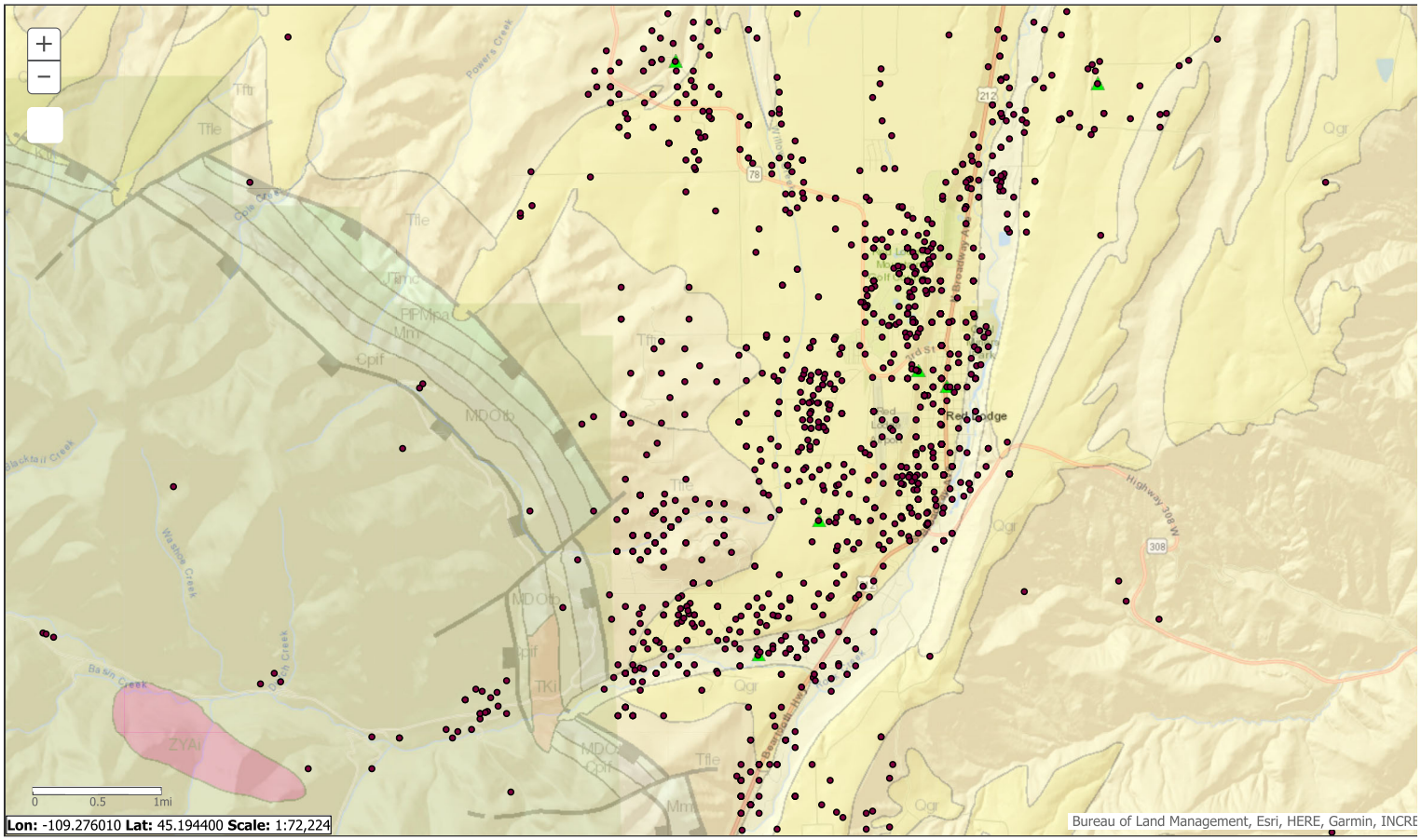
**GWIC Sites**

**MBMG Statewide Monitoring**

**Streams**

Original data layers

Streams



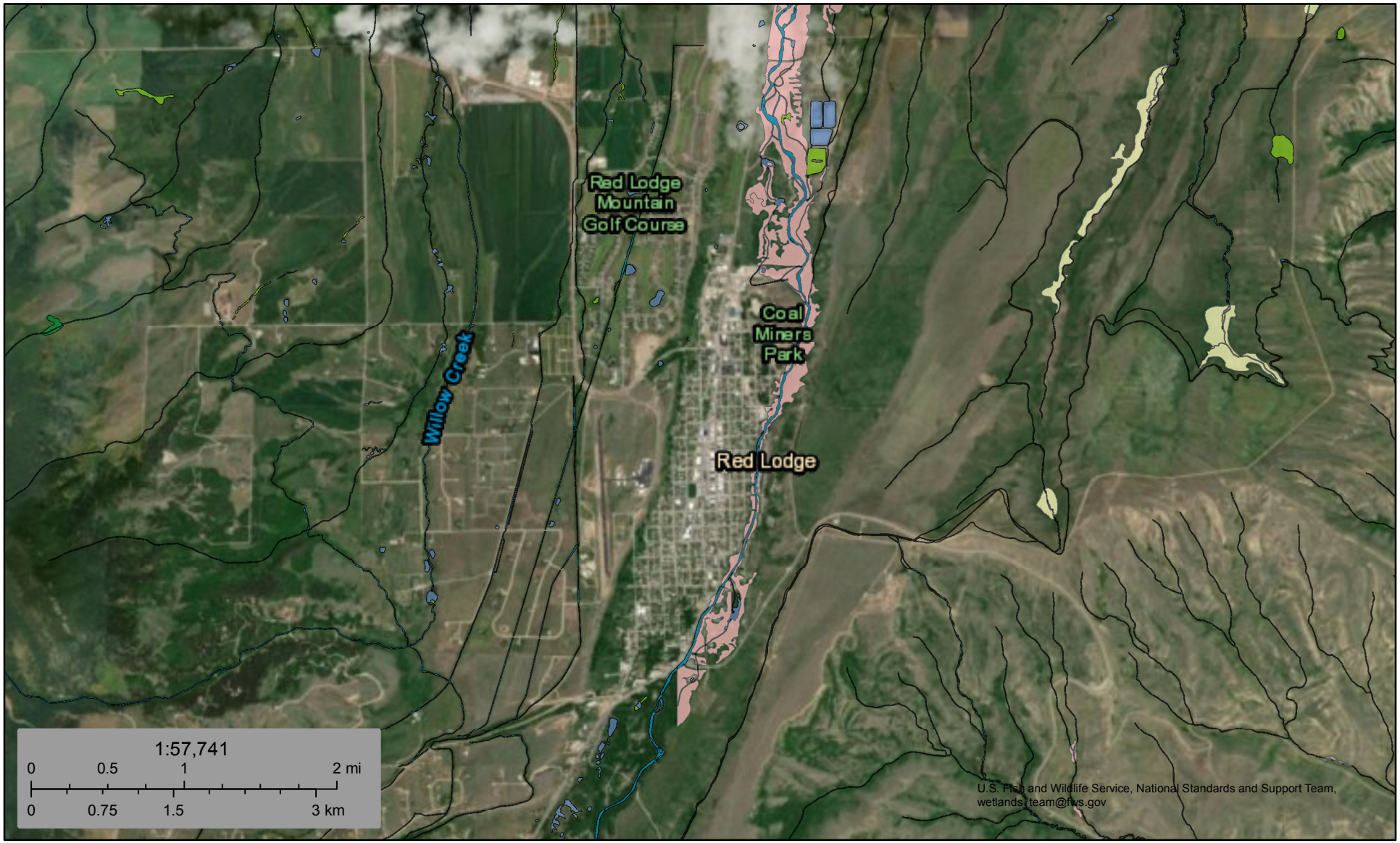
# Appendix F

National Wetlands Inventory Maps

U.S. Fish and Wildlife Service

# National Wetlands Inventory

## City of Red Lodge




January 29, 2020

**Wetlands**

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

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

# Appendix G

Montana Natural Heritage Program Data

**Montana Natural Heritage - SOC Report** Species List Last Updated **10/31/2019**

# Animal Species of Concern

**29** Species of Concern
**1** Special Status Species
**Filtered by the following criteria:**
Town (buffered by 10 miles) = Red Lodge (based on mapped Species Occurrences)



Expand All | Collapse All

## Introduction

## Species of Concern

**Species of Concern**
**29 Species**
**Filtered by the following criteria:**
Town (buffered by 10 miles) = Red Lodge (based on mapped **Species Occurrences**)

### MAMMALS (MAMMALIA)

7 SPECIES
TOWN (BUFFERED BY 10 MILES) = RED LODGE (based on mapped **Species Occurrences**)

| SCIENTIFIC NAME / COMMON NAME / TAXA SORT | FAMILY (SCIENTIFIC) / FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | FWP SWAP | % OF GLOBAL BREEDING RANGE IN MT | % OF MT THAT IS BREEDING RANGE | HABITAT |
|---|---|---|---|---|---|---|---|---|---|---|
| Cynomys leucurus<br>White-tailed Prairie Dog | Sciuridae<br>Squirrels | G4 | S1 | | Sensitive - Known on Forests (CG) | SENSITIVE | SGCN1 | 1% | 1% | Sagebrush grassland |
| | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** Within Montana, this species if found only in a small geographic area and the total population exists within a few colonies. The population appears to have declined over the last few decades, and faces ongoing threats from sylvatic plague. | | | | | | | | |
| Cynomys ludovicianus<br>Black-tailed Prairie Dog | Sciuridae<br>Squirrels | G4 | S3 | | Sensitive - Known on Forests (CG) | SENSITIVE | SGCN3 | 15% | 71% | Grasslands |
| | | **Species Occurrences verified in these Counties:** Big Horn, Blaine, Carbon, Carter, Cascade, Chouteau, Custer, Fallon, Fergus, Garfield, Golden Valley, Hill, Jefferson, Judith Basin, Lewis and Clark, Liberty, Mccone, Musselshell, Petroleum, Phillips, Powder River, Prairie, Richland, Rosebud, Stillwater, Sweet Grass, Toole, Treasure, Valley, Wheatland, Yellowstone<br>**State Rank Reason:** Across much of eastern Montana this species occurs in areas with suitable soil and topography. However sylvatic plague has caused the species to decline and has affected colony size and dynamics. Ongoing threats from disease and persecution due to perceived competition with grazing make long-term status of this species uncertain. | | | | | | | | |
| Gulo gulo<br>Wolverine | Mustelidae<br>Weasels | G4 | S3 | P | Proposed on Forests (BD, BRT, CG, HLC, KOOT, LOLO) | SENSITIVE | SGCN3 | 0% | 37% | Boreal Forest and Alpine Habitats |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Broadwater, Carbon, Cascade, Deer Lodge, Flathead, Gallatin, Glacier, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Pondera, Powell, Ravalli, Sanders, Silver Bow, Stillwater, Sweet Grass, Teton, Wheatland | | | | | | | | |
| Lasiurus cinereus<br>Hoary Bat | Vespertilionidae<br>Bats | G3G4 | S3 | | | | SGCN3 | 2% | 100% | Riparian and forest |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Deer Lodge, Fallon, Fergus, Flathead, Gallatin, Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Lincoln, Madison, Mccone, Meagher, Mineral, Missoula, Musselshell, Park, Petroleum, Phillips, Pondera, Powder River, Powell, Prairie, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Sheridan, Silver Bow, Stillwater, Sweet Grass, Teton, Toole, Treasure, Valley, Wheatland, Wibaux, Yellowstone | | | | | | | | |
| Lynx canadensis<br>Canada Lynx | Felidae<br>Cats | G5 | S3 | LT; CH | Threatened on Forests (BD, BRT) Threatened, Critical Habitat on Forests (CG, HLC, KOOT, LOLO) | THREATENED | SGCN3 | 1% | 40% | Subalpine conifer forest |
| | | **Species Occurrences verified in these Counties:** Carbon, Flathead, Gallatin, Glacier, Granite, Lake, Lewis and Clark, Lincoln, Missoula, Park, Pondera, Powell, Stillwater, Sweet Grass, Teton | | | | | | | | |
| Myotis lucifugus<br>Little Brown Myotis | Vespertilionidae<br>Bats | G3 | S3 | | | | SGCN3 | 3% | 100% | Generalist |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Deer Lodge, Fallon, Fergus, Flathead, Gallatin, Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Madison, Mccone, Meagher, Mineral, Missoula, Musselshell, Park, Petroleum, Phillips, Pondera, Powder River, Powell, Prairie, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Sheridan, Silver Bow, Stillwater, Sweet Grass, Teton, Toole, Treasure, Valley, Wheatland, Wibaux, Yellowstone<br>**State Rank Reason:** Species is common and widespread, but under significant threat of catastrophic declines due to White-Nose Syndrome, a fungal disease responsible for the collapse of populations of this species in the eastern US. | | | | | | | | |
| Ursus arctos<br>Grizzly Bear | Ursidae<br>Bears | G4 | S2S3 | PS: LT; XN | Threatened on Forests (BD, CG, HLC, KOOT, LOLO) | THREATENED | SGCN2-3 | 1% | 22% | Conifer forest |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Cascade, Chouteau, Deer Lodge, Flathead, Gallatin, Glacier, Granite, Jefferson, Lake, Lewis and Clark, Liberty, Lincoln, Madison, Mineral, Missoula, Park, Pondera, Powell, Ravalli, Sanders, Silver Bow, Stillwater, Sweet Grass, Teton, Toole | | | | | | | | |

### BIRDS (AVES)

17 SPECIES
TOWN (BUFFERED BY 10 MILES) = RED LODGE (based on mapped **Species Occurrences**)

| SCIENTIFIC NAME / COMMON NAME / TAXA SORT | FAMILY (SCIENTIFIC) / FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | FWP SWAP | % OF GLOBAL BREEDING RANGE IN MT | % OF MT THAT IS BREEDING RANGE | HABITAT |
|---|---|---|---|---|---|---|---|---|---|---|
| Accipiter gentilis<br>Northern Goshawk | Accipitridae<br>Hawks / Kites / Eagles | G5 | S3 | MBTA | | | SGCN3 | 2% | 68% | Mixed conifer forests |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Broadwater, Carbon, Carter, Cascade, Deer Lodge, Fergus, Flathead, Gallatin, Glacier, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Pondera, Powder River, Powell, Ravalli, Rosebud, Sanders, Silver Bow, Stillwater, Sweet Grass, Teton, Wheatland | | | | | | | | |
| Aquila chrysaetos<br>Golden Eagle | Accipitridae<br>Hawks / Kites / Eagles | G5 | S3 | BGEPA; MBTA; BCC17 | | SENSITIVE | SGCN3 | 3% | 100% | Grasslands |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Dawson, Deer Lodge, Fallon, Fergus, Flathead, Gallatin, Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Lincoln, Madison, Mccone, Meagher, Missoula, Musselshell, Park, Petroleum, Phillips, Pondera, Powder River, Powell, Prairie, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Sheridan, Silver Bow, Stillwater, Sweet Grass, Teton, Toole, Treasure, Valley, Wheatland, Wibaux, Yellowstone | | | | | | | | |
| **Ardea herodias**<br>Great Blue Heron | **Ardeidae**<br>Bitterns / Egrets / Herons / Night-Herons | G5 | S3 | MBTA | | | SGCN3 | 3% | 100% | Riparian forest |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Dawson, Deer Lodge, Fallon, Fergus, Flathead, Gallatin, Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Lincoln, Madison, Mccone, Meagher, Mineral, Missoula, Musselshell, Park, Petroleum, Phillips, Pondera, Powder River, Powell, Prairie, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Sheridan, Silver Bow, Stillwater, Sweet Grass, Teton, Treasure, Valley, Wheatland, Wibaux, Yellowstone<br>**State Rank Reason:** Small breeding population size, evidence of recent declines, and declining regeneration of riparian cottonwood forests due to altered hydrology and grazing. | | | | | | | | |
| **Artemisiospiza nevadensis**<br>Sagebrush Sparrow | **Passerellidae**<br>New World Sparrows | G5 | S3B | MBTA; BCC10; BCC17 | | SENSITIVE | SGCN3 | 0% | 13% | Sagebrush |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Gallatin, Meagher, Park, Ravalli | | | | | | | | |
| **Catharus fuscescens**<br>Veery | **Turdidae**<br>Thrushes | G5 | S3B | MBTA | | SENSITIVE | SGCN3 | 6% | 100% | Riparian forest |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Cascade, Chouteau, Custer, Deer Lodge, Fergus, Flathead, Gallatin, Glacier, Granite, Hill, Jefferson, Lake, Lewis and Clark, Liberty, Lincoln, Madison, Mccone, Meagher, Mineral, Missoula, Musselshell, Park, Petroleum, Phillips, Pondera, Powder River, Powell, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Silver Bow, Stillwater, Sweet Grass, Teton, Wheatland, Yellowstone | | | | | | | | |
| **Centrocercus urophasianus**<br>Greater Sage-Grouse | **Phasianidae**<br>Upland Game Birds | G3G4 | S2 | | Sensitive - Known on Forests (BD) Sensitive - Suspected on Forests (CG, HLC) | SENSITIVE | SGCN2 | 17% | 75% | Sagebrush |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Chouteau, Custer, Dawson, Deer Lodge, Fallon, Fergus, Gallatin, Garfield, Golden Valley, Hill, Madison, Mccone, Meagher, Musselshell, Park, Petroleum, Phillips, Powder River, Prairie, Rosebud, Silver Bow, Stillwater, Sweet Grass, Treasure, Valley, Wheatland, Wibaux, Yellowstone | | | | | | | | |
| **Certhia americana**<br>Brown Creeper | **Certhiidae**<br>Creepers | G5 | S3 | MBTA | | | SGCN3 | 4% | 53% | Moist conifer forests |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Broadwater, Carbon, Carter, Cascade, Chouteau, Deer Lodge, Fergus, Flathead, Gallatin, Glacier, Golden Valley, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Powder River, Powell, Ravalli, Rosebud, Sanders, Silver Bow, Stillwater, Sweet Grass, Teton, Wheatland | | | | | | | | |
| **Falco peregrinus**<br>Peregrine Falcon | **Falconidae**<br>Falcons | G4 | S3 | DM; MBTA; BCC10; BCC11; BCC17 | Sensitive - Known on Forests (BD, BRT, CG, HLC, KOOT, LOLO) | SENSITIVE | SGCN3 | 2% | 100% | Cliffs / canyons |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Cascade, Chouteau, Deer Lodge, Flathead, Gallatin, Glacier, Granite, Jefferson, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Pondera, Powell, Prairie, Ravalli, Sanders, Silver Bow, Stillwater, Sweet Grass, Teton, Toole, Treasure, Yellowstone | | | | | | | | |
| **Gymnorhinus cyanocephalus**<br>Pinyon Jay | **Corvidae**<br>Jays / Crows / Magpies | G3 | S3 | MBTA; BCC17 | | | SGCN3 | 5% | 55% | Open conifer forest |
| | | **Species Occurrences verified in these Counties:** Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Fergus, Gallatin, Garfield, Golden Valley, Jefferson, Lewis and Clark, Musselshell, Park, Petroleum, Phillips, Powder River, Rosebud, Stillwater, Sweet Grass, Wheatland, Yellowstone | | | | | | | | |
| **Haemorhous cassinii**<br>Cassin's Finch | **Fringillidae**<br>Finches | G5 | S3 | MBTA; BCC10 | | | SGCN3 | 11% | 62% | Drier conifer forest |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Broadwater, Carbon, Cascade, Chouteau, Custer, Deer Lodge, Fergus, Flathead, Gallatin, Glacier, Golden Valley, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Musselshell, Park, Petroleum, Phillips, Powder River, Powell, Ravalli, Rosebud, Sanders, Silver Bow, Stillwater, Sweet Grass, Teton, Wheatland, Yellowstone<br>**State Rank Reason:** Data show recent short-term declines in population for this species | | | | | | | | |
| **Histrionicus histrionicus**<br>Harlequin Duck | **Anatidae**<br>Swans / Geese / Ducks | G4 | S2B | MBTA | Sensitive - Known on Forests (BD, CG, HLC, KOOT, LOLO) | | SGCN2 | 4% | 40% | Mountain streams |
| | | **Species Occurrences verified in these Counties:** Carbon, Flathead, Glacier, Granite, Lewis and Clark, Lincoln, Mineral, Missoula, Park, Pondera, Powell, Sanders, Sweet Grass, Teton<br>**State Rank Reason:** The Harlequin Duck has an extremely limited breeding range in Montana. | | | | | | | | |
| **Nucifraga columbiana**<br>Clark's Nutcracker | **Corvidae**<br>Jays / Crows / Magpies | G5 | S3 | MBTA | Species of Conservation Concern on Forests (FLAT) | | SGCN3 | 9% | 84% | Conifer forest |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Deer Lodge, Fergus, Flathead, Gallatin, Glacier, Golden Valley, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Lincoln, Madison, Meagher, Mineral, Missoula, Musselshell, Park, Petroleum, Phillips, Pondera, Powder River, Powell, Ravalli, Sanders, Silver Bow, Stillwater, Sweet Grass, Teton, Toole, Wheatland, Yellowstone | | | | | | | | |
| **Numenius americanus**<br>Long-billed Curlew | **Scolopacidae**<br>Sandpipers | G5 | S3B | MBTA; BCC10; BCC11; BCC17 | | SENSITIVE | SGCN3 | 19% | 100% | Grasslands |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Deer Lodge, Fallon, Fergus, Flathead, Gallatin, Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Madison, Mccone, Meagher, Missoula, Musselshell, Park, Petroleum, Phillips, Pondera, Powder River, Powell, Prairie, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Sheridan, Stillwater, Sweet Grass, Teton, Toole, Treasure, Valley, Wheatland, Wibaux, Yellowstone | | | | | | | | |
| **Oreoscoptes montanus**<br>Sage Thrasher | **Mimidae**<br>Thrashers / Mockingbirds / Catbirds | G4 | S3B | MBTA; BCC10; BCC17 | | SENSITIVE | SGCN3 | 9% | 84% | Sagebrush |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Broadwater, Carbon, Carter, Chouteau, Custer, Fallon, Gallatin, Garfield, Golden Valley, Jefferson, Lewis and Clark, Madison, Musselshell, Park, Petroleum, Phillips, Powder River, Prairie, Richland, Rosebud, Sanders, Silver Bow, Stillwater, Sweet Grass, Valley, Wheatland, Yellowstone | | | | | | | | |
| **Pipilo chlorurus**<br>Green-tailed Towhee | **Passerellidae**<br>New World Sparrows | G5 | S3B | MBTA | | | SGCN3 | 3% | 60% | Shrub woodland |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Chouteau, Custer, Deer Lodge, Fergus, Gallatin, Garfield, Granite, Jefferson, Judith Basin, Lewis and Clark, Madison, Meagher, Musselshell, Park, Petroleum, Phillips, Powder River, Silver Bow, Stillwater, Sweet Grass, Valley, Wheatland, Yellowstone<br>**State Rank Reason:** Populations in Montana and across the Northern Rockies have undergone recent declines. | | | | | | | | |
| **Spizella breweri**<br>Brewer's Sparrow | **Passerellidae**<br>New World Sparrows | G5 | S3B | MBTA; BCC10; BCC17 | | SENSITIVE | SGCN3 | 12% | 100% | Sagebrush |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Chouteau, Custer, Dawson, Deer Lodge, Fallon, Fergus, Flathead, Gallatin, Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Lake, Lewis and Clark, Liberty, Lincoln, Madison, Mccone, Meagher, Missoula, Musselshell, Park, Petroleum, Phillips, Pondera, Powder River, Powell, Prairie, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Sheridan, Silver Bow, Stillwater, Sweet Grass, Teton, Toole, Treasure, Valley, Wheatland, Wibaux, Yellowstone<br>**State Rank Reason:** Species faces threats from loss of sagebrush habitats it is dependent on as a result of habitat conversion for agriculture and increased frequency of fire as a result of weed encroachment and drought. | | | | | | | | |
| **Strix nebulosa**<br>Great Gray Owl | **Strigidae**<br>Owls | G5 | S3 | MBTA | | SENSITIVE | SGCN3, SGIN | 2% | 46% | Conifer forest near open meadows |
| | | | | | | | | | | |

| | | |
|---|---|---|
| | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Deer Lodge, Flathead, Gallatin, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Meagher, Missoula, Park, Powell, Ravalli, Silver Bow, Sweet Grass, Teton, Wheatland |

## REPTILES (REPTILIA)

2 SPECIES
TOWN (BUFFERED BY 10 MILES) = RED LODGE (based on mapped **Species Occurrences**)

| SCIENTIFIC NAME<br>COMMON NAME<br>TAXA SORT | FAMILY (SCIENTIFIC)<br>FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | FWP SWAP | % OF GLOBAL BREEDING RANGE IN MT | % OF MT THAT IS BREEDING RANGE | HABITAT |
|---|---|---|---|---|---|---|---|---|---|---|
| **Lampropeltis gentilis**<br>Western Milksnake | **Colubridae**<br>Colubrid Snakes | G5 | S2 | | Sensitive - Known on Forests (CG) | SENSITIVE | SGCN2 | 2% | 51% | Rock outcrops |
| | | **Species Occurrences verified in these Counties:** Big Horn, Blaine, Carbon, Custer, Dawson, Fergus, Garfield, Musselshell, Petroleum, Phillips, Powder River, Rosebud, Stillwater, Yellowstone | | | | | | | | |
| **Phrynosoma hernandesi**<br>Greater Short-horned Lizard | **Phrynosomatidae**<br>Sagebush / Spiny Lizards | G5 | S3 | | Sensitive - Known on Forests (CG)<br>Sensitive - Suspected on Forests (HLC) | SENSITIVE | SGCN3, SGIN | 19% | 66% | Sandy / gravelly soils |
| | | **Species Occurrences verified in these Counties:** Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Dawson, Fergus, Gallatin, Garfield, Glacier, Golden Valley, Hill, Lewis and Clark, Liberty, Mccone, Musselshell, Petroleum, Phillips, Pondera, Powder River, Prairie, Richland, Roosevelt, Rosebud, Silver Bow, Stillwater, Sweet Grass, Teton, Toole, Treasure, Valley, Wheatland, Wibaux, Yellowstone | | | | | | | | |

## FISH (ACTINOPTERYGII)

1 SPECIES
TOWN (BUFFERED BY 10 MILES) = RED LODGE (based on mapped **Species Occurrences**)

| SCIENTIFIC NAME<br>COMMON NAME<br>TAXA SORT | FAMILY (SCIENTIFIC)<br>FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | FWP SWAP | % OF GLOBAL BREEDING RANGE IN MT | % OF MT THAT IS BREEDING RANGE | HABITAT |
|---|---|---|---|---|---|---|---|---|---|---|
| **Oncorhynchus clarkii bouvieri**<br>Yellowstone Cutthroat Trout | **Salmonidae**<br>Trout | G5T4 | S2 | | Sensitive - Known on Forests (CG) | SENSITIVE | SGCN2 | | 12% | Mountain streams, rivers, lakes |
| | | **Species Occurrences verified in these Counties:** Big Horn, Carbon, Gallatin, Meagher, Park, Stillwater, Sweet Grass, Yellowstone<br>**State Rank Reason:** The Yellowstone Cutthroat trout is currently ranked "S2" in Montana because it is at risk because of very limited and/or potentially declining population numbers, range and/or habitat, making it vulnerable to extirpation in the state. | | | | | | | | |

## INVERTEBRATES - MOLLUSKS

2 SPECIES
TOWN (BUFFERED BY 10 MILES) = RED LODGE (based on mapped **Species Occurrences**)

| SCIENTIFIC NAME<br>COMMON NAME<br>TAXA SORT | FAMILY (SCIENTIFIC)<br>FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | FWP SWAP | % OF GLOBAL BREEDING RANGE IN MT | % OF MT THAT IS BREEDING RANGE | HABITAT |
|---|---|---|---|---|---|---|---|---|---|---|
| **Discus shimekii**<br>Striate Disc | **Discidae**<br>Discs | G5 | S1 | | | | | 5% | 36% | Aspen, mesic/moist conifer woodlands |
| | | **Species Occurrences verified in these Counties:** Carbon, Gallatin, Granite, Hill, Lake, Lincoln, Madison, Meagher, Park, Powell, Sweet Grass | | | | | | | | |
| **Oreohelix strigosa berryi**<br>Berry's Mountainsnail | **Oreohelicidae**<br>Mountain Snails | G5T2 | S1S2 | | | | | 67% | 1% | Limestone talus |
| | | **Species Occurrences verified in these Counties:** Broadwater, Carbon, Fergus, Golden Valley, Meagher, Park | | | | | | | | |

### Potential Species of Concern

**Potential Species of Concern**
**0 Species**
**Filtered by the following criteria:**
Town (buffered by 10 miles) = Red Lodge (based on mapped **Species Occurrences**)

### Special Status Species

**Special Status Species**
**1 Species**
**Filtered by the following criteria:**
Town (buffered by 10 miles) = Red Lodge (based on mapped **Species Occurrences**)

## BIRDS (AVES)

1 SPECIES
TOWN (BUFFERED BY 10 MILES) = RED LODGE (based on mapped **Species Occurrences**)

| SCIENTIFIC NAME<br>COMMON NAME<br>TAXA SORT | FAMILY (SCIENTIFIC)<br>FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | FWP SWAP | % OF GLOBAL BREEDING RANGE IN MT | % OF MT THAT IS BREEDING RANGE | HABITAT |
|---|---|---|---|---|---|---|---|---|---|---|
| **Haliaeetus leucocephalus**<br>Bald Eagle | **Accipitridae**<br>Hawks / Kites / Eagles | G5 | S4 | DM; BGEPA; MBTA; BCC10; BCC11; BCC17 | Sensitive - Known on Forests (BD, BRT, CG, HLC, KOOT, LOLO) | SENSITIVE | | 2% | 100% | Riparian forest |
| | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Dawson, Deer Lodge, Fallon, Fergus, Flathead, Gallatin, Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Lincoln, Madison, Mccone, Meagher, Mineral, Missoula, Musselshell, Park, Petroleum, Phillips, Pondera, Powder River, Powell, Prairie, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Silver Bow, Stillwater, Sweet Grass, Teton, Toole, Treasure, Valley, Wheatland, Wibaux, Yellowstone<br>**State Rank Reason:** Populations numbers have steadily increased since the 1980s and breeding pairs now occupy a high percentage of suitable habitat across the state. However the species is still protected under the Bald and Golden Eagle Protection Act of 1940. | | | | | | | | |

### Additions To Statewide List

**Species Removed From Statewide List**

**Species of Greatest Inventory Need**

**Citation for data on this website:**
Montana Animal Species of Concern Report. Montana Natural Heritage Program and Montana Fish, Wildlife and Parks. Retrieved on 1/29/2020, from http://mtnhp.org/SpeciesOfConcern/?AorP=a

**Montana Natural Heritage - SOC Report** Species List Last Updated **10/31/2019**

# Plant Species of Concern

**447** Species of Concern
**90** Potential Species of Concern
All Records (no filtering)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## Introduction

## Species of Concern

**Species of Concern**
**447 Species**
All Records (no filtering)

FERNS AND FERN ALLIES (PTERIDOPHYTA) 35 SPECIES

| SCIENTIFIC NAME COMMON NAME TAXA SORT | OTHER NAMES | FAMILY (SCIENTIFIC) FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | MNPS THREAT CATEGORY | HABITAT |
|---|---|---|---|---|---|---|---|---|---|
| **Asplenium trichomanes-ramosum** Limestone Maidenhair Spleenwort | Asplenium viride | Aspleniaceae Spleenwort Family | G5 | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Carbon, Fergus, Flathead, Glacier, Lake, Lewis and Clark, Pondera, Teton<br>**State Rank Reason:** S3 SOC: Asplenium trichomanes-ramosum plants are never common, grow in habitat that is limited in Montana, and occur where land management (example: national park, wilderness) provides some protections. | | | | | | |
| **Botrychium ascendens** Upward-lobed Moonwort | | Ophioglossaceae Adder's-Tongue / Moonworts | G3 | S3 | | Sensitive - Known on Forests (HLC, KOOT) | | 2 | Various Mesic Sites |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** This moonwort species is documented in Montana primarily from the northwest corner of the state. Almost all observations are on federally-managed lands. Most occurrences are small in size and occupy roadsides or other similarly open or disturbed habitats. As such, it is vulnerable to activities such as weed invasion, weed spraying and road maintenance. | | | | | | |
| **Botrychium campestre** Prairie Moonwort | | Ophioglossaceae Adder's-Tongue / Moonworts | G3G4 | S1S2 | | | | 4 | Various Mesic Sites |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** Reported from a very small number of sites in Montana. All occurrences are small with the largest population count at a single site being approximately 2 dozen plants. All known sites are in northwest Montana. | | | | | | |
| **Botrychium crenulatum** Wavy Moonwort | Botrychium dusenii | Ophioglossaceae Adder's-Tongue / Moonworts | G4 | S3 | | Sensitive - Known on Forests (BD, HLC, KOOT, LOLO) | | 2 | Various Mesic Sites |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** This moonwort species is known from numerous observations in western Montana. Most populations are located on either National Forest or State lands. Populations are generally small in size and occupy roadsides or other similarly open or disturbed habitats. As such, it is vulnerable to activities such as weed invasion, weed spraying and road maintenance. | | | | | | |
| **Botrychium gallicomontanum** Frenchman's Bluff Moonwort | | Ophioglossaceae Adder's-Tongue / Moonworts | G2 | S1S2 | | | | | Grasslands (Fescue) |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** A globally rare species, recently documented in Montana from Glacier National Park | | | | | | |
| **Botrychium hesperium** Western Moonwort | Botrychium matricariifolium, Botrychium michiganense [in part] | Ophioglossaceae Adder's-Tongue / Moonworts | G4 | S3 | | Sensitive - Known on Forests (BD, KOOT) | | 2 | Various Mesic Sites |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** This moonwort species is known from 25-30 extant sites in western Montana, mostly in Glacier National Park or on National Forest lands. Many sites are poorly documented in terms of population size or are small in size, though several sites have been observed with >100 plants. Many populations occur on roadsides or other similarly open or disturbed habitats. As such, the species is vulnerable to activities such as weed invasion, weed spraying and road maintenance. | | | | | | |
| **Botrychium lanceolatum** Lanceleaf Moonwort | | Ophioglossaceae Adder's-Tongue / Moonworts | G5 | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** Reported from approximately two dozen sites. Population levels are poorly documented. As this species was not previously tracked in the state, it may be under-reported. | | | | | | |
| **Botrychium lineare** Linearleaf Moonwort | Slender Moonwort | Ophioglossaceae Adder's-Tongue / Moonworts | G3 | S1S2 | | | | 4 | Various Mesic Sites |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** This moonwort species is known to occur in western Montana from 6 locations, 5 of which are on federally-managed lands and the remaining site is located in a tribal wilderness area. However, occurrences are generally small in size and occupy roadsides or other similarly open or disturbed habitats. As such, it is vulnerable to activities such as weed invasion, weed spraying and road maintenance. | | | | | | |
| **Botrychium michiganense** Michigan Moonwort | Botrychium hesperium s.l. | Ophioglossaceae Adder's-Tongue / Moonworts | G3 | S2 | | | | | Various Mesic Sites |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** This species recently has been split from *B. hesperium*, although it has not yet been formally published (Donald Farrar, Iowa State Univeristy). Some of the sites for *B. hesperium* almost certainly belong here. See *B. hesperium* for additional information on habitat and characteristics which are very similar.<br><br>This enity would be included within the concept of *B. hesperium* as used by the Forest Service on their Sensitive species list. | | | | | | |
| **Botrychium pallidum** Pale Moonwort | | Ophioglossaceae Adder's-Tongue / Moonworts | G3 | S1S2 | | | | 2 | Grasslands (Fescue) |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** Reported from a very small number of sites in Montana. All occurrences are small with the largest population count at a single site being approximately 30 plants. All known sites are in northwest Montana. | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|
| **Botrychium paradoxum**<br>Peculiar Moonwort | | **Ophioglossaceae**<br>Adder's-Tongue / Moonworts | G3G4 | S3 | | Sensitive - Known on Forests (BD, HLC, KOOT)<br>Sensitive - Suspected on Forests (LOLO)<br>Species of Conservation Concern on Forests (FLAT) | | 2 | Meadows (Mesic Montane/Subalpine) |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** This moonwort species is known to occur in western Montana from over two dozen extant occurrences, almost all of which are on federally-managed lands. Many occurrences are small in size and occupy mesic meadows and bunchgrass communities. Potential impacts to the these sites include livestock grazing, weed invasion and recreational uses. Though some threats exist to individual occurrences, the species as a whole is not highly threatened by any single or combination of potential impacts in the state. | | | | | | | |
| **Botrychium pedunculosum**<br>Stalked Moonwort | | **Ophioglossaceae**<br>Adder's-Tongue / Moonworts | G3G4 | S2 | | Sensitive - Known on Forests (KOOT)<br>Species of Conservation Concern on Forests (FLAT) | | 3 | Forests (Mesic bottmlands)/Open sites |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** This moonwort species is known to occur in western Montana from approximately a dozen extant occurrences, almost all of which are on National Forest lands. Many occurrences are small in size and occupy western redcedar forests and roadsides or other similarly open or disturbed habitats. Several site records are based upon specimen collections with no available population data; almost all other sites have population counts with <10 plants observed. One site has been observed with >100 plants. Sites could be negatively impacted by timber harvesting or road-related activities. | | | | | | | |
| **Botrychium pinnatum**<br>Northern Moonwort | **Botrychium boreale ssp. obtusilobum** | **Ophioglossaceae**<br>Adder's-Tongue / Moonworts | G5 | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** | | | | | | |
| **Botrychium simplex**<br>Least Moonwort | | **Ophioglossaceae**<br>Adder's-Tongue / Moonworts | G5 | S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** | | | | | | |
| **Botrychium sp. (SOC)**<br>Moonworts (SOC) | | **Ophioglossaceae**<br>Adder's-Tongue / Moonworts | G1G3 | S1S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Deer Lodge, Flathead, Glacier, Granite, Jefferson, Lake, Lewis and Clark, Lincoln, Missoula, Park, Pondera, Powell, Ravalli, Sanders, Sweet Grass, Teton<br>**State Rank Reason:** This is a general record for Botrychium species tracked by MTNHP. MTNHP tracks and maintains observation data for all Botrychium species in the state excluding *B. multifidum* and *B. virginianum* which are fairly common and readily identifiable from all other Botrychiums. Global and State Ranks for this record are placeholders only to allow Botrychium SOC to appear in searches using global and state ranks. For information pertinent to specific Botrychium species, please see the individual species' accounts. | | | | | | | |
| **Botrychium sp. 4**<br>Adnate Moonwort | **Botrychium adnatum** | **Ophioglossaceae**<br>Adder's-Tongue / Moonworts | G1? | S1S2 | | | | | Grasslands (Fescue) |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** A tentatively recognized species that has not been formally published; currently known only from northwest Montana. | | | | | | |
| **Botrychium spathulatum**<br>Spoon-leaf Moonwort | | **Ophioglossaceae**<br>Adder's-Tongue / Moonworts | G3 | S1 | | | | | Forests (Mesic bottmlands)/Open sites |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** One of the rarest moonwort species in Montana, currently reported from 2 sites in northwest Montana. Population levels at these sites are undocumented. | | | | | | |
| **Botrychium tunux**<br>Moosewort | | **Ophioglossaceae**<br>Adder's-Tongue / Moonworts | G3G4 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** A globally rare species, recently documented in Montana from Glacier National Park. | | | | | | |
| **Botrychium yaaxudakeit**<br>Yakutat Moonwort | | **Ophioglossaceae**<br>Adder's-Tongue / Moonworts | G3G4 | S1 | | | | | Open sites (mesic) |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** A globally rare species, recently documented in Montana from Glacier National Park. | | | | | | |
| **Cryptogramma cascadensis**<br>Cascade Rockbrake | | **Pteridaceae**<br>Maidenhair Fern Family | G5 | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lincoln, Missoula, Ravalli, Sanders<br>**State Rank Reason:** Cryptogramma cascadensis is known from 11 locations in western Montana, of which 2 locations are poorly defined and considered historical, 5 locations occur in Wilderness areas, and the remaining 4 locations occur on U.S. Forest Service lands. Although the fern is thought to be undercollected and could be more common, current population and location data is needed to remove this plant from the Species of Concern list. | | | | | | |
| **Dryopteris cristata**<br>Crested Shieldfern | | **Dryopteridaceae**<br>Wood Fern Family | G5 | S3 | | Sensitive - Known on Forests (BRT, KOOT, LOLO)<br>Species of Conservation Concern on Forests (FLAT) | | 3 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lake, Lincoln, Missoula, Ravalli<br>**State Rank Reason:** Rare to uncommon in Montana where it is known from scattered occurrences across the western portion of the state. Most documented occurrences are on National Forest lands, though State Trust Lands and private lands also host significant populations. | | | | | | |
| **Equisetum palustre**<br>Marsh Horsetail | | **Equisetaceae**<br>Horsetails | G5 | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Flathead, Glacier, Lake, Lincoln, Madison, Missoula, Ravalli, Sanders<br>**State Rank Reason:** Equisetum palustre is known from a small number of sites in seven counties of western Montana. | | | | | | |
| **Equisetum pratense**<br>Meadow Horsetail | | **Equisetaceae**<br>Horsetails | G5 | S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Cascade, Chouteau, Flathead, Judith Basin, Lincoln, Meagher, Powell, Teton<br>**State Rank Reason:** Equisetum pratense has accurately been identified to occur in a few places within three counties of Montana. This species can be easily mis-identified. Specimens deposited in herbaria outside of Montana will need to be examined before it can be demonstrated that this plant is more widely distributed. | | | | | | |
| **Isoetes echinospora**<br>Spiny-spore Quillwort | **Isoetes tenella** | **Isoetaceae**<br>Quillworts | G5 | S3 | | | | | feshwater lakes |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Madison, Missoula, Ravalli, Sanders<br>**State Rank Reason:** *Isoetes echinospora* is known from 8 occurrences scattered in western Montana. At one occurrence, the species has been observed in 1940, 1967, and 1998 indicating persistence. However, current survey work is needed to document locations, population sizes, and threats. | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Isoetes howellii**<br>Howell's Quillwort | | **Isoetaceae**<br>Quillworts | G4G5 | S3 | | | | | | feshwater lakes |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lake, Missoula<br>**State Rank Reason:** *Isoetes howellii* is known from about 5 locations in Northwestern Montana. Based on limited information threats appear to be minimal, but survey work to document locations, population sizes, and threats is greatly needed. | | | | | | | |
| **Isoetes occidentalis**<br>Western Quillwort | **Isoetes lacustris var. paupercula** | **Isoetaceae**<br>Quillworts | G4G5 | S1 | | | | | | feshwater lakes |
| | | | **Species Occurrences verified in these Counties:** Flathead, Missoula<br>**State Rank Reason:** *Isoetes occidentalis* is known from two locations in northwest Montana. Survey work to identify other locations, document population sizes, and determine threats is greatly needed. | | | | | | | |
| **Lycopodium dendroideum**<br>Treelike Clubmoss | **Lycopodium obscurum var. dendroideum, Dendrolycopodium dendroideum** | **Lycopodiaceae**<br>Club-moss (Lycopod) Family | G5 | S2 | | Sensitive - Known on Forests (KOOT) | | 3 | | Forests (Mesic valley and montane) |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lewis and Clark, Lincoln<br>**State Rank Reason:** Rare in Montana where the species has been documented from only a few sites in the northwest corner of the state. Trend data are unavailable. Known populations do not appear to be immediately threatened by any activities. Populations may be susceptible to negative impacts from fire. | | | | | | | |
| **Lycopodium inundatum**<br>Northern Bog Clubmoss | **Lycopodiella inundata** | **Lycopodiaceae**<br>Club-moss (Lycopod) Family | G5 | S2 | | Sensitive - Suspected on Forests (KOOT)<br>Species of Conservation Concern on Forests (FLAT) | | 3 | | Fens |
| | | | **Species Occurrences verified in these Counties:** Flathead, Missoula<br>**State Rank Reason:** Rare in Montana where it is known from only a few occurrences in the western portion of the state. Trend data are unavailable. One population may be negatively impacted or extirpated in the future by proposed activities and all populations are susceptible to changes in hydrology. | | | | | | | |
| **Lycopodium lagopus**<br>Running-pine | **Lycopodium clavatum var. lagopus** | **Lycopodiaceae**<br>Club-moss (Lycopod) Family | G5 | S2 | | Sensitive - Known on Forests (KOOT) | | 3 | | Alpine |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lincoln<br>**State Rank Reason:** Rare in Montana. Currently known from two occurrences in the northwest portion of the state. Trend data are unavailable. The known sites do not appear likely to be negatively impacted or threatened from human activity at the current time. | | | | | | | |
| **Marsilea oligospora**<br>Pepperwort | | **Marsileaceae**<br>Water-Clover Family | G5 | S2 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lake<br>**State Rank Reason:** Marsilea oligospora has relatively recently been segregated from Marsilea vestita (FNA 1993). It is quite common around Ninepipes National Wildlife Refuge, but has not been documented elsewhere in Montana. Observation data is greatly needed to further assess its distribution and viability in Montana. | | | | | | | |
| **Ophioglossum pusillum**<br>Adder's Tongue | **Ophioglossum vulgatum [misapplied]** | **Ophioglossaceae**<br>Adder's-Tongue / Moonworts | G5 | S3 | | Sensitive - Known on Forests (KOOT) | | 3 | | Fens, Wet meadows |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Lincoln, Missoula<br>**State Rank Reason:** Rare in Montana, where it is known from a couple dozen fens and wet meadows in the northwest corner of the state. Its viability in the state generally does not appear to be at risk from any human-caused impacts at this time. | | | | | | | |
| **Phegopteris connectilis**<br>Northern Beechfern | **Thelypteris phegopteris** | **Thelypteridaceae**<br>Beechfern-Marsh Fern Family | G5 | S2S3 | | Sensitive - Known on Forests (KOOT) | | 2 | | Forests (Mesic valley to subalpine) |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lincoln, Sanders<br>**State Rank Reason:** Rare in Montana where it is known from the extreme northwest corner of the state to Glacier National Park. Past timber harvesting likely led to declines in the species' abundance and distribution. Invasive weeds (Orange and Meadow Hawkweeds), proposed mining activity, timber harvesting and fires all have the potential to detrimentally impact the species in the future. | | | | | | | |
| **Polystichum kruckebergii**<br>Kruckeberg's Swordfern | Kruckeberg's Hollyfern | **Dryopteridaceae**<br>Wood Fern Family | G4 | S2S3 | | | | | | Alpine |
| | | | **Species Occurrences verified in these Counties:** Deer Lodge, Flathead, Gallatin, Lake<br>**State Rank Reason:** Sparsely distributed across western Montana on alpine and subalpine cliffs and talus slopes. Very little data are available for the locations in Montana, though the habitats occupied by the species are not generally impacted by human activities or disturbance. Additional survey and monitoring data are needed. | | | | | | | |
| **Polystichum scopulinum**<br>Mountain Swordfern | Mountain Hollyfern | **Dryopteridaceae**<br>Wood Fern Family | G4 | S1S2 | | | | | | Rock Crevices |
| | | | **Species Occurrences verified in these Counties:** Ravalli, Sanders<br>**State Rank Reason:** Only two known locations from western Montana. Very little data are available for the known occurrences. Additional surveys are needed. | | | | | | | |
| **Selaginella selaginoides**<br>Northern Spikemoss | | **Selaginellaceae**<br>Spike-mosses | G5 | S2S3 | | | | 3 | | Wet, mossy soil (montane/subalpine) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Deer Lodge, Granite, Madison<br>**State Rank Reason:** Rare in Montana, where it is known from a few occurrences from the southwest portion of the state. Little survey data are available for known occurrences. | | | | | | | |

## GYMNOSPERM (CONIFERS) — 1 SPECIES

| SCIENTIFIC NAME<br>COMMON NAME<br>TAXA SORT | OTHER NAMES | FAMILY (SCIENTIFIC)<br>FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | MNPS THREAT CATEGORY | HABITAT |
|---|---|---|---|---|---|---|---|---|---|
| **Pinus albicaulis**<br>Whitebark Pine | | **Pinaceae**<br>Fir / Hemlock / Larch / Pine / Spruce | G3? | S3 | C | Candidate on Forests (BD, BRT, CG, HLC, KOOT, LOLO) | SENSITIVE | | Subalpine forest, timberline |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Broadwater, Carbon, Cascade, Deer Lodge, Fergus, Flathead, Gallatin, Glacier, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Pondera, Powell, Ravalli, Sanders, Silver Bow, Stillwater, Sweet Grass, Teton, Toole, Wheatland<br>**State Rank Reason:** Whitebark pine is a common component of subalpine forests and a dominant species of treeline and krummholtz habitats. It occurs in almost all major mountain ranges of western and central Montana. Populations of whitebark pine in Montana and across most of western North America have been severely impacted by past mountain pine beetle outbreaks and by the introduced pathogen, white pine blister rust. The results of which have been major declines in whitebark pine populations across large areas of its range. Additionally, negative impacts associated with encroachment and increased competition from other trees, primarily subalpine fir have occurred as a result of fire suppression in subalpine habitats. | | | | | | | |

## FLOWERING PLANTS - DICOTS (MAGNOLIOPSIDA) — 249 SPECIES

| SCIENTIFIC NAME<br>COMMON NAME<br>TAXA SORT | OTHER NAMES | FAMILY (SCIENTIFIC)<br>FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | MNPS THREAT CATEGORY | HABITAT |
|---|---|---|---|---|---|---|---|---|---|
| **Adoxa moschatellina**<br>Musk-root | | **Adoxaceae**<br>Moschatel Family | G5 | S3 | | Sensitive - Known on Forests (BD, CG, LOLO) | | | Rock/Talus |
| | | | **Species Occurrences verified in these Counties:** Carbon, Cascade, Granite, Jefferson, Madison, Meagher, Park, Stillwater<br>**State Rank Reason:** Sparsely distributed across southwest Montana. Populations are generally small, though they occur in habitats not generally impacted by human disturbance or invasive weeds. Building of roads and trails may potentially impact populations. | | | | | | |
| **Agastache cusickii**<br>Cusick's Horsemint | | **Lamiaceae**<br>Mints | G3G4 | S2S3 | | Sensitive - Known on Forests (BD) | SENSITIVE | | Rock/Talus |
| | | | **Species Occurrences verified in these Counties:** Beaverhead<br>**State Rank Reason:** This species is known in Montana from only a few locations in the Tendoy and Beaverhead Mountains. The steeply sloping habitat and relative remoteness of most populations minimizes its vulnerability to grazing and timber harvest -- the principle current land uses. However, these slopes can be vulnerable to destabilization if impacted by activities such as mining or road maintenance; the largest occurrence is in an area that is quarried for rock/gravel. | | | | | | |
| **Ageratina occidentalis**<br>Western Joepye-weed | **Eupatorium occidentale**<br>Western Boneset | **Asteraceae**<br>Aster/Sunflowers | G4 | S2 | | Sensitive - Known on Forests (BRT)<br>Sensitive - Suspected on Forests (BD, KOOT, LOLO) | | | Rock/Talus |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Lewis and Clark, Mineral, Ravalli, Teton<br>**State Rank Reason:** This peripheral species in Montana is known from a handful of small to large populations in the extreme western part of the state. Minor impacts associated with a rock quarry at one location and rock climbing at another site are possible. Otherwise, few threats have been documented for the species in Montana. | | | | | | |
| **Almutaster pauciflorus**<br>Alkali Marsh Aster | **Aster pauciflorus** | **Asteraceae**<br>Aster/Sunflowers | G4 | S1 | | | | | mesic grasslands |
| | | | **Species Occurrences verified in these Counties:** Richland, Sheridan, Valley, Wheatland<br>**State Rank Reason:** Almutaster pauciflorus was first documented in 1988, and is now known from five sites in central and northeastern Montana. It grows in wet meadows or calcareous soil of fens within the plains. | | | | | | |
| **Alnus rubra**<br>Red Alder | | **Betulaceae**<br>Birch/Alder | G5 | S2S3 | | | | 3 | Forest (Mesic) |
| | | | **Species Occurrences verified in these Counties:** Lincoln, Sanders<br>**State Rank Reason:** Rare in Montana, where it occurs only in the extreme western portion of the state. The species is at the eastern end of its range in the state. | | | | | | |
| **Ammannia robusta**<br>Scarlet Ammannia | **Ammannia coccinea ssp. robusta** | **Lythraceae**<br>Loosestrife Family | G5 | S2 | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Park, Phillips, Valley, Yellowstone<br>**State Rank Reason:** Known from a few extant populations and a historical collection in northeastern Montana. Likely occurs in additional wetlands in Montana east of the Continental Divide, though many of these would be on private lands and are unlikely to be surveyed for its presence. | | | | | | |
| **Amorpha canescens**<br>Lead Plant | | **Fabaceae**<br>Pea Family | G5 | SH | | | | | Prairie |
| | | | **Species Occurrences verified in these Counties:** Carter, Rosebud<br>**State Rank Reason:** Known from three historical collections from southeast Montana. | | | | | | |
| **Antennaria densifolia**<br>Dense-leaved Pussytoes | | **Asteraceae**<br>Aster/Sunflowers | G4G5 | S1 | | Sensitive - Known on Forests (BD) | | | Alpine |
| | | | **Species Occurrences verified in these Counties:** Deer Lodge, Granite, Ravalli<br>**State Rank Reason:** Known from one high elevation site in the Anaconda-Pintler Wilderness on the border of Deerlodge and Granite counties. The single occurrence is in a designated wilderness, which should protect it from most human-caused disturbance. However, it is susceptible to trail-building and maintenance activities. | | | | | | |
| **Aquilegia brevistyla**<br>Short-styled Columbine | | **Ranunculaceae**<br>Buttercup Family | G5 | S2S3 | | Sensitive - Known on Forests (CG, HLC) | | | Forest (Mesic) |
| | | | **Species Occurrences verified in these Counties:** Judith Basin<br>**State Rank Reason:** See rank details. | | | | | | |
| **Aquilegia formosa**<br>Sitka Columbine | | **Ranunculaceae**<br>Buttercup Family | G5 | S3 | | | | | Forest (Mesic) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Madison, Park<br>**State Rank Reason:** Known from several areas in southwest Montana. However, only four of these are large, high quality populations. Effects of human disturbance, such as logging, on the species are uncertain. | | | | | | |
| **Arctostaphylos patula**<br>Greenleaf Manzanita | **Arctostaphylos x media** | **Ericaceae**<br>Heath Family | G4 | S1 | | | | 1 | Forest (Montane) |
| | | | **Species Occurrences verified in these Counties:** Lake, Ravalli, Sanders<br>**State Rank Reason:** Known from two or three seperate locations in Montana. Population sizes are very small and are susceptible to the negative effects associated with such. Additional negative impacts from timber harvesting, invasive weeds and development are possible.<br><br>Primarily a species of the Great Basin and California, and disjunct in Montana. Not known from either Idaho or Wyoming. | | | | | | |
| **Artemisia tilesii**<br>Tilesius Wormwood | | **Asteraceae**<br>Aster/Sunflowers | G5 | S3 | | | | | grassland, meadows |
| | | | **Species Occurrences verified in these Counties:** Glacier, Lake, Lewis and Clark, Ravalli, Sweet Grass<br>**State Rank Reason:** *Artemisia tilesii* is known from seven locations located at higher elevations in western Montana. This species can be difficult to separate from *Artemisia ludoviciana* and *A. michauxiana*. Survey work to identify occurrences, determine population sizes, and assess threats is greatly needed before re-evaluating its status. | | | | | | |
| **Asclepias incarnata**<br>Swamp Milkweed | | **Asclepiadaceae**<br>Milkweeds | G5 | S1? | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Carbon, Wibaux<br>**State Rank Reason:** Known in Montana from Carbon County. One of the known sites is likely extirpated. Additional information is needed on the species' distribution, abundance, potential trends and threats within Montana. | | | | | | |
| **Asclepias ovalifolia**<br>Ovalleaf Milkweed | | **Asclepiadaceae**<br>Milkweeds | G5? | S1S2 | | Sensitive - Known on Forests (CG) | | | Prairie |
| | | | **Species Occurrences verified in these Counties:** Carter, Lewis and Clark, Rosebud, Sheridan<br>**State Rank Reason:** Known in the state from two sites in extreme eastern Montana. Additional information on population levels, threats and trends are needed. | | | | | | |
| **Asclepias stenophylla**<br>Narrowleaf Milkweed | | **Asclepiadaceae**<br>Milkweeds | G4G5 | S2 | | | | | Sandy sites |
| | | | **Species Occurrences verified in these Counties:** Carter, Rosebud<br>**State Rank Reason:** In Montana, *Asclepias stenophylla* is known from only a few occurrences in two southeastern counties. So far, surveys in Montana have documented a total population that numbers only several hundred plants. Trends are unknown. | | | | | | |
| **Astragalus aretioides** | **Astragalus sericoleucus** | **Fabaceae** | G4 | S2S3 | | | | 3 | Exposed ridges and slopes |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Sweetwater Milkvetch | var. aretioides, Orophaca aretioides | Pea Family | **Species Occurrences verified in these Counties:** Big Horn, Carbon<br>**State Rank Reason:** Sweetwater milkvetch is a reginal regional endemic from Montana south through Wyoming to Colorado and Utah, known in Montana only from exposed ridges and outcrops in the Pryor Mountains / Bighorn Canyon area. Threats to the species' viability in Montana appear to be minimal. Trend data are unavailable. | | | | | | |
| **Astragalus barrii**<br>Barr's Milkvetch | | **Fabaceae**<br>Pea Family | G3G4 | S3 | | Sensitive - Known on Forests (CG) | | 2 | Sparsely vegetated knobs and buttes |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Carbon, Carter, Powder River, Rosebud<br>**State Rank Reason:** Barr's Milkvetch is endemic to southwestern South Dakota, northeastern Wyoming, Nebraska and southeastern Montana. In Montana, it is known from numerous watersheds, several of which contain large, expansive populations. The habitat occupied by this species is not typically suitable for grazing, and the location of its habitat makes it less vulnerable to all but large-scale developments. Proposed resource extraction in southeast Montana may eventually impact the species. Invasive weeds have the potential to be a threat but currently are not posing problems to the species. | | | | | | |
| **Astragalus ceramicus**<br>Pottery Milkvetch | Painted Milkvetch | **Fabaceae**<br>Pea Family | G4 | S3 | | | | | sandy sites, sand dunes |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** *Astragalus ceramicus* is found in Beaverhead County and in the eastern-most counties of Montana. Populations represent two varieties which together are known from about 25 occurrences observed between 1903 and 2005. Plants grow in sand, very sandy soil of sandhills, or below sandstone outcrops which in Montana represent specialized habitats. Most sites have not been revisited since the 1980s to 1990s; therefore, current data on locations, population sizes, and threats is greatly needed. | | | | | | |
| **Astragalus ceramicus var. apus**<br>Painted Milkvetch | Pottery Milkvetch | **Fabaceae**<br>Pea Family | G4T3 | S1S2 | | | SENSITIVE | 2 | sandy sites, sand dunes |
| | | | **Species Occurrences verified in these Counties:** Beaverhead<br>**State Rank Reason:** *Astragalus ceramicus* variety *apus* is known only from the upper Snake River Plains of southeast Idaho and adjacent Montana, where it is restricted to the Centennial Valley of Beaverhead County. The disruption of natural disturbance regimes, including fire, ungulate grazing and pocket gopher activity, can lead to dune stabilization, reducing the extent of blowout areas with early successional vegetation, upon which this species depends. Portions of its habitat lie on private or public lands without sensitive species management policies in place. | | | | | | |
| **Astragalus ceramicus var. filifolius**<br>Painted Milkvetch | Pottery Milkvetch | **Fabaceae**<br>Pea Family | G4T4 | S3 | | | | | sandy sites, sand dunes |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Carter, Dawson, Powder River, Sheridan<br>**State Rank Reason:** *Astragalus ceramicus* variety *filifolius* is associated with sandy soils of the sandhills and sandstone outcrops in eastern Montana. It is known from about 20 occurrences observed mostly from 1983 to 2000. Some populations occur in State Parks. The Flora of the Great Plains (1986) considered it rare for the region except in the Nebraska sandhill area where it was somewhat common. Based on aging data, limited distribution, and an association to specific habitat types it is considered a Species of Concern. Current data on locations, populations sizes, and threats is greatly needed. | | | | | | |
| **Astragalus convallarius**<br>Lesser Rushy Milkvetch | Astragalus diversifolius [misapplied] | **Fabaceae**<br>Pea Family | G5 | S3 | | | | 2 | Grasslands (Intermountain) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Broadwater, Jefferson, Lewis and Clark<br>**State Rank Reason:** The distribution of *A. convallarius* in Montana is limited to two disjuct localities in the state: the Helena Valley vicinity and an area in extreme southwest Montana in Beaverhead County. The species has been and continues to be negatively impacted by development in the Helena area. Past development in the Helena Valley likely eliminated extensive areas of previously occupied habitat resulting in the more fragmented distribution seen today. The grassland habitats this species occupies are also being invaded by several noxious weeds, partcularly in the Helena vicinity. However, the species appears to tolerate some levels of disturbance and degradation of habitat quality. Several large occurrences are presently known and some areas of potentially suitable habitat remain unsurveyed. | | | | | | |
| **Astragalus geyeri**<br>Geyer's Milkvetch | | **Fabaceae**<br>Pea Family | G4 | S2 | | | | 3 | Sandy sites |
| | | | **Species Occurrences verified in these Counties:** Carbon, Garfield<br>**State Rank Reason:** Geyer's milkvetch has a very limited distribution in Montana, primarily limited to Carbon County. Size of the population in Montana is estimated to be in the thousands, but population levels likely fluctuate significantly from year to year. Approximately half the populations occur entirely or partially on federally managed lands. | | | | | | |
| **Astragalus grayi**<br>Gray's Milkvetch | | **Fabaceae**<br>Pea Family | G4? | S2S3 | | | SENSITIVE | | Sagebrush-Grassland |
| | | | **Species Occurrences verified in these Counties:** Carbon, Fergus<br>**State Rank Reason:** Rare in the state. Locally restricted to Carbon and Big Horn counties. Population levels, trends and threats to the species are poorly documented. Additional information is needed for the species within Montana. | | | | | | |
| **Astragalus lackschewitzii**<br>Lackschewitz' Milkvetch | | **Fabaceae**<br>Pea Family | G2G3 | S2S3 | | Sensitive - Known on Forests (HLC) | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Pondera, Teton<br>**State Rank Reason:** Montana endemic restricted to high elevation, gravelly and rocky slopes and ridges. Several of the known occurrences are in designated wilderness and the habitats occupied by the species are not generally subject to human disturbance. | | | | | | |
| **Astragalus oreganus**<br>Wind River Milkvetch | | **Fabaceae**<br>Pea Family | G4? | S2 | | | | 1 | Sandy sites/Sagebrush-Grassland |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** Wind River milkvetch is a regional endemic known in Montana only from southern Carbon County. Although populations are relatively large, there are few known occurrences in the state and negative impacts or potential impacts to the species from livestock grazing, ORV use and extractive industries have been noted. | | | | | | |
| **Astragalus racemosus**<br>Raceme Milkvetch | | **Fabaceae**<br>Pea Family | G5 | S2S3 | | | | 3 | Grasslands (Clay soils) |
| | | | **Species Occurrences verified in these Counties:** Carter, Fallon, Missoula<br>**State Rank Reason:** Raceme milkvetch occurs near the margin of its range in Montana, where several, mostly small populations have been found in Carter and Fallon counties. Its response to grazing is unknown, however it accumulates selenium and may be toxic to livestock. Accurate population and trend data are lacking. | | | | | | |
| **Astragalus scaphoides**<br>Bitterroot Milkvetch | | **Fabaceae**<br>Pea Family | G3 | S3 | | Sensitive - Known on Forests (BD) | SENSITIVE | 3 | Sagebrush-grassland |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Granite<br>**State Rank Reason:** Bitterroot milkvetch occurs only in Lemhi County, Idaho and Beaverhead County, Montana. In Montana, the documented occurrences are confined to an area from the Grasshopper Creek drainage south to the Tendoy Mountains. The total number of individual plants has been estimated in the tens of thousands, but occupied habitat is likely less than 700 acres. | | | | | | |
| **Astragalus terminalis**<br>Railhead Milkvetch | | **Fabaceae**<br>Pea Family | G3 | S2S3 | | | SENSITIVE | 3 | Sagebrush steppe |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Gallatin, Madison<br>**State Rank Reason:** *Astragalus terminalus* is a regional endemic known from southwest Montana, east-central Idaho and northwest Wyoming. In Montana it is documented from Beaverhead County and the Upper Madison River Valley. The species appears to be vulnerable to intensive grazing and competition from noxious weeds, at least in low-elevation areas. | | | | | | |
| **Athysanus pusillus**<br>Sandweed | | **Brassicaceae**<br>Mustards | G5 | S1S2 | | Sensitive - Known on Forests (BRT)<br>Sensitive - Suspected on Forests (LOLO) | | 1 | Rock/talus-Mesic |
| | | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | **Species Occurrences verified in these Counties:** Ravalli, Sanders<br>**State Rank Reason:** Known in Montana from a limited area of the Bitterroot Mountains. Only three occurrences have a large number of indivuals and several occurrences have populations of spotted knapweed and/or cheatgrass established. Invasive weeds may threaten the long-term viability of the species in Montana. | | | | | |
| **Atriplex truncata**<br>Wedge-leaf Saltbush | | **Amaranthaceae**<br>Amaranth (Pigweed) Family | G5 | S3 | | | | 3 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Deer Lodge, Jefferson, Lake, Lewis and Clark, Madison, Park, Powell<br>**State Rank Reason:** Known from two extent occurrences; one in the Centennial Valley and the other near Warm Springs. Also, known historically from four collections in the western half of the state. Additional population and trend data are needed to better evaluate the species' vulnerability. | | | | | |
| **Bacopa rotundifolia**<br>Roundleaf Water-hyssop | | **Plantaginaceae**<br>Plantain Family | G5 | S3? | | | | 3 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Cascade, Fergus, Garfield, Phillips, Powder River, Yellowstone<br>**State Rank Reason:** A rare species known in Montana from only a few observations in the central and eastern portions of the state. However, the species is widely distributed and appears tolerant of brackish waters as well as some degree of nutrient enrichment. As such, it is unclear to what extent the species' viability is at risk in the state and whether it responds negatively to human-induced impacts to water quality. Additional populations of the species are likely to occur in Montana. | | | | | |
| **Balsamorhiza hookeri**<br>Hooker's Balsamroot | **Balsamorhiza hispidula** | **Asteraceae**<br>Aster/Sunflowers | G5 | S3 | | | | 3 | Sagebrush-grassland |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Deer Lodge<br>**State Rank Reason:** Known in Montana only from the vicinity of Monida and within the Mount Haggin WMA. | | | | | |
| **Berberis nervosa**<br>Longleaf Oregon-grape | **Mahonia nervosa** | **Berberidaceae**<br>Barberries | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Sanders<br>**State Rank Reason:** Berberis nervosa is disjunct in northern Idaho. In Montana it is known from 2-3 locations in Sanders County, of which one population in 2001 is reported to have over 1,000 plants. Additional data on locations and population sizes are greatly needed. | | | | | |
| **Bidens beckii**<br>Beck Water-marigold | **Megalodonta beckii** | **Asteraceae**<br>Aster/Sunflowers | G5 | S2 | | Sensitive - Known on Forests (KOOT, LOLO) | | 3 | Aquatic |
| | | | **Species Occurrences verified in these Counties:** Broadwater, Flathead, Lake, Lincoln, Missoula<br>**State Rank Reason:** Known from ten occurrences in the western valleys of the state, including 6 moderate to large populations and one historical occurrence from Salmon Lake dating to 1937. However, the species may be more abundant in the state than what current data suggests. Threats and impacts to populations in Montana include boating activity, lake shore development, aquatic weeds and use of aquatic herbicides. | | | | | |
| **Boechera demissa**<br>Daggett Rockcress | **Arabis demissa** | **Brassicaceae**<br>Mustards | G5 | S1S3 | | | | 3 | Open woodland and sagebrush steppe |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** Daggett rockcress is at the northern edge of its range in Montana, where it is known only from the vicinity of the Pryor Mountains and adjacent Bighorn Canyon. Detailed survey information for most occurrences is lacking. | | | | | |
| **Boechera fecunda**<br>Sapphire Rockcress | **Arabis fecunda** | **Brassicaceae**<br>Mustards | G2 | S2 | | Sensitive - Known on Forests (BD)<br>Sensitive - Suspected on Forests (BRT, LOLO) | SENSITIVE | 1 | Rocky, calcareous, montane slopes |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Ravalli, Silver Bow<br>**State Rank Reason:** Sapphire rockcress is a state endemic known from several locations in southwest Montana where it is restricted to specific and localized habitats. Encroachment of spotted knapweed threatens several populations, particularly in Ravalli County. It is unclear whether grazing has significant negative impacts | | | | | |
| **Brasenia schreberi**<br>Watershield | | **Cabombaceae**<br>Watershields | G5 | S1S2 | | Sensitive - Known on Forests (KOOT, LOLO) | | 4 | Aquatic |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Lincoln, Missoula, Powell<br>**State Rank Reason:** Restricted in Montana to shallow waters in the valleys of the northwest corner of the state where it is known from eight occurrences, including six relatively high quality populations. Potential threats to the species include boating activity, aquatic weeds, and several populations are subject to runoff from adjacent agricultural fields, though it is uncertain if this has negatively impacted any populations. | | | | | |
| **Braya humilis**<br>Low Braya | **Neotorularia humilis** | **Brassicaceae**<br>Mustards | G5 | S2 | | | | 2 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Fergus, Teton<br>**State Rank Reason:** Known from four locations in the state, including one site in which only one plant was observed. One population occurs in an area with historical mining activity and may have been detrimentally impacted. Another populations occurs along the Rocky Mtn Front and is actively monitored; population levels may be declining at this site based upon preliminary data. | | | | | |
| **Brickellia oblongifolia**<br>Mojave Brickellbush | | **Asteraceae**<br>Aster/Sunflowers | G5 | S1S2 | | | | 1 | Rock/Talus |
| | | | **Species Occurrences verified in these Counties:** Park, Silver Bow<br>**State Rank Reason:** Few collections known for Montana. Only known extant occurrences are all near Melrose. The current status of one historical occurrence near Wilsall is unknown.<br><br>Invasive weeds do not apear to be a threat at this time and the rocky, sparsely-vegetated slopes that the species occupies are not generally subject to human impacts. Livestock grazing may be negatively impacting the species at one site. Updated population and site data are needed for the known occurrences. Other occurrences of the species are likely to be found in Montana. | | | | | |
| **Camissonia andina**<br>Obscure Evening-primrose | **Oenothera andina, Holmgrenia andina** | **Onagraceae**<br>Evening-primrose Family | G4 | S2 | | | | 3 | Sandy sites |
| | | | **Species Occurrences verified in these Counties:** Carbon, Missoula<br>**State Rank Reason:** This species is at the edge of its range in Montana, where it has been documented from just a few locations. All known extant locations are from Carbon County. These populations collectively cover less than 20 acres, but they can vary greatly in size from year to year. It tolerates grazing well, and moderate grazing may be important in maintaining a suitable seedbed of exposed soil. Invasive weeds may pose the greatest risk. | | | | | |
| **Camissonia parvula**<br>Small Camissonia | **Oenothera parvula** | **Onagraceae**<br>Evening-primrose Family | G5 | S1S2 | | | | 3 | Sandy sites |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** *Camissonia parvula* is currently known from one extant location in Montana on the southern edge of the Pryor Mountains in Carbon County. Populations are thought to be small, but may vary widely from year to year. As an annual plant, it may tolerate - or even respond positively to - moderate levels of disturbance. Additional population and site data are needed for this species in Montana. | | | | | |
| **Cardamine oligosperma var. kamtschatica**<br>Few-seeded Bittercress | **Cardamine umbellata** | **Brassicaceae**<br>Mustards | G5T5 | S2? | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Flathead<br>**State Rank Reason:** Only known from 1 collection in Montana. Additional data are needed to reliably determine the species' conservation status and needs in Montana. | | | | | |
| **Cardamine rupicola**<br>Cliff Toothwort | | **Brassicaceae**<br>Mustards | G3 | S3 | | | | 3 | Alpine |

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| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Lewis and Clark, Missoula, Powell<br>**State Rank Reason:** State endemic known from 3 population clusters. These are in the Mission Mtns, Swan Range and the Rocky Mtn Front Range. Many occurrences have not been surveyed for 30 or more years and many are based on a single herbarium specimen. However, the species grows at high elevations in rock and scree fields that generally are not subject to disturbance or other threats. Many populations also occur in designated wilderness areas which offer further protection. Additional occurrences likely exist across the known range of the species. | | | | | | |
| **Castilleja cervina**<br>Deer Indian Paintbrush | | **Orobanchaceae**<br>Broomrape Family | G4 | SH | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Flathead, Madison, Missoula, Powell<br>**State Rank Reason:** Known from 3 widely separated collections in western Montana, including a 1901 collection in Missoula County near "Sunset Hill", a 1960 collection near Deer Lodge and an 1894 collection near Columbia Falls. | | | | | | |
| **Castilleja covilleana**<br>Coville Indian Paintbrush | | **Orobanchaceae**<br>Broomrape Family | G3G4 | S3 | | Sensitive - Known on Forests (BRT)<br>Sensitive - Suspected on Forests (BD) | | 2 | Subalpine slopes |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Missoula, Ravalli<br>**State Rank Reason:** This species is known in Montana, primarily from the West Fork of the Bitterroot River on the Bitterroot National Forest. 5 occurrences are known from historical collections or have unknown status. A few occurrences contain minor amounts of spotted knapweed and others occur in habitats that are susceptible to invasion by knapweed and other invasive species. Timber harvest activities may also pose a threat to some populations. | | | | | | |
| **Castilleja exilis**<br>Annual Indian Paintbrush | **Castilleja minor ssp. minor** | **Orobanchaceae**<br>Broomrape Family | G5T5 | S2 | | | | 2 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Broadwater, Deer Lodge, Fergus, Gallatin, Jefferson, Madison, Park<br>**State Rank Reason:** Annual Indian Paintbrush is known from a half dozen counties in southwest Montana with the majority of documented locations on private lands. Many areas of suitable habitat have been converted to agricultural uses and/or are used for livestock grazing. Additionally, populations are susceptible to hydrologic changes and may negatively impacted by invasive weeds. | | | | | | |
| **Castilleja gracillima**<br>Slender Indian Paintbrush | **Castilleja miniata ssp. miniata** | **Orobanchaceae**<br>Broomrape Family | G3G4 | S2 | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Cascade, Fergus, Gallatin, Madison, Meagher, Park, Sweet Grass<br>**State Rank Reason:** This plant is a regional endemic, known in Montana from a limited number of populations, with most being relatively small. No threats have been observed, though it could be vulnerable to hydrologic alterations or noxious weeds. | | | | | | |
| **Castilleja kerryana**<br>Kerry's Paintbrush | | **Orobanchaceae**<br>Broomrape Family | G3 | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lewis and Clark<br>**State Rank Reason:** Castilleja kerryana is a recently recognized species that grows in alpine habitat in a portion of the Scapegoat Wilderness in Montana. Populations tend to be small and scattered on slopes and ridges, and apparently absent on broad, fairly flat alpine terrain. Although Castilleja species in general have brittle stems that are easily damaged by livestock, grazing is not known to occur where Kerry's Paintbrush grows. The plant appears to be limited geographically in Montana, and additional surveys are needed to accurately determine its range. | | | | | | |
| **Castilleja nivea**<br>Snow Indian Paintbrush | | **Orobanchaceae**<br>Broomrape Family | G3 | S3 | | | | | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon, Fergus, Golden Valley, Madison, Park, Sweet Grass<br>**State Rank Reason:** Currently known from a few collections from the Beartooths, Crazy Mtns, Tobacco Root Mtns and the Centennial Range. It is very likely that additional occurrences exist in the known mountain ranges as well as additional mountain ranges. Additionally, the high elevation habitat generally limits the potential for impacts to the species. | | | | | | |
| **Celastrus scandens**<br>Bittersweet | | **Celastraceae**<br>Bittersweet Family | G5 | S1 | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Dawson, Richland<br>**State Rank Reason:** *Celastrus scandens* occurs frequently in woodlands, rocky hillsides, thickets, fence rows, and roadsides in the Great Plains (McGregor et al. 1986). The previous Montana rank of SH was based on a vague location provided on a 1975 herbarium specimen. In recent years it has been been collected at four locations in woody draws. It appears that the Montana sites represent the western edge of its range, and currently it ranks as an S1. Additional surveys of woody draws are needed to accurately document its distribution and population size in Montana. | | | | | | |
| **Centunculus minimus**<br>Chaffweed | **Anagallis minima** | **Myrsinaceae**<br>Myrsine Family | G5 | S2 | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Cascade, Lake, Missoula, Phillips, Powell, Ravalli, Sheridan, Valley<br>**State Rank Reason:** Known from scattered locations across the state, though it is rare to uncommon in Montana. May be susceptible to some adverse impacts from human-caused disturbance due to its preference for vernally moist habitats in valley loctions. | | | | | | |
| **Cercocarpus montanus**<br>Alderleaf mountain-mahogany | | **Rosaceae**<br>Rose Family | G5 | S2S3 | | | | 3 | Open, stony slopes |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Treasure<br>**State Rank Reason:** This widespread western species is only known in the state from one area of Treasure County where it is reported to be fairly extensive. Additional data on population size and extent are needed to more precisely rank the species. | | | | | | |
| **Chenopodium subglabrum**<br>Smooth Goosefoot | **Chenopodium leptophyllum var. subglabrum** | **Amaranthaceae**<br>Amaranth (Pigweed) Family | G3G4 | S2 | | | | 4 | Sandy sites |
| | | | **Species Occurrences verified in these Counties:** Carter, Cascade, Custer, Fergus, Garfield, Mccone, Phillips, Powder River, Sheridan<br>**State Rank Reason:** Smooth goosefoot is known from just a few locations in Montana, one of which may be extirpated. It occupies an early-succession habitat that is vulnerable to loss of natural disturbance regimes such as fire and flooding. Invasion of exotic plants may also pose a threat. Population data and trend monitoring data are lacking though the populations likely flucuate widely from year to year. | | | | | | |
| **Cirsium longistylum**<br>Long-styled Thistle | | **Asteraceae**<br>Aster/Sunflowers | G2G3 | S2S3 | | | | 1 | Meadows (Montane-subalpine ) |
| | | | **Species Occurrences verified in these Counties:** Broadwater, Cascade, Fergus, Jefferson, Judith Basin, Lewis and Clark, Meagher, Wheatland<br>**State Rank Reason:** Population estimates of approximately 30,000 plants, including seven high quality populations, scattered over four mountain ranges are promising for the long-term viability of the species. Habitat in the largest populations is generally of high quality with few if any problem weeds posing significant and immediate threats. In the near future, little change in habitat quality is expected in these populations. Sites are mostly on National Forest lands that provide a degree of protection and two large populations on private lands that have a history of light to moderate grazing appear stable. Also of benefit at this time is the active weed control program employed by the private landowners on their lands.<br><br>Long- and short-term population trends are difficult to gauge due to the lack of good survey data over many years. However, available data and observations provide some evidence that population levels have at least remained fairly stable over the past decade, with significant yearly fluctuations possible. Threats posed by invasive weeds and the introduced bio-control agent do provide reason for concern. | | | | | | |
| **Cirsium pulcherrimum**<br>Wyoming Thistle | | **Asteraceae**<br>Aster/Sunflowers | G5 | S3 | | | | | Sparsely-vegetated soils |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Carbon, Powder River, Prairie<br>**State Rank Reason:** Known in Montana from one badlands area of Powder River County with a small number of scattered individuals observed in 2006. Also, reported for Dawson and Garfield Counties by Flora of the Great Plains and 1 collection from each of Carbon and Custer Counties. | | | | | | |
| **Clarkia rhomboidea**<br>Diamond Clarkia | | **Onagraceae**<br>Evening-primrose Family | G5 | S3 | | Sensitive - Known on Forests (BRT, KOOT, LOLO) | | 2 | Forests (Open, montane ) |
| | | | **Species Occurrences verified in these Counties:** Lake, Lincoln, Ravalli, Sanders<br>**State Rank Reason:** Rare in Montana, where it is known from only a small portion of the northwest corner of the state, primarily along the lower Clark Fork River drainage. Some detrimental impacts from invasive weeds and subsequent herbicide treatments are possible as are loss of habitat due to fire suppression. | | | | | | |

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| **Claytonia arenicola**<br>Sand Springbeauty | Montia arenicola | **Portulacaceae**<br>Purslane Family | G4 | S2S3 | | Sensitive - Known on Forests (LOLO) | | 3 | Mesic, rocky slopes |
| | | | **Species Occurrences verified in these Counties:** Sanders<br>**State Rank Reason:** Rare in Montana, where it is currently known from only one localized area in the western portion of the state. As an annual, populations likely fluctuate widely from year to year. No specific threats have been identified. | | | | | | |
| **Cleome lutea**<br>Yellow Beeplant | Peritoma lutea | **Cleomaceae**<br>Cleome Family | G5 | S1S2 | | | | 3 | Sagebrush-grassland (Low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Carbon, Deer Lodge<br>**State Rank Reason:** Rare in Montana, where it is currently known from only a small area in the south-central portion of the state. Current population levels and trends are undocumented, though populations likely fluctuate widely from year to year. Additional monitoring is needed. | | | | | | |
| **Collomia debilis var. camporum**<br>Alpine Collomia | | **Polemoniaceae**<br>Phlox Family | G5T2 | S1S2 | | | | | Rock/Talus (Valleys to Montane) |
| | | | **Species Occurrences verified in these Counties:** Granite, Missoula, Ravalli<br>**State Rank Reason:** Only known from a few sites in western Montana and Lemhi County, Idaho, from low elevation scree, talus or rocky slopes. Negative impacts from human disturbance and weed invasion are possible. Current status of most of the documented locations is not known. Survey and monitoring data are needed. | | | | | | |
| **Corydalis sempervirens**<br>Pale Corydalis | | **Fumariaceae**<br>Fumary family | G5 | S2 | | Sensitive - Known on Forests (KOOT) Species of Conservation Concern on Forests (FLAT) | | 4 | Forests/Meadows (Recently-burned) |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lincoln, Powell<br>**State Rank Reason:** Known to occur in northwest Montana from approximately a dozen recently documented (past 25 years) occurrences. Another five historical occurrences are also known. This species occurs in disturbed habitats, predominantly burned forests and it depends heavily on historical fire regimes to maintain populations. Thus, the main threat to this species' viability appears to be from fire suppression activities. Invasive weeds also threaten habitat occupied by the species. | | | | | | |
| **Cryptantha fendleri**<br>Fendler Cat's-eye | | **Boraginaceae**<br>Borage Family | G5 | S2 | | | SENSITIVE | 2 | Sandy sites |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Gallatin, Sheridan<br>**State Rank Reason:** Fendler cat's-eye is restricted to very localized sandhills habitat in the far southwestern and northeastern corners of Montana where it is known from a total of three moderate to large-sized populations. It responds positively to disturbance that maintains its sparsely vegetated habitat. Fire suppression and dune stabilization efforts have likely had an adverse effect on populations of this species. | | | | | | |
| **Cryptantha humilis**<br>Round-headed Cryptantha | | **Boraginaceae**<br>Borage Family | G4? | SH | | | | | Sagebrush Steppe (low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Jefferson<br>**State Rank Reason:** Known from 3 historical collections in the state, including a 1955 collection west of Dillon in the Grasshopper Valley, a 1952 collection 3 miles south of Lima and an undated collection from the Yellowstone Valley in Park County. | | | | | | |
| **Cryptantha scoparia**<br>Miner's Candle | | **Boraginaceae**<br>Borage Family | G4? | S2 | | | | 3 | Sagebrush Steppe (low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** This species is documented from a single area in Carbon County, where it is widely disjunct from the nearest known occurrences in southwest Wyoming and central Idaho. In 1991 about 1,000 plants were reported occupying less than one acre. The habitat is subject to grazing, and may be affected by exotic weed encroachment. Additional surveys and monitoring data are needed. | | | | | | |
| **Dalea enneandra**<br>Nine-anther prairie clover | | **Fabaceae**<br>Pea Family | G5 | S2S3 | | | | 3 | Grasslands (Plains) |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Custer, Fallon, Richland<br>**State Rank Reason:** In Montana, known from a few poorly documented occurrences in the eastern half of the state. Additional surveys and updated population data are needed. | | | | | | |
| **Dalea villosa**<br>Silky prairie clover | Petalostemon villosus | **Fabaceae**<br>Pea Family | G5 | S2 | | | | | Sandy sites |
| | | | **Species Occurrences verified in these Counties:** Carter, Fallon, Richland, Sheridan<br>**State Rank Reason:** In Montana, known from a few, small occurrences in the extreme eastern portion of the state. Current population levels and trends are unknown. | | | | | | |
| **Delphinium burkei**<br>Meadow Larkspur | [including] Delphinium distichum | **Ranunculaceae**<br>Buttercup Family | G4 | S1S2 | | | | | Meadows (Moist, low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Flathead, Silver Bow<br>**State Rank Reason:** Only known from a few collections from the western half of the state. | | | | | | |
| **Delphinium depauperatum**<br>Slim Larkspur | | **Ranunculaceae**<br>Buttercup Family | G5 | S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Flathead, Pondera<br>**State Rank Reason:** Delphinium depauperatum has been identified in Beaverhead, Flathead, and possibly Jefferson Counties in western Montana. It is found in common habitats, yet relatively few occurrences have been documented. | | | | | | |
| **Delphinium glaucum**<br>Pale Larkspur | | **Ranunculaceae**<br>Buttercup Family | G5 | S1? | | | | | |
| | | | **Species Occurrences verified in these Counties:** Mineral<br>**State Rank Reason:** Based on the discrepancy in the number of herbarium specimens identified as Delphinium glaucum (CPNWH 2015) and in its Montana County distribution (Lesica 2012), there seems to be an issue in how to accurately identify this species. Specimens deposited in herbaria outside of Montana will need to be examined before it can be demonstrated that this plant is more widely distributed. | | | | | | |
| **Descurainia torulosa**<br>Wyoming Tansymustard | | **Brassicaceae**<br>Mustards | G2 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Park<br>**State Rank Reason:** One collection from Park County, Montana (Consortium of Pacific Northwest Herbaria; http://www.pnwherbaria.org). | | | | | | |
| **Douglasia conservatorum**<br>Bloom Peak Douglasia | | **Primulaceae**<br>Primrose Family | G1G2 | S1 | | | | | Ridges (Open, subalpine) |
| | | | **Species Occurrences verified in these Counties:** Sanders<br>**State Rank Reason:** Described as a new species in 2010 from a single location along the Idaho/Montana border. The population of this newly described species is apparently closely allied to *Douglasia idahoensis*, *D. laevigata* and *D. nivalis* (Bjork 2010). Additional research may be needed to determine if this population warrants recognition at the specific level or if it should be treated as conspecific with *D. idahoensis* or *D. nivalis*. However, the discovery of this population is significant in that it is a new addition to the state flora no matter if it is treated as a distinct species or as a population of one of the previously mentioned species. | | | | | | |
| **Downingia laeta**<br>Great Basin Downingia | | **Campanulaceae**<br>Bellflower Family | G5 | S2S3 | | | | 3 | Wetland/Riparian (Shallow water ponds, lakes) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Lewis and Clark, Madison, Meagher, Teton<br>**State Rank Reason:** Rare in Montana, where it is currently known from a few scattered sites in the western half of the state, most of these sites were documented several decades ago and are in need of follow-up surveys. Current population levels and trends are unknown. | | | | | | |

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| **Draba crassa**<br>Thick-leaf Whitlow-grass | | **Brassicaceae**<br>Mustards | G3G4 | S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Deer Lodge, Granite, Madison, Park, Stillwater<br>**State Rank Reason:** Scattered across southwest Montana where it is known from alpine slopes in several mountain ranges. Overall abundance and distribution is still poorly known, though it is likely to be more common than collections indicate. | | | | | | |
| **Draba daviesiae**<br>Bitterroot Draba | **Draba apiculata var. daviesiae** | **Brassicaceae**<br>Mustards | G3 | S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Granite, Ravalli<br>**State Rank Reason:** A Montana endemic, known from several occurrences in alpine areas of the Bitterroot Mountains. Overall abundance and distribution are still poorly known though the high elevation habitat would likely limit most potential impacts. | | | | | | |
| **Draba densifolia**<br>Dense-leaf Draba | | **Brassicaceae**<br>Mustards | G5 | S2 | | | | 2 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Flathead, Gallatin, Glacier, Granite, Jefferson, Lewis and Clark, Park, Pondera, Powell, Ravalli, Silver Bow, Sweet Grass<br>**State Rank Reason:** *Draba densifolia* is distributed in the western half of the state in four moderate to large populations, six small occurrences and nine historical or poorly documented occurrences. Occupied habitats are at moderate to high elevation which help to minimize disturbance to some of the populations. However, livestock grazing, invasive weeds and off-road ATV use impact some populations. | | | | | | |
| **Draba fladnizensis**<br>White Arctic Draba | | **Brassicaceae**<br>Mustards | G5 | S2? | | | | | Alpine |
| | | | **Species Occurrences verified in these Counties:** Deer Lodge, Madison, Stillwater<br>**State Rank Reason:** Rare in Montana, where it is currently known from a few scattered alpine locations in the southern half of the state. Additional sites are likely to be documented in the future and the species does not appear to be at significant risk due to the remoteness of its habitat. | | | | | | |
| **Draba globosa**<br>Round-fruited Draba | **Draba apiculata** | **Brassicaceae**<br>Mustards | G3 | S2S3 | | | | | Alpine |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Madison<br>**State Rank Reason:** Round-fruited draba is a regional endemic, known from widely separated sites in Colorado, northeastern Utah, northwest Wyoming and adjacent Montana. It has been found in three southwest Montana mountain ranges. Current population levels and trends are unknown. However, its high-elevation habitat is relatively inaccessible, and there are no obvious threats. Additional sites are likely to be documented. | | | | | | |
| **Draba macounii**<br>Macoun's Draba | | **Brassicaceae**<br>Mustards | G5? | S2S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier<br>**State Rank Reason:** Known in Montana from only a few occurrences in Glacier National Park. Current population levels and trends are unknown. However, its high-elevation habitat is relatively inaccessible, and there are no obvious threats. Additional sites are likely to be documented. | | | | | | |
| **Draba porsildii**<br>Porsild's Draba | | **Brassicaceae**<br>Mustards | G3G4 | S2S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon, Madison<br>**State Rank Reason:** Only known in Montana from a few collections on the Beartooth Plateau and the Madison Range. Current population levels and trends are unknown. However, its high-elevation habitat is relatively inaccessible, and there are no obvious threats. Additional sites are likely to be documented. | | | | | | |
| **Draba ventosa**<br>Wind River Draba | | **Brassicaceae**<br>Mustards | G3 | S2S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Madison<br>**State Rank Reason:** *Draba ventosa* is known from one site in the Madison Range and has been reported from a second site in the Snowcrest Range. Current population levels and trends are unknown. However, its high-elevation habitat is relatively inaccessible, and there are no obvious threats. Additional sites are likely to be documented. | | | | | | |
| **Drosera anglica**<br>English Sundew | | **Droseraceae**<br>Sundew Family | G5 | S3 | | Sensitive - Known on Forests (BD, BRT, CG, HLC, KOOT, LOLO) | | 2 | Fens |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Flathead, Granite, Lake, Lewis and Clark, Lincoln, Madison, Missoula, Park, Powell, Ravalli, Sanders<br>**State Rank Reason:** Known from over two dozen populations in the state, most of these are moderate to large-sized, healthy populations. Most occurrences are on federally managed lands with several of these in designated wilderness areas, research natural areas or Glacier National Park which help to protect the occurrences from many potential threats. However, one population is vulnerable to ski area expansion and activity, and the species may be negatively impacted by fire as observations at one location appear to indicate. Plants are also sensitive to and negatively impacted by trampling of peat mats on which the species grow. | | | | | | |
| **Drosera linearis**<br>Slenderleaf Sundew | | **Droseraceae**<br>Sundew Family | G4G5 | S2 | | Sensitive - Known on Forests (HLC)<br>Sensitive - Suspected on Forests (KOOT)<br>Species of Conservation Concern on Forests (FLAT) | | 3 | Fens |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Lewis and Clark, Powell<br>**State Rank Reason:** Only known from four populations in Montana though all are moderate to large-sized occurrences that are located in either the Bob Marshall Wilderness or Indian Meadows Research Natural Area which afford all known populations some protection from disturbance. | | | | | | |
| **Dryas integrifolia**<br>Entire-leaved Avens | | **Rosaceae**<br>Rose Family | G5 | S2S3 | | | | 4 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Fergus, Golden Valley<br>**State Rank Reason:** Known in Montana from the Big Snowy Mountains and possibly from the Tobacco Root Mountains, though location of this latter specimen collection is unknown and cannot be confirmed. Current population levels and trends are unknown. However, its high-elevation habitat is relatively inaccessible, and there does not appear to be any significant threats. | | | | | | |
| **Ericameria discoidea var. discoidea**<br>Whitestem Goldenbush | **Haplopappus macronema var. macronema** | **Asteraceae**<br>Aster/Sunflowers | G4G5T4 | S2 | | Sensitive - Known on Forests (BD, CG)<br>Sensitive - Suspected on Forests (BRT) | | 3 | Rock/Talus |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Gallatin<br>**State Rank Reason:** Rare in Montana where it is only known from a couple of sites in the southwest corner of the state. Population levels are poorly documented. One site is relatively inaccessible and not likely to be threatened by human impacts. | | | | | | |
| **Ericameria parryi var. montana**<br>Parry's Mountain Rabbitbrush | **Chrysothamnus parryi ssp. montanus** | **Asteraceae**<br>Aster/Sunflowers | G5T2 | S2 | | | | 3 | Grasslands (subalpine ) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead<br>**State Rank Reason:** A globally rare endemic, restricted to a small area of southwest Montana and adjacent Idaho. Though only known from one population in Montana with an estimated couple hundred plants, its habitat is remote and there are no apparent threats to its viability in the near future. Additional data on population levels and trend should be collected. | | | | | | |
| **Erigeron allocotus**<br>Big Horn Fleabane | | **Asteraceae**<br>Aster/Sunflowers | G3 | S3 | | | | 3 | Rock outcrops/Ridges (low-elevation) |
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| | | | **Species Occurrences verified in these Counties:** Big Horn, Carbon<br>**State Rank Reason:** A regional endemic of Montana and Wyoming. In Montana, it is known only from the Pryor Mountain Desert - Bighorn Basin area of Carbon and Big Horn Counties. The species can be common in areas where it is found. | | | | | | |
| **Erigeron asperugineus**<br>Idaho Fleabane | | **Asteraceae**<br>Aster/Sunflowers | G4 | S2 | | Sensitive - Known on Forests (BD, BRT) | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Madison, Ravalli<br>**State Rank Reason:** Idaho fleabane is a regional endemic that has been documented from a few locations in Montana. It grows in alpine habitats, which tend to be relatively isolated from anthropogenic disturbance. Updated population data are needed for most occurrences and it is likely that a few additional occurrences will be documented. | | | | | | |
| **Erigeron evermannii**<br>Evermann Fleabane | | **Asteraceae**<br>Aster/Sunflowers | G4 | S2? | | Sensitive - Known on Forests (BRT) | | | Alpine |
| | | | **Species Occurrences verified in these Counties:** Ravalli<br>**State Rank Reason:** Rare in Montana, where it is currently known from two alpine peaks in the Bitterroot Mountains. Available data are based on specimen collections from the 1960's and 1970's, though there is no reason to believe that these populations no longer exist or that they have been negatively impacted. More current data are needed. | | | | | | |
| **Erigeron flabellifolius**<br>Fan-leaved Fleabane | | **Asteraceae**<br>Aster/Sunflowers | G3 | S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon, Glacier, Lincoln, Meagher, Park, Sanders, Sweet Grass<br>**State Rank Reason:** Restricted to rocky, alpine habitats in the mountains of south-central Montana. Though uncommon and restricted in distribution, the high elevation habitat tends to reduce the potential for any impacts to the species. | | | | | | |
| **Erigeron formosissimus**<br>Beautiful Fleabane | | **Asteraceae**<br>Aster/Sunflowers | G5 | S1S3 | | | | | Meadows (Montane/subalpine) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Madison, Park<br>**State Rank Reason:** Species has been documented for southern Montana from a few collections. Additional data are needed for this species to more precisely determine its conservation status and need. | | | | | | |
| **Erigeron grandiflorus**<br>Large-flower Fleabane | | **Asteraceae**<br>Aster/Sunflowers | G5 | S1S3 | | | | | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon, Lincoln, Mineral<br>**State Rank Reason:** Only a few collections from Carbon and Sweet Grass counties. | | | | | | |
| **Erigeron lackschewitzii**<br>Lackschewitz' Fleabane | | **Asteraceae**<br>Aster/Sunflowers | G3 | S3 | | Sensitive - Known on Forests (HLC) | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Granite, Lewis and Clark, Pondera, Powell, Teton<br>**State Rank Reason:** Endemic to Montana and adjacent Alberta though the large majority of the species' range is in Montana. Though many of the individual occurrences are small in size, the species is distributed over a relatively wide area along the Rocky Mtn Front south to the Flint Creek Range. The high elevation habitat reduces the potential for detrimental impacts. | | | | | | |
| **Erigeron leiomerus**<br>Smooth Fleabane | | **Asteraceae**<br>Aster/Sunflowers | G4 | S2 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Madison<br>**State Rank Reason:** Rare in Montana, where it is currently known from only a couple of alpine sites in the southwest portion of the state. Current population levels and trends are unknown. However, its high-elevation habitat is relatively inaccessible, and there are no obvious threats. Additional sites are likely to be documented if surveys were to be conducted. | | | | | | |
| **Erigeron linearis**<br>Linear-leaf Fleabane | | **Asteraceae**<br>Aster/Sunflowers | G5 | S2 | | | | 2 | Sagebrush/Grasslands (Foothills to Montane) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Deer Lodge, Lewis and Clark, Mineral, Missoula, Park, Ravalli, Sanders, Silver Bow<br>**State Rank Reason:** *Erigeron linearis* is a peripheral species known from a few small and moderate-sized, localized occurrences. Almost all populations are on federally-managed lands or lands under conservation easement. However, development on adjacent lands may fragment some areas of suitable habitat. Two historical locations are also known. The occupied habitats and population are susceptible to negative impacts from invasive weeds. | | | | | | |
| **Erigeron parryi**<br>Parry's Fleabane | | **Asteraceae**<br>Aster/Sunflowers | G2G3 | S2S3 | | | | 3 | Slopes and ridges (Open, Montane) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Broadwater, Carbon, Jefferson, Madison<br>**State Rank Reason:** Though the species is restricted to southwest Montana, it is locally common at many of the sites it occupies. Additionally, threats to the species appear to be low as a result of the rocky, sparsely vegetated habitat it prefers. | | | | | | |
| **Erigeron tener**<br>Slender Fleabane | | **Asteraceae**<br>Aster/Sunflowers | G4 | S2? | | | | 3 | Slopes (Open, limestone, montane) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead<br>**State Rank Reason:** Rare in Montana, where it is currently known from a single locality in the southwest corner of the state. Current population levels and trends are unknown. | | | | | | |
| **Eriogonum caespitosum**<br>Mat Buckwheat | | **Polygonaceae**<br>Buckwheat Family | G5 | S2S3 | | | | 3 | Sagebrush steppe (Montane) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Lewis and Clark, Meagher, Park, Powell, Rosebud<br>**State Rank Reason:** Rare in Montana, where it is has been documented from a few sites from Beaverhead County. Trends are unknown, though the potential for negative impacts to known populations appears to be low. | | | | | | |
| **Eriogonum crosbyae**<br>Crosby's Buckwheat | **Eriogonum capistratum var. muhlickii, Eriogonum chrysops [misapplied]** | **Polygonaceae**<br>Buckwheat Family | G4 | S3 | | | | | Alpine |
| | | | **Species Occurrences verified in these Counties:** Deer Lodge, Gallatin, Granite, Ravalli<br>**State Rank Reason:** Rare to Uncommon. This entity is restricted to high elevation sites in the Bitterroot Range and in the Anaconda-Pintlers, where it may be locally common in some areas. Good population data are lacking for most occurrences, though it's long-term viability does not appear to be a major concern at this time due, in part, to the remoteness of its habitat. | | | | | | |
| **Eriogonum salsuginosum**<br>Smooth Buckwheat | **Stenogonum salsuginosum** | **Polygonaceae**<br>Buckwheat Family | G4? | S1S2 | | | | 2 | Clay Barrens |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** This species is on the northern edge of its range in south-central Montana, where it has been documented from only two small areas on the south side of the Pryor Mountains. There is active bentonite mining in the immediate vicinity of one of the known occurrences. Follow-up visits are needed to document the extent of the populations and to monitor population trends. | | | | | | |
| **Eriogonum soliceps**<br>Railroad Canyon Wild Buckwheat | | **Polygonaceae**<br>Buckwheat Family | G3 | S3 | | | | 3 | Ridges/slopes (Open, Montane) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Deer Lodge, Madison<br>**State Rank Reason:** See rank details. Described as a new species in 2004 (Reveal and Bjork). | | | | | | |
| **Eriogonum visheri**<br>Visher's Buckwheat | | **Polygonaceae**<br>Buckwheat Family | G3 | S2 | | | SENSITIVE | 3 | Clay Barrens |
| | | | **Species Occurrences verified in these Counties:** Carter, Powder River<br>**State Rank Reason:** *Eriogonum visheri* is a regional endemic known in Montana since 1997 from only one area in Carter County. This population grows on sparsley vegetated alluvial outwash in badlands topography and as such does not appear to be threatened by weeds, livestock or other activities at this time. | | | | | | |
| **Eupatorium maculatum**<br>Spotted Joepye-weed | **Eupatoriadelphus maculatus, Eutrochium** | **Asteraceae**<br>Aster/Sunflowers | G5 | S1S2 | | | | 4 | Wetland/Riparian |

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| | maculatum | | **Species Occurrences verified in these Counties:** Big Horn, Carbon<br>**State Rank Reason:** Widespread species known in Montana from a few occurrences in the south-central part of the state on a variety of ownerships. Four of the occurrences are moderate to large-sized populations. | | | | | | |
| **Euphrasia subarctica**<br>Arctic Eyebright | **Euphrasia arctica var. disjuncta, Euphrasia disjuncta [misapplied]** | **Orobanchaceae**<br>Broomrape Family | G5 | S2 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Glacier<br>**State Rank Reason:** In Montana, only known from a few locations in Glacier National Park, including one historical collection from 1897. Some plants in at least one population are subject to trampling by hikers. Current population levels and trends are unknown. However, its high-elevation habitat is relatively inaccessible, and there are no significant threats. Additional sites are likely to be documented. | | | | | | |
| **Gentiana glauca**<br>Glaucous Gentian | | **Gentianaceae**<br>Gentians | G5 | S2S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Flathead<br>**State Rank Reason:** Rare in Montana, where it is has been documented only from Glacier National Park. Current population levels and trends are unknown, though it was described as locally common at the collection sites. Its high-elevation habitat is inaccessible, and there are no obvious threats. Additional sites are likely to be documented if surveys were to be conducted. | | | | | | |
| **Gentianopsis macounii**<br>Macoun's Gentian | **Gentiana macounii, Gentianella crinita ssp. macounii, Gentianopsis procera ssp. macounii, Gentiana detonsa, Gentianopsis virgata ssp. macounii** | **Gentianaceae**<br>Gentians | G5 | S2 | | Sensitive - Known on Forests (HLC) | | 2 | Fens |
| | | | **Species Occurrences verified in these Counties:** Glacier, Lincoln, Madison, Teton<br>**State Rank Reason:** Rare in Montana, where it is known from several sites just east of the Continental Divide. | | | | | | |
| **Gentianopsis simplex**<br>Hiker's Gentian | **Gentiana simplex, Gentianella simplex** | **Gentianaceae**<br>Gentians | G5 | S2 | | Sensitive - Known on Forests (BD, CG)<br>Sensitive - Suspected on Forests (KOOT, LOLO) | | 3 | Fens, wet meadows, seeps |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Madison, Mineral, Missoula, Park, Stillwater, Sweet Grass<br>**State Rank Reason:** Rare in Montana, where it is known from several widely scattered locations. Current population levels and trends are unknown, though potential threats to known populations appear to be minimal or non-existent at this time. Additional sites are likely to be documented if surveys were to be conducted. | | | | | | |
| **Githopsis specularioides**<br>Common Blue-cup | **Githopsis calycina** | **Campanulaceae**<br>Bellflower Family | G5 | S1S2 | | | | 3 | Cliffs |
| | | | **Species Occurrences verified in these Counties:** Sanders<br>**State Rank Reason:** This plant is known from only one location in Montana -- more than 150 miles disjunct from the nearest documented populations in eastern Washington. The Montana population is small, however its cliff habitat is not thought to be particularly vulnerable to human disturbance. | | | | | | |
| **Glossopetalon spinescens**<br>Spiny Greasebush | **Glossopetalon nevadense** | **Crossosomataceae**<br>Greasebush | G5 | S1 | | Sensitive - Known on Forests (BRT) | | 1 | Rock/Talus |
| | | | **Species Occurrences verified in these Counties:** Ravalli<br>**State Rank Reason:** A peripheral species in Montana where it is only known from one small occurrence on the Bitterroot National Forest. Population is vulnerable to human impacts as it occurs adjacent to a road. | | | | | | |
| **Gratiola ebracteata**<br>Bractless Hedge-hyssop | | **Plantaginaceae**<br>Plantain Family | G4 | S2 | | | | 3 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Pondera, Teton, Yellowstone<br>**State Rank Reason:** Rare and peripheral in Montana. Currently known from approximately a half-dozen wetlands along the Rocky Mountain Front and from a couple historical collections. Available data for the species are limited. However, threats to existing populations appear to be minimal. As an annual, population levels likely fluctuate widely from year to year. | | | | | | |
| **Grayia spinosa**<br>Spiny Hopsage | | **Amaranthaceae**<br>Amaranth (Pigweed) Family | G5 | S2 | | | | 4 | Shrublands (Dry) |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Carbon, Park<br>**State Rank Reason:** *Grayia spinosa* is located in Montana primarily in the Pryor Mountain Desert with a couple additional records from southwest Montana. In the Pryor Mounatin area, it is known from less than a dozen, generally small ocurrences. The total population of the species in the state likely numbers less than 2,000 individuals. As the plant is highly palatable, negative impacts associated with heavy grazing are possible. Cheatgrass invasion may also pose a threat to the species by reducing seedling establishment and increasing fire frequency. | | | | | | |
| **Grindelia howellii**<br>Howell's Gumweed | **Grindelia paysonorum** | **Asteraceae**<br>Aster/Sunflowers | G3 | S2S3 | | Sensitive - Known on Forests (LOLO)<br>Sensitive - Suspected on Forests (HLC, KOOT)<br>Species of Conservation Concern on Forests (FLAT) | | 1 | Vernally moist sites (Open, Low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Granite, Missoula, Powell<br>**State Rank Reason:** In Montana, *Grindelia howellii* is known from over 100 mapped occurrences. However, most populations are small and many occur on roadsides or other similarly disturbed habitat. This habitat preference in conjunction with the short-lived nature of the species means occurrences may drift from place to place or from year to year and as a result many occurrences may be ephemeral. These attributes make determination of population numbers as well as the number of extant populations at any given time difficult to assess.<br><br>Invasive weeds are a threat to many occurrences, as the habitat occupied by *G. howellii* is also favorable for many weedy species. Application of herbicides to control these weeds, especially along roadsides may also have a direct, negative impact. | | | | | | |
| **Gymnosteris parvula**<br>Small-flower Gymnosteris | | **Polemoniaceae**<br>Phlox Family | G4 | S2 | | | | 3 | Grasslands/Sagebrush steppe |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Gallatin<br>**State Rank Reason:** Known in Montana from one 1932 collection near West Yellowstone and one recent collection from Beaverhead County. | | | | | | |
| **Heterocodon rariflorum**<br>Western Pearl-flower | | **Campanulaceae**<br>Bellflower Family | G5 | S2 | | Sensitive - Known on Forests (BRT, KOOT, LOLO) | | 2 | Vernally moist habitats |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Lake, Lincoln, Mineral, Missoula, Powell, Ravalli, Sanders<br>**State Rank Reason:** Over a dozen known occurrences, including a half-dozen moderate to large-sized populations, a few small populations and several occurrences that need further survey work to document population sizes. Most populations are on National Forest lands. Invasive weeds infest several populations and are likely infest others. Hiking and ORV trails occur though or adjacent to a few populations and associated use may impact *H. rariflorum* plants. | | | | | | |
| **Hornungia procumbens**<br>Hutchinsia | **Hutchinsia procumbens** | **Brassicaceae**<br>Mustards | G5 | S2 | | | | 3 | Sagebrush Steppe |

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| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Flathead, Powell<br>**State Rank Reason:** Rare in Montana. Currently known from approximately a half-dozen occurrences scattered across the mountainous portion of the state. Trend and population data are generally lacking, though it is an annual and populations probably fluctuate widely from year to year. Threats to the species' viability in Montana appear to minimal. | | | | | | |
| **Howellia aquatilis**<br>Water Howellia | | **Campanulaceae**<br>Bellflower Family | G3 | S3 | LT | Threatened on Forests (LOLO) | | 2 | Aquatic |
| | | | **Species Occurrences verified in these Counties:** Lake, Missoula<br>**State Rank Reason:** Water howellia is restricted in Montana to depressional wetlands in the Swan Valley, typically occupying small basins where the water level recedes partially or completely by the Fall. Montana contains the largest number of occupied ponds and wetlands though the total occupied area is small and it is clustered in a small portion of the state, making it vulnerable to localized events and management actions. Reed canary grass (*Phalaris arundinacea*) has invaded into some wetlands in the Swan Valley and it has the potential to form dense monocultures, thereby decreasing the amount of available habitat, though it has only been found in a small percentage of occupied water howellia sites so far. Additionally, water howellia is an annual species, which is solely dependent on recruitment from seed; and it has very narrow habitat and moisture requirements which leaves it vulnerable to extirpation as a result of consecutive years of unfavorable growing conditions. | | | | | | |
| **Idahoa scapigera**<br>Scalepod | | **Brassicaceae**<br>Mustards | G5 | S1S2 | | Sensitive - Known on Forests (BRT)<br>Sensitive - Suspected on Forests (LOLO)<br>Species of Conservation Concern on Forests (FLAT) | | 1 | Vernally moist, rock ledges |
| | | | **Species Occurrences verified in these Counties:** Flathead, Ravalli<br>**State Rank Reason:** Rare and peripheral in Montana. Currently known from approximately a half-dozen sites in western Montana, mostly along the lower slopes of the Bitterroot Mountains. Populations are highly susceptible to negative impacts from invasive weeds, primarily spotted knapweed and cheatgrass. Data on population trends are lacking, though levels likely fluctuate widely from year to year. | | | | | | |
| **Impatiens aurella**<br>Pale-yellow Jewel-weed | | **Balsaminaceae**<br>Impatiens | G4 | S3 | | | | | riparian |
| | | | **Species Occurrences verified in these Counties:** Cascade, Flathead, Gallatin, Jefferson, Lake, Lewis and Clark, Mineral, Missoula, Sanders<br>**State Rank Reason:** *Impatiens aurella* is known from about 20 locations documented from 1886 to 2016. It is considered uncommon in Lake and Flathead Counties, where the majority of observations have been found, and rare in other counties of western Montana. It grows in wet, often organic soil in both disturbed and undisturbed wetlands, and rarely appears abundant. However, it may require or persist better with some hydrological disturbance. Revisits to known locations and more surveys are needed to better document locations, population sizes, and threats. | | | | | | |
| **Ipomoea leptophylla**<br>Bush morning-glory | | **Convolvulaceae**<br>Morning-glory Family | G3G5 | S1S2 | | | | | Prairie |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Rosebud, Treasure, Yellowstone<br>**State Rank Reason:** Known in Montana from only a few collections in the southeastern part of the state, only 1 of these collections was in the last 2 decades. This is a very conspicuous, attractive species, so it is probably not undercollected. | | | | | | |
| **Ipomopsis congesta ssp. crebrifolia**<br>Ballhead Ipomopsis | **Gilia congesta var. crebrifolia**<br>Ballhead Gilia, Ball-head Standing-cypress, Compact Gilia | **Polemoniaceae**<br>Phlox Family | G5T3T4 | S2S3 | | | | 3 | Sagebrush Steppe |
| | | | **Species Occurrences verified in these Counties:** Beaverhead<br>**State Rank Reason:** Rare and peripheral in Montana. Currently known from only a small geographic area encompassing parts of the Centennial Mountains to the Monida Pass area in southwest Montana. Additional data on population levels are needed, though it is expected that populations are stable. Potential threats to the known occurrences appear to be minimal or non-existent at the current time. | | | | | | |
| **Ipomopsis minutiflora**<br>Small-flower Ipomopsis | **Gilia minutiflora, Microgilia minutiflora**<br>Small-flower Standing-cypress | **Polemoniaceae**<br>Phlox Family | G4 | S1S2 | | | | | Sagebrush (Open) |
| | | | **Species Occurrences verified in these Counties:** Ravalli<br>**State Rank Reason:** Rare and peripheral in Montana. Currently documented in the state from one collection from the Bitterroot Valley. Very little is known about this species in the state. Additional surveys are needed. Species may be overlooked/undercollected or perhaps the Montana occurrence could be the result of a more recent and isolated establishment event. | | | | | | |
| **Kelloggia galioides**<br>Kelloggia | | **Rubiaceae**<br>Bedstraws / Madder Family | G5 | SH | | | | | Forest (Open/low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Mineral<br>**State Rank Reason:** Known in Montana from one 1971 collection in the South Fork Fish Creek valley approximately 12 miles west-northwest of Alberton and a 0.5 mile north of the junction with Deer Creek. | | | | | | |
| **Kochia americana**<br>Red Sage | **Bassia americana**<br>Green Molly | **Amaranthaceae**<br>Amaranth (Pigweed) Family | G5 | S2 | | | | 2 | Saline/Alkaline Sites |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Petroleum<br>**State Rank Reason:** The species is at the periphery of its range in Beaverhead County where it is known from one large extant population on BLM and private lands, two historical locations and two other locations that need additional survey work. Agricultural conversion has significantly reduced available habitat. Additional impacts to *K. americana* from agriculture, grazing and/or invasive weeds are possible. | | | | | | |
| **Koenigia islandica**<br>Island Koenigia | | **Polygonaceae**<br>Buckwheat Family | G4 | S2 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** Rare in Montana, where it is only known from several, high elevation sites on the Beartooth Plateau. Data are insufficient for accurately determining population levels and trend, though populations probably flucuate widely from year to year. The known occurrences and their habitat do not appear to be at any significant risk of adverse impacts from human activities. | | | | | | |
| **Lagophylla ramosissima**<br>Slender Hareleaf | | **Asteraceae**<br>Aster/Sunflowers | G5 | S1 | | | | 2 | Grasslands (Dry/Valley) |
| | | | **Species Occurrences verified in these Counties:** Sanders<br>**State Rank Reason:** Species is poorly documented in Montana where it is known from three occurrences in close proximity to each other. More survey work for the species is needed to determine sizes of existing populations at a minimum. Invasive weeds occur at or near existing sites, though impacts of invasive weeds on *L. ramosissima* are unknown. | | | | | | |
| **Lathyrus bijugatus**<br>Latah Tule Pea | | **Fabaceae**<br>Pea Family | G4 | S2S3 | | Sensitive - Known on Forests (KOOT) | | | Forest (Open/Valley) |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lincoln<br>**State Rank Reason:** Rare and peripheral in Montana. Currently documented from three, widely scattered sites in the valleys-lower mountains of northwest Montana. | | | | | | |
| **Leptodactylon caespitosum**<br>Mat Prickly-phlox | **Linanthus caespitosus, Linanthus cespitosus** | **Polemoniaceae**<br>Phlox Family | G4 | S2S3 | | | | 3 | Sandy Breaks/Outcrops |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** This plant occurs in Montana at the edge of a broad but patchy range. It is known from only a dozen or so mostly small populations, all in the Pryor Mountains - Bighorn Canyon area, and is confined to a very specific substrate. The habitat of this plant receives little human disturbance and there are no evident threats. | | | | | | |
| **Lewisia columbiana**<br>Columbia Lewisia | | **Portulacaceae**<br>Purslane Family | G4G5 | S1S2 | | | | 3 | Rock Crevices |
| | | | **Species Occurrences verified in these Counties:** Ravalli<br>**State Rank Reason:** Rare and peripheral in Montana, where it is known from only one location in the Bitterroot Mountains. Its relatively inaccessible habitat reduces the potential for negative impacts. | | | | | | |

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| **Ligusticum verticillatum**<br>Idaho Lovage | | **Apiaceae**<br>Parsley/Carrot Family | G4G5 | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Granite, Lincoln, Missoula, Ravalli<br>**State Rank Reason:** Ligusticum verticillatum occurs in northern Idaho, western Montana, and British Columbia. It has been found in Lincoln and Ravalli Counties, growing in moist forests and meadows of spruce-fir habitats, becoming common in Idaho. Herbarium specimens from Missoula and Granite Counties may be mis-identified. Current data on locations, population sizes, and threats is greatly needed. | | | | | | |
| **Lobelia kalmii**<br>Kalm's Lobelia | | **Campanulaceae**<br>Bellflower Family | G5 | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Deer Lodge, Flathead, Lake, Lincoln, Powell, Sheridan, Teton, Wheatland<br>**State Rank Reason:** Lobelia kalmii occurs in fens and other high-organic wetlands in northwest, central, and northeast Montana. Approximately 34 observations have been made at about 23 unique locations. The central Montana location has not been observed since 1934. Current observation, population size, and threat information at documented sites is needed. | | | | | | |
| **Lobelia spicata**<br>Pale-spiked Lobelia | | **Campanulaceae**<br>Bellflower Family | G5 | S2? | | | | | Moist meadows |
| | | | **Species Occurrences verified in these Counties:** Dawson, Richland, Sheridan<br>**State Rank Reason:** Rare and peripheral in Montana, where it is known from a few locations in the northeast corner of the state. Additional data on population levels and trends are needed. Unclear if any of the documented occurrences are subject to negative impacts or disturbances. | | | | | | |
| **Lomatium attenuatum**<br>Taper-tip Desert-parsley | | **Apiaceae**<br>Parsley/Carrot Family | G3 | S3 | | | | 3 | Slopes and Scree (Dry) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Madison, Mineral<br>**State Rank Reason:** *Lomatium attenuatum* is restricted to northwest Wyoming and southwest Montana, with most of its range in Montana. It is known from several locations in Beaverhead and Madison counties. Some populations may be vulnerable to impacts from mining activities and noxious weed invasion. | | | | | | |
| **Lomatium geyeri**<br>Geyer's Biscuitroot | | **Apiaceae**<br>Parsley/Carrot Family | G4 | S2 | | Sensitive - Known on Forests (KOOT) | | 4 | Rocky sites (Mesic) |
| | | | **Species Occurrences verified in these Counties:** Lincoln<br>**State Rank Reason:** Geyer's biscuitroot occurs in northwest Montana in less than a dozen occurrences, including several large, extensive populations. Encroachment of invasive weeds from nearby infestations into habitat occupied by the species is the primary concern. | | | | | | |
| **Lomatium nuttallii**<br>Nuttall Desert-parsley | | **Apiaceae**<br>Parsley/Carrot Family | G3 | S2 | | | | 2 | Rocky, pine woodlands |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Rosebud<br>**State Rank Reason:** The few populations of Nuttall's desert-parsley in the upper Tongue River drainage of Montana are disjunct from the main range of the species in southeastern Wyoming and adjacent Nebraska and Colorado. Its position on mid and lower slopes along drainages in conjunction with its occurrence on private land may make it susceptible to negative impacts from development activities. Potential future coal and/or coalbed methane development could eventually impact the species. Weeds are not currently a problem at any of the known sites. Additional locations are likely to be fond in the vicinity of the known occurrences with additional surveys. | | | | | | |
| **Lomatogonium rotatum**<br>Marsh Felwort | | **Gentianaceae**<br>Gentians | G5 | S1S2 | | | | 2 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Ravalli<br>**State Rank Reason:** Only two known occurrences in Montana on BLM and private lands, including one moderate-sized population. Livestock grazing occurs in the occupied habitat, though it is unclear what effect it may have on *L. rotatum*. Changes in the hydrology, particularly lowering of the water table may adversely affect populations. | | | | | | |
| **Malacothrix torreyi**<br>Desert Dandelion | | **Asteraceae**<br>Aster/Sunflowers | G4 | S1S2 | | | | 3 | Open slopes (low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** Desert dandelion is limited in Montana to a few localized sites on the south side of the Pryor Mountains. Impacts of grazing are unknown, but it may respond positively to moderate levels of disturbance. Additional data on population levels and trends are needed. | | | | | | |
| **Mentzelia nuda**<br>Bractless blazingstar | | **Loasaceae**<br>Blazingstar / Stickleaf Family | G5 | S1S2 | | | | | Open areas (sandy or gravelly solis) |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Custer, Dawson, Powder River, Roosevelt, Rosebud, Valley<br>**State Rank Reason:** Rare and peripheral in Montana, where it is known from a few locations in the eastern half of the state. Additional data on population levels and trends are needed. | | | | | | |
| **Mentzelia pumila**<br>Dwarf mentzelia | | **Loasaceae**<br>Blazingstar / Stickleaf Family | G4 | S2S3 | | | | 3 | Shrublands (Dry, sandy soils) |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Carbon<br>**State Rank Reason:** Rare in Montana, where it is known only from sandy sites within the Bighorn Basin area. Additional data on population levels and trends are needed. | | | | | | |
| **Mertensia bella**<br>Oregon Bluebells | | **Boraginaceae**<br>Borage Family | G4 | S2S3 | | Sensitive - Known on Forests (LOLO) | | 2 | Vernally moist soil (Montane) |
| | | | **Species Occurrences verified in these Counties:** Missoula<br>**State Rank Reason:** Rare in Montana, where it is known only from the Lolo National Forest. Some disturbance may be beneficial or at least tolerated. Mining activity occurs near one site though it is unknown if this has had any impact on *M. bella*. Additional monitoring of the populations is needed to determine trends. | | | | | | |
| **Micranthes apetala**<br>Tiny Swamp Saxifrage | **Saxifraga integrifolia Hook. var. apetala, Saxifraga apetala** | **Saxifragaceae**<br>Saxifrage Family | G3Q | S2? | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Deer Lodge, Granite, Madison, Silver Bow<br>**State Rank Reason:** Known from two occurrences, one in the East Pioneers and one in the Absaroka-Beartooth Wilderness. Both occurrences are known from single specimen collections. Though little data are available for the species in Montana, the alpine habitat in which it grows is not generally subject to negative impacts from human disturbance. | | | | | | |
| **Micranthes tempestiva**<br>Storm Saxifrage | **Saxifraga tempestiva** | **Saxifragaceae**<br>Saxifrage Family | G2G3 | S2S3 | | Sensitive - Known on Forests (BD, BRT) Sensitive - Suspected on Forests (HLC) | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Deer Lodge, Granite, Ravalli<br>**State Rank Reason:** State endemic known from approximately a dozen extant sites in southwest Montana. The high elevation habitat of the species in conjuction with approximately half of the populations in designated wilderness areas minimize the potential for negative impacts to the species. | | | | | | |
| **Mimulus ampliatus**<br>Stalk-leaved Monkeyflower | **Mimulus patulus, Mimulus washingtonensis** | **Phrymaceae**<br>Lopseed Family | G3 | S3 | | Sensitive - Known on Forests (KOOT) | | | Vernally moist soil (Valleys to subalpine) |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lincoln, Missoula, Park, Ravalli, Sanders<br>**State Rank Reason:** See rank details. | | | | | | |
| **Mimulus breviflorus**<br>Short-flowered Monkeyflower | | **Phrymaceae**<br>Lopseed Family | G4 | S1S2 | | Sensitive - Known on Forests (KOOT) Species of Conservation Concern on Forests (FLAT) | | 3 | Rock/Talus (Mesic, Montane) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Flathead, Glacier, Lincoln<br>**State Rank Reason:** Rare in Montana, where it is known from a few, scattered locations in the northwest corner of the state. | | | | | | |

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| **Mimulus clivicola**<br>North Idaho Monkeyflower | | **Phrymaceae**<br>Lopseed Family | G4 | S2? | | Sensitive - Known on Forests (LOLO)<br>Sensitive - Suspected on Forests (KOOT) | | | |
| | | | **Species Occurrences verified in these Counties:** Mineral, Sanders<br>**State Rank Reason:** See rank details. | | | | | | |
| **Mimulus floribundus**<br>Floriferous Monkeyflower | | **Phrymaceae**<br>Lopseed Family | G5 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Cascade, Flathead, Glacier, Lincoln, Park, Ravalli, Sanders, Stillwater | | | | | | |
| **Mimulus hymenophyllus**<br>Thinsepal monkeyflower | | **Phrymaceae**<br>Lopseed Family | G2 | S1S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Carbon, Lake, Park, Stillwater<br>**State Rank Reason:** See rank details. Surveys of the previous collection sites are needed to document the species' status. Without additional data, a rank of "SH" will be applicable. | | | | | | |
| **Mimulus nanus**<br>Dwarf Purple Monkeyflower | | **Phrymaceae**<br>Lopseed Family | G5 | S2S3 | | Sensitive - Known on Forests (BRT, CG) | | 2 | Open slopes (low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Gallatin, Ravalli<br>**State Rank Reason:** *Mimulus nanus* is only known from a few extent occurrences in the state, plus two historical collections. Populations are generally small and in habitats susceptible to weed invasion. At least a few of the occurrences contain scattered spotted knapweed plants. | | | | | | |
| **Mimulus primuloides**<br>Primrose Monkeyflower | | **Phrymaceae**<br>Lopseed Family | G4 | S3 | | Sensitive - Known on Forests (BD, BRT) | | 3 | Fens and wet meadows |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Deer Lodge, Gallatin, Ravalli<br>**State Rank Reason:** Known from several watersheds in southwest Montana, occurring almost entirely on National Forest lands. Eight of the occurrences are moderate to large-sized populations. Two historical locations are also known. Fire may adversely impact *M. primuloides* though more study is needed. It is also vulnerable to changes in hydrology and one population could be adversely affected by activity at an adjacent ski area. | | | | | | |
| **Mimulus ringens**<br>Square-stem Monkeyflower | | **Phrymaceae**<br>Lopseed Family | G5 | S2? | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Cascade, Chouteau, Fergus<br>**State Rank Reason:** Rare. Currently known from a few riparian sites along the Missouri River in central Montana. Additional survey data are needed. | | | | | | |
| **Myriophyllum quitense**<br>Andean Water-milfoil | | **Haloragaceae**<br>Water Milfoils | G4? | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Broadwater, Gallatin, Madison<br>**State Rank Reason:** *Myriophyllum quitense* is an aquatic plant that has recently (2008-2016) been found in three waterbodies of Montana. Plants are found in slow-moving rivers that vary in water quality from the Madison River in Yellowstone National Park to Toston Reservoir on the Missouri River. These locations represent a very narrow geographical portion of Montana. Proper identification of *Myriophyllum* species require careful collections to obtain flowering or fruiting structures, use of an appropriate and current taxonomic key, and time spent studying the specimen. More surveys are greatly needed to assess the true abundance and distribution of *Myriophyllum quitense* in Montana. | | | | | | |
| **Nama densum**<br>Nama | | **Hydrophyllaceae**<br>Waterleaf Family | G5 | S1S2 | | | | 3 | Sagebrush (Sandy soil) |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** Nama occurs in Montana on the northeastern edge of its range. It has been found at a single location on the south side of the Pryor Mountains in 1991, occupying less than one acre of habitat. Additional survey data are needed. | | | | | | |
| **Navarretia divaricata**<br>Divaricate Navarretia | | **Polemoniaceae**<br>Phlox Family | G5 | S1S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Sanders | | | | | | |
| **Noccaea parviflora**<br>Small-flowered Pennycress | **Thlaspi parviflorum** | **Brassicaceae**<br>Mustards | G3 | S3 | | | | 3 | Meadows (Moist, Montane to alpine) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Cascade, Madison, Meagher, Mineral, Park, Silver Bow<br>**State Rank Reason:** *Noccaea parviflora* is a regional endemic, known in Montana from several southwestern counties. It is a small, short-lived plant that likely requires some disturbance to maintain its habitat. | | | | | | |
| **Nuttallanthus texanus**<br>Blue Toadflax | **Linaria canadensis var. texana** | **Plantaginaceae**<br>Plantain Family | G4G5 | S1S2 | | | | 2 | Grasslands/woodlands (sandy to clay soils) |
| | | | **Species Occurrences verified in these Counties:** Carter, Dawson<br>**State Rank Reason:** Known from one extant occurrence in southeastern Montana near Alzada and another occurrence from Makoshika State Park. Additional surveys and monitoring are needed. | | | | | | |
| **Nymphaea leibergii**<br>Pygmy Water-lily | **Nymphaea tetragona ssp. leibergii** | **Nymphaeaceae**<br>Water-lily Family | G5 | S1 | | | | 3 | Aquatic |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Missoula<br>**State Rank Reason:** Known from 4 extant occurrences in western valleys and one historical collection from Salmon Lake in the Seeley Lake area. Populations are susceptible to impacts from development, recreation, siltation and aquatic weeds. | | | | | | |
| **Oenothera pallida ssp. pallida**<br>Pale Evening-primrose | **Oenothera pallida var. idahoensis** | **Onagraceae**<br>Evening-primrose Family | G5T4Q | S1 | | | | | Sandy sites |
| | | | **Species Occurrences verified in these Counties:** Beaverhead<br>**State Rank Reason:** Limited in Montana to the sandhills of the Centennial Valley in Beaverhead County. A reduction in natural disturbances, including fire, ungulate grazing and pocket gopher activity has led to greater dune stabilization and reduced the extent of early successional (blowout) habitat in the area. | | | | | | |
| **Oxytropis campestris var. columbiana**<br>Columbia Locoweed | **Oxytropis columbiana** | **Fabaceae**<br>Pea Family | G5T2 | S1 | | | | 1 | Wetland/Riparian, Gravelly shoreline |
| | | | **Species Occurrences verified in these Counties:** Lake<br>**State Rank Reason:** Originally known in Montana from six occurrences all around Flathead Lake. However, two of the occurrences are now extirpated. Private lands, which are subject to development in the area, play a vital role in maintaining viable populations of this plant in Montana. | | | | | | |
| **Oxytropis deflexa var. foliolosa**<br>Nodding Locoweed | | **Fabaceae**<br>Pea Family | G5T5 | S2S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Gallatin, Madison, Park<br>**State Rank Reason:** Rare in Montana, where it has been documented from a few, high-elevation sites in the mountains of the southwest portion of the state. | | | | | | |
| **Oxytropis parryi**<br>Parry's Locoweed | | **Fabaceae**<br>Pea Family | G5 | S2S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Madison<br>**State Rank Reason:** Rare in Montana where it is known only from a few occurrences in the southwestern portion of the state. However, the species high-elevation habitat and its viability do not appear to be at significant risk at the current time. | | | | | | |
| **Oxytropis podocarpa**<br>Stalked-pod Locoweed | | **Fabaceae**<br>Pea Family | G4G5 | S1 | | Sensitive - Known on Forests (HLC)<br>Sensitive - Suspected on Forests (BD) | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Glacier, Teton<br>**State Rank Reason:** Rare in Montana, where it is known from a small area of the Rocky Mountain Front. The remote habitat should limit the possibily of negative impacts. | | | | | | |

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| **Papaver pygmaeum**<br>Alpine Glacier Poppy | Papaver radicatum var. pygmaeum | **Papaveraceae**<br>Poppy Family | G3 | S2S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lewis and Clark<br>**State Rank Reason:** See rank details. | | | | | | |
| **Papaver radicatum ssp. kluanensis**<br>Alpine Poppy | Papaver kluanense, Papaver kluenensis | **Papaveraceae**<br>Poppy Family | G5T4 | S2S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon, Park, Sweet Grass<br>**State Rank Reason:** See rank details. | | | | | | |
| **Pedicularis contorta var. ctenophora**<br>Pink Coil-beaked Lousewort | | **Orobanchaceae**<br>Broomrape Family | G5T3 | S2S3 | | | | 3 | Slopes (Montane/Subalpine) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Judith Basin, Madison, Ravalli, Teton<br>**State Rank Reason:** Restricted to extreme southwestern Montana where it is documented from a few populations. Limited data is available for the species and it may be more common than the few collections indicate. | | | | | | |
| **Pedicularis contorta var. rubicunda**<br>Selway Coil-beaked Lousewort | | **Orobanchaceae**<br>Broomrape Family | G5T3 | S2S3 | | | | | Ridgetops and meadows (subalpine and alpine) |
| | | | **Species Occurrences verified in these Counties:** Ravalli<br>**State Rank Reason:** Restricted in Montana to the Bitterroot Mountains where it is documented from several occurrences. Limited data are available for the species and it may be more common than the few collections indicate. | | | | | | |
| **Pedicularis crenulata**<br>Scallop-leaf Lousewort | | **Orobanchaceae**<br>Broomrape Family | G4 | S1 | | | | 1 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Beaverhead<br>**State Rank Reason:** Two known populations in Montana. Much of the riparian meadow habitat occupied by this species has been converted to agriculture or is being used as hay meadows. | | | | | | |
| **Pedicularis pulchella**<br>Mountain Lousewort | | **Orobanchaceae**<br>Broomrape Family | G3 | S3 | | | | | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon, Deer Lodge, Gallatin, Granite, Madison, Park, Powell<br>**State Rank Reason:** Restricted to high elevation areas of southern Montana. Limited data are available for the species and it may be more common than the few collections indicate. | | | | | | |
| **Penstemon angustifolius**<br>Narrowleaf Penstemon | | **Plantaginaceae**<br>Plantain Family | G5 | S2S3 | | | | 3 | Sandy sites |
| | | | **Species Occurrences verified in these Counties:** Carter, Dawson, Fallon, Granite<br>**State Rank Reason:** Over a dozen, small extant and/or presumed extant occurrences are known in southeast Montana, plus a few historical collections from the same area. Only one of the known populations appears to be relatively large. Additional suitable, but unsurveyed habitat likely exists in eastern Montana. | | | | | | |
| **Penstemon caryi**<br>Cary's Beardtongue | | **Plantaginaceae**<br>Plantain Family | G3 | S3 | | | | 3 | Grasslands and slopes (Open, montane) |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** Restricted in Montana to the Pryor Mountains. | | | | | | |
| **Penstemon flavescens**<br>Yellow Beardtongue | | **Plantaginaceae**<br>Plantain Family | G3 | S3 | | | | 3 | Rocky slopes (Open, montane) |
| | | | **Species Occurrences verified in these Counties:** Mineral, Missoula, Ravalli<br>**State Rank Reason:** Restricted in Montana to the Bitterroot Range primarily in Ravalli County but also documented from Mineral County. The species can be relatively common or widely scattrered in areas of suitable habitat, though detailed information on the abundance of the species is lacking. More detailed information documenting the abundance, distribution and any potential threats is needed. | | | | | | |
| **Penstemon grandiflorus**<br>Large Flowered Beardtongue | | **Plantaginaceae**<br>Plantain Family | G5? | S1 | | | | | Sandy soils |
| | | | **Species Occurrences verified in these Counties:** Custer<br>**State Rank Reason:** Rare in Montana, where it is known from only a few sites on the plains of eastern Montana. | | | | | | |
| **Penstemon humilis**<br>Low Beardtongue | | **Plantaginaceae**<br>Plantain Family | G5 | S1S3 | | | | | Sagebrush steppe (Montane) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Gallatin, Lewis and Clark, Lincoln, Madison, Meagher, Missoula, Park, Powell, Ravalli<br>**State Rank Reason:** Known in Montana from 1 collection from Beaverhead County | | | | | | |
| **Penstemon lemhiensis**<br>Lemhi Beardtongue | | **Plantaginaceae**<br>Plantain Family | G3 | S3 | | Sensitive - Known on Forests (BD, BRT) | | 2 | Sagebrush-grasslands |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Deer Lodge, Ravalli, Silver Bow<br>**State Rank Reason:** *Penstemon lemhiensis* is a regional endemic that occurs only in southwest Montana and adjacent Idaho. There are numerous occurrences in Beaverhead and Ravalli Counties with a few additional occurrences located in Deer Lodge and Silver Bow Counties in Montana, but most are small to moderate in size. The number of plants in Montana is estimated at approximately 10,000 individual plants based on recent survey efforts. Plants occur on a mix of federal, state and private ownerships with National Forest lands supporting the majority of the occurrences. The species is primarily sensitive to negative impacts associated with drought conditions and fire suppression, both of which are believed to have played a significant role in the species' decline. Additional impacts to populations are occurring from noxious weed invasion, primarily spotted knapweed in the Bitterroot region. Heavy livestock grazing also negatively impacts the species. Several occurrences are found adjacent to roadsides and thus may be impacted by activities associated with road construction, maintenance and use. | | | | | | |
| **Penstemon payettensis**<br>Payette Beardtongue | | **Plantaginaceae**<br>Plantain Family | G4 | S1 | | Sensitive - Known on Forests (BRT) | | 1 | Slopes (Open, Montane) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Ravalli<br>**State Rank Reason:** Known in Montana from only two small occurrrences in close proximity on the Bitterroot National Forest.<br>Spotted knapweed invasion, fire suppression and road construction/maintenance are all concerns for the viability of the species in Montana. Additional data on the species in Montana are needed. | | | | | | |
| **Penstemon whippleanus**<br>Whipple's Beardtongue | | **Plantaginaceae**<br>Plantain Family | G5 | S2 | | | | | Open areas (subalpine and alpine) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Gallatin, Madison<br>**State Rank Reason:** Whipple's beardtongue occurs at the edge of its range in Montana, and is known here from just two collections, only one of which is recent. The species occupies high elevation, rocky habitat that is relatively unthreatened. | | | | | | |
| **Petasites frigidus var. frigidus**<br>Arctic Sweet Coltsfoot | | **Asteraceae**<br>Aster/Sunflowers | G5T5 | S2 | | Species of Conservation Concern on Forests (FLAT) | | 2 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier<br>**State Rank Reason:** Rare in Montana, where it is at the southern edge of its range. Known from a few widely scattered sites in the northwest corner of the state. | | | | | | |
| **Phacelia incana**<br>Hoary Phacelia | | **Hydrophyllaceae**<br>Waterleaf Family | G3G4 | S3 | | | | 3 | Rocky slopes (foothills) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead<br>**State Rank Reason:** *Phacelia incana* occurs in Idaho, Nevada, Utah, Colorado and Montana. In Montana, it is known from approximately ten occurrences in Beaverhead County. It is difficult to estimate the size of populations because the plant is an annual, and seed germination varies greatly with climate. Habitat is probably not threatened by anthropogenic sources. | | | | | | |

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| **Phacelia thermalis**<br>Hot Spring Phacelia | | **Hydrophyllaceae**<br>Waterleaf Family | G3G4 | S1S3 | | | | | Barren clay slopes |
| | | | **Species Occurrences verified in these Counties:** Fergus, Garfield, Phillips, Valley<br>**State Rank Reason:** Hot spring phacelia is known from a very small number of sites in northeastern Montana, where it is disjunct from its primary range (northern California to southwestern Idaho). The species is an annual and may be vulnerable to competition from invasive exotics, particularly sweet clover, which is widespread in the type of habitat where hot spring phacelia has been found. | | | | | | |
| **Phlox kelseyi var. missoulensis**<br>Missoula Phlox | **Phlox missoulensis** | **Polemoniaceae**<br>Phlox Family | G3 | S3 | | Sensitive - Known on Forests (BD, HLC)<br>Sensitive - Suspected on Forests (LOLO) | | 2 | Slopes/ridges (Open, foothills to subalpine) |
| | | | **Species Occurrences verified in these Counties:** Cascade, Granite, Jefferson, Judith Basin, Lewis and Clark, Madison, Meagher, Missoula, Powell, Teton<br>**State Rank Reason:** Missoula phlox is a state endemic known from over 2 dozen occurrences in west-central Montana, most of which are moderate to large-sized. Populations occur on a mix of ownerships, including private lands which host several occurrences. The Waterworks Hill population is infested with several noxious weeds and heavy recreational trail use also occurs within the occupied habitat. Other populations appear to be at much less risk though some impacts from invasive weeds, recreational use and development are possible. | | | | | | |
| **Physaria brassicoides**<br>Double Bladderpod | | **Brassicaceae**<br>Mustards | G5 | S3 | | | | 3 | Breaklands/badlands |
| | | | **Species Occurrences verified in these Counties:** Carbon, Carter, Custer, Petroleum, Phillips, Powder River, Stillwater<br>**State Rank Reason:** Double bladderpod is endemic to a restricted area of the northern Great Plains, and is known in Montana only from a handful of populations. Populations occur on a mix of federal, state and private ownerships. Impacts to the species from livestock grazing and invasive weeds are minimal at this time as the typically steep, sparsely-vegetated habitat is not conducive to grazing. Yellow sweetclover was observed at one location and it may eventually have a negaitive impact on the species. | | | | | | |
| **Physaria carinata**<br>Keeled Bladderpod | **Lesquerella carinata, Lesquerella carinata var. languida, Lesquerella paysonii [misapplied in MT], Physaria carinata ssp. carinata** | **Brassicaceae**<br>Mustards | G3G4 | S1S2 | | Sensitive - Known on Forests (BD) | | 1 | Grassland slopes (low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Granite, Musselshell<br>**State Rank Reason:** *Physaria carinata* is restricted to areas of calcareous limestone substrates on low elevation, south-facing grasslands of Granite and Beaverhead Counties. Population numbers appear to have declined significantly in at least several of the occurrences in the Garnet Mountains from the time they were first documented in the 1980's and early 1990's. During this time period, spotted knapweed densities have increased in the area and the noxious weed is now a dominant plant in most of the keeled bladderpod sites. At least one previous study has documented decreased vigor and survivorship of keeled bladderpod in knapweed infested areas. | | | | | | |
| **Physaria didymocarpa var. lanata**<br>Woolly Twinpod | | **Brassicaceae**<br>Mustards | G5T2 | S2S3 | | | | 2 | Grasslands/Shrublands (Open, plains) |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Rosebud<br>**State Rank Reason:** Only a few known occurrences in Montana, including two potentially large populations. However, lots of unsurveyed potential habitat exists. Both BLM and private lands are important to the viability of the species in Montana. Oil and gas development, coalbed methane, and invasive weeds have the potential to detrimentally impact populations. | | | | | | |
| **Physaria douglasii**<br>Douglas Bladderpod | **Lesquerella douglasii** | **Brassicaceae**<br>Mustards | G5 | S1 | | | | 2 | Woodlands (Sandy soils, low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Lincoln<br>**State Rank Reason:** Known from one population in northwest Montana at the edge of Lake Koocanusa. Impacts to the population from ORV use, recreation and erosion of the sandy bluffs are possible, though additional monitoring is needed to determine what impacts if any are occurring. | | | | | | |
| **Physaria humilis**<br>Bitterroot Bladderpod | **Lesquerella humilis** | **Brassicaceae**<br>Mustards | G2 | S2 | | Sensitive - Known on Forests (BRT) | | 2 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Ravalli<br>**State Rank Reason:** Montana endemic restricted to a very small area of the Bitterroot Mountains with only a few known occurrences. All occurrences are in the Selway-Bitterroot Wilderness. However, activity related to hiking trails and a lookout tower may adversely impact *P. humilis* plants or its habitat. | | | | | | |
| **Physaria klausii**<br>Divide Bladderpod | **Lesquerella klausii** | **Brassicaceae**<br>Mustards | G3 | S3 | | | | 3 | Slopes (Open, Montane/subalpine) |
| | | | **Species Occurrences verified in these Counties:** Broadwater, Lewis and Clark, Meagher<br>**State Rank Reason:** State endemic restricted to central-Montana with the majority of populations occurring in the Big Belt Mountains and extending north to the southern end of the Rocky Mountain Front. Many large populations exist and the species typically occurs on gravelly slopes that are not usually subject to human disturbance. | | | | | | |
| **Physaria lesicii**<br>Lesica's Bladderpod | **Lesquerella lesicii** | **Brassicaceae**<br>Mustards | G2 | S2 | | | SENSITIVE | 1 | Woodlands/Grasslands (Montane) |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** Lesica's bladderpod occurs only in Montana, where it is restricted to a few areas of limestone outcrops in the eastern Pryor Mountains. All known populations are on federal lands. While it occurs largely on steep terrain that is relatively inaccessible to humans, trampling and terracing through its habitat by wild horses may be negatively impacting the plant. | | | | | | |
| **Physaria ludoviciana**<br>Silver Bladderpod | **Lesquerella ludoviciana** | **Brassicaceae**<br>Mustards | G5 | S2S3 | | | | | Sandy sites |
| | | | **Species Occurrences verified in these Counties:** Carbon, Carter, Cascade, Chouteau, Fallon, Fergus, Garfield, Golden Valley, Lewis and Clark, Mccone, Petroleum, Phillips, Powder River, Prairie, Rosebud, Sheridan, Teton, Valley<br>**State Rank Reason:** Rare in Montana. Primarily a plains species which barely enters eastern Montana where it is restricted to sandy sites. Locally common at one site and threats to the species' viability appear to be minimal at this time. | | | | | | |
| **Physaria pachyphylla**<br>Thick-leaf Bladderpod | | **Brassicaceae**<br>Mustards | G2G3 | S2S3 | | | | | Rocky slopes (foothills) |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** See rank details. | | | | | | |
| **Physaria pulchella**<br>Beautiful Bladderpod | **Lesquerella pulchella, Physaria carinata ssp. pulchella** | **Brassicaceae**<br>Mustards | G3 | S3 | | Sensitive - Known on Forests (BD) | SENSITIVE | 3 | Open slopes (Calcaeous soils, foothills to alpine) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead<br>**State Rank Reason:** Beautiful bladderpod is a state endemic - occurring only in Montana - and is known only from a few locations, where it is restricted to small areas of sparsely vegetated habitat. | | | | | | |
| **Physaria saximontana var. dentata**<br>Rocky Mountain Twinpod | | **Brassicaceae**<br>Mustards | G3T3 | S3 | | | | | Gravelly slopes/talus (Montane/subalpine) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Broadwater, Carbon, Chouteau, Fergus, Flathead, Gallatin, Glacier, Lewis and Clark, Madison, Park, Pondera, Powell, Silver Bow, Sweet Grass, Teton<br>**State Rank Reason:** State endemic known from several counties across central and southern Montana mountain ranges. | | | | | | |
| **Plagiobothrys leptocladus**<br>Slender-branched Popcorn-flower | | **Boraginaceae**<br>Borage Family | G4 | S2S3 | | | | | Wetland/Riparian (low-elevation) |

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| | | | **Species Occurrences verified in these Counties:** Beaverhead, Custer, Glacier, Park, Phillips, Valley<br>**State Rank Reason:** Rare in Montana, where it is known from a few widely scattered sites in the state. Additional data on population levels, trends and threats to the known ocuurences are needed to more precisely evaluate its status. As it occurs in drying mud of ponds, wetlands, stockponds, etc it is likely that additional populations exist in Montana. | | | | | | |
| **Pleiacanthus spinosus**<br>Spiny Skeletonweed | **Stephanomeria spinosa, Lygodesmia spinosa** | **Asteraceae**<br>Aster/Sunflowers | G4 | S2S3 | | | | 3 | Grasslands (low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Madison, Park<br>**State Rank Reason:** *Pleiacanthus spinosus* occurs in Montana at the northeastern edge of its range, where it is known only from grasslands in the Madison Valley. Currently, there are only a few extant occurrences and three historical collections from this area. No specific threats have been reported. Trend data are not available. However, parts of the Madison Valley are being subdivided and habitat is likely to be negatively impacted. | | | | | | |
| **Potentilla brevifolia**<br>Short-leaved Cinquefoil | | **Rosaceae**<br>Rose Family | G4 | S2S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Madison<br>**State Rank Reason:** Rare in Montana, where it is currently only from a few collections from the Madison Range. The remote, high-elevation habitat should greatly minimize the potential for any negative impacts to the viability of the species in the state. Accurate estimates of population levels are lacking. | | | | | | |
| **Potentilla hyparctica**<br>Low Arctic Cinquefoil | **Potentilla nana, Potentilla flabellifolia var. emarginata** | **Rosaceae**<br>Rose Family | G4G5 | S2 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon, Flathead, Glacier<br>**State Rank Reason:** Rare in Montana, where it is currently only from a couple collections from the Beartooth Mtns. The remote, high-elevation habitat should greatly minimize the potential for any negative impacts to the viability of the species in the state. Accurate estimates of population levels are lacking. | | | | | | |
| **Potentilla nivea var. pentaphylla**<br>Five-leaf Cinquefoil | **Potentilla quinquefolia** | **Rosaceae**<br>Rose Family | G5T4 | S3 | | Sensitive - Known on Forests (BD, HLC) | | 4 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lincoln, Madison, Park, Pondera<br>**State Rank Reason:** Rare in Montana, though several large populations are known and most populations, as well as the species' habitat, are not being negatively impacted. | | | | | | |
| **Potentilla plattensis**<br>Platte Cinquefoil | | **Rosaceae**<br>Rose Family | G4 | S3 | | | | 4 | Grasslands/Sagebrush (Mesic) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Judith Basin, Valley<br>**State Rank Reason:** Rare in Montana, where it is known from several collections, particularly from Beaverhead County. | | | | | | |
| **Primula alcalina**<br>Alkali Primrose | | **Primulaceae**<br>Primrose Family | G2 | S2 | | Sensitive - Known on Forests (BD) | SENSITIVE | 1 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Madison<br>**State Rank Reason:** *Primula alcalina* is a regional endemic, occuring only in east-central Idaho and adjacent Montana, where it is known from just one recently documented population in Beaverhead County on BLM and National Forest lands. Another population documented by a historical collection from 1920 by F. Rose has not been relocated. The extant location is actively grazed and the species may be vulnerable to impacts associated with cattle grazing and activities that alter the hydrology (irrigation, diversions). | | | | | | |
| **Primula incana**<br>Mealy Primrose | | **Primulaceae**<br>Primrose Family | G5 | S3 | | Sensitive - Known on Forests (BD)<br>Sensitive - Historically known, not recently documented on Forests (CG) | | 2 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Broadwater, Carbon, Deer Lodge, Gallatin, Jefferson, Madison, Meagher, Powell, Sheridan, Silver Bow, Teton<br>**State Rank Reason:** *Primula incana* is known from a few dozen extant occurrences in Montana, including several moderate to large populations. However, most known populations are small, and the status of several populations is uncertain. Ownership of the occupied areas is varied and includes federal, state and private lands, including several locations managed or protected for their conservation values. However, unprotected private lands host many occurrences. Cattle grazing may have some negative effects on the species including the direct effects of herbivory and trampling. The species is also vulnerable to activities that alter the hydrology of the wetlands it occupies. Continued threats and potentially declining trends, particularly in regards to habitat quality make the species' vulnerable to local extirpation. | | | | | | |
| **Prunus pumila**<br>Sand Cherry | | **Rosaceae**<br>Rose Family | G5 | S1S3 | | | | 2 | Sandy or rocky soils (Plains) |
| | | | **Species Occurrences verified in these Counties:** Fallon<br>**State Rank Reason:** The sole known extant location in Montana occurs along a county road and is susceptible to road construction and maintenance activities. A 1960 collection with vague locational data has not been relocated but it apparently occurred in native habitat. | | | | | | |
| **Psilocarphus brevissimus**<br>Dwarf woolly-heads | | **Asteraceae**<br>Aster/Sunflowers | G4 | S2S3 | | Sensitive - Known on Forests (KOOT) | | 3 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Cascade, Lincoln, Petroleum, Phillips, Sanders, Valley<br>**State Rank Reason:** Limited data combined with the posibility that several reported observations from western MT may be mis-identified with other Psilocarphus species make a precise determination of the species' status difficult. | | | | | | |
| **Pyrrocoma carthamoides var. subsquarrosa**<br>Beartooth Large-flowered Goldenweed | **Haplopappus carthamoides var. subsquarrosus** | **Asteraceae**<br>Aster/Sunflowers | G4G5T3 | S3 | | Sensitive - Known on Forests (CG) | SENSITIVE | 3 | Sagebrush-Grassland |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** The Beartooth large-flowered goldenweed is a local endemic to the eastern front of the Beartooth Mountains and the foothills of the Pryor Mountains and adjacent areas of Wyoming. Although several populations are large, it is vulnerable to increased shrub and tree cover due to fire suppression and to competition from invasive plants. | | | | | | |
| **Quercus macrocarpa**<br>Bur Oak | | **Fagaceae**<br>Beech / Oaks | G5 | S2 | | | | 1 | Shale ridges |
| | | | **Species Occurrences verified in these Counties:** Carter<br>**State Rank Reason:** Bur oak is at the extreme western edge of its range in Montana, where it occurs in a localized, though fairly large, occurrence in Carter County. Bentonite mining is active in this area and exotic weeds are prevalent though negative impacts to bur oak have not been documented due to a lack of surveys and monitoring. | | | | | | |
| **Ranunculus cardiophyllus**<br>Heart-leaved Buttercup | | **Ranunculaceae**<br>Buttercup Family | G5 | S3 | | | | 2 | Grasslands (Moist, Montane) |
| | | | **Species Occurrences verified in these Counties:** Chouteau, Glacier, Sweet Grass, Toole<br>**State Rank Reason:** Rare in Montana, where it is primarily distributed in the north-central part of the state. | | | | | | |
| **Ranunculus grayi**<br>Arctic Buttercup | **Ranunculus karelinii, Ranunculus verecundus, Ranunculus gelidus** | **Ranunculaceae**<br>Buttercup Family | G4G5 | S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon, Deer Lodge, Flathead, Glacier, Madison, Meagher, Park, Stillwater<br>**State Rank Reason:** Also includes *R. verecundus*, which was formerly tracked as a separate Species of Concern. | | | | | | |
| **Ranunculus orthorhynchus**<br>Straightbeak Buttercup | | **Ranunculaceae**<br>Buttercup Family | G5 | S1S2 | | | | 1 | Wetland/Riparian (Montane) |
| | | | **Species Occurrences verified in these Counties:** Deer Lodge, Flathead, Glacier, Granite, Lake, Mineral, Missoula, Sanders<br>**State Rank Reason:** Rare in Montana, where is is known from the western portion of the state based upon several specimen collections. However, only one collection has been made in the past two decades. Additional data are need to determine this species' status. | | | | | | |

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| **Ranunculus pedatifidus**<br>Northern Buttercup | | **Ranunculaceae**<br>Buttercup Family | G5 | S3 | | | | 2 | Meadows/Woodlands (Montane to Alpine) |
| | | | **Species Occurrences verified in these Counties:** Carbon, Flathead, Glacier, Granite, Liberty, Teton<br>**State Rank Reason:** Rare in Montana. Documented in the state from several collections. Additional data are needed to more precisely determine the species' status. | | | | | | |
| **Ribes laxiflorum**<br>Trailing Black Currant | | **Grossulariaceae**<br>Currants / Gooseberries | G5 | S2? | | | | | Shrublands (Rocky, montane) |
| | | | **Species Occurrences verified in these Counties:** Lincoln<br>**State Rank Reason:** Rare in Montana, where it is known from a single collection from Lincoln County. The documented population does not appear to be at risk. Additional data are needed. | | | | | | |
| **Ribes triste**<br>Swamp Red Currant | | **Grossulariaceae**<br>Currants / Gooseberries | G5 | S2? | | | | | Forest openings (Mesic, montane/subalpine) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Deer Lodge, Granite, Mineral, Ravalli<br>**State Rank Reason:** Rare in Montana, where it is known from a few collections from the western portion of the state. Additional data are needed. | | | | | | |
| **Rorippa calycina**<br>Persistent-sepal Yellow-cress | | **Brassicaceae**<br>Mustards | G3 | SH | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Custer, Mccone, Rosebud, Treasure, Yellowstone<br>**State Rank Reason:** *Rorippa calycina* is a regional endemic currently known only from four Montana records. The species was last observed in Montana more than 30 years ago. Surveys are needed. | | | | | | |
| **Rotala ramosior**<br>Toothcup | | **Lythraceae**<br>Loosestrife Family | G5 | S1S2 | | | | 4 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Lake, Missoula, Ravalli<br>**State Rank Reason:** Rare in Montana, where it is known from approximately a half-dozen wetland sites in the valley bottoms in the western portion of the state. Potential threats and impacts to the known occurrences, as well as population trends, need to be evaluated. | | | | | | |
| **Rubus arcticus**<br>Nagoonberry | **Rubus acaulis, Rubus arcticus ssp. acaulis** | **Rosaceae**<br>Rose Family | G5 | S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier<br>**State Rank Reason:** *Rubus acaulis* may be rare or common where its habitat is present. However, its habitat (hummocks in *Sphagnum*-moss dominated fens, high elevation wet-meadows, etc.) is very specific and often limited in Montana. | | | | | | |
| **Sagina nivalis**<br>Arctic Pearlwort | | **Caryophyllaceae**<br>Pink Family | G5 | S2S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon, Glacier, Stillwater<br>**State Rank Reason:** Rare in Montana, where it is known from Glacier National Park and the Beartooth Plateau. The remote, high-elevation habitat should greatly minimize the potential for any negative impacts to the viability of the species in the state. Accurate estimates of population levels are lacking. | | | | | | |
| **Salix barrattiana**<br>Barratt's Willow | | **Salicaceae**<br>Willows / Poplar | G5 | S2 | | Sensitive - Known on Forests (CG)<br>Sensitive - Suspected on Forests (HLC) | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon, Glacier, Madison<br>**State Rank Reason:** Rare in Montana. Known from two disjunct sites, one in Glacier National Park and one on the Beartooth Plateau. Populations are small, but the remote, high-elevation habitat should greatly minimize the potential for any negative impacts to the viability of the species in the state. | | | | | | |
| **Salix cascadensis**<br>Cascade Willow | | **Salicaceae**<br>Willows / Poplar | G5 | S2 | | | | | Alpine |
| | | | **Species Occurrences verified in these Counties:** Deer Lodge, Sanders, Teton<br>**State Rank Reason:** Rare in Montana. Species is known in Montana only from a small area of the Anaconda-Pintlers. The remote, high-elevation habitat should greatly minimize the potential for any negative impacts to the viability of the species in the state. Accurate estimates of population levels are lacking. | | | | | | |
| **Salix serissima**<br>Autumn Willow | | **Salicaceae**<br>Willows / Poplar | G5 | S3 | | | | 3 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Cascade, Glacier, Meagher, Pondera, Teton<br>**State Rank Reason:** This willow is primarily found in Montana along the Rocky Mountain Front. Approximately half the occurrences are on lands managed in part for their conservation value. The species is primarily susceptible to impacts associated with heavy grazing and changes in the hydrology of the fens and wet meadows which it occupies. | | | | | | |
| **Sandbergia perplexa**<br>Puzzling Rockcress | **Halimolobos perplexa** | **Brassicaceae**<br>Mustards | G4 | S2 | | Sensitive - Known on Forests (BRT) | | 2 | Shrubland/woodland slopes (Open, Montane) |
| | | | **Species Occurrences verified in these Counties:** Ravalli<br>**State Rank Reason:** Rare in Montana, where it is known only from the very southern end of the Bitterroot Valley on the Bitterroot National Forest. Spotted knapweed is known from at least one of the populations and further spread of invasive weeds at the known occurrences is likely without control measures. Trend data and repeat observations of the known occurrences are lacking. | | | | | | |
| **Satureja douglasii**<br>Yerba Buena | **Clinopodium douglasii** | **Lamiaceae**<br>Mints | G5 | S3 | | | | | Forest (Moist, montane) |
| | | | **Species Occurrences verified in these Counties:** Mineral, Missoula, Ravalli, Sanders<br>**State Rank Reason:** Rare in Montana, where it is known from several sites near the Idaho border. It is primarily a coastal species, disjunct in western Montana. Population levels appear healthy and may be increasing in some areas. | | | | | | |
| **Saussurea densa**<br>Dwarf Saw-wort | **Saussurea nuda var. densa** | **Asteraceae**<br>Aster/Sunflowers | G4Q | S2S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lewis and Clark, Pondera, Teton<br>**State Rank Reason:** Known from a handfull of small occurrences along the Rocky Mountain Front, primarily in the Bob Marshall Wilderness Complex. Limited data are available for most occurrences leading to the uncertainty in the species' rank. | | | | | | |
| **Saussurea weberi**<br>Weber's Saw-wort | | **Asteraceae**<br>Aster/Sunflowers | G3 | S2 | | Sensitive - Known on Forests (BD) | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Deer Lodge, Granite, Park<br>**State Rank Reason:** Known from one large occurrence in the Anaconda-Pintler Range in the alpine zone. The remote, high-elevation habitat should greatly minimize the potential for any negative impacts to the viability of the species in the state. Population estimates from the single, documented occurrence vary widely. Additional population data are needed. | | | | | | |
| **Saxifraga hirculus**<br>Yellow Marsh Saxifrage | | **Saxifragaceae**<br>Saxifrage Family | G5 | S1S2 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** Known from one small population in the Absorka-Beartooth Wilderness. Though little data are available for the species in Montana, the alpine habitat in which it grows is not generally subject to negative impacts from human disturbance. | | | | | | |
| **Senecio amplectens**<br>Clasping Groundsel | **Ligularia amplectens** | **Asteraceae**<br>Aster/Sunflowers | G4 | S1S2 | | | | 1 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon, Glacier<br>**State Rank Reason:** In Montana, only known from the Beartooth (Line Creek) Plateau. Additional data on population size, trends and potential threats are needed to evaluate the species' vulnerability. | | | | | | |
| **Senecio elmeri**<br>Elmer's Ragwort | **Senecio spribillei** | **Asteraceae**<br>Aster/Sunflowers | G4 | S2 | | | | | Alpine |

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| | | | **Species Occurrences verified in these Counties:** Lincoln, Sanders<br>**State Rank Reason:** Rare in the state. Known from only one high-elevation site in the Cabinet Mountains. Its location in a designated wilderness and its high-elevation habitat should prevent most detrimental imapcts to the species' viability in Montana. | | | | | | |
| **Senecio eremophilus**<br>Desert Groundsel | | **Asteraceae**<br>Aster/Sunflowers | G5 | S1S2 | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Blaine, Hill, Lake, Phillips<br>**State Rank Reason:** Known from at least 5 occurrences, including two historical collections. Little data are available for this species in Montana. More information is needed. May be more common than collections indicate. | | | | | | |
| **Senecio hydrophilus**<br>Alkali-marsh Ragwort | | **Asteraceae**<br>Aster/Sunflowers | G5 | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Broadwater, Flathead, Gallatin, Madison, Missoula, Park, Powell<br>**State Rank Reason:** Senecio hydrophilus is present in alkaline habitats within a portion of southwest Montana. Plants are not that common, and occur in low-elevation wetlands that can be victum to dewatering. | | | | | | |
| **Senecio integerrimus var. scribneri**<br>Scribner's Ragwort | | **Asteraceae**<br>Aster/Sunflowers | G5T2T3 | S2S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Carbon, Custer, Fergus, Golden Valley, Hill, Liberty, Musselshell, Park, Phillips, Rosebud, Valley, Wheatland, Yellowstone<br>**State Rank Reason:** See rank details. | | | | | | |
| **Shoshonea pulvinata**<br>Shoshonea | | **Apiaceae**<br>Parsley/Carrot Family | G3 | S2 | | Sensitive - Known on Forests (CG) | SENSITIVE | 3 | Rock Outcrops |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** Known in Montana only from the Pryor Mountains and the eastern slope of the Beartooth Plateau. Occurrences are located mostly on federal lands. | | | | | | |
| **Sidalcea oregana**<br>Oregon Checker-mallow | | **Malvaceae**<br>Mallow Family | G5 | S2S3 | | | | 1 | Grasslands (low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Gallatin, Lake<br>**State Rank Reason:** Known from two widely separate sites in Gallatin and Lake counties. Habitats occupied by the species are susceptible to weed invasion and both locations have a large component of weedy species. However, *S. oregana* appears capable of tolerating at least some competition from these weedy species. The Lake County population occurs near and along Highway 93 and has the potential to be significantly negatively impacted by highway construction. | | | | | | |
| **Silene spaldingii**<br>Spalding's Catchfly | Spalding's Campion | **Caryophyllaceae**<br>Pink Family | G2 | S2 | LT | Threatened on Forests (KOOT, LOLO) | | 1 | Grasslands (Intermountain) |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Lincoln, Sanders<br>**State Rank Reason:** *Silene spaldingii* exists in only a few locations in the northwest corner of the state. Extant occurrences are known in the following areas: Tobacco Plains area, Lost Trail National Wildlife Refuge, the Niarada area and on Wild Horse Island. The majority of occurrences have less than 100 individuals, though 3 sites are each known to contain over 1,000 individuals and the total population size in Montana is likely 20,000+ mature plants based upon 2011 data. One historical occurrence exists from the Columbia Falls area. Several threats affect the long-term viability of the species in the state. Invasive weeds are the most widespread threat and are negatively impacting the bunchgrass habitat occupied by *S. spaldingii*. Housing development and subdivision are directly impacting populations in the Tobacco Plains and has the potential to further isolate known occurrences in the area. Cattle grazing is affecting several populations and two other occurrences have apparently been extirpated recently from the severe impacts associated with llama grazing. Fire exclusion and the successive build-up of litter compared to historical conditions appears to be having negative impacts on survival and reproduction. Populations are also at risk due to the small numbers of individuals and their isolated nature, which reduces the chances of cross-pollination and gene flow between populations.<br><br>Long- and short-term trends are difficult to gauge due to the lack of survey and monitoring data. Estimates of trends and population size are also compounded by *S. spaldingii* plants exhibiting summer dormancy at rates that vary widely from year to year. | | | | | | |
| **Solidago ptarmicoides**<br>Prairie Goldenrod | **Oligoneuron album, Aster ptarmicoides** | **Asteraceae**<br>Aster/Sunflowers | G5 | S2S3 | | | | | Grasslands (Plains) |
| | | | **Species Occurrences verified in these Counties:** Carter, Richland, Wibaux<br>**State Rank Reason:** Rare in Montana, where it has been documented from only a few locations on the eastern plains. | | | | | | |
| **Sphaeromeria argentea**<br>Chicken-sage | **Tanacetum nuttallii, Artemisia macarthurii** | **Asteraceae**<br>Aster/Sunflowers | G3G4 | S3 | | | SENSITIVE | 3 | Sagebrush steppe (low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead<br>**State Rank Reason:** *Sphaeromeria argentea* occurs in east-central Idaho and adjacent Beaverhead County, Montana with disjunct populations in Nevada as well as southwest Wyoming and adjacent Colorado. There are nearly 20 known locations south of Dillon; many populations are sparse but spread over large areas, so population estimates are difficult. All known populations are subject to livestock grazing; however chicken sage is aromatic and most likely unpalatable to cattle. | | | | | | |
| **Stellaria crassifolia**<br>Fleshy Stitchwort | | **Caryophyllaceae**<br>Pink Family | G5 | S2 | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Glacier, Granite<br>**State Rank Reason:** Rare in Montana where it is known from a few sparsely distributed locations that are mostly poorly documented. | | | | | | |
| **Sullivantia hapemanii**<br>Wyoming Sullivantia | | **Saxifragaceae**<br>Saxifrage Family | G3 | S2S3 | | | | 3 | Rock/Talus |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Carbon<br>**State Rank Reason:** Wyoming Sullivantia is regional endemic known in Montana only from a few, clustered locations. It grows in small, fragile aquatic habitats that may be vulnerable to hydrologic changes from water development or diversion, or trampling. | | | | | | |
| **Symphyotrichum molle**<br>Soft Aster | | **Asteraceae**<br>Aster/Sunflowers | G3 | S1S3 | | | | | NA |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Carbon<br>**State Rank Reason:** Known in Montana from 1 collection from the Bighorn Mtns. Though its exact status is uncertain, its rarity warrants its inclusion as a Species of Concern. | | | | | | |
| **Synthyris canbyi**<br>Mission Mountain kittentails | | **Plantaginaceae**<br>Plantain Family | G2G3 | S2S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Flathead, Granite, Lake, Missoula, Ravalli<br>**State Rank Reason:** State endemic with 10 occurrences restricted to high elevation, open, rocky slopes in the Mission and Swan Ranges. As such, habitat is not generally prone to human disturbance and most occurrences are in designated wilderness areas. Additional occurrences likely exist across the known range of the species. | | | | | | |
| **Thalictrum alpinum**<br>Alpine Meadowrue | | **Ranunculaceae**<br>Buttercup Family | G5 | S2 | | Sensitive - Known on Forests (BD)<br>Sensitive - Suspected on Forests (CG, HLC) | | 2 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Deer Lodge, Granite<br>**State Rank Reason:** Rare in Montana, where it is known from approximately two dozen sites mostly on public land. Its habitat is vulnerable to hydrological alteration. Grazing can be beneficial, except where it leads to stream downcutting and loss of riparian habitat. | | | | | | |
| **Thelypodium paniculatum**<br>Northwestern Thelypody | **Thelypodium sagittatum var. crassicarpum** | **Brassicaceae**<br>Mustards | G2 | SH | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Gallatin, Madison<br>**State Rank Reason:** Known only from an 1899 collection in Beaverhead County, although Dorn (1984) also reports it for Madison County. | | | | | | |

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| **Thelypodium sagittatum**<br>Slender Thelypody | | **Brassicaceae**<br>Mustards | G4 | S2 | | | | 3 | Alkaline meadows (Valleys and Montane) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Gallatin<br>**State Rank Reason:** Known from numerous occurrences in extreme southwestern Montana. | | | | | | |
| **Tonestus aberrans**<br>Idaho Goldenweed | **Haplopappus aberrans, Triniteurybia aberrans, Eurybia aberrans** | **Asteraceae**<br>Aster/Sunflowers | G3 | S1S2 | | Sensitive - Known on Forests (BRT) | | 1 | Rock/Talus |
| | | | **Species Occurrences verified in these Counties:** Ravalli<br>**State Rank Reason:** Known from two moderate-sized occurrences and two smaller occurrences on the Bitterroot National Forest and adjacent private land. One population occurs adjacent to a road, where construction may have impacted the population. No negative impacts to the populations are currently known to be occurring. However, populations are susceptible to potential impacts associated with roads and rock climbing. | | | | | | |
| **Townsendia condensata**<br>Cushion Townsend-daisy | | **Asteraceae**<br>Aster/Sunflowers | G4 | S1S3 | | | | 2 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Flathead, Glacier, Park<br>**State Rank Reason:** Cushion townsendia is known in Montana from one presumed extant occurrence in Glacier National Park and three other historical collections from GNP and the Beartooth Mountains. Risks are likely minimal given the remoteness of its alpine habitat. | | | | | | |
| **Townsendia florifer**<br>Showy Townsend-daisy | **Townsendia florifera** | **Asteraceae**<br>Aster/Sunflowers | G5 | S2 | | | | 3 | Grasslands and Sagebrush |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Park, Sweet Grass<br>**State Rank Reason:** Known in Montana from only a few, small occurrences in the southwestern corner of the state. | | | | | | |
| **Trifolium cyathiferum**<br>Cup Clover | | **Fabaceae**<br>Pea Family | G4 | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Missoula, Ravalli<br>**State Rank Reason:** Trifolium cyathiferum occurs in two counties with limited information on population size. One occurrence was re-visited in 1998 and found to be absent due to habitat succession. | | | | | | |
| **Trifolium eriocephalum**<br>Woolly-head Clover | | **Fabaceae**<br>Pea Family | G5 | S2 | | Sensitive - Known on Forests (BRT)<br>Sensitive - Suspected on Forests (BD, LOLO) | | 2 | Open areas (foothills and montane) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Ravalli<br>**State Rank Reason:** Known from eight large occurrences on the Bitterroot National Forest. Invasive weeds, particularly spotted knapweed, are a problem in the habitat occupied by the species. Timber harvest and related road-building activities may also negatively impact populations. However, *Trifolium eriocephalum* appears capable of tolerating some level of disturbance. | | | | | | |
| **Trifolium gymnocarpon**<br>Hollyleaf Clover | | **Fabaceae**<br>Pea Family | G5 | S2 | | Sensitive - Known on Forests (BRT, LOLO)<br>Sensitive - Suspected on Forests (BD) | | 2 | Open areas (foothills and montane) |
| | | | **Species Occurrences verified in these Counties:** Granite, Ravalli<br>**State Rank Reason:** Known from many sites within the West Fork Bitterroot River drainage, which would encompass one large metapopulation. Also known in Montana from one disjunct occurrence in the Rock Creek drainage on the Lolo National Forest. Invasive weeds, particularly spotted knapweed, are a problem in some of the habitat occupied by the species. However, *Trifolium gymmocarpon*, as with other clover species, appears capable of tolerating or even benefitting from some disturbance. | | | | | | |
| **Trifolium microcephalum**<br>Woolly Clover | | **Fabaceae**<br>Pea Family | G5 | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Missoula, Ravalli | | | | | | |
| **Triodanis leptocarpa**<br>Slim-pod Venus'-looking-glass | **Specularia leptocarpa** | **Campanulaceae**<br>Bellflower Family | G5? | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Carter, Cascade, Chouteau, Custer, Park, Petroleum, Phillips, Powder River, Rosebud, Stillwater, Sweet Grass, Valley<br>**State Rank Reason:** Triodanis leptocarpa is common in the southern Great Plains and extends into eastern and central Montana. It occurs in grasslands, grass-dominated rocky slopes, and sagebrush-dominated grasslands. It has been found in grazed and ungrazed lands and appears to tolerate some disturbance. Approximately 14 locations were documented prior to 1958 and occur in central Montana. Approximately 14 locations were documented since 1974 and mostly occur in eastern Montana. Re-visits to known locations and current population data is greatly needed. | | | | | | |
| **Utricularia intermedia**<br>Flatleaf Bladderwort | | **Lentibulariaceae**<br>Bladderworts | G5 | S2 | | Sensitive - Known on Forests (KOOT) | | 3 | Fens (Aquatic) |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lake, Lincoln, Madison<br>**State Rank Reason:** Only known from a few occurrences in the western half of the state. | | | | | | |
| **Utricularia ochroleuca**<br>Northern Bladderwort | | **Lentibulariaceae**<br>Bladderworts | G4G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Deer Lodge, Glacier | | | | | | |
| **Vaccinium myrtilloides**<br>Velvetleaf Huckleberry | | **Ericaceae**<br>Heath Family | G5 | S2 | | | | 2 | Forests |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier<br>**State Rank Reason:** Only known in Montana from several sites in the vicinity of West Glacier. Some of the known population and associated habitat has been negatively impacted by development (visitor and transportation facilities) within Glacier National Park. | | | | | | |
| **Viburnum lentago**<br>Nannyberry | | **Caprifoliaceae**<br>Honeysuckle Family | G5 | S2S3 | | | | 2 | Riparian forest |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Richland, Roosevelt<br>**State Rank Reason:** Three known occurrrences in eastern Montana. | | | | | | |
| **Viguiera multiflora**<br>Many-flowered Viguiera | **Heliomeris multiflora** | **Asteraceae**<br>Aster/Sunflowers | G4G5 | S2S3 | | | | 3 | Aspen woodlands |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Cascade, Gallatin, Madison<br>**State Rank Reason:** Known from one extant occurrence in Beaverhead County and four historical collections from Beaverhead, Gallatin and Madison Counties. | | | | | | |
| **Viola selkirkii**<br>Great-spurred Violet | | **Violaceae**<br>Violets | G5 | S2 | | Sensitive - Known on Forests (KOOT) | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Lincoln<br>**State Rank Reason:** Only known in Montana from a few locations in the northwest corner of the state. Additional survey data are needed to document population sizes and extent. | | | | | | |
| **Waldsteinia idahoensis**<br>Idaho Barren Strawberry | | **Rosaceae**<br>Rose Family | G3 | S2S3 | | Sensitive - Known on Forests (LOLO) | | | Forests (Ponderosa Pine) |
| | | | **Species Occurrences verified in these Counties:** Mineral, Missoula<br>**State Rank Reason:** Only one known site in Montana on National Forest land. Population is in an area susceptible to impacts from timber harvesting and road maintenance, though population appears to be stable or perhaps increasing in size. | | | | | | |

FLOWERING PLANTS - MONOCOTS (LILIOPSIDA) — 80 SPECIES

| SCIENTIFIC NAME / COMMON NAME / TAXA SORT | OTHER NAMES | FAMILY (SCIENTIFIC) / FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | MNPS THREAT CATEGORY | HABITAT |
|---|---|---|---|---|---|---|---|---|---|
| **Acorus americanus** Sweetflag | Acorus calamus [misapplied name] | Acoraceae Sweetflag/Calamus Family | G5 | S1S2 | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake<br>**State Rank Reason:** This species occurs at the edge of its range in Montana, where it has been collected from two localities in the vicinity of Flathead Lake. Current status of these populations is largely unknown. The species has likely been negatively impacted by hydrologic alterations and devolopment in the area. | | | | | | |
| **Allium acuminatum** Tapertip Onion | | Liliaceae Lillies | G5 | S2S3 | | Sensitive - Known on Forests (BD, BRT, LOLO) | | | Dry Forest-Grassland |
| | | | **Species Occurrences verified in these Counties:** Lincoln, Madison, Ravalli, Sanders<br>**State Rank Reason:** Rare in Montana, where it is known from several widely scattered sites in the western half of the state. Trend data are lacking. Threats to populations do not appear to be significant at this time, though invasive weeds may eventually pose problems at some sites. | | | | | | |
| **Allium columbianum** Columbia Onion | | Liliaceae Lillies | G3 | S1 | | | | | Open, mesic sites |
| | | | **Species Occurrences verified in these Counties:** Lincoln, Ravalli, Sanders<br>**State Rank Reason:** Known from one occurrence in Camas Prairie. Part of this occurrence has been replaced by a gravelpit. Nearly all suitable habitat in the area has been converted to agriculture. Invasive weeds may also negatively impact the remaining habitat and threaten the population. Survey and monitoring data are needed. | | | | | | |
| **Allium geyeri var. geyeri** Geyer's Onion | | Liliaceae Lillies | G4G5T4 | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Broadwater, Carbon, Flathead, Madison<br>**State Rank Reason:** S3 SOC: This variety of Allium geyeri appears to be found in limited numbers with a limited distribution in Montana. | | | | | | |
| **Allium parvum** Small Onion | | Liliaceae Lillies | G5 | S3 | | Sensitive - Known on Forests (BRT)<br>Sensitive - Suspected on Forests (BD) | | | Dry Forest-Grassland |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Ravalli<br>**State Rank Reason:** Known from southwest Montana, primarily on the Bitterroot National Forest. Many of the the documented occurrences have large numbers of individuals and cover extensive areas. However, many of the sites are also infested with spotted knapweed and/or cheatgrass and continued increases in the density and spread of both invasive weeds are likely, further degrading the habitat occupied by Allium parvum. | | | | | | |
| **Allium simillimum** Dwarf Onion | | Liliaceae Lillies | G4 | S2? | | | | | Mesic Grasslands-Meadows |
| | | | **Species Occurrences verified in these Counties:** Gallatin, Lincoln, Ravalli<br>**State Rank Reason:** Rare in Montana, where it is known from only a few locations in the southwest portion of the state near the Idaho border. Available survey data are limited for the species in Montana. | | | | | | |
| **Amerorchis rotundifolia** Round-leaved Orchis | Orchis rotundifolia | Orchidaceae Orchids | G5 | S3 | | Sensitive - Known on Forests (HLC, KOOT)<br>Sensitive - Suspected on Forests (LOLO)<br>Species of Conservation Concern on Forests (FLAT) | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lake, Lewis and Clark, Lincoln, Pondera, Powell, Teton<br>**State Rank Reason:** In Montana, this species is restricted to the Rocky Mountain Front, Bob Marshall Wilderness Complex, Swan Valley and the northwest corner of the state. Several dozen occurrences are known in Montana with many being large, healthy populations. However, information on threats faced by the species, as well as trend data are lacking. | | | | | | |
| **Bolboschoenus fluviatilis** River Bulrush | Scirpus fluviatilis, Schoenoplectus fluviatilis | Cyperaceae Sedges | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Sheridan, Valley<br>**State Rank Reason:** S1 SOC: Accurate identifications of Bolboshchoenus fluviatilis are found in very few populations within three counties of Montana. | | | | | | |
| **Calamagrostis tweedyi** Cascade reedgrass | | Poaceae Grasses | G3 | S3 | | | | | Montane Forest |
| | | | **Species Occurrences verified in these Counties:** Mineral, Missoula, Ravalli, Sanders<br>**State Rank Reason:** A species of limited distribution and currently considered to be globally rare. Restricted in Montana to the extreme western portion of the state. | | | | | | |
| **Calochortus bruneaunis** Bruneau Mariposa Lily | | Liliaceae Lillies | G5 | S1S3 | | | | | Grasslands (Intermountain) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead<br>**State Rank Reason:** Known in Montana from one 1941 collection by M. Ownbey approximately 1.5 miles southeast of Lima and a 2009 observation from the Centennial Mtns, though specific observation and locality data are unknown. | | | | | | |
| **Carex amplifolia** Big-leaf Sedge | | Cyperaceae Sedges | G4 | S3 | | Sensitive - Known on Forests (KOOT) | | | Wetland |
| | | | **Species Occurrences verified in these Counties:** Flathead, Sanders<br>**State Rank Reason:** *Carex amplifolia* occurs in temperate western North America where it is usually uncommon or rare from coastal lowlands to middle elevations in the mountains (FNA 2002). The previous SH rank in Montana was based on a 1978 herbarium specimen. In recent years it has been collected from several wetlands in Sanders and Flathead Counties. Additional wetland surveys are needed to accurately document its distribution and population size in Montana. | | | | | | |
| **Carex chordorrhiza** Creeping Sedge | | Cyperaceae Sedges | G5 | S3 | | Sensitive - Known on Forests (KOOT)<br>Sensitive - Suspected on Forests (LOLO)<br>Species of Conservation Concern on Forests (FLAT) | | 3 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lincoln, Powell<br>**State Rank Reason:** Rare in Montana, where it is known from fens and wet meadows in the northwest corner of the state. Generally does not appear to be threatened by any particular activities, though populations are susceptible to hydrologic changes. | | | | | | |

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| **Carex comosa**<br>Bristly Sedge | | **Cyperaceae**<br>Sedges | G5 | S1S2 | | | | 1 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Flathead<br>**State Rank Reason:** Only one known location in Montana on the shore of Flathead Lake. Occurrence is threatened by erosion caused by wave action and artificially high lake levels. | | | | | | |
| **Carex crawei**<br>Crawe's Sedge | | **Cyperaceae**<br>Sedges | G5 | S2S3 | | | | 2 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Cascade, Pondera, Powell, Prairie, Teton<br>**State Rank Reason:** Rare in Montana, where it is known from several areas. A few sites contain moderate to large populations. Trend data are lacking for the species. Negative impacts to populations from hydrologic changes are a potential threat. | | | | | | |
| **Carex glacialis**<br>Alpine Sedge | | **Cyperaceae**<br>Sedges | G5 | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lewis and Clark, Pondera<br>**State Rank Reason:** Carex glacialis occurs throughout Canada, and has recently been discovered in the United States where it occurs at 4 locations in Montana. It grows in limestone fellfield habitats within the alpine. Populations are few, but appear stable. Surveys are needed to explore potential habitat, map its distribution, and determine population sizes. | | | | | | |
| **Carex gravida**<br>Heavy Sedge | | **Cyperaceae**<br>Sedges | G5 | S3 | | Sensitive - Known on Forests (CG) | | 2 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Carter, Fallon, Mccone, Powder River, Richland, Rosebud<br>**State Rank Reason:** *Carex gravida* has been found at a few widely scattered locations in eastern Montana, and is not generally abundant where it occurs. However, it is likely that the species is more abundant than the current data shows. Habitats include moist, green ash woodlands, which are attractive to livestock, and it may be particularly vulnerable to moderate grazing because of its cespitose growth form. These habitats are also quite vulnerable to invasion by non-native plants. | | | | | | |
| **Carex idahoa**<br>Idaho Sedge | **Carex parryana ssp. idahoa** | **Cyperaceae**<br>Sedges | G3 | S3 | | Sensitive - Known on Forests (BD) | SENSITIVE | 2 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Broadwater, Deer Lodge, Gallatin, Madison, Powell, Silver Bow<br>**State Rank Reason:** Idaho sedge is a regional endemic known from several dozen sites in Montana which cluster into approx 15-20 populations, most on public lands. The estimated number of stems is in the tens of thousands, but total occupied habitat has been estimated at less than 200 acres. The species is palatable, and populations may be affected by heavy grazing. Other risks are competition from exotic species, hydrologic alterations, agricultural development and road construction/maintenance. Updated population data and related site information are needed. | | | | | | |
| **Carex incurviformis**<br>Coastal Sand Sedge | **Carex maritima var. incurviformis** | **Cyperaceae**<br>Sedges | G4G5 | S2? | | | | 3 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Deer Lodge, Glacier, Madison, Teton<br>**State Rank Reason:** Five known occurrences in Montana, three are in Wilderness areas or Glacier National Park. However, all populations are apparenly small to moderate in size based on limited survey data for the species. All occurrences are in alpine habitat that is not generally subject to human impacts. | | | | | | |
| **Carex lacustris**<br>Lake-bank Sedge | | **Cyperaceae**<br>Sedges | G5 | S1S2 | | Species of Conservation Concern on Forests (FLAT) | | 2 | Fens and marshes |
| | | | **Species Occurrences verified in these Counties:** Lake, Missoula<br>**State Rank Reason:** A rare species in Montana, known only from a few occurrences from Lake County. | | | | | | |
| **Carex multicostata**<br>Many-ribbed Sedge | | **Cyperaceae**<br>Sedges | G5 | S2S3 | | | | | Grasslands (Montane) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Gallatin, Granite, Missoula, Park, Ravalli<br>**State Rank Reason:** A rare species in Montana, scattered in the mountains of the southwest and south-central portions of the state. Very little data are available for the species in Montana. However, the potential for negative impacts to the popoulations appears to be low. | | | | | | |
| **Carex occidentalis**<br>Western Sedge | | **Cyperaceae**<br>Sedges | G4 | SH | | | | | Dry, montane to alpine |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Gallatin, Silver Bow<br>**State Rank Reason:** Known in Montana from an 1887 collection by Tweedy near "Boulder Creek" and a 1930 collection on Willow Creek in Beaverhead County. | | | | | | |
| **Carex petricosa**<br>Rock Sedge | | **Cyperaceae**<br>Sedges | G4 | S1S2 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Glacier, Powell, Silver Bow<br>**State Rank Reason:** Rare in Montana, where it is currently known from one site in Glacier National Park. Very little data are available for the species in Montana. However, the potential for negative impacts to the popoulations appears to be low. | | | | | | |
| **Carex plectocarpa**<br>Goose-grass Sedge | **Carex lenticularis var. dolia** | **Cyperaceae**<br>Sedges | G3 | S3 | | | | 2 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Park<br>**State Rank Reason:** Known in Montana primarily from Glacier National Park and from one population in the Absarokas. Some plants in the Logan Pass area are subject to trampling by hikers. Otherwise, the potential for negative impacts to the species appears to be low. | | | | | | |
| **Carex prairea**<br>Prairie Sedge | | **Cyperaceae**<br>Sedges | G5 | S3 | | Sensitive - Known on Forests (KOOT) | | 4 | Fens |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lewis and Clark, Lincoln<br>**State Rank Reason:** Rare in Montana, where it is currently known from a small area in the northwest corner of the state. The potential for negative impacts to the popoulations appears to be low. | | | | | | |
| **Carex rostrata**<br>Glaucus Beaked Sedge | | **Cyperaceae**<br>Sedges | G5 | S2S3 | | Sensitive - Known on Forests (KOOT, LOLO) | | 3 | Fens |
| | | | **Species Occurrences verified in these Counties:** Flathead, Gallatin, Lincoln, Missoula, Stillwater<br>**State Rank Reason:** This is a rare species in Montana, not to be confused with the more common *Carex utriculata*, which had been mistakenly treated under the name *Carex rostrata* in many past Floras. | | | | | | |
| **Carex scoparia**<br>Pointed Broom Sedge | | **Cyperaceae**<br>Sedges | G5 | S1S2 | | | | | Wetland/Riparian (Valleys) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Missoula, Phillips, Ravalli<br>**State Rank Reason:** Rare in Montana, where it is currently known from only a few sites in the Clark Fork and Bitterroot River drainages. | | | | | | |
| **Carex stenoptila**<br>Small-winged Sedge | | **Cyperaceae**<br>Sedges | G3 | S2S3 | | | | | Grasslands (Montane) |
| | | | **Species Occurrences verified in these Counties:** Carbon, Gallatin, Madison, Mineral, Park, Ravalli, Sheridan, Stillwater, Sweet Grass, Teton<br>**State Rank Reason:** A globally rare species, which is known from several widely scattered locations in Montana. Very little data are available for the species in Montana, as the sites are known only from specimen collections with sparse information. | | | | | | |
| **Carex stevenii**<br>Steven's Scandinavian Sedge | **Carex norvegica ssp. stevenii** | **Cyperaceae**<br>Sedges | G5T4? | S2? | | | | | Wetland/Riparian (Subalpine) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Deer Lodge, Stillwater<br>**State Rank Reason:** Rare in Montana, where it is currently known from a few scattered sites in mountainous areas across the southern half of the state. Additional data on population levels are needed. Survey of suitable habitats will likely document additional occurrences. | | | | | | |
| **Carex sychnocephala**<br>Many-headed Sedge | | **Cyperaceae**<br>Sedges | G5 | S1S2 | | | | 1 | Wetland/Riparian |

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|---|---|---|---|---|---|---|---|---|---|
| | | | **Species Occurrences verified in these Counties:** Cascade, Flathead, Garfield, Glacier, Lake, Lincoln, Sheridan<br>**State Rank Reason:** Currently known in the state from three occurrences that are believed to be extant. Also, known from one 1891 collection near Great Falls and two locations in northwest Montana now believed to be extirpated or severly impacted as a result of wetland draining and construction of a dock. The remaining populations are on the Blackfeet Indian Reservation and a Nature Conservancy Preserve. Due to the habitats in which the species grows, it is vulnerable to development and hydrologic alterations. | | | | | | |
| **Carex tenuiflora**<br>Thin-flowered Sedge | | **Cyperaceae**<br>Sedges | G5 | S2 | | | | 3 | Fens |
| | | | **Species Occurrences verified in these Counties:** Flathead<br>**State Rank Reason:** Rare in Montana, where it is currently known from only one site in Glacier National Park. The potential for negative impacts to the occurrence are minimal. | | | | | | |
| **Carex vaginata**<br>Sheathed Sedge | | **Cyperaceae**<br>Sedges | G5 | S2? | | Sensitive - Known on Forests (KOOT) | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Lincoln<br>**State Rank Reason:** Rare in Montana, where it is currently known from one area in the northwest corner of the state, which is at the southern edge of the species' range. Additional data on population levels and trends are needed. | | | | | | |
| **Cyperus acuminatus**<br>Short-pointed Flatsedge | | **Cyperaceae**<br>Sedges | G5 | S1 | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Missoula, Sanders<br>**State Rank Reason:** Rare in Montana, where it is currently known from only 2 collections in the western portion of the state. | | | | | | |
| **Cyperus bipartitus**<br>Shining Flatsedge | **Cyperus rivularis** | **Cyperaceae**<br>Sedges | G5 | S1 | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Missoula, Ravalli<br>**State Rank Reason:** Rare in Montana, where it is currently known from only the Bitterroot Valley. | | | | | | |
| **Cyperus erythrorhizos**<br>Red-root Flatsedge | | **Cyperaceae**<br>Sedges | G5 | S2? | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Prairie<br>**State Rank Reason:** Known in Montana from one Prairie County collection in 2008. Previous reports were based upon mis-identified specimens. Survey work in appropriate habitat would likely discover additional locations in Montana. Additional site and population information is needed to more precisely rank the species. | | | | | | |
| **Cyperus schweinitzii**<br>Schweinitz's Flatsedge | Schweinitz Flatsedge | **Cyperaceae**<br>Sedges | G5 | S2 | | | | 4 | Sandy sites |
| | | | **Species Occurrences verified in these Counties:** Carter, Cascade, Custer, Powder River, Roosevelt, Sheridan<br>**State Rank Reason:** Rare in Montana, where it is currently known from a few widely scattered sandy sites. | | | | | | |
| **Cypripedium fasciculatum**<br>Clustered Lady's-slipper | | **Orchidaceae**<br>Orchids | G4 | S3 | | Sensitive - Known on Forests (KOOT, LOLO)<br>Species of Conservation Concern on Forests (FLAT) | | 1 | Forests (Montane) |
| | | | **Species Occurrences verified in these Counties:** Lake, Mineral, Missoula, Sanders<br>**State Rank Reason:** Clustered lady's-slipper is known for Montana from the northwest portion of the state, where it is documented from 10 moderate to large populations, 3 historical occurrences and many additional small occurrences. Most populations occur on National Forest lands. Potential negative impacts to the species have mainly been related to timber harvesting. | | | | | | |
| **Cypripedium passerinum**<br>Sparrow's-egg Lady's-slipper | | **Orchidaceae**<br>Orchids | G5 | S2S3 | | Sensitive - Known on Forests (HLC, KOOT)<br>Sensitive - Suspected on Forests (LOLO)<br>Species of Conservation Concern on Forests (FLAT) | | 2 | Forests (Mesic bottoms) |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lake, Lewis and Clark, Lincoln, Pondera, Powell, Teton<br>**State Rank Reason:** Sparrow's-egg lady's-slipper is known from over a dozen moderate to large-sized populations, a few dozen small occurrences and one historical location. Several of the occurrences are either in designated wilderness areas or in Glacier National Park. The main threat to populations appears to be from potential hydrologic changes. | | | | | | |
| **Dichanthelium acuminatum**<br>Panic Grass | **Panicum acuminatum, Dichanthelium lanuginosum, Panicum lanuginosum, Panicum occidentale** | **Poaceae**<br>Grasses | G5 | S2S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Carbon, Deer Lodge, Flathead, Lake, Sanders<br>**State Rank Reason:** *Dichanthelium acuminatum* is common and ubiquitous in most of the U.S. and Canada (Freckmann and Lelong in FNA 2007). The species is polymorphic and 10 major subspecies have been described, but many overlap in characteristics and widespread introgression from other *Dichanthium* species contributes to taxonomic difficulties (Freckmann and Lelong in FNA 2007). However, only subspecies sericeum has been documented in Montana. *Dichanthelium acuminatum* susp. *sericeum* colonizes wet soils around the edges of hot springs. It occurs widely scattered through south-central, southwest, and northwest Montana, where it can be locally common. Observation data is aging, and some re-visits to known populations did not re-locate the grass. Given its narrow habitat requirements, potential threats from ground disturbance and recreation, and lack of current data a Species of Concern rank is warranted. Current data on locations, population sizes, threats, and how it responds to natural and manmade disturbances are greatly needed. | | | | | | |
| **Dichanthelium oligosanthes var. scribnerianum**<br>Scribner's Panic Grass | **Panicum oligosanthes var. scribnerianum, Panicum scribnerianum** | **Poaceae**<br>Grasses | G5T5 | S1S2 | | | | | Mesic, sandy woodlands (low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Carter, Lake, Powder River, Sanders<br>**State Rank Reason:** Scribner's panic grass is a plant of dry woodlands, known from widely separated sites in southeastern and northwestern Montana. Only one large-sized population is known in the state, two others are very small, and the fourth occurrence is known only from a historical collection. Occurrences in eastern Montana may be negatively impacted by cattle grazing. The largest occurrence in the state lies adjacent to Highway 93 and negative impacts associated with expansion of the highway is likely. Invasive weeds and forest encroachment are also problems at this site. | | | | | | |
| **Eleocharis rostellata**<br>Beaked Spikerush | | **Cyperaceae**<br>Sedges | G5 | S3 | | Sensitive - Known on Forests (BD, CG, HLC)<br>Species of Conservation Concern on Forests (FLAT) | | 3 | Wetlands (Alkaline) |
| | | | **Species Occurrences verified in these Counties:** Carbon, Flathead, Gallatin, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Park, Sanders, Sweet Grass, Teton<br>**State Rank Reason:** Known from over a dozen extant sites and a few historical locations. Private and state lands host many occurrences that are vital to the viability of the species in the state. The species is vulnerable to hydrologic alteration and development. | | | | | | |
| **Elodea bifoliata**<br>Long-sheath Waterweed | **Elodea longivaginata** | **Hydrocharitaceae**<br>Waterweeds | G4G5 | S2? | | | | 3 | Wetland/Riparian (Shallow water) |

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| | | | **Species Occurrences verified in these Counties:** Beaverhead, Blaine, Fergus, Glacier, Hill, Lake, Liberty, Phillips, Richland, Stillwater, Teton<br>**State Rank Reason:** Rare in Montana, where it is currently known from a few widely scattered locations across the state. Additional population and trend data are needed for the species within Montana. | | | | | | |
| **Elymus flavescens**<br>Sand Wildrye | Leymus flavescens | **Poaceae**<br>Grasses | G4 | S1S2 | | | SENSITIVE | 2 | Sandy sites |
| | | | **Species Occurrences verified in these Counties:** Beaverhead<br>**State Rank Reason:** Sand wildrye occurs at the edge of its range in Montana, where it is known from one small population in the Centennial Valley sandhills. It requires early successional sandy habitats, which are localized in sand deposition areas of the dunes. This habitat is at risk from dune succession and stabilization that can result from suppression of natural disturbance regimes such as fire and grazing. | | | | | | |
| **Elymus innovatus**<br>Northern Wildrye | Leymus innovatus | **Poaceae**<br>Grasses | G5 | S2 | | Sensitive - Known on Forests (HLC) | | 3 | Wetland/Riparian (mesic openings /streambanks, low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Cascade, Glacier, Pondera, Teton<br>**State Rank Reason:** Rare in Montana, where it is currently known from a few scattered sites east of the Divide. Additional population data are needed for the species witin Montana. Population trends are unknown and two occurrences are only known from historical collections. | | | | | | |
| **Epipactis gigantea**<br>Giant Helleborine | | **Orchidaceae**<br>Orchids | G4 | S2S3 | | Sensitive - Known on Forests (BD, HLC, LOLO)<br>Sensitive - Suspected on Forests (BRT, CG, KOOT)<br>Species of Conservation Concern on Forests (FLAT) | | 2 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Carbon, Flathead, Granite, Lake, Lewis and Clark, Lincoln, Madison, Powell, Sanders, Teton<br>**State Rank Reason:** Known from several dozen occurrences across western and southern Montana where it is associated with seeps and springs, fens, and thermal waters. Several sites are likely extirpated, while others are known only from historical collections. National Forest, state and private lands all host significant populations. The species is primarily vulnerable to hydrologic changes and development. | | | | | | |
| **Eriophorum callitrix**<br>Sheathed Cotton-grass | | **Cyperaceae**<br>Sedges | G5 | S2S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** Rare in Montana, where it is has been documented only from the Beartooth Plateau. Additional population data for the species in Montana are needed. However, based on the locality and habitat of the known sites, the species does not appear to be at a high degree of risk from human impacts. Additional occurrences likely exist on the Beartooth Plateau. | | | | | | |
| **Eriophorum gracile**<br>Slender Cottongrass | | **Cyperaceae**<br>Sedges | G5 | S3 | | Sensitive - Known on Forests (CG, KOOT)<br>Species of Conservation Concern on Forests (FLAT) | | 2 | Fens |
| | | | **Species Occurrences verified in these Counties:** Flathead, Gallatin, Lake, Lincoln, Madison, Missoula, Park, Powell<br>**State Rank Reason:** Known from a very few large populations, several smaller populations and a half dozen historical or poorly documented locations. Populations occur on a mix of federal, state and private ownerships in northwest Montana at low to moderate elevations. Populations are vulnerable to any activities that may alter the hydrology of occupied sites. | | | | | | |
| **Festuca viviparoidea**<br>Northern Fescue | Festuca vivipara, Festuca ovina var. vivipara | **Poaceae**<br>Grasses | G4G5 | S2? | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier<br>**State Rank Reason:** Rare in Montana, where it is only know from a few sites in Glacier National park. Population numbers are apparently very low. However, the species generally occurs in areas and habitats that either are not susceptible or not experiencing negative impacts. | | | | | | |
| **Goodyera repens**<br>Northern Rattlesnake-plantain | | **Orchidaceae**<br>Orchids | G5 | S3 | | Sensitive - Known on Forests (HLC)<br>Sensitive - Suspected on Forests (CG) | | 2 | Mesic Forest |
| | | | **Species Occurrences verified in these Counties:** Fergus, Flathead, Judith Basin, Meagher, Wheatland<br>**State Rank Reason:** A widespread species that is found in Montana in the Little Belt and Big Snowy Mountains and at one site in Glacier National Park. The species occupies moist, montane forests with a mossy understory. Occurrences are vulnerable to disturbances that open or reduce the canopy such as timber harvesting and fire. Monitoring of the species in the Little Belt Mountains have documented negative impacts associated with both disturbances. However, *Goodyera repens* is known from approximately 20 moderate to large-sized populations and many additional, smaller occurrences. Recent trends are unknown. | | | | | | |
| **Heteranthera dubia**<br>Water Star-grass | | **Pontederiaceae**<br>Water-hyacinth Family | G5 | S1S2 | | | | 2 | Aquatic |
| | | | **Species Occurrences verified in these Counties:** Flathead, Sanders<br>**State Rank Reason:** Three occurrences known in Montana, two are moderate-sized populations and the third is of undocumented size. One population is adjacent to a campground and related human activity at this site may have extirpated the population. All sites are vulnerable to changes in hydrology, water quality and recreational impacts. | | | | | | |
| **Juncus acuminatus**<br>Tapered Rush | | **Juncaceae**<br>Rushes | G5 | S1 | | | | 2 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Lincoln, Teton<br>**State Rank Reason:** Rare in Montana. Only known in the state from one wetland site in Teton County. | | | | | | |
| **Juncus covillei**<br>Coville's Rush | | **Juncaceae**<br>Rushes | G5 | S2S3 | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Flathead, Mineral, Missoula, Ravalli, Sweet Grass<br>**State Rank Reason:** Rare and peripheral in Montana. Currently known from approximately a half-dozen widely scattered wetland/riparian sites in the mountainous portion of the state. | | | | | | |
| **Juncus triglumis var. albescens**<br>Three-flowered Rush | Juncus albescens | **Juncaceae**<br>Rushes | G5 | S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon, Flathead, Glacier, Madison, Park, Stillwater<br>**State Rank Reason:** Rare in Montana, where it is known from a few, moist, alpine sites in Glacier National Park and the Absaroka-Beartooth Mountains. The potential for negative impacts from human-caused activities appears to be minimal. | | | | | | |
| **Kobresia sibirica**<br>Large-fruited Kobresia | Kobresia macrocarpa | **Cyperaceae**<br>Sedges | G5 | S2 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** Rare in Montana. Only known in the state from a small area of the Beartooth Plateau. | | | | | | |
| **Kobresia simpliciuscula**<br>Simple Kobresia | | **Cyperaceae**<br>Sedges | G5 | S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Glacier, Granite, Park, Teton<br>**State Rank Reason:** Rare in Montana, where it is known from over a dozen sites from montane wetlands to mesic, alpine tundra. The specieshas a wide distribution and is scattered across the mountainous portion of the state. | | | | | | |

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| **Lilaea scilloides**<br>Flowering Quillwort | Triglochin scilloides | **Juncaginaceae**<br>Arrow-grass family | G5? | S1S2 | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Lake, Phillips<br>**State Rank Reason:** Known in Montana from a couple recent collections and previously from a 1933 collection by C. L. Hitchcock about 2 miles southeast of Charlo and a 1965 collection about 1.5 miles southwest of Ninepipe Reservoir. Population sizes and trends for the species are unknown. However, addiditonal populations are likely to exist as many suitable, though un-surveyed ponds and wetlands exist across the state. | | | | | | |
| **Lilium columbianum**<br>Columbia Lily | | **Liliaceae**<br>Lillies | G5 | S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lincoln<br>**State Rank Reason:** Lilium columbianum is currently only known from Lincoln County, where six locations have been documented in the 1970's and 1980's. This species is vulnerable to extirpation in Montana because its attractiveness, potential to be over-collected, and limited range. Native lilies have rarely survived in gardens. Current information on known locations is greatly needed. | | | | | | |
| **Lilium philadelphicum**<br>Wood Lily | | **Liliaceae**<br>Lillies | G5 | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Carbon, Carter, Fergus, Lewis and Clark, Lincoln, Pondera, Powder River, Stillwater, Sweet Grass, Teton<br>**State Rank Reason:** Lilium philadelphicum has a patchy, but wide distribution in Montana, and is often found in specialized habitats. Observations in eastern Montana have not been made since the 1930's and 1940's. This species is vulnerable to extirpation in Montana because of its attractiveness, potential to be over-collected, and habitat requirements. Native lilies have rarely survived in gardens. Current information on known locations, especially in the eastern counties, is greatly needed. | | | | | | |
| **Liparis loeselii**<br>Loesel's Twayblade | | **Orchidaceae**<br>Orchids | G5 | S2 | | Species of Conservation Concern on Forests (FLAT) | | 3 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Lake<br>**State Rank Reason:** Known from several occurrences clustered in a small area of the Swan Valley. Susceptible to changes in hydrology. May also be susceptible to impacts from fire. | | | | | | |
| **Muhlenbergia andina**<br>Foxtail Muhly | | **Poaceae**<br>Grasses | G4 | S2S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Broadwater, Carbon, Cascade, Gallatin, Granite, Lake, Lewis and Clark, Madison, Park<br>**State Rank Reason:** *Muhlenbergia andina* occurs widely scattered in western and south-central Montana. It grows in damp places, but often with well-drained soils. It can be found along streams, in wet meadows and seeps, and around hot springs. The low number of collections in combination with limited habitat and/or specific micro-habitat characteristics indicates it is either rare, declining, or over-looked in floristic surveys. Current data on locations, population sizes, habitat, and threats is greatly needed to better assess its status in Montana. | | | | | | |
| **Muhlenbergia minutissima**<br>Annual Muhly | | **Poaceae**<br>Grasses | G5 | S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Gallatin, Madison, Missoula, Ravalli, Silver Bow<br>**State Rank Reason:** *Muhlenbergia minutissima* is known from 7 locations observed from 1895 to 2015 in central and western Montana. It is also reported to occur in northeast Montana, but specimens have not been located (Peterson *in* FNA 2003). A 1941 occurrence near Belgrade has been searched for in recent decades, but not re-located (Matt Lavin personal communication). Plants can occupy disturbed areas, yet populations may not be persisting. Surveys that bring forth current data on locations, populations sizes, habitat requirements, or threats is needed. | | | | | | |
| **Najas guadalupensis**<br>Guadalupe Water-nymph | | **Najadaceae**<br>Water-nymph Family | G5 | S2S3 | | | | | Aquatic |
| | | | **Species Occurrences verified in these Counties:** Carter, Cascade, Flathead, Lake, Ravalli<br>**State Rank Reason:** Rare. Currently documented from a few fresh water sites in the western and central portions of the state. Species is poorly documented in Montana and additional information on population levels, trends and threats is needed. | | | | | | |
| **Phippsia algida**<br>Ice Grass | | **Poaceae**<br>Grasses | G5 | S2S3 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Carbon, Stillwater<br>**State Rank Reason:** Rare in Montana, where it has been documented from only a few sites on the Beartooth Plateau. Additional surveys of suitable habitat and revisits of documented occurrences are needed to more accurately assess the species' conservation status. | | | | | | |
| **Poa laxa ssp. banffiana**<br>Banff Bluegrass | | **Poaceae**<br>Grasses | G5?T1 | S1 | | | | | Alpine |
| | | | **Species Occurrences verified in these Counties:** Glacier | | | | | | |
| **Potamogeton obtusifolius**<br>Blunt-leaved Pondweed | | **Potamogetonaceae**<br>Pondweeds | G5 | S3 | | Sensitive - Known on Forests (HLC)<br>Sensitive - Suspected on Forests (LOLO) | | 2 | Aquatic |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lake, Missoula, Powell<br>**State Rank Reason:** Known from over a dozen occurrences in northwest Montana. Several contain moderate to large-size populations and occur in valley and foothill locations in a variety of federal, state, and private ownerships. A few populations are on lands managed specifically for their conservation value. Some populations are vulnerable to impacts associated with development, recreation and increased sediment and nutrient loads. | | | | | | |
| **Puccinellia lemmonii**<br>Lemmon's Alkaligrass | | **Poaceae**<br>Grasses | G4 | S1S2 | | | | 2 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Beaverhead<br>**State Rank Reason:** Very rare in Montana where it is known only from Beaverhead County on BLM and State Trust Lands. At least one site is actively grazed, though its susceptibility and response to such activity is uncertain. | | | | | | |
| **Scheuchzeria palustris**<br>Pod Grass | | **Scheuchzeriaceae**<br>Pod-grasses | G5 | S3 | | Sensitive - Known on Forests (BD, KOOT, LOLO)<br>Sensitive - Suspected on Forests (BRT) | | 2 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Flathead, Granite, Lake, Lincoln, Missoula<br>**State Rank Reason:** Known in Montana from several dozen fens west of the Continental Divide. Several locations are known only from historical surveys or collections, or from sites that need additional surveys to document the populations. The majority of populations are on National Forest lands with MT State Trust lands, private and National Park lands supporting the remaining occurrences. Populations are primarily vulnerable to activities that change the hydrology of the occupied fen and wetland habitats. | | | | | | |
| **Schoenoplectus heterochaetus**<br>Slender Bulrush | Scirpus heterochaetus | **Cyperaceae**<br>Sedges | G5 | S1S2 | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Lake, Phillips<br>**State Rank Reason:** Information on the species is lacking within montana where it is recorded from only two poorly documented sites. However, its apparent rarity in the state warrants a high conservation status rank. | | | | | | |
| **Schoenoplectus subterminalis**<br>Water Bulrush | Scirpus subterminalis | **Cyperaceae**<br>Sedges | G5 | S3 | | Sensitive - Known on Forests (HLC, KOOT, LOLO) | | 2 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Lewis and Clark, Lincoln, Missoula<br>**State Rank Reason:** Over a dozen known occurrences in western Montana, most of which are moderate to large-sized populations primarily on National Forest lands. Populations are potentially vulnerable to changes in water levels or increases in nutrient and sediment loads associated with development, agriculture or adjacent timber harvesting. | | | | | | |

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| **Scolochloa festucacea**<br>Sprangletop | | **Poaceae**<br>Grasses | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead<br>**State Rank Reason:** Scolochloa festucacea occurs through most of Canada and in portions of mid-western and western States. In Montana it is known from 3 locations collected from 1949 to 1999 in Flathead County. A fourth location from a specimen with a poorly defined location in Carbon county needs to be verified. Surveys to find this species have been unsuccessful. | | | | | | |
| **Sisyrinchium septentrionale**<br>Northern Blue-eyed-grass | | **Iridaceae**<br>Irises | G4 | S1S2 | | | | 3 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Sheridan<br>**State Rank Reason:** Rare in Montana, where it is known from one prairie site in the northeastern corner of the state. Population information and related habitat data from the known location are lacking. | | | | | | |
| **Spiranthes diluvialis**<br>Ute ladies'-tresses | Ute Lady's-tresses | **Orchidaceae**<br>Orchids | G2G3 | S1S2 | LT | | | 2 | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Broadwater, Gallatin, Jefferson, Madison<br>**State Rank Reason:** *Spiranthes diluvialis* (Ute ladies'-tresses) is known from only a handful of occurrences in southwest and south-central Montana in the Missouri, Jefferson, Beaverhead, Ruby and Madison River drainages. *S. diluvialis* is restricted in area by specific hydrologic requirements. Many populations have less than 100 individuals, though a couple have over 500 plants. Sites are susceptible to hydrologic changes and weed invasion. Large areas of habitat have been converted to agricultural uses. Livestock grazing is also a common use of these habitats. Two populations occur along highway right-of-ways. Most populations occur on private lands and only one occurrence is currently provided some potential protection or management for its conservation value. | | | | | | |
| **Sporobolus compositus**<br>Tall Dropseed | **Sporobolus asper** | **Poaceae**<br>Grasses | G5 | SH | | | | | Forests/Grasslands (open, plains) |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Carter, Custer<br>**State Rank Reason:** Known in Montana from 3 collections; a 1939 collection near Ekalaka, a 1957 collection from Fort Keogh Livestock and Range Laboratory and a 1980 collection from Bighorn County. | | | | | | |
| **Sporobolus neglectus**<br>Small Dropseed | | **Poaceae**<br>Grasses | G5 | S1S2 | | | | | Grasslands (low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Gallatin, Sanders, Wheatland<br>**State Rank Reason:** Rare in Montana, where it is known from a few widely scattered and poorly documented sites. | | | | | | |
| **Stipa lettermanii**<br>Letterman's Needlegrass | **Achnatherum lettermanii** | **Poaceae**<br>Grasses | G5 | S1S3 | | | | | Talus and Grasslands (low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Big Horn, Carbon, Gallatin, Madison, Mineral, Park, Powell<br>**State Rank Reason:** Documented from several locations in the southern portion of the state. However, population levels, site characteristics and related information needed to determine the species' status are lacking. | | | | | | |
| **Tofieldia pusilla**<br>Small Tofieldia | | **Liliaceae**<br>Lillies | G5 | S2 | | | | 3 | Alpine |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier<br>**State Rank Reason:** Very rare in Montana, where it is known from only a very small area in Glacier National Park. | | | | | | |
| **Trichophorum alpinum**<br>Hudson's Bay Bulrush | **Scirpus hudsonianus, Eriophorum alpinum** | **Cyperaceae**<br>Sedges | G5 | S2 | | Species of Conservation Concern on Forests (FLAT) | | 2 | Fens and cold, wet slopes |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier<br>**State Rank Reason:** Rare in Montana, where it is only known from a few sites in the northwest corner of the state. | | | | | | |
| **Trichophorum cespitosum**<br>Tufted Club-rush | **Scirpus cespitosus, Trichophorum caespitosum** | **Cyperaceae**<br>Sedges | G5 | S2 | | Sensitive - Known on Forests (BD, HLC, KOOT)<br>Species of Conservation Concern on Forests (FLAT) | | 3 | Fens and wet meadows |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Flathead, Glacier, Lake, Lincoln, Powell, Teton<br>**State Rank Reason:** Rare in Montana, where it is currently documented from over a dozen fens and wet meadows in the mountainous portion of western Montana. | | | | | | |
| **Trichophorum pumilum**<br>Rolland's bulrush | **Scirpus pumilus, Scirpus rollandii** | **Cyperaceae**<br>Sedges | G5 | S3 | | | | 3 | Fens |
| | | | **Species Occurrences verified in these Counties:** Glacier, Teton<br>**State Rank Reason:** Rare in Montana, where it is currently documented from only a few calcareous fens near the Rocky Mtn Front. | | | | | | |
| **Veratrum californicum**<br>California False-hellebore | | **Liliaceae**<br>Lillies | G5 | S2 | | Sensitive - Known on Forests (BD, BRT)<br>Sensitive - Suspected on Forests (CG, HLC) | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Gallatin, Granite, Lewis and Clark, Lincoln, Meagher, Powell, Ravalli<br>**State Rank Reason:** Rare in Montana, where it is known from a very localized area in the southwestern corner of the state. | | | | | | |
| **Wolffia columbiana**<br>Columbia Water-meal | | **Lemnaceae**<br>Duckweeds | G5 | S2S3 | | | | | Aquatic |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Missoula, Ravalli<br>**State Rank Reason:** Rare. Known from several water bodies in the valleys of western Montana. Additional information on the species is needed within Montana to more precisely determine the species' conservation status. | | | | | | |

BRYOPHYTES (BRYOPHYTA) — 50 SPECIES

| SCIENTIFIC NAME<br>COMMON NAME<br>TAXA SORT | OTHER NAMES | FAMILY (SCIENTIFIC)<br>FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | MNPS THREAT CATEGORY | HABITAT |
|---|---|---|---|---|---|---|---|---|---|
| **Aloina brevirostris**<br>Short-beaked Aloe Moss | | **Pottiaceae** | G4G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lincoln | | | | | | |
| **Catoscopium nigritum**<br>Black Golf Club Moss | | **Catoscopiaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lewis and Clark, Lincoln, Teton | | | | | | |
| **Cinclidium stygium**<br>A Cinclidium Moss | | **Mniaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Teton | | | | | | |
| **Cynodontium tenellum**<br>A Cynodontium Moss | | **Dicranaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** | | | | | | |
| **Dichodontium** | Olympic Fork Moss | **Dicranaceae** | G3G5 | S1 | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| **olympicum**<br>Olympic Dichodontium Moss | | | **Species Occurrences verified in these Counties:** Missoula | | | | | | |
| **Dicranella schreberiana**<br>Schreber's Dicranella Moss | **Dicranella grevilleana**<br>Schreber's Fork Moss | **Dicranaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier<br>**State Rank Reason:** D. grevilleana had previously been ranked S1, but is now a synonym for D. schreberiana. Until a full review of the species can be performed, D. schreberiana (previously unranked) will be given the rank assigned to D. grevilleana. | | | | | | |
| **Dicranum acutifolium**<br>Acuteleaf Dicranum Moss | | **Dicranaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Ravalli | | | | | | |
| **Eucladium verticillatum**<br>Lime-Seep Eucladium Moss | Whorled Tufa Moss | **Pottiaceae** | G4 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Granite, Powell | | | | | | |
| **Fabronia pusilla**<br>Silky Urn Moss | Fabronia Moss | **Fabroniaceae** | G4G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Madison | | | | | | |
| **Fissidens fontanus**<br>Flat Pocket Moss | A Pocket Moss | **Fissidentaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Granite | | | | | | |
| **Grimmia brittoniae**<br>Britton's Dry Rock Moss | Britton's Black Rock Moss | **Grimmiaceae** | G2 | S2 | | Sensitive - Known on Forests (KOOT, LOLO)<br>Species of Conservation Concern on Forests (FLAT) | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Sanders | | | | | | |
| **Grimmia incurva**<br>Curved Dry Rock Moss | Curved Black Rock Moss | **Grimmiaceae** | GNR | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Ravalli | | | | | | |
| **Hamatocaulis vernicosus**<br>Hamatocaulis Moss | **Drepanocladus vernicosus** | **Amblystegiaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lincoln | | | | | | |
| **Haplodontium macrocarpum**<br>Waterfall Copper Moss | **Mielichhoferia macrocarpa, Bryum porsildii** | **Bryaceae** | G2G3 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** One specimen collected from a population growing on a wet limestone cliff in Park County, MT in 1973. | | | | | | |
| **Hennediella heimii**<br>Heim's Hennediella Moss | **Desmatodon heimii** | **Pottiaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Ravalli | | | | | | |
| **Homalothecium megaptilum**<br>Giant Golden Moss | **Trachybryum megaptilum** | **Brachytheciaceae** | G4 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lake, Lincoln, Mineral, Sanders<br>**State Rank Reason:** Endemic to western North America. In Montana it occurs on the eastern edge of its distribution. | | | | | | |
| **Hygroamblystegium varium ssp. noterophilum**<br>A Conecap Moss | **Hygroamblystegium noterophilum**<br>A Hygroamblystegium Moss | **Amblystegiaceae** | G5T4 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Cascade, Granite | | | | | | |
| **Leucolepis acanthoneuron**<br>Umbrella Moss | **Leucolepis menziesii** | **Mniaceae** | G4G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lincoln, Sanders | | | | | | |
| **Meesia longiseta**<br>Meesia Moss | | **Meesiaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead | | | | | | |
| **Meesia triquetra**<br>Meesia Moss | | **Meesiaceae** | G5 | S2 | | Sensitive - Known on Forests (BRT, CG, KOOT)<br>Sensitive - Suspected on Forests (LOLO)<br>Species of Conservation Concern on Forests (FLAT) | | | |
| | | | **Species Occurrences verified in these Counties:** Carbon, Flathead, Glacier, Lake, Lincoln, Ravalli, Sanders, Teton | | | | | | |
| **Meesia uliginosa**<br>Meesia Moss | Broad-leaved Hump Moss | **Meesiaceae** | G5 | S1S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lake, Lincoln, Sanders | | | | | | |
| **Meiotrichum lyallii**<br>Lyall's Polytrichum Moss | **Polytrichum lyallii, Polytrichadelphus lyallii, Polytrichastrum lyallii** | **Polytrichaceae** | G3G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Sanders | | | | | | |
| **Myurella tenerrima**<br>A Mousetail Moss | | **Pterigynandraceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Glacier | | | | | | |
| **Neckera douglasii**<br>Douglas' Neckera Moss | | **Neckeraceae** | G4 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Sanders | | | | | | |
| **Paludella squarrosa**<br>Angled Paludella Moss | | **Meesiaceae** | G5 | S1S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Flathead, Glacier | | | | | | |
| **Paraleucobryum enerve**<br>A Windblown Moss | | **Dicranaceae** | G5? | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Stillwater | | | | | | |
| **Physcomitrium hookeri**<br>Hooker's Physcomitrium Moss | | **Funariaceae** | G2G4 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Ravalli, Roosevelt | | | | | | |

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| **Porotrichum bigelovii**<br>Bigelow's Porotrichum Moss | | Thamnobryaceae | G4 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Ravalli | | | | | | |
| **Pseudocrossidium obtusulum**<br>A Pseudocrossidium Moss | | Pottiaceae | GU | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Musselshell, Ravalli | | | | | | |
| **Ptychostomum schleicheri**<br>Schleicher's Ptychostomum Moss | Bryum schleicheri | Bryaceae | G5? | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Glacier | | | | | | |
| **Rhynchostegium aquaticum**<br>Aquatic Rhynchostegium Moss | Eurhynchium riparioides, Platyhpnidium riparioides, Platyhpnidium aquaticum | Brachytheciaceae | GNR | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lake, Lincoln, Sanders | | | | | | |
| **Sarmentypnum exannulatum**<br>Warnstorfia Moss | Warnstorfia exannulata | Amblystegiaceae | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Flathead, Glacier, Lincoln | | | | | | |
| **Scorpidium revolvens**<br>Limprichtia Moss | Drepanocladus revolvens, Limprichtia revolvens | Amblystegiaceae | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Gallatin, Glacier, Lake, Missoula, Sanders, Stillwater, Teton | | | | | | |
| **Scorpidium scorpioides**<br>A Scorpidium Moss | | Amblystegiaceae | G5 | S2 | | Sensitive - Known on Forests (HLC, KOOT) Species of Conservation Concern on Forests (FLAT) | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lake, Lewis and Clark, Lincoln, Missoula, Powell, Teton | | | | | | |
| **Sphagnum angustifolium**<br>Narrowleaf Peatmoss | | Sphagnaceae<br>Peat Mosses | G5 | S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Flathead, Lincoln, Missoula, Sanders | | | | | | |
| **Sphagnum centrale**<br>A Peatmoss | | Sphagnaceae<br>Peat Mosses | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Missoula, Ravalli, Sanders | | | | | | |
| **Sphagnum compactum**<br>Cushion Peatmoss | Low Peatmoss | Sphagnaceae<br>Peat Mosses | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Granite, Meagher | | | | | | |
| **Sphagnum contortum**<br>Contorted Sphagnum Moss | | Sphagnaceae<br>Peat Mosses | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lincoln | | | | | | |
| **Sphagnum fimbriatum**<br>Fringed Bogmoss | Ragged Hair Peatmoss | Sphagnaceae<br>Peat Mosses | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Flathead, Granite, Lewis and Clark | | | | | | |
| **Sphagnum fuscum**<br>Brown Hair Peatmoss | Brown Peatmoss | Sphagnaceae<br>Peat Mosses | G5 | S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Lincoln, Missoula, Ravalli | | | | | | |
| **Sphagnum girgensohnii**<br>Star Hair Peatmoss | Girgensohn's Peatmoss | Sphagnaceae<br>Peat Mosses | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lincoln | | | | | | |
| **Sphagnum magellanicum**<br>Red Spoon Peatmoss | Magellan's Peatmoss | Sphagnaceae<br>Peat Mosses | G5 | S1 | | Species of Conservation Concern on Forests (FLAT) | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lincoln, Madison, Missoula, Ravalli | | | | | | |
| **Sphagnum mendocinum**<br>Mendocino Peatmoss | | Sphagnaceae<br>Peat Mosses | G4G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Missoula | | | | | | |
| **Sphagnum riparium**<br>Streamside Peatmoss | Streamside Sphagnum Moss | Sphagnaceae<br>Peat Mosses | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lewis and Clark, Lincoln, Missoula | | | | | | |
| **Sphagnum wulfianum**<br>Wulf's Peatmoss | | Sphagnaceae<br>Peat Mosses | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lake, Lincoln | | | | | | |
| **Stegonia latifolia**<br>Wideleaf Stegonia Moss | A Twist Moss | Pottiaceae | G5T4T5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** | | | | | | |
| **Syntrichia bartramii**<br>Bartram's Syntrichia Moss | Tortula bartramii<br>Bartram's Twist Moss | Pottiaceae | G2G4 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Ravalli<br>**State Rank Reason:** *Tortula* species with leaves turning red in 2% KOH solution, among other characteristics, have been placed in *Henediella*, *Microbryum*, or *Syntrichia*. Reduction in sporophyte development, such as capsule and peristome development, is prominent in *Tortula* but for which there is little evidence in *Syntrichia* (FNA 2007). | | | | | | |
| **Syntrichia norvegica**<br>Norwegian Syntrichia Moss | Tortula norvegica<br>Norwegian Twist Moss | Pottiaceae | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Glacier, Lake, Madison | | | | | | |
| **Syntrichia papillosissima**<br>Antler Twist Moss | Tortula papillosissima<br>Antler Moss | Pottiaceae | G3G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Carbon, Lewis and Clark, Musselshell, Powell, Ravalli, Sanders, Toole | | | | | | |
| **Tortula acaulon**<br>Elfin Crisp Moss | Phascum acaulon, Phascum cuspidatum<br>Entire-Leaf Nitrogen Moss | Pottiaceae | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Ravalli, Richland | | | | | | |

## LICHENS (FUNGI) — 32 SPECIES

| SCIENTIFIC NAME<br>COMMON NAME<br>TAXA SORT | OTHER NAMES | FAMILY (SCIENTIFIC)<br>FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | MNPS THREAT CATEGORY | HABITAT |
|---|---|---|---|---|---|---|---|---|---|
| **Arctomia delicatula** | | Arctomiaceae | GNR | S1 | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| Delicate Arctic Scale Lichen | | | **Species Occurrences verified in these Counties:** | | | | | | |
| **Arctoparmelia subcentrifuga** Subcentric Ring Lichen | | **Parmeliaceae** | G4G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Missoula<br>**State Rank Reason:** In Montana known from a few sites in the western and central regions of the state. | | | | | | |
| **Cetraria commixta** Friendly Camouflage Lichen | **Cetrariella commixta, Melanelia commixta** | **Parmeliaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier<br>**State Rank Reason:** Known from very few locations in northwest Montana. | | | | | | |
| **Circinaria rogeri** Roger's Vagabond Lichen | **Aspicilia fruticulosa, Aspicilia rogeri** | **Megasporaceae** | G2G3 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** In Montana known from one location in south-central region of the state. | | | | | | |
| **Cladonia botrytes** Stump Pixie-Cup Lichen | Stump Soldiers, Wooden Soldiers | **Cladoniaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lincoln<br>**State Rank Reason:** This species is common northward, but is found sporadically in Montana and east to the Black Hills and south to Colorado. | | | | | | |
| **Cladonia uncialis** Thorny Pixie-Sticks Lichen | | **Cladoniaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lake<br>**State Rank Reason:** Known to occur at one location in Montana. | | | | | | |
| **Collema curtisporum** Pustulate Tarpaper Lichen | | **Collemataceae** | G3 | S1 | | Sensitive - Known on Forests (KOOT) Species of Conservation Concern on Forests (FLAT) | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lake, Mineral, Sanders<br>**State Rank Reason:** In Montana this lichen occurs in a few locations and is not always present where habitat appears to be suitable. | | | | | | |
| **Dactylina ramulosa** Frosted Finger Lichen | | **Parmeliaceae** | G5 | S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Park, Ravalli | | | | | | |
| **Gyalectaria diluta** Diluted Wart Lichen | **Pertusaria diluta** | **Coccotremataceae** | GNR | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** This species was first recognized in Montana. The Type specimen is from the Cabinet Mountains and is currently the only Montana occurrence. | | | | | | |
| **Lobaria amplissima** Large Lungwort Lichen | | **Lobariaceae** | GNR | SNR | | | | | |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** Known from one location in western Montana. | | | | | | |
| **Lobaria anomala** Netted Lungwort Lichen | **Pseudocyphellaria anomala** | **Lobariaceae** | G2G4 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lake<br>**State Rank Reason:** Known in western Montana from a few locations. | | | | | | |
| **Lobaria hallii** Gray Lungwort Lichen | | **Lobariaceae** | G4? | S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Lincoln, Missoula, Sanders<br>**State Rank Reason:** Known from several locations in western Montana. | | | | | | |
| **Lobaria linita** Cabbage Lungwort Lichen | | **Lobariaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Ravalli<br>**State Rank Reason:** Known from very few locations in western Montana. | | | | | | |
| **Lobaria scrobiculata** Textured Lungwort Lichen | | **Lobariaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lake, Mineral<br>**State Rank Reason:** Known from one location in western Montana. | | | | | | |
| **Melanohalea septentrionalis** Northern Camouflage Lichen | | **Parmeliaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** Montana occurs on the southern edge of this species range, where it has been found occasionally. | | | | | | |
| **Nodobryoria subdivergens** Alpine Foxtail Lichen | **Alectoria subdivergens, Bryoria subdivergens** | **Parmeliaceae** | G2G3 | S1S2 | | Sensitive - Known on Forests (BRT, KOOT) | | | |
| | | | **Species Occurrences verified in these Counties:** Glacier, Lincoln, Ravalli<br>**State Rank Reason:** Known from several locations in western Montana where its abundance is always sparse. | | | | | | |
| **Normandina pulchella** Elf-Ear Lichen | | **Verrucariaceae** | G4G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Missoula, Ravalli<br>**State Rank Reason:** In the Rocky Mountains, this lichen has a spotty distribution. Known in Montana from one location. | | | | | | |
| **Parmeliella triptophylla** Fingered Shingle Lichen | **Pannaria triptophylla** Black-bordered Shingle Lichen | **Pannariaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Glacier, Lake, Missoula, Ravalli<br>**State Rank Reason:** Locally rare when found. | | | | | | |
| **Peltigera gowardii** Western Waterfan Lichen | **Peltigera hydrothyria [name misapplied in western North America]** | **Peltigeraceae** | G3G4 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Missoula, Ravalli<br>**State Rank Reason:** Known from a few sites in western Montana. | | | | | | |
| **Peltigera pacifica** Fringed Pelt Lichen | | **Peltigeraceae** | G3G4 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** Known from one location in western Montana, but expected to be more present. | | | | | | |
| **Phaeophyscia kairamoi** Least Shadow Lichen | | **Physciaceae** | G4G5 | S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake<br>**State Rank Reason:** This species occurs sporadically in the northern United States and southern Canada and is known from a few locations in western Montana. | | | | | | |
| **Ramalina labiosorediata** Chalky Bush Lichen | **Ramalina pollinaria** | **Ramalinaceae** | G4 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lake<br>**State Rank Reason:** Known in western Montana from several locations. | | | | | | |

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| **Ramalina obtusata**<br>Hooded Bush Lichen | | **Ramalinaceae** | G5 | S2 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Ravalli<br>**State Rank Reason:** In Montana sporadic occurrences have been found in western Montana. | | | | | | | |
| **Rhizoplaca haydenii**<br>Hayden's Rimmed Navel Lichen | | **Lecanoraceae** | G2G3 | S1S2 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon<br>**State Rank Reason:** Known from a few locations in south-central to southeastern Montana. This species is also likely to be found in appropriate habitats in southwestern Montana. Both subspecies are found in Montana: R. haydenii ssp. haydenii and R. haydenii ssp arbuscular. | | | | | | | |
| **Sclerophora amabilis**<br>Lovely Pin Lichen | | **Coniocybaceae** | G4G5 | S1 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lincoln<br>**State Rank Reason:** In Montana known from one location. | | | | | | | |
| **Solorina bispora**<br>Lesser Tundra Owl Lichen | | **Peltigeraceae** | G5 | S1S2 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Flathead, Glacier, Missoula<br>**State Rank Reason:** Known from a few locations in western Montana. | | | | | | | |
| **Solorina octospora**<br>Greater Tundra Owl Lichen | | **Peltigeraceae** | G3G5 | S1 | | | | | | |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** In Montana known from one location in the northwest. | | | | | | | |
| **Solorina spongiosa**<br>Fringed Chocolate Chip Lichen | | **Peltigeraceae** | G4G5 | S1S2 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Lewis and Clark<br>**State Rank Reason:** Known from a few locations in western and central portions of Montana. | | | | | | | |
| **Sphaerophorus tuckermanii**<br>Tuckermann's Coral Lichen | | **Sphaerophoraceae** | G5 | S1 | | | | | | |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** Known from two locations in northwestern Montana. | | | | | | | |
| **Stereocaulon paschale**<br>Easter Foam Lichen | | **Stereocaulaceae** | G5 | S1S2 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lake<br>**State Rank Reason:** Known from a few locations in northwest and south-central Montana. | | | | | | | |
| **Umbilicaria hirsuta**<br>Granulating Rocktripe Lichen | | **Umbilicariaceae** | G2G4 | S1 | | | | | | |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** This species is apparently rare throughout its range in North America. In Montana it is known from one location. | | | | | | | |
| **Verrucaria kootenaica**<br>Kootenai Speck Lichen | | **Verrucariaceae** | G2 | S1S2 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake<br>**State Rank Reason:** Known in western Montana from a few locations. | | | | | | | |

### Potential Species of Concern

**Potential Species of Concern**
**90 Species**
All Records (no filtering)

FERNS AND FERN ALLIES (PTERIDOPHYTA) — 4 SPECIES

| SCIENTIFIC NAME<br>COMMON NAME<br>TAXA SORT | OTHER NAMES | FAMILY (SCIENTIFIC)<br>FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | MNPS THREAT CATEGORY | HABITAT |
|---|---|---|---|---|---|---|---|---|---|
| **Asplenium trichomanes**<br>Maidenhair Spleenwort | | **Aspleniaceae**<br>Spleenwort Family | G5 | SH | | | | | Rock/Talus |
| | | | **Species Occurrences verified in these Counties:** Flathead<br>**State Rank Reason:** Known from one 1895 collection with imprecise location data near "Columbia Falls" in Flathead County. | | | | | | |
| **Botrychium montanum**<br>Mountain Moonwort | | **Ophioglossaceae**<br>Adder's-Tongue / Moonworts | G3 | S3S4 | | | | | Forests (Mesic bottmlands)/Open sites |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** This moonwort species is known from numerous observations in western Montana. Populations are often small and most have been found in old growth Western Red Cedar forest, though some have been documented from second growth forests. Populations occur on a mix of federal, state and private ownerships.<br><br>Montana supports a significant percentage of the species range-wide populations. | | | | | | |
| **Botrychium sp. (Non-SOC)**<br>Moonworts (Non-SOC) | | **Ophioglossaceae**<br>Adder's-Tongue / Moonworts | GNR | S3S5 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Cascade, Deer Lodge, Flathead, Glacier, Granite, Lake, Lewis and Clark, Lincoln, Mineral, Missoula, Pondera, Powell, Sanders, Teton<br>**State Rank Reason:** This is a general record for Botrychium species tracked by MTNHP. MTNHP tracks and maintains observation data for all Botrychium species in the state excluding B. multifidum and B. virginianum which are fairly common and readily identifiable from all other Botrychiums. Global and State Ranks for this record are placeholders only to allow Botrychium SOC to appear in searches using global and state ranks. For information pertinent to specific Botrychium species, please see the individual species' accounts. | | | | | | |
| **Cystopteris montana**<br>Mountain Bladder Fern | | **Dryopteridaceae**<br>Wood Fern Family | G5 | SH | | | | | Rock/talus |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Sanders<br>**State Rank Reason:** Reported for Montana from one collection in 1932 near Gunsight Pass in Glacier National Park. | | | | | | |

FLOWERING PLANTS - DICOTS (MAGNOLIOPSIDA) — 53 SPECIES

| SCIENTIFIC NAME<br>COMMON NAME<br>TAXA SORT | OTHER NAMES | FAMILY (SCIENTIFIC)<br>FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | MNPS THREAT CATEGORY | HABITAT |
|---|---|---|---|---|---|---|---|---|---|
| **Agoseris lackschewitzii**<br>Pink Agoseris | **Agoseris aurantiaca var. aurantiaca, Agoseris carnea** | **Asteraceae**<br>Aster/Sunflowers | G4Q | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Cascade, Deer Lodge, Gallatin, Granite, Judith Basin, Liberty, Madison, Meagher, Park, Silver Bow, Sweet Grass<br>**State Rank Reason:** See rank details. | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| **Allotropa virgata**<br>Candystick | | **Ericaceae**<br>Heath Family | G4 | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Deer Lodge, Granite, Ravalli<br>**State Rank Reason:** Limited distribution and small population sizes make the species potentially vulnerable to impacts to its habitat, primary lodgepole pine stands. Trend and monitoring data for the species are lacking. However, populations are presumed to be relatively stable at the present time. | | | | | | |
| **Aquilegia jonesii**<br>Jones' Columbine | | **Ranunculaceae**<br>Buttercup Family | G3 | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Judith Basin, Lewis and Clark, Stillwater, Sweet Grass, Teton | | | | | | |
| **Arabidopsis lyrata**<br>Lyre-leaf Rockcress | **Arabis lyrata, Arabis kamchatica** | **Brassicaceae**<br>Mustards | G5 | SH | | | | | NA |
| | | | **Species Occurrences verified in these Counties:** Flathead<br>**State Rank Reason:** Known from one 1952 collection near Mount Brown in Glacier National Park. | | | | | | |
| **Atriplex canescens**<br>Four-wing Saltbush | | **Amaranthaceae**<br>Amaranth (Pigweed) Family | G5 | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Blaine, Carter, Jefferson, Mccone, Musselshell, Park, Pondera, Powder River, Rosebud, Silver Bow, Toole, Wheatland | | | | | | |
| **Atriplex suckleyi**<br>Suckley's Saltbush | **Atriplex dioica (Nutt.) Macbr. [not Raf.], Endolepis dioica** | **Amaranthaceae**<br>Amaranth (Pigweed) Family | G4 | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Carter, Phillips, Valley, Wheatland<br>**State Rank Reason:** Few collections from Montana, mostly along the Missouri River Breaks. However, this species has weedy tendencies.<br><br>MONT collections from Valley, McCone Counties. | | | | | | |
| **Balsamorhiza macrophylla**<br>Large-leaved Balsamroot | | **Asteraceae**<br>Aster/Sunflowers | G3G5 | S3S4 | | Sensitive - Known on Forests (BD, CG) | | 3 | Sagebrush-grassland |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Gallatin, Madison<br>**State Rank Reason:** This species occurs in Montana at the edge of its range where it is known from three southwestern Montana mountain ranges. Most of the known populations are moderate to large in size and in generally good-quality habitat. One occurrence in Gallatin County is only known from a 1931 collection. Invasive weeds are not a problem at sites occupied by *Balsamorhiza macrophylla* and livestock grazing at some of the sites does not appear to be negatively impacting the species. | | | | | | |
| **Camissonia minor**<br>Small-flowered Evening-primrose | **Oenothera minor** | **Onagraceae**<br>Evening-primrose Family | G4 | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Carbon | | | | | | |
| **Ceanothus herbaceus**<br>New Jersey Tea | | **Rhamnaceae**<br>Buckthorn Family | G5 | SH | | | | | Forests (Dry. Open) |
| | | | **Species Occurrences verified in these Counties:** Powder River<br>**State Rank Reason:** Known from one 1948 specimen collection with imprecise location data in Powder River County that noted a "few" plants. Subsequent surveys have not been able to relocate this species. | | | | | | |
| **Centaurium exaltatum**<br>Western Centaury | **Zeltnera exaltata** | **Gentianaceae**<br>Gentians | G5 | SH | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Treasure, Yellowstone<br>**State Rank Reason:** Known from one 1890 collection with imprecise location data from Big Horn County, "seven miles south of Custer Station". | | | | | | |
| **Collomia tinctoria**<br>Yellow-staining Collomia | | **Polemoniaceae**<br>Phlox Family | G5 | SH | | | | | Grasslands/Rocky slopes (Valleys to Montane) |
| | | | **Species Occurrences verified in these Counties:** Flathead, Teton<br>**State Rank Reason:** Has not been collected in Montana for over 100 years. | | | | | | |
| **Cryptantha flavoculata**<br>Pale Yellow Cryptantha | | **Boraginaceae**<br>Borage Family | G5 | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Carbon | | | | | | |
| **Delphinium bicolor ssp. calcicola**<br>Limestone Larkspur | | **Ranunculaceae**<br>Buttercup Family | G4G5T3T4 | S3S4 | | | | 3 | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Broadwater, Carbon, Jefferson, Lewis and Clark, Madison, Missoula, Silver Bow<br>**State Rank Reason:** A Montana endemic. | | | | | | |
| **Delphinium glaucescens**<br>Electric Peak Larkspur | | **Ranunculaceae**<br>Buttercup Family | G3G4 | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Deer Lodge, Granite, Madison, Park, Silver Bow<br>**State Rank Reason:** Occurs in southwest Montana at relatively high elevations. Though it has a restricted distribution, it may not be that uncommon. | | | | | | |
| **Drosera rotundifolia**<br>Roundleaf Sundew | | **Droseraceae**<br>Sundew Family | G5 | S3S4 | | | | | Fens |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Granite, Lake, Lewis and Clark, Lincoln, Missoula, Ravalli, Sanders<br>**State Rank Reason:** Our most common sundew. Numerous occurrences in fens across western Montana. | | | | | | |
| **Epilobium densiflorum**<br>Dense Spike-primrose | **Boisduvalia densiflora** | **Onagraceae**<br>Evening-primrose Family | G5 | SH | | | | | Wetland/Riparian |
| | | | **Species Occurrences verified in these Counties:** Petroleum, Sanders, Teton<br>**State Rank Reason:** Known from one historical collection in Sanders County from 1938. | | | | | | |
| **Epilobium suffruticosum**<br>Shrubby Willowherb | | **Onagraceae**<br>Evening-primrose Family | G5 | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Park | | | | | | |
| **Ericameria nana**<br>Dwarf Goldenweed | **Haplopappus nanus** | **Asteraceae**<br>Aster/Sunflowers | G5 | SH | | | | | Rock/Talus |
| | | | **Species Occurrences verified in these Counties:** Beaverhead<br>**State Rank Reason:** Known from one 1952 collection south of Upper Red Rock Lake. | | | | | | |
| **Erigeron eatonii**<br>Eaton's Fleabane | | **Asteraceae**<br>Aster/Sunflowers | G5 | SH | | | | | Sagbrush/Woodlands (Open, Montane) |
| | | | **Species Occurrences verified in these Counties:** Sweet Grass<br>**State Rank Reason:** This species has only been collected once in Montana, several decades ago in Stillwater County. The population where this specimen was collected is likely still extant, but no surveys have been conducted to try and re-locate it. | | | | | | |
| **Erigeron lanatus**<br>Woolly Fleabane | | **Asteraceae**<br>Aster/Sunflowers | G4 | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Flathead, Glacier<br>**State Rank Reason:** Only known in Montana from a few occurrences in Glacier National Park, though the high elevation habitat as well as the occurrences all being within the Park boundary greatly diminish the potential for negative impacts. The likelihood of additional occurrences being located appears good. | | | | | | |
| **Eriogonum brevicaule var. canum**<br>Rabbit Buckwheat | **Eriogonum lagopus, Eriogonum pauciflorum var. canum** | **Polygonaceae**<br>Buckwheat Family | G3G4 | S3S4 | | | | 3 | |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** Regional endemic taxa restricted in Montana to the Bighorn Basin/Pryor Mountain Desert area where it is locally abundant in some locality and is a dominant component of some vegetation communities. Trends are unknown, though likely stable. | | | | | | |
| **Eutrema salsugineum**<br>Saltwater Cress | **Arabidopsis salsuginea, Thellungiella salsuginea** | **Brassicaceae**<br>Mustards | G5? | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|
| **Gaultheria ovatifolia**<br>Slender Wintergreen | | **Ericaceae**<br>Heath Family | G5 | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lake, Lincoln, Mineral, Sanders | | | | | | | |
| **Geocaulon lividum**<br>Northern Toadflax | **Comandra lividum** | **Santalaceae**<br>Sandalwood Family | G5 | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Lincoln, Missoula | | | | | | | |
| **Gilia tweedyi**<br>Tweedy's Gilia | **Gilia sinuata var. tweedyi, Gilia inconspicua var. tweedyi** | **Polemoniaceae**<br>Phlox Family | G4G5Q | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon<br>**State Rank Reason:** Gilia tweedyi is locally common on the south and west sides of the Pryor Mountains in the drainages of the Bighorn and Clarks Fork of the Yellowstone rivers and is also known from Beaverhead County. | | | | | | | |
| **Hedysarum alpinum**<br>Alpine Sweet-vetch | | **Fabaceae**<br>Pea Family | G5 | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Glacier, Phillips | | | | | | | |
| **Hymenoxys torreyana**<br>Torrey Bitterweed | **Tetraneuris torreyana** | **Asteraceae**<br>Aster/Sunflowers | G4 | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Carbon | | | | | | | |
| **Impatiens ecalcarata**<br>Spurless Touch-me-not | | **Balsaminaceae**<br>Impatiens | G3G4 | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lake, Missoula | | | | | | | |
| **Linanthastrum nuttallii**<br>Nuttall's Linanthus | **Linanthus nuttallii, Leptosiphon nuttallii** | **Polemoniaceae**<br>Phlox Family | G5 | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Ravalli<br>**State Rank Reason:** Reported as locally common in the Bitterroot Mountains by Lesica & Shelly (1991). | | | | | | | |
| **Lomatium bicolor**<br>Bicolor Biscuitroot | | **Apiaceae**<br>Parsley/Carrot Family | G4 | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Ravalli | | | | | | | |
| **Lorandersonia linifolia**<br>Spearleaf Rabbitbrush | **Chrysothamnus viscidiflorus var. linifolius, Chrysothamnus linifolius** | **Asteraceae**<br>Aster/Sunflowers | G5 | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** | | | | | | | |
| **Madia minima**<br>Small-headed Tarweed | **Hemizonella minima** | **Asteraceae**<br>Aster/Sunflowers | G4 | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Granite, Lincoln, Missoula, Ravalli, Sanders | | | | | | | |
| **Mimulus suksdorfii**<br>Suksdorf Monkeyflower | | **Phrymaceae**<br>Lopseed Family | G4 | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Gallatin, Lewis and Clark, Madison, Missoula, Park, Rosebud, Silver Bow | | | | | | | |
| **Musineon vaginatum**<br>Rydberg's Parsley | | **Apiaceae**<br>Parsley/Carrot Family | G3G4 | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Carbon, Rosebud<br>**State Rank Reason:** See rank details. | | | | | | | |
| **Orobanche corymbosa**<br>Flat-topped Broomrape | | **Orobanchaceae**<br>Broomrape Family | G4 | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Deer Lodge, Granite, Jefferson, Madison, Ravalli | | | | | | | |
| **Oxytropis lagopus var. conjugans**<br>Hare's-foot Locoweed | | **Fabaceae**<br>Pea Family | G4G5T3T4 | S3S4 | | | | | 3 | Sagebrush (low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Granite, Lewis and Clark<br>**State Rank Reason:** See rank details. | | | | | | | |
| **Pedicularis oederi**<br>Oeder's Lousewort | | **Orobanchaceae**<br>Broomrape Family | G5 | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Carbon | | | | | | | |
| **Pediomelum hypogaeum**<br>Little Indian Breadroot | | **Fabaceae**<br>Pea Family | G5 | S3S4 | | | | | 3 | Grasslands/Woodlands (Open, sandy soil) |
| | | | **Species Occurrences verified in these Counties:** Carter, Cascade, Chouteau, Fergus, Golden Valley, Petroleum, Powder River, Rosebud<br>**State Rank Reason:** See rank details. | | | | | | | |
| **Penstemon laricifolius**<br>Larch-leaf Beardtongue | | **Plantaginaceae**<br>Plantain Family | G4 | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Carbon<br>**State Rank Reason:** In Montana, *Penstemon laricifolius* is known from Carbon County where it is common on the south and west flanks of the Pryor Mountains. | | | | | | | |
| **Phacelia scopulina**<br>Dwarf Phacelia | **Phacelia lutea var. scopulina** | **Hydrophyllaceae**<br>Waterleaf Family | G4 | SH | | | | | | Alkaline sites |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Madison, Silver Bow<br>**State Rank Reason:** Known in Montana from one 1885 collection by P.A. Rydberg near Melrose, probably in Silver Bow County. | | | | | | | |
| **Phlox andicola**<br>Plains Phlox | | **Polemoniaceae**<br>Phlox Family | G4 | S3S4 | | | | | 3 | Open sites (Sand to clay soils) |
| | | | **Species Occurrences verified in these Counties:** Carter, Dawson, Phillips, Powder River, Rosebud, Sheridan<br>**State Rank Reason:** Plains phlox reaches the western margin of its range in Montana's eastern counties. It has been documented from relatively few locations, but surveys during its early blooming season have been few, and additional spring inventory work may locate more populations. It likely tolerates grazing and may benefit from some level of disturbance. | | | | | | | |
| **Polygonum austiniae**<br>Austin's Knotweed | **Polygonum douglasii ssp. austiniae** | **Polygonaceae**<br>Buckwheat Family | G5T4 | S3S4 | | Sensitive - Known on Forests (BD, HLC)<br>Sensitive - Suspected on Forests (CG) | | 2 | Rock/Talus | |
| | | | **Species Occurrences verified in these Counties:** Broadwater, Flathead, Glacier, Granite, Lewis and Clark, Madison, Meagher, Park, Pondera, Powell, Teton<br>**State Rank Reason:** Austin's knotweed is sparsely distributed in mountainous areas of Montana from the Rocky Mountain Front to the Madison and Gallatin Ranges. Sites are usually on open, gravelly, sparsely-vegetated slopes with shale-derived soils and as such are not generally impacted by human activity. Some sites however, are along forest roads and are susceptible to weed invasion and other disturbances. The probability of finding additional occurrences appears to be good since large areas of suitable habitat across western and central Montana remain unsurveyed for the species. | | | | | | | |
| **Ranunculus hyperboreus**<br>High Northern Buttercup | **Ranunculus natans** | **Ranunculaceae**<br>Buttercup Family | G5 | S3S4 | | | | | | Wetland/Riparian (Montane) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon, Deer Lodge, Gallatin, Jefferson, Madison, Missoula, Silver Bow, Valley<br>**State Rank Reason:** Known from several southwest and south-central counties in Montana. See rank details for additional information. | | | | | | | |
| **Sedum borschii**<br>Borsch's Stonecrop | **Sedum leibergii** | **Crassulaceae**<br>Stonecrops | G3? | S3S4 | | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead | | | | | | | |
| **Solidago velutina**<br>Three-nerved Goldenrod | **Solidago sparsiflora** | **Asteraceae**<br>Aster/Sunflowers | G5? | SH | | | | | | NA |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** Few-flowered goldenrod is known in Montana from 1 specimen collection from the Stillwater River Valley, which lacks precise locality data. Other reports of this species from the state are based on mis-identified specimens. Additional data are needed. | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| **Sphaeralcea munroana**<br>White-stemmed globemallow | | **Malvaceae**<br>Mallow Family | G4 | S3S4 | | | | 3 | Sagebrush-Grasslands (low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Jefferson, Park<br>**State Rank Reason:** Peripheral in southwest Montana where it is known from a few locations. Additional survey and monitoring data are needed. Most documented locations are along roads and 2-tracks, as such, at least several of the populations may be adventive or introduced. Species appears to be tolerant of or perhaps benefits from some disturbance activity. Additional information concerning the conservation needs and population dynamics of this species in Montana is needed to clarify its status. | | | | | | |
| **Stanleya tomentosa**<br>Woolly Prince's plume | | **Brassicaceae**<br>Mustards | G4 | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Carbon<br>**State Rank Reason:** See rank details. | | | | | | |
| **Stanleya viridiflora**<br>Green Prince's plume | | **Brassicaceae**<br>Mustards | G4 | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Madison<br>**State Rank Reason:** See rank details. | | | | | | |
| **Stenotus multicaulis**<br>Many-stem Goldenweed | **Oonopsis multicaulis, Haplopappus multicaulis** | **Asteraceae**<br>Aster/Sunflowers | G4 | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Carter, Fallon<br>**State Rank Reason:** Though restricted in distribution in Montana to Carter County, it is common in some habitats, including along some roadsides at least on BLM lands. No apparent, substantial threats to the species' viability in the state exist. | | | | | | |
| **Streptanthella longirostris**<br>Streptanthella | | **Brassicaceae**<br>Mustards | G5 | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** Uncommon in Montana and restricted in distribution to Carbon County. Population sizes are poorly documented and associated information on trends and threats are also lacking. | | | | | | |
| **Synthyris missurica**<br>Western Mountain kittentails | | **Plantaginaceae**<br>Plantain Family | G4 | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Ravalli<br>**State Rank Reason:** Uncommon in Montana and restricted in distribution to the Bitterroot Mtns. Population sizes are poorly documented and associated information on trends and threats are also lacking. | | | | | | |
| **Tonestus pygmaeus**<br>Pygmy Goldenweed | **Haplopappus pygmaeus** | **Asteraceae**<br>Aster/Sunflowers | G4 | SH | | | | | Alpine |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** Known in Montana from 1 historical collection from Lolo Peak. Other historical locations previously reported for MT have all been based on mis-identified specimens of Tonestus lyallii | | | | | | |
| **Townsendia spathulata**<br>Sword Townsend-daisy | | **Asteraceae**<br>Aster/Sunflowers | G3 | S3S4 | | | | 3 | |
| | | | **Species Occurrences verified in these Counties:** Beaverhead, Broadwater, Carbon, Madison, Park, Silver Bow<br>**State Rank Reason:** Sword townsendia occurs in limestone areas of southwest and south-central Montana. Overall, The species' viability in the state does not appear to be at risk due in part to its relatively widespread distribution and its overall abundance. The population in the Limestone Hills in Broadwater County may be negatively impacted by proposed mine expansion and military activities. | | | | | | |

## FLOWERING PLANTS - MONOCOTS (LILIOPSIDA) — 7 SPECIES

| SCIENTIFIC NAME<br>COMMON NAME<br>TAXA SORT | OTHER NAMES | FAMILY (SCIENTIFIC)<br>FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | MNPS THREAT CATEGORY | HABITAT |
|---|---|---|---|---|---|---|---|---|---|
| **Carex nelsonii**<br>Nelson's Sedge | | **Cyperaceae**<br>Sedges | G3 | S3S4 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Carbon, Park, Stillwater<br>**State Rank Reason:** See rank details. | | | | | | |
| **Cyperus strigosus**<br>Straw-colored Flatsedge | | **Cyperaceae**<br>Sedges | G5 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** Known in Montana from two historical collections (Flathead and Missoula Counties). | | | | | | |
| **Cypripedium parviflorum**<br>Small Yellow Lady's-slipper | **Cypripedium calceolus** | **Orchidaceae**<br>Orchids | G5 | S3S4 | | Sensitive - Known on Forests (CG, HLC, KOOT, LOLO)<br>Sensitive - Suspected on Forests (BRT) | | 2 | |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Carter, Flathead, Gallatin, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Missoula, Pondera, Stillwater, Sweet Grass, Teton<br>**State Rank Reason:** Many occurrences known from the western half of the state, including a dozen or so historical or poorly documented sites. Many occurrences have small population numbers, though approximately two dozen occurrences are moderate to large populations. Populations occur on variety of federal, state and private ownerships with varied land uses and management. A variety of land uses and activities, including development, livestock grazing and timber harvesting may have detrimental impacts to populations. However, yellow lady's-slipper appears to be tolerant to some disturbances at low levels and the number of populations scattered over a wide area reduces the risk to the species. A loss of populations or a significant decline in numbers may warrant a re-listing as a Species of Concern in Montana, and populations should continue to be monitored on a semi-regular basis. Moderate to large occurrences should be managed to maintain habitat and viable population numbers. | | | | | | |
| **Damasonium californicum**<br>Fringed Water-plantain | **Machaerocarpus californicus** | **Alismataceae**<br>Water-plantains | G4 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** Collected once in Montana along the Kootenai river near Rexford prior to the creation of Lake Koocanusa. | | | | | | |
| **Lipocarpha micrantha**<br>Dwarf Bulrush | **Hemicarpha micrantha** | **Cyperaceae**<br>Sedges | G5 | SH | | | | | Sandy soil (Moist) |
| | | | **Species Occurrences verified in these Counties:** Carbon<br>**State Rank Reason:** Known in Montana from a 1941 Collection by W. E. Booth near Fromberg. | | | | | | |
| **Maianthemum canadense**<br>Wild Lily-of-the-valley | | **Liliaceae**<br>Lillies | G5 | SH | | | | | Riparian forest |
| | | | **Species Occurrences verified in these Counties:** Carter<br>**State Rank Reason:** Documented for Montana from one 1948 collection by W. E. Booth near Alzada. | | | | | | |
| **Sphenopholis intermedia**<br>Slender Wedgegrass | **Sphenopholis obtusata var. major** | **Poaceae**<br>Grasses | G5 | S3S4 | | | | | Mesic sites (low-elevation) |
| | | | **Species Occurrences verified in these Counties:** Big Horn, Broadwater, Fergus, Flathead, Gallatin, Judith Basin, Lake, Lewis and Clark, Phillips, Wheatland<br>**State Rank Reason:** Rare in Montana, where it has only been documented from a very few collections, though the population data required to more precisely assign a conservation rank are lacking. | | | | | | |

## BRYOPHYTES (BRYOPHYTA) — 18 SPECIES

| SCIENTIFIC NAME<br>COMMON NAME<br>TAXA SORT | OTHER NAMES | FAMILY (SCIENTIFIC)<br>FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | MNPS THREAT CATEGORY | HABITAT |
|---|---|---|---|---|---|---|---|---|---|
| **Amblyodon dealbatus**<br>An Amblyodon Moss | | **Meesiaceae** | G3G5 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** Cascade, Flathead<br>**State Rank Reason:** Known from 1 collection from Flathead County in 1895. | | | | | | |
| **Brachythecium turgidum**<br>Stiff Matt Moss | Stiff Brachythecium Moss | **Brachytheciaceae** | G5 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier | | | | | | |
| **Callicladium haldanianum**<br>Pretty Branch Moss | | **Hypnaceae** | G5 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead | | | | | | |
| **Calliergon richardsonii**<br>Richardson's Calliergon Moss | | **Amblystegiaceae** | G5 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** Glacier | | | | | | |
| **Dendroalsia abietina**<br>A Dendroalsia Moss | | **Leucodontaceae** | G4 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** | | | | | | |
| **Dicranum fragilifolium**<br>Fragile Leaf Dicranum Moss | | **Dicranaceae** | G4G5 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lake | | | | | | |
| **Dicranum spadiceum**<br>A Dicranum Moss | **Dicranum angustum** | **Dicranaceae** | G5 | SNR | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier<br>**State Rank Reason:** MT Botanist MIncemoyer downgraded species from S1 to SH for lack of knowledge of specimens after 1972 and was not aware of specimens collected in 1994 from Glacier NP and 1995 from Pine Butte. | | | | | | |
| **Distichium inclinatum**<br>Incline Thread Moss | Incline Distichium Moss | **Ditrichaceae** | G5 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** Glacier, Teton | | | | | | |
| **Entosthodon rubiginosus**<br>Rusty Cord Moss | Entosthodon Moss | **Funariaceae** | G1G3 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** Cascade | | | | | | |
| **Grimmia mollis**<br>A Dry Rock Moss | **Hydrogrimmia mollis**<br>A Black Rock Moss | **Grimmiaceae** | G5 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier | | | | | | |
| **Hygrohypnum cochlearifolium**<br>Ear-leaf Boat Moss | Ear-leaf Hygrohypnum Moss | **Amblystegiaceae** | G4 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lincoln | | | | | | |
| **Plagiobryum zieri**<br>Zierian Hump-Moss | | **Bryaceae** | G5 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** | | | | | | |
| **Pseudocalliergon trifarium**<br>Blunt Water Moss | **Calliergon trifarium**<br>Worm Moss | **Amblystegiaceae** | G5 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Missoula | | | | | | |
| **Pseudocalliergon turgescens**<br>A Pseudocalliergon Moss | **Scorpidium turgescens, Calliergon turgescens** | **Amblystegiaceae** | G5 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Teton | | | | | | |
| **Sarmentypnum sarmentosum**<br>A Sarmenthypnum Moss | **Calliergon sarmentosum** | **Amblystegiaceae** | G5 | SNR | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier | | | | | | |
| **Tayloria acuminata**<br>Acuminate Dung Moss | | **Splachnaceae** | G3G4 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** | | | | | | |
| **Thamnobryum neckeroides**<br>Necker's Thamnobryum Moss | A Tree Moss | **Thamnobryaceae** | G4 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Missoula, Sanders | | | | | | |
| **Tortula cernua**<br>A Tortella Moss | **Desmatodon cernuus** | **Pottiaceae** | G4G5 | SH | | | | | |
| | | | **Species Occurrences verified in these Counties:** | | | | | | |

## LICHENS (FUNGI)

8 SPECIES

| SCIENTIFIC NAME<br>COMMON NAME<br>TAXA SORT | OTHER NAMES | FAMILY (SCIENTIFIC)<br>FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | MNPS THREAT CATEGORY | HABITAT |
|---|---|---|---|---|---|---|---|---|---|
| **Brigantiaea praetermissa**<br>Brick-Spored Firedot Lichen | | **Brigantiaeaceae**<br>(Brigantiaeaceae) | GNR | S2S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lake<br>**State Rank Reason:** The type specimen is from Sanders County. This lichen is considered uncommon in western Montana and widely scattered in the Pacific Northwest. | | | | | | |
| **Cetraria sepincola**<br>Chestnut Wrinkled Lichen | **Tuckermannopsis sepincola** | **Parmeliaceae** | G5 | S2S3 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Lake, Madison, Mineral<br>**State Rank Reason:** Known from many locations, associated with bogs, in western Montana. | | | | | | |
| **Evernia divaricata**<br>Mountain Oakmoss Lichen | | **Parmeliaceae** | G4G5 | S1S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Carbon, Lake, Missoula<br>**State Rank Reason:** Populations have a very spotty distribution in Montana. | | | | | | |
| **Parmelia fraudans**<br>Pea-green Shield Lichen | | **Parmeliaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** Rare in the Pacific Northwest (McCune and Goward 2009); Infrequently collected in Montana and adjacent states. | | | | | | |
| **Platismatia herrei**<br>Tattered Rag Lichen | | **Parmeliaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:**<br>**State Rank Reason:** Known from a few locations in northwestern Montana. | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Platismatia stenophylla**<br>Ribbon Rag Lichen | | **Parmeliaceae** | G5 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Lake, Ravalli<br>**State Rank Reason:** Known from a few locations in western Montana. | | | | | | |
| **Psora rubiformis**<br>Pea-green Scale Lichen | | **Psoraceae** | G3G5 | S1S2 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Glacier, Lake, Madison, Rosebud<br>**State Rank Reason:** In Montana widely scattered populations have been found in northwest, southwest, and southeast. | | | | | | |
| **Umbilicaria havaasii**<br>Havaas' Rocktripe Lichen | | **Umbilicariaceae** | G4 | S1 | | | | | |
| | | | **Species Occurrences verified in these Counties:** Flathead, Ravalli<br>**State Rank Reason:** Known from a few locations in western Montana. Montana occurs on the eastern edge of this species range. | | | | | | |

### Special Status Species

**Special Status Species**
**0 Species**
All Records (no filtering)

### Additions To Statewide List

### Species Removed From Statewide List

**Citation for data on this website:**
Montana Plant Species of Concern Report. Montana Natural Heritage Program. Retrieved on 1/29/2020, from http://mtnhp.org/SpeciesOfConcern/?AorP=p

# Appendix H

Climate Data

Back to:
State Map | Western U.S. map | Home Page

**NOTE:**
To print data frame (right side), click on right frame before printing.

### 1981 - 2010

- Daily Temp. & Precip.
- Daily Tabular data (~23 KB)
- Monthly Tabular data (~1 KB)
- NCDC 1981-2010 Normals (~3 KB)

### 1971 - 2000

- Daily Temp. & Precip.
- Daily Tabular data (~23 KB)
- Monthly Tabular data (~1 KB)
- NCDC 1971-2000 Normals (~3 KB)

### 1961 - 1990

- Daily Temp. & Precip.
- Daily Tabular data (~23 KB)
- Monthly Tabular data (~1 KB)
- NCDC 1961-1990 Normals (~3 KB)

### Period of Record

- Station Metadata
- Station Metadata Graphics

# RED LODGE, MONTANA (246918)

### Period of Record Monthly Climate Summary

**Period of Record : 03/01/1894 to 06/10/2016**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Max. Temperature (F) | 32.9 | 35.2 | 41.1 | 51.2 | 60.5 | 69.4 | 78.4 | 77.2 | 66.5 | 55.5 | 42.3 | 35.1 | 53.8 |
| Average Min. Temperature (F) | 10.8 | 12.9 | 18.2 | 27.8 | 36.2 | 43.5 | 49.7 | 48.1 | 39.8 | 31.4 | 20.8 | 14.0 | 29.4 |
| Average Total Precipitation (in.) | 0.98 | 0.88 | 1.83 | 2.81 | 3.64 | 2.73 | 1.41 | 1.23 | 1.98 | 1.76 | 1.17 | 0.88 | 21.31 |
| Average Total SnowFall (in.) | | | | | | No | Data | | | | | | |
| Average Snow Depth (in.) | | | | | | No | Data | | | | | | |

Percent of possible observations for period of record.
Max. Temp.: 93.8% Min. Temp.: 93.6% Precipitation: 93.5% Snowfall: 93.2% Snow Depth: 87%
Check Station Metadata or Metadata graphics for more detail about data completeness.

---

*Western Regional Climate Center, wrcc@dri.edu*

# Appendix I

Target Rate and Population Data

COMMUNITY DEVELOPMENT DIVISION

# Census and Target Rate 2010 Info

For 2018 application submissions for TSEP or CDBG, please see the 2015 American Community Survey data.

Search below for 2010 American Communities Survey data used to calculate target rates when applying to the **Treasure State Endowment Program** and **Community Development Block Group Grant Program.**

## Select a Location:

City/Designated location Red Lodge city **or** County Choose County

| | |
|---|---|
| **City** | Red Lodge city |
| **County** | *Carbon County* |
| **Total Population** | 2,125 |
| **Total Households** | 1,082 |
| **Median Household Income** | $50,352 |
| **Low & Moderate Income Percent** | 37.94% |
| **Percent Poverty** | 18.2 % |

### Target Rates

| | |
|---|---|
| **Water & Waste Water** | $96.51 |
| **Water Only** | $58.74 |
| **WasteWater Only** | $37.76 |
| **Solid Waste Only** | $12.59 |

Amounts are computed using the 2010 census and target percentage rationale reviewed biennially by Commerce. The target percentages are:

2.3% combined (water and wastewater)
1.4% for water alone
0.9% for wastewater alone
0.3% for solid waste

For example: Community median household income is $25,000 and the residents pay both water and wastewater rates, the calculation would be: $25,000 times 2.3% divided by 12 equals monthly target rate of $47.92. (25,000 x 2.3%)/12 = $47.92)

Having trouble finding data for your community? Some communities may not be listed in the resources above because the American Community Survey (ACS) did not provide 2010 MHI data for those areas. Additionally, some 2000 Census Designated Place areas have updated boundaries in the 2010 ACS data. Please contact us at (406) 841-2770 or email **TSEP** or **CDBG** if you have any questions about this information.

## Mapping

To see maps of the City/Town/CDP or County in which you are interested, please go to **http://ceic.mt.gov/**. For more information about the maps or tools available, please contact the Census and Economic Information Bureau at (406) 841-2713 or email **ceic@mt.gov**.

## Contacts

| | |
|---|---|
| Treasure State Endowment Program (TSEP) | 406 841-2770 |
| Community Development Block Grant Program (CDBG) | 406 841-2770 |
| Census & Economic Information Center | 406 841-2740 |

## Definitions

**Census Designated Place (CDP):** Census designated places (CDPs) have been created for each decennial census as the statistical counterparts of incorporated places. CDPs are delineated to provide census data for concentrations of population, housing, and commercial structures that are identifiable by name but are not within an incorporated place. CDP boundaries usually are defined in cooperation with state, local, and tribal officials. These boundaries, which usually coincide with visible features or the boundary of an adjacent incorporated place or other legal entity boundary, have no legal status, nor do these places have officials elected to serve traditional municipal functions.

**Household:** A household includes all the people who occupy a housing unit as their usual place of residence.

**Income of households:** This includes the income of the householder and all other individuals 15 years old and over in the household, whether they are related to the householder or not.

**Low and Moderate Income Percent:** Low and Moderate Income Percent is calculated by U.S. Housing and Urban Development (HUD) using data from the U.S. Census Bureau's Decennial Census, specifically for the Community Development Block Grant Program (CDBG). LMI families are defined as those families whose income does not exceed 80% of the county median income for the previous year or 80% of the median income of the entire non-metropolitan area of the State of Montana, whichever is higher.

**Median income:** The median income divides the income distribution into two equal groups, one having incomes above the median, and other having incomes below the median.

**Notes:** Total Population and Total Households are from Summary File (SF) 1, 100% data. Poverty Rates and Median Household Income are from Summary File (SF) 3, Sample data. Low and Moderate Income Percentage was developed by HUD using Census 2010 data.

**Sources:** U.S. Census Bureau & HUD
Median Household Income
*Census Bureau, American Community Survey 2006 - 2010 Estimates*

Total Population & Households
*U.S. Census Bureau, 2010 Census - Summary File 1 (SF1) 100% Data*

Low to Moderate Income Percent
*HUD 2014 Low and Moderate Income Data*

COMMUNITY DEVELOPMENT DIVISION

# Census and Target Rate 2015 Info

## CDD Target Rate Calculation Resource

The Community Development Division (CDD) has updated the U.S. Census Bureau's American Communities Survey (ACS) data set 2011-2015 for the calculation of local government target rates. The Treasure State Endowment Program (TSEP) and Community Development Block Grant (CDBG) programs use ACS information as the base data set to calculate applicant target rates for community infrastructure systems.

These calculated rates, along with other demographic information, are components of the review and analysis of applications submitted to the programs for funding requests. Applications to be submitted in 2018 or later for TSEP or CDBG programs must use the 2015 ACS data for the calculation of target rates for an applicant.

Search below for 2015 American Communities Survey data used to calculate target rates when applying to the **Treasure State Endowment Program** and **Community Development Block Group Grant Program.**

## Select a Location:

City/Designated location Red Lodge city **or** County Choose County

| | |
|---|---|
| **City** | Red Lodge city |
| **County** | *Carbon County* |
| **Total Population** | 2,236 |
| **Total Households** | 1,038 |
| **Median Household Income** | $42,500 |
| **Low & Moderate Income Percent** | 48.97% |
| **Percent Poverty** | 20.6 % |

### Target Rates

| | |
|---|---|
| **Water & Waste Water** | $81.46 |
| **Water Only** | $49.58 |
| **WasteWater Only** | $31.88 |
| **Solid Waste Only** | $10.63 |

Amounts are computed using the 2015 census and target percentage rationale reviewed biennially by Commerce. The target percentages are:

2.3% combined (water and wastewater)
1.4% for water alone
0.9% for wastewater alone
0.3% for solid waste

For example: Community median household income is $25,000 and the residents pay both water and wastewater rates, the calculation would be: $25,000 times 2.3% divided by 12 equals monthly target rate of $47.92. (25,000 x 2.3%)/12 = $47.92)

Having trouble finding data for your community? Some communities may not be listed in the resources above because the American Community Survey (ACS) did not provide 2015 MHI data for those areas. Please contact us at (406) 841-2770 or email **TSEP** or **CDBG** if you have any questions about this information.

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**Notes:** Total Population and Total Households are from Summary File (SF) 1, 100% data. Poverty Rates and Median Household Income are from Summary File (SF) 3, Sample data. Low and Moderate Income Percentage was developed by HUD using Census 2010 data.

**Sources:** U.S. Census Bureau & HUD
Median Household Income
*Census Bureau, American Community Survey 2011 - 2015 Estimates*

Total Population & Households
*U.S. Census Bureau, 2015 Census - Summary File 1 (SF1) 100% Data*

Low to Moderate Income Percent
*HUD 2015 Low and Moderate Income Data*

## Target Rates for 2010 Census Data

**View 2010 Census data rates** for comparison purposes.

# Red Lodge, Montana Population:
# Census 2010 and 2000 Interactive Map, Demographics, Statistics, Quick Facts

Compare population statistics about Red Lodge, MT by race, age, gender, Latino/Hispanic origin etc. CensusViewer delivers detailed demographics and population statistics from the 2010 Census, 2000 Census, American Community Survey (ACS), registered voter files, commercial data sources and more.

Experience breakthrough technology for census data discovery, population analysis and visualization over Bing Maps. Visually "fly over" a state, viewing in great detail the census blocks, census tracts, cities, counties and various political districts in your selection or "zoom down" to the street level to get demographic statistics and information about the population in an individual census block or census tract.

Click on any map link to see our blazing-fast data visualization over Bing Maps in action. Read more about the unprecedented demographic insight and analytical power of CensusViewer interactive maps.

CensusViewer maps, data and statistics pages for all states, counties and cities.

| Red Lodge, Montana - Overview | 2010 Census | | 2000 Census | | 2000-2010 Change | |
|---|---|---|---|---|---|---|
| | Counts | Percentages | Counts | Percentages | Change | Percentages |
| Total Population | | | | | | |
| Total Population | 2,125 | 100.00% | 2,177 | 100.00% | -52 | -2.39% |
| | | | | | | |
| Population by Race | | | | | | |
| American Indian and Alaska native alone | 13 | 0.61% | 24 | 1.10% | -11 | -45.83% |
| Asian alone | 6 | 0.28% | 10 | 0.46% | -4 | -40.00% |
| Black or African American alone | 9 | 0.42% | 9 | 0.41% | 0 | 0% |
| Native Hawaiian and Other Pacific native alone | 2 | 0.09% | | 0% | 0 | 0% |
| Some other race alone | 13 | 0.61% | 10 | 0.46% | 3 | 30.00% |
| Two or more races | 35 | 1.65% | 31 | 1.42% | 4 | 12.90% |
| White alone | 2,047 | 96.33% | 2,093 | 96.14% | -46 | -2.20% |
| | | | | | | |
| Population by Hispanic or Latino Origin (of any race) | | | | | | |
| Persons Not of Hispanic or Latino Origin | 2,085 | 98.12% | 2,134 | 98.02% | -49 | -2.30% |
| Persons of Hispanic or Latino Origin | 40 | 1.88% | 43 | 1.98% | -3 | -6.98% |

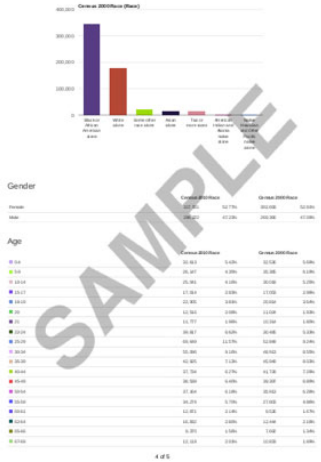
| | | | | | | |
|---|---|---|---|---|---|---|
| Population by Gender | | | | | | |
| Female | 1,075 | 50.59% | 1,125 | 51.68% | -50 | -4.44% |
| Male | 1,050 | 49.41% | 1,052 | 48.32% | -2 | -0.19% |
| | | | | | | |
| Population by Age | | | | | | |
| Persons 0 to 4 years | 63 | 2.96% | 96 | 4.41% | -33 | -34.38% |
| Persons 5 to 17 years | 294 | 13.84% | 343 | 15.76% | -49 | -14.29% |
| Persons 18 to 64 years | 1,347 | 63.39% | 1,316 | 60.45% | 31 | 2.36% |
| Persons 65 years and over | 421 | 19.81% | 422 | 19.38% | -1 | -0.24% |

## Red Lodge, Montana Registered Voters - Overview Statistics and Quick Facts

## CensusViewer - Graphs & Tables: Race by Age

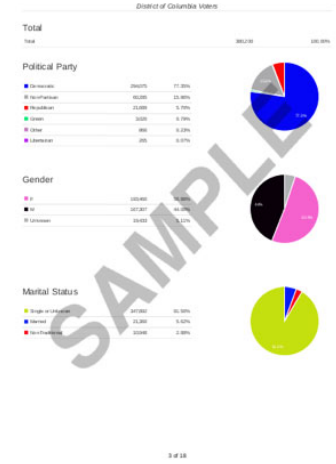
## CensusViewer - Graphs & Tables: Hispanic/Latino Origin

X
Download Reports for Red Lodge, Montana




Click here to download a sample Census 2010/2000 Race PDF.

Click here to download a sample Census 2010/2000 Latino PDF.




Click here to download a sample Voter PDF.

**Here's what you get...**

PDF Reports for:

1. Census 2010/2000 Race for Red Lodge, Montana [**SAMPLE**]
2. Census 2010/2000 Latino for Red Lodge, Montana [**SAMPLE**]
3. Voter for Red Lodge, Montana [**SAMPLE**]

CSV Files for:

1. Census 2010 Race for Red Lodge, Montana
2. Census 2010 Latino for Red Lodge, Montana
3. Census 2000 Race for Red Lodge, Montana
4. Census 2000 Latino for Red Lodge, Montana
5. Montana Voters for Red Lodge, Montana

| Historic Population Data | | |
|---|---|---|
| City of Red Lodge and Carbon County | | |
| Decennial Census | Carbon County | City of Red Lodge |
| 2010 | 10,078 | 2,125 |
| 2000 | 9,552 | 2,177 |
| 1990 | 8,080 | 1,958 |
| 1980 | 8,099 | 1,896 |
| 1970 | 7,080 | 1,844 |
| 1960 | 8,317 | 2,278 |
| 1950 | 10,241 | 2,730 |
| 1940 | 11,865 | 2,950 |
| 1930 | 12,571 | 3,026 |
| 1920 | 15,279 | 4,515 |
| 1910 | 13,962 | 4,860 |
| 1900 | 7,533 | 2,152 |
| 1890 | | 624 |

Source of County Data: U.S. Decennial Census

Source of City Data: Moffatt, Riley, Population of History of Western U.S. Cities & Towns, 1850-1990, Scarecrow Press, 1996

Note: Riley Moffat is Senior Librarian and Head of Reference, Joseph F. Smith Library, Brigham Young University, Hawaii Campus

**Population History**

| | Red Lodge | | Carbon County | |
|---|---|---|---|---|
| Census | Population | % Annual Growth | Population | % Annual Growth |
| 1890 | -- | -- | -- | -- |
| 1900 | -- | -- | -- | -- |
| 1910 | 4,860 | -- | -- | -- |
| 1920 | 4,515 | -0.7% | 15,279 | -- |
| 1930 | 3,026 | -3.9% | 12,571 | -1.9% |
| 1940 | 2,950 | -0.3% | 11,865 | -0.6% |
| 1950 | 2,730 | -0.8% | 10,241 | -1.5% |
| 1960 | 2,278 | -1.8% | 8,317 | -2.1% |
| 1970 | 1,844 | -2.1% | 7,080 | -1.6% |
| 1980 | 1,896 | 0.3% | 8,099 | 1.4% |
| 1990 | 1,958 | 0.3% | 8,080 | 0.0% |
| 2000 | 2,177 | 1.1% | 9,552 | 1.7% |
| 2010 | 2,125 | -0.2% | 10,078 | 0.5% |
| 2015 | 2,236 | 0.5% | 10,268 | 0.2% |

**Population Projections**

| | Red Lodge | | Carbon County | |
|---|---|---|---|---|
| Year | Population | % Annual Growth | Population | % Annual Growth |
| 2010 | 2,125 | | 10,078 | |
| 2011 | 2,146 | 1.0% | 10,179 | 1.0% |
| 2012 | 2,168 | 1.0% | 10,281 | 1.0% |
| 2013 | 2,189 | 1.0% | 10,383 | 1.0% |
| 2014 | 2,211 | 1.0% | 10,487 | 1.0% |
| 2015 | 2,233 | 1.0% | 10,592 | 1.0% |
| 2016 | 2,256 | 1.0% | 10,698 | 1.0% |
| 2017 | 2,278 | 1.0% | 10,805 | 1.0% |
| 2018 | 2,301 | 1.0% | 10,913 | 1.0% |
| 2019 | 2,324 | 1.0% | 11,022 | 1.0% |
| 2020 | 2,347 | 1.0% | 11,132 | 1.0% |
| 2030 | 2,593 | 1.0% | 12,297 | 1.0% |
| 2038 | 2,808 | 1.0% | 13,316 | 1.0% |
| 2040 | 2,864 | 1.0% | 13,584 | 1.0% |
| 2050 | 3,164 | 1.0% | 15,005 | 1.0% |

# QuickFacts

## Montana; Carbon County, Montana

QuickFacts provides statistics for all states and counties, and for cities and towns with a ***population of 5,000 or more***.

## Table

| All Topics | Montana | Carbon County, Montana |
|---|---|---|
| **Population per square mile, 2010** | **6.8** | **4.9** |
| **PEOPLE** | | |
| **Population** | | |
| Population estimates, July 1, 2017, (V2017) | 1,050,493 | NA |
| Population estimates, July 1, 2016, (V2016) | 1,042,520 | 10,460 |
| Population estimates base, April 1, 2010, (V2017) | 989,414 | NA |
| Population estimates base, April 1, 2010, (V2016) | 989,414 | 10,078 |
| Population, percent change - April 1, 2010 (estimates base) to July 1, 2017, (V2017) | 6.2% | NA |
| Population, percent change - April 1, 2010 (estimates base) to July 1, 2016, (V2016) | 5.4% | 3.8% |
| Population, Census, April 1, 2010 | 989,415 | 10,078 |
| **Age and Sex** | | |
| Persons under 5 years, percent, July 1, 2016, (V2016) | 6.0% | 3.7% |
| Persons under 5 years, percent, April 1, 2010 | 6.3% | 4.1% |
| Persons under 18 years, percent, July 1, 2016, (V2016) | 21.8% | 17.9% |
| Persons under 18 years, percent, April 1, 2010 | 22.6% | 19.7% |
| Persons 65 years and over, percent, July 1, 2016, (V2016) | 17.7% | 24.0% |
| Persons 65 years and over, percent, April 1, 2010 | 14.8% | 18.8% |
| Female persons, percent, July 1, 2016, (V2016) | 49.7% | 49.1% |
| Female persons, percent, April 1, 2010 | 49.8% | 49.3% |
| **Race and Hispanic Origin** | | |
| White alone, percent, July 1, 2016, (V2016) (a) | 89.2% | 96.5% |
| Black or African American alone, percent, July 1, 2016, (V2016) (a) | 0.6% | 0.6% |
| American Indian and Alaska Native alone, percent, July 1, 2016, (V2016) (a) | 6.6% | 1.3% |
| Asian alone, percent, July 1, 2016, (V2016) (a) | 0.8% | 0.4% |
| Native Hawaiian and Other Pacific Islander alone, percent, July 1, 2016, (V2016) (a) | 0.1% | Z |
| Two or More Races, percent, July 1, 2016, (V2016) | 2.7% | 1.2% |
| Hispanic or Latino, percent, July 1, 2016, (V2016) (b) | 3.6% | 2.6% |
| White alone, not Hispanic or Latino, percent, July 1, 2016, (V2016) | 86.5% | 94.2% |
| **Population Characteristics** | | |
| Veterans, 2012-2016 | 87,936 | 1,131 |
| Foreign born persons, percent, 2012-2016 | 2.0% | 1.3% |
| **Housing** | | |
| Housing units, July 1, 2016, (V2016) | 497,756 | 6,439 |
| Housing units, April 1, 2010 | 482,825 | 6,441 |
| Owner-occupied housing unit rate, 2012-2016 | 67.2% | 78.0% |
| Median value of owner-occupied housing units, 2012-2016 | $199,700 | $217,700 |
| Median selected monthly owner costs -with a mortgage, 2012-2016 | $1,307 | $1,241 |
| Median selected monthly owner costs -without a mortgage, 2012-2016 | $392 | $395 |
| Median gross rent, 2012-2016 | $732 | $770 |
| Building permits, 2016 | 4,781 | 8 |
| **Families & Living Arrangements** | | |
| Households, 2012-2016 | 412,653 | 4,385 |
| Persons per household, 2012-2016 | 2.41 | 2.34 |
| Living in same house 1 year ago, percent of persons age 1 year+, 2012-2016 | 83.5% | 89.0% |
| Language other than English spoken at home, percent of persons age 5 years+, 2012-2016 | 3.9% | 4.7% |
| **Education** | | |
| High school graduate or higher, percent of persons age 25 years+, 2012-2016 | 92.9% | 93.9% |
| Bachelor's degree or higher, percent of persons age 25 years+, 2012-2016 | 29.9% | 29.2% |
| **Health** | | |
| With a disability, under age 65 years, percent, 2012-2016 | 9.3% | 10.5% |

| | | |
|---|---|---|
| Persons without health insurance, under age 65 years, percent | ⚠ 9.8% | ⚠ 15.0% |
| **Economy** | | |
| In civilian labor force, total, percent of population age 16 years+, 2012-2016 | 63.2% | 60.4% |
| In civilian labor force, female, percent of population age 16 years+, 2012-2016 | 59.4% | 56.8% |
| Total accommodation and food services sales, 2012 ($1,000) (c) | 2,420,455 | 24,815 |
| Total health care and social assistance receipts/revenue, 2012 ($1,000) (c) | 6,469,475 | D |
| Total manufacturers shipments, 2012 ($1,000) (c) | 11,535,236 | D |
| Total merchant wholesaler sales, 2012 ($1,000) (c) | 12,645,824 | D |
| Total retail sales, 2012 ($1,000) (c) | 15,623,573 | D |
| Total retail sales per capita, 2012 (c) | $15,544 | NA |
| **Transportation** | | |
| Mean travel time to work (minutes), workers age 16 years+, 2012-2016 | 17.9 | 28.2 |
| **Income & Poverty** | | |
| Median household income (in 2016 dollars), 2012-2016 | $48,380 | $52,869 |
| Per capita income in past 12 months (in 2016 dollars), 2012-2016 | $27,309 | $30,461 |
| Persons in poverty, percent | ⚠ 13.3% | ⚠ 10.3% |

## BUSINESSES

| | | |
|---|---|---|
| **Businesses** | | |
| Total employer establishments, 2015 | 37,270[1] | 415 |
| Total employment, 2015 | 375,041[1] | 2,211 |
| Total annual payroll, 2015 ($1,000) | 14,227,065[1] | 59,716 |
| Total employment, percent change, 2014-2015 | 3.1%[1] | 2.5% |
| Total nonemployer establishments, 2015 | 86,969 | 1,126 |
| All firms, 2012 | 112,419 | 1,780 |
| Men-owned firms, 2012 | 55,913 | 647 |
| Women-owned firms, 2012 | 35,449 | 515 |
| Minority-owned firms, 2012 | 5,578 | 34 |
| Nonminority-owned firms, 2012 | 102,746 | 1,676 |
| Veteran-owned firms, 2012 | 11,486 | 99 |
| Nonveteran-owned firms, 2012 | 93,393 | 1,408 |

## GEOGRAPHY

| | | |
|---|---|---|
| **Geography** | | |
| **Population per square mile, 2010** | **6.8** | **4.9** |
| Land area in square miles, 2010 | 145,545.80 | 2,048.79 |
| FIPS Code | 30 | 30009 |

**Value Notes**

**1.** Includes data not distributed by county.

This geographic level of poverty and health estimates is not comparable to other geographic levels of these estimates

Some estimates presented here come from sample data, and thus have sampling errors that may render some apparent differences between geographies statistically indistinguishable. Click the Quick Info icon to the left of ea
TABLE view to learn about sampling error.

The vintage year (e.g., V2017) refers to the final year of the series (2010 thru 2017). *Different vintage years of estimates are not comparable.*

**Fact Notes**

**(a)** Includes persons reporting only one race
**(b)** Hispanics may be of any race, so also are included in applicable race categories
**(c)** Economic Census - Puerto Rico data are not comparable to U.S. Economic Census data

**Value Flags**

**-** Either no or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest or upper interval of distribution.
**D** Suppressed to avoid disclosure of confidential information
**F** Fewer than 25 firms
**FN** Footnote on this item in place of data
**NA** Not available
**S** Suppressed; does not meet publication standards
**X** Not applicable
**Z** Value greater than zero but less than half unit of measure shown

QuickFacts data are derived from: Population Estimates, American Community Survey, Census of Population and Housing, Current Population Survey, Small Area Health Insurance Estimates, Small Area Income and Poverty State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits.

# Appendix J

## As Constructed MDT Plans for Stormwater Systems

trunkline along the center of the proposed roadway and connect this new P-78 trunkline with the proposed trunkline in Highway 212. This will replace the current system within P-78 which allows all of the ditch water to enter the 24-inch pipe along Brewery Hill. Once the new trunkline is in place, the only inflow into the existing 12-inch/15-inch system will be an area inlet for the firehouse property, the water coming from the Villard Avenue trunkline, and new curb inlets proposed on the east and west legs of the roundabout intersection of P-78 and Highway 212.

Finally, there is an existing 8-inch PVC outfall pipe discharging into the roadside ditch on the west side of Highway 212 in front of the Red Lodge Ales building which is draining their on-site storm drain detention pond. The pond is designed to retain the 100-year runoff volume. A maximum outflow from this pipe was calculated using the existing pipe slope and is considered to contribute 2.5 cfs to the ditch during the design storm event. This pipe is to be used as is in the new design.

## 5.0 PROPOSED CONSTRUCTION

The project will incorporate curb and gutter, area inlets, curb inlets, storm drain trunkline and laterals from the beginning of the project to the developed limits of Red Lodge. A storm drain collection system is needed along the project because of the implementation of curb and gutter. Impervious area, and therefore stormwater runoff, along Highway 212 will increase due to roadway widening, larger intersections, and the extension of 4th Street from Highway 212 to Villard Avenue.

Existing drainage patterns will be affected somewhat due to the new typical roadway section with curb and gutter along 4th Street as well as curb and gutter around the proposed cul-de-sac on Villard Avenue. Curb inlets will convey street runoff to the trunkline system, while area drop inlets are proposed to handle overland drainage collecting in low areas along the roadway. The City of Red Lodge is currently designing new curb and gutter and sidewalk down the east side of Villard Avenue ultimately connecting to both the 4th Street and cul-de-sac curb to be placed with the Highway 212 project. This will, in effect, direct flows coming from the southwest residential area, down along this new curb to the proposed inlet within the cul-de-sac.

Within the rural section of the project the ditch sections on both sides of the roadway will be reconstructed. Crossings from the west side under the Highway to the east ditch will typically be

perpetuated in approximately the same locations as existing crossings, however there are a few crossings being added in order to prevent ponding/flooding of adjacent properties.

## 6.0 HORIZONTAL ALIGNMENT

The proposed project centerline will generally coincide with the existing centerline of the roadway. An existing "S" curve in the area of the P-78 (3rd Street) intersection will be replaced and a roundabout constructed at the Highway 212/P-78 intersection. The alignment entering and exiting the roundabout will include a series of horizontal curves. Likewise, a roundabout will be installed at the intersection of Two-Mile Bridge Road on the northern end of the project, which will also consist of the necessary curved alignment for the roundabout. In addition, the horizontal alignment includes a 1,000-foot radius curve to the left between 6th Street and 7th Street. There is a horizontal alignment shift by approximately 8-feet to the east via an "S" curve with a 5,700 foot radius to the right and then 5,700 foot radius to the left within the Station range of 46+00 to 50+25. From Sta. 50+25 to 63+00, the 8-foot shift to the east stays constant to minimize right-of-way and functional impacts to businesses in the area. From 63+00 to 74+00, the alignment shifts back to matching existing through an "S" curve with a 7,700 foot radius to the left and then a 7,700 foot radius back to the right. All curves within the project limits are large enough to not require any super elevation and will consist of a normal crown typical section.

## 7.0 VERTICAL ALIGNMENT

Existing roadway slopes have a consistent down-grade from south to north within the project limits, and is fairly consistent at +/- 1.5 percent.

The proposed roadway vertical alignment also projects an approximate grade of +/- 1.5-percent throughout the project limits. The proposed vertical alignment was established to minimize cuts and fills, create desirable connections to private and public approaches, and balance these objectives with vertical clearance requirements over proposed and existing underground utilities. Roadside ditches were also evaluated when fine tuning the vertical alignment. A few vertical curves are proposed throughout the project in order to accommodate the design objectives stated above. The two vertical sags that will occur within the alignment are at each proposed roundabout on the south

approaches. To accommodate drainage requirements, a network of storm drain inlets, curb and gutter, and other drainage design features are proposed.

The sidewalk alignment will generally be dependent on the vertical alignment of the roadway. In the areas that include a 10-foot bike trail, the vertical alignment of this trail may or may not be dependent on the mainline alignment depending on the desired grading and hydraulic effects of this feature.

## 8.0 HYDROLOGY & HYDRAULICS

This section will provide an overview of the hydrology and hydraulic criteria and approaches used in this project. To determine the peak discharge, the rational method and MDT's "STORM" program were utilized because the contributing areas were each under 200 acres. Runoff coefficients were determined based on existing land use and a type "B" Hydrologic Soils Group. The area around Highway 212 varies in land use from commercial, dense urban, to low-density residential. Sanderson Stewart has conducted the hydrologic analysis of the 'base' watershed to determine the runoff characteristics and flow rates for the stormwater trunkline which MDT assumes financial responsibility. This watershed encompasses contributing areas to the system up to one-half block either side of the Highway. The actual contributing drainage area associated with the project did not produce flows that will require any upsizing of trunkline pipe sizes. The design storm based on the minor arterial classification was determined to be the 10-year, 1-hour storm, which is consistent with table 4-1 in the Hec-22 Manual as well as Chapter 13 in the MDT manual guidelines. The pipe sizes were determined assuming the pipe flow depth would not exceed 75-percent of the pipe diameter (91-percent of full-pipe flow capacity). Also, a minimum flushing velocity of 2.5 ft/s has been provided. Maximum flow velocities typically desired by MDT will be exceeded at some locations where steep grades on the trunkline are required. Therefore, entrance and exit headlosses at each manhole have been hand-calculated to account for the sizeable losses due to these high velocities. MDT's inlet spacing excel worksheet was used in designing the proper inlet spacing along the corridor. Spread width requirements vary based on the typical section and design speed of the roadway. Area drop inlets have been placed in locations where natural drainage patterns for stormwater runoff from offsite leads up to the roadway fill and collects.

## Design Parameters – Urban Section

Hydrology

- Because the classification of Highway 212 is a minor arterial and the design speed throughout the urban section is 35 mph, it was determined that a design storm frequency of 10-year would be used. Intensity-versus-duration values for the City of Billings will be used per MDT's comments made in the Hydraulics Memo dated April 27, 2010 (See correspondence section of Appendix G).
- The rational method was utilized with a weighted runoff coefficient calculated for all contributing areas. Where applicable, a composite coefficient for the proposed roadway was calculated taking into consideration a 5-foot boulevard on each side of the road.
- MDT assumes financial responsibility for project storm drain facilities that accommodate the contributing storm runoff limited to one-half block either side of the corridor.
- The actual contributing areas were calculated based upon field observation, available topo, discussion with City of Red Lodge public works director, and project cross sections.

Hydraulics

- Storm drain trunkline was sized based on a maximum depth of flow of 75-percent of the pipe diameter, or approximately 91-percent full capacity. Irrigation class reinforced concrete pipe (RCP-IRR) class III, 18 inches in diameter is the minimum trunkline size for the proposed main.
- Lateral pipe sizes meet a minimum slope of 0.0075 ft/ft.
- A minimum flushing velocity of 2.5 ft/s and a maximum of 10 ft/s where possible.
- Head losses occurring at access manholes, where sizeable, were accounted for with an additional drop in the outgoing invert elevation.

## Design Parameters – Rural Section

Hydrology

- US Highway 212 has a design year ADT of greater than 3,000 vehicles per day; therefore, the design storm that was used for the rural section of the project was a

50-year, 1-hour storm per Table A-1 in Appendix A of the Hydrology Chapter of the MDT Hydraulics Manual.

- The rational method was also used in the rural section with a weighted runoff coefficient calculated for all contributing areas.
- Small ditches traversing through the adjacent land on the west side of the highway were considered to be overtopped with a 50-year event and, therefore, did not dictate the overall flow patterns during the design storm.

Hydraulics

- A comparison of the existing and proposed ditch capacities has been conducted at several locations near culvert crossings (see calculations in Appendix F). It demonstrates that the proposed ditch section on the west side of the road will not decrease capacity from what is seen under existing ditch conditions, and that they will adequately contain the design storm. In some cases a ditch block and berm will be built on in the west ditch and wrap around the inlet end of a culvert crossing mainline in order to provide the necessary elevation to contain and divert the total design flow through that crossing.
- A comparison of the existing and proposed culvert crossings within the rural section was completed. Calculations for these comparisons can be found in Appendix F.
- Culvert pipe material selections have been based on pertinent geotechnical information for the in situ soils and minimum cover requirements.

AND THEY ARE.....

## 9.0 STORM DRAIN DESIGN

There are storm drain plan and profile sheets included with this report and can be found in Appendix A of this report.

### Inlets

Inlet locations were determined using an MDT Inlet Spacing Excel spreadsheet, based on the maximum spread width criteria set forth in the MDT Hydraulics Manual. Within the project there are three main typical sections specified; one being a two-lane facility with on-street parking, another being a three-lane facility without parking, and the other being a three-lane facility with raised median and shoulder. During the 10-year storm event, the allowed spread width for a two-lane

facility with parking is limited to the parking lane. For a two-lane facility without parking the spread width is limited to the shoulder plus one-half the travel lane. Three-lane facilities require a spread width confined to the shoulder plus one-half the travel lane. Within the rural limits of the project where speeds are 45 mph or greater, the spread width will be limited to the 6-foot shoulder per the HEC-22 manual recommendations. Table 1 shows spread width criteria for specific Station ranges throughout the project. Also, see correspondence with MDT's hydraulics section, and a hydraulics discussion memo dated February 18, 2010, which are included in Appendix G for further clarification on storm drain design parameters.

**Table 1 – Maximum Allowed Spread Width**

| Station Range | Typical Section | Max. Allowable Spread Width |
|---|---|---|
| 17+14.40 to 18+33.94 | Two-lane no parking (west only) | 2' Shoulder + half 12' travel lane = 8' |
| 18+54.66 to 31+30.87 | Two-lane with parking | 10' parking lane = 10' |
| 32+27.12 to 32+60.10 | Two-lane no parking (west only) | 2' Shoulder + half 12' travel lane = 8' |
| 32+73.90 to 34+44.62 | Two-lane no parking (east & west) | 4' Shoulder + half 12' travel lane = 10' |
| 36+93.49 to 37+92.82 | Two-lane no parking (east & west) | 4' Shoulder + half 12' travel lane = 10' |
| 37+92.82 to 56+00.00 | Three-lane | 6' Shoulder + half 12' travel lane = 12' |
| 56+00.00 to 60+73.06 | Three-lane with speed ≥ 45 mph | 6' shoulder |
| Oakes Avenue | One-way with parking | 19' parking lane |
| 4th Street | Two-lane with parking | 8' parking lane |

A contributing drainage area for each of the proposed inlet locations was derived from site topography and field observation. See Excel worksheets in Appendix B for the size and weighted "C" of each of these sub-areas. It was found that, in general, the worst case scenario for storm drain discharge at the inlets consisted of stormwater contributions limited to the area only within the proposed typical width, which is primarily impervious area except for a landscaped boulevard. MDT Inlet Spacing worksheet printouts, and corresponding exhibits for inlet spacing runs along the entire corridor can also be found in Appendix B.

City of Red Lodge Public Works Director, Skip Boyer, was asked if the City had a preference for which type of storm drain inlet is proposed with this project. He indicated that they would prefer to use the same inlets that the City of Billings is using. After approval from MDT, it was determined

that this project would utilize the City of Billings preferred inlets, which are 1.5-foot by 3.0-foot rectangular curb inlets that are mounted on a concrete 2.0-foot by 3.0-foot box structure. These inlets are currently being used by the City of Billings, and it was Skip's desire that the same structures as what the City of Billings uses be specified for this project so that replacement parts are readily available. On-grade inlets will use a curved vane grate, while sag inlets will have safety parallel bar grates. These inlets also have a curb opening for the 3-foot length of the inlet but were not included in the capacity calculations per instruction by the HEC-22 manual. The slope of the grate from the lip of curb to the flow line of the inlet is nearly 14-percent which effectively depresses the inlet 2.5-inches. MDT personnel along with City of Red Lodge ile infrastructure associated with this project will be owned by MD m drain system will be a joint effort between the two agencies.

ONLY DEPRESSED 1 3/4"

HOW IS C&G GOING TO BE TRANSFERED IN

IS THERE ANY CALCS TO SHOW BENEFIT OF EXTRA DEPRESSION, SEE HEC-22 SECT. 4.4.4.2, FIG. 4-13

There are existing drainage patterns where runoff had previously b ng roadside ditches and culvert system. With the proposed improvements, it was determined that in these low-lying areas where the roadway acts as a barrier and ponding against roadway fill will occur, standard type IV drop inlets and lateral pipes will be used to carry this water to the storm drain system within the highway. The calculations for each of the area inlet's flow and corresponding drainage areas can be found in Appendix C.

**Trunkline**

MDT assumes financially responsibility for Highway 212 storm drain facilities that accommodate a 10-year storm runoff event from the area encompassed within one-half block either side of the corridor. Both this watershed and the actual contributing watershed were analyzed to produce peak flows and trunkline slopes and sizes. Included with this report are exhibits and design calculations for both of these analyses, which are located in Appendix D. The one-half block watershed peak flow analysis did not result in any deviation in pipe size requirements from what the actual watershed analysis produced.

Also part of the trunkline sizing exercise was to account for the storm drain runoff associated with the MDT Red Lodge-NW (STPP 78-1(8)0; UPN 4890) project along P-78. Calculations were given to Sanderson Stewart by the Hydraulics section of MDT that show a peak flow of 28.03 cfs will contribute to the Highway 212 trunkline at a time to concentration of 23.03 minutes. To calculate a

worst case scenario flow in producing the trunkline design within Highway 212 from P-78 north, 28.03 cfs was added to the Highway 212 flow calculated at a 23.03 time to concentration.

After talking with the City of Red Lodge public works and identifying the logical outfall locations to be utilized with this project, two systems of proposed storm drain trunk main have been identified within the project limits. In addition, two systems of existing trunk main, a 15-inch PVC main within 8th Street and a 15-inch PVC main within 3rd Street will also be utilized. Details of these storm drain facilities, existing and proposed, can be observed in the storm drain plans presented in Appendix A.

The reaches of proposed storm drain trunkline include:

1. An 18-inch RCP-IRR main from Sta. 20+32 (near the intersection of Highway 212 and 7th Street) to Sta. 29+05. From Sta. 29+05 the pipe is sized at a 24-inch RCP-IRR until Sta. 34+47.32 where the trunkline drops to an approximate depth of 10.5 feet from finished grade. The trunkline for this segment is a 30-inch RCP-IRR and crosses beneath the existing 15-inch PVC storm drain trunkline in 3rd Street at a grade of 0.3-percent. After this crossing, there is a proposed manhole to which the trunkline coming from the west down P-78 will connect into the Highway 212 trunkline. The trunkline continuing north from this point remains a 30-inch RCP-IRR until Sta. 53+30.10 where it leaves the roadway as a 42-inch RCP-IRR to the east. Originally, it was anticipated that City Public Works would construct an outfall ditch to Rock Creek; recently this effort has become less certain due to fiscal constraints. Therefore Sanderson Stewart developed a preliminary route for the outfall ditch. The alignment of the trunkline after it leaves the roadway has been designed largely based on the ground elevations and maintaining adequate cover over the proposed trunkline. Also taken into consideration was avoiding conflicts with an existing gas main and existing sewer main that traverses along the southern property line of the Beartooth Electric property. As a result, the proposed storm drain trunkline has been placed 10-feet on center south from the southern property line of the Beartooth Electric property and will likely require a 20-foot utility easement for a distance of approximately 100 feet through the Ready-Mix property. Once the trunkline is back on City property, it outfalls in to an open ditch with a 4-foot

bottom width and 2:1 side slopes which will carry the storm water to a discharge site in Rock Creek. A preliminary alignment and ditch section has been laid out based on aerial photos, discussion with the City, and topography. The ditch alignment is still in a state of flux, since the City is considering constructing a road back to and into the City property near the outfall into Rock Creek. Sanderson Stewart and the City of Red Lodge will work further to coordinate the design of this outfall once additional survey has been collected along the proposed ditch alignment.

2. The second segment of proposed trunkline is an 18-inch RCP-IRR from Sta. 54+60 to Sta. 69+13.38. The curb and gutter section of the roadway ends just south of Red Lodge Ales at Sta. 60+73.06, however storm drain trunkline continues north of this location until the beginning of the flat-bottom ditch on the east side of the roadway which will consist of a 6:1 slope for 10 feet, a 4:1 for 10 feet, a 20:1 for 8 feet, and then a back slope of 3:1 up to the edge of the multi-use path. Water that accumulates in the roadside swales up to this point will connect into this trunkline system via RCP-IRR pipe before being discharged via 24-inch RCP-IRR into the flat-bottom ditch. The final destination for this storm water carried within the flat-bottom ditch outfalls at approximate Sta. 95+30 where there is a proposed 42-inch RCP-IRR pipe crossing under the proposed multi-use path, replacing an existing outfall in to Rock Creek.

The segment of proposed storm drain trunkline starting at 7th Street and ending at the open ditch on City property south of the Beartooth Electric Property collects the majority of the storm drain runoff for the urban segment of the project as well as the storm water runoff associated with the MDT road project for P-78. This outfall has been calculated to discharge 49.2 cfs from a 42-inch RCP-IRR into the open ditch. Hydraulic and energy gradelines for both proposed trunkline systems have been performed using StormCAD, which has served as a design check for the surcharge potential of the system and other design criteria. Because of multiple manhole locations where there are angled inflow pipes, as well as the high velocity of flow throughout the system, hand calculated headlosses for each manhole have been entered in to the StormCAD model. The junction of the P-78 trunkline with the Highway 212 trunkline at Sta. 36+07.10 is one such location where high headlosses occur. A drop in depth of the Highway 212 trunkline prior to this manhole has been

proposed, and serves two purposes. One is to provide clearance below the existing 15-inch PVC trunkline crossing in 3rd Street, and the other is to prevent a surcharge of the system at this junction when it is flowing at design capacity. From this point forward until the trunkline leaves the highway in a 42-inch pipe, downstream pipe inverts at each structure will be dropped by a constant 0.35 feet instead of the standard 0.1 foot to ensure that pipe capacity is not compromised due to the high headlosses across each manhole. Calculations of headlosses associated with each manhole are provided in Appendix E of this report, as well as printouts of the hydraulic gradeline profiles.

Twelve-inch RCP-IRR laterals will typically be used when conveying water from inlets to the trunkline. Pipe sizes from the depressed area inlets have been calculated using the MDT Storm program assuming a pipe slope of 0.01 ft/ft or greater. Flows from these inlets have been factored into the mainline storm drain trunkline design. Calculations for the flows at these area inlets and the associated pipes are included in Appendix C of this report.

**Rural Roadside Drainage**

The current drainage features for the corridor in the rural section of the project include a roadside ditch on each side of the roadway, with sparse culvert crossings between the two. The proposed design incorporates a traversable v-ditch on the west side of the roadway which will contain runoff from adjacent property that has a tendency to collect along the roadway fill. This west side ditch will carry water for a short distance before sending it to the larger flat-bottom ditch on the east side of the roadway. The general direction of overland flow in the rural section is from south to north and, to a lesser degree, from west to east. The v-ditch will maintain adequate depths to contain the calculated 50-year flow event and ensure that resulting 'spread widths' of flow at culvert crossing locations will not endanger any existing structures or future building sites from being inundated with water. Ditch blocks at several of these crossing locations will be necessary to provide adequate elevation head for the design flow to be diverted through the culvert to the other side. Culvert capacity calculations at each crossing are provided in Appendix F, which include exhibits showing locations of culverts and contributing runoff areas. A steel culvert material option was not given due to cover restraints throughout the project. A pipe service life calculations spreadsheet can also be found in Appendix F. Because of the south to north slope of the terrain, overtopping of all culverts will occur either at the ditch block or side approaches, whichever is the case, and will not overtop mainline.

On the east side of the roadway, near the developed limits of Red Lodge at approx. Sta. 56+60 there is a roadside swale, or v-ditch, proposed with 6:1 slopes between the back of curb and multi-use path. This typical section continues for nearly 1,500 feet until the larger flat-bottom ditch begins. Water collected in this swale will drain to interceptor pipes (12-inch RCP-IRR with FETS) which will connect into the proposed trunkline within this section of road. Once the separation between the roadway and the trail widens near Sta. 71+14, the typical section of the ditch will consist of a 6:1 slope for 10 feet, a 4:1 for 10 feet, a 20:1 for 8 feet, and then a back slope of 3:1 up to the edge of the multi-use path. The depth of this ditch is nearly 3.0 feet beneath the subgrade of the roadway; however maximum capacity of the ditch is constrained by multi-use path elevations at approach culverts where flow must check up to provide the necessary head through the pipe. All culverts were sized for the 50-year storm event while providing 1-foot of freeboard beneath the top of the multiuse path. All pipe materials were assumed to be concrete because of minimum cover requirements. Based on subsurface conditions encountered and described in the geotechnical findings report, culvert bearing soils will likely consist of loose to very dense sandy soils with intermittent cobble and boulders; no special culvert foundation is anticipated. See calculations in Appendix F for the existing and proposed flows and hydraulic conditions at these culverts.

For the rural portion of the project, the main outfall location into Rock Creek is identified at approximate Sta. 95+30. Although there is another existing outlet pipe (42-inch RCP) from the existing flat-bottom ditch to the east side of the abandoned railroad bed at approx. Sta. 78+00, the landowner for this property has indicated that he does not want to perpetuate runoff onto his property at this location. (See phone log dated 3/10/2010 in Appendix G). Therefore, the current design for the rural stormwater system bypasses this outlet altogether and carries water to the outfall at approx. Sta. 95+30. The existing 24-inch CSP is proposed to be replaced with a 42-inch RCP-IRR and a new ditch block will be constructed at this location to contain the design flow for this outfall. There is a steep grade from the existing pipe to Rock Creek and the outlet of the pipe is suspended over a riprap protected bank. Because this receives constant spring-fed flow from one of the main ponds in the golf course, there is continual flow at this ditch and outfall location. Runoff collected in the east ditch north of this outfall will proceed to the intersection of Two Mile Road and Highway 212 where the flat-bottom ditch will wrap around the south side of Two-Mile Road to a discharge site approximately 300 feet east of the Highway 212 centerline near the existing bridge. Pictures of the outfalls and other hydraulic features have been included in Appendix G.

### Alternative Outfall Design

Because full environmental impacts for the storm drain trunkline/open ditch leaving the highway to the east at approx. Sta. 53+30.10 were not identified during the writing of the EA, further investigation and dialog must occur before construction of this outfall can occur. In the event that this outfall is eliminated as a viable option, the storm drain runoff for the project up to this outfall will be carried forward via 36-inch RCP-IRR trunkline, combining with the runoff already contributing to the flat-bottom ditch. Calculations have been conducted to provide the needed trunkline size and slopes up to the discharge site in the flat-bottom ditch. Approach culverts in the east ditch at Stations 79+66.59 and 87+97.56, as well as the outfall culvert beneath the old railroad bed at Sta. 95+30.55 have been sized for the combined flow condition (see appendix H for all calculations associated with the combined outfall alternative). Once discussion on this alternative has taken place at the Plan-in-Hand review, a revision or addendum to this report will be done to resolve design and specifications for the alternative that is chosen.

### Receiving Waters

Storm drain runoff in the vicinity of the project ultimately ends up in the Rock Creek drainage system. The destination for the proposed outfall for the urban section of the project is an existing discharge site along the west side of Rock Creek. The existing trunkline system for the City of Red Lodge within Haggin Avenue discharges at this site with no known permit for discharging into the Creek. Skip Boyer with Red Lodge Public Works has indicated that in the future they would like to convert an existing sanitary sewer lagoon(s) into a storm drain pond which would be used once a flume across the creek is in place. This pond would be designed to store and attenuate runoff, and ultimately discharge flow back in to Rock Creek and its tributaries. However, at this time, the means to complete this pond system have not been established. Further considerations for all outfalls associated with this project and their permitting requirements will be looked at for the Activity 174 submittal.

### Irrigation Facilities

One irrigation facility exists within the project limits, and is known as the Brewery Ditch. The Brewery Ditch originates on top of the hill west of Highway 212 and south of P-78. As it comes down the hill working its way parallel to the Highway 212 corridor, it turns east and crosses the highway via an 18-inch CSP at approximate Sta. 56+00. There are four users currently identified as

being served by the ditch for a total of 23.3 acres of land being irrigated and a capacity of 1.99 cfs. This irrigation ditch will not be affected by the proposed improvements other than to replace the culvert crossing in kind. The contractor will be instructed to do work on the Brewery Ditch in the irrigation off season, with the coordination of the share holders of the water rights. => w/ SPECIAL PROVISION

## MDT INLET SPACING - CURB AND GUTTER SPREADSHEET (ENGLISH UNITS)

Left Side Mainline

Frequency 5
Billings

Project Name: Red Lodge - 2 Mi Rd
Project #: MT 28-2(34)70
CN 09069
Engineer: ALK
Date: 6/29/2011
**Instructions:** Red Text is automatically calculated. Black Text should be input.
Move mouse over column titles for a detailed description of each

Mannings n 0.016

| Station Ft | Distance Ft | Width Ft | Area Acres | C | Elevation | Tc Minutes | Intensity In/Hr | Q CFS | Total Q CFS | Grade At Inlet | Cross Slope | Gutter Cross Slope | Gutter Width | Grate Type | Inlet Type | Grate Width Ft | Grate Length Ft | Depth | Flow Width | Vcontinuous** | $E_o$ | $R_s$ | E | $Q_i$ | $Q_{bp}$** | Shoulder Width | Lane Width | Allowable Width |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | --------- | | | | | | | ------- | ------- | | | | | | | | | | | | | | | | | | | |
| 20+32.00 | | | 0.30 | 0.89 | 5538.85 | 9.00 | 3.47 | 0.93 | 1.70 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.18 | 7.83 | 2.71 | 0.39 | 0.22 | 59.0% | 1.00 | 0.70 | 10.00 | | 10 |
| 23+90.00 | 358 | | 0.43 | 0.91 | 5533.72 | 5.76 | 4.37 | 1.71 | 2.41 | 0.013 | 0.030 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.23 | 7.36 | 2.93 | 0.39 | 0.27 | 61.2% | 1.47 | 0.93 | 10.00 | | 10 |
| 26+00.00 | 215 | | 0.18 | 0.98 | 5530.58 | 5.00 | 4.58 | 0.81 | 1.74 | 0.013 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.20 | 8.57 | 2.51 | 0.36 | 0.24 | 57.6% | 1.08 | 0.80 | 10.00 | | 10 |
| 27+59.37 | 159.37 | | 0.13 | 0.95 | 5528.50 | 5.00 | 4.58 | 0.57 | 1.36 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.16 | 6.98 | 2.45 | 0.44 | 0.25 | 64.3% | 0.79 | 0.44 | 10.00 | | 10 |
| 29+05.00 | 145.63 | | 0.12 | 0.95 | 5526.43 | 5.00 | 4.58 | 0.52 | 0.96 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.15 | 6.33 | 2.31 | 0.47 | 0.27 | 68.4% | 0.66 | 0.30 | 10.00 | | 10 |
| 31+25.00 | 220 | | 0.15 | 0.84 | 5522.87 | 5.94 | 4.32 | 0.54 | 0.85 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.14 | 6.02 | 2.25 | 0.50 | 0.28 | 70.6% | 0.60 | 0.25 | | 15.20 | 7.6 |
| 33+25.00 | 200 | | 0.15 | 0.87 | 5520.03 | 5.23 | 4.52 | 0.59 | 0.84 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.14 | 6.00 | 2.24 | 0.50 | 0.28 | 70.7% | 0.59 | 0.25 | | 15.20 | 7.6 |
| 34+37.32 | 112.32 | | 0.08 | 0.87 | 5518.36 | 5.00 | 4.58 | 0.32 | 0.56 | 0.006 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.15 | 6.23 | 1.40 | 0.48 | 0.48 | 77.8% | 0.44 | 0.13 | | 15.20 | 7.6 |
| 34+47.32 | 10 | | 0.01 | 0.66 | 5518.35 | 5.37 | 4.48 | 0.03 | 0.16 | 0.006 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.10 | 3.66 | 1.04 | 0.72 | 0.61 | 93.0% | 0.14 | 0.01 | | 15.20 | 7.6 |
| 34+57.32 | 10 | | 0.10 | 0.82 | 5518.34 | 5.00 | 4.58 | 0.38 | 0.39 | 0.001 | 0.020 | 0.040 | 1.210 | SAFE BAR P-1-7/8-4 | GRATE IN SAG | 1.50 | 3.00 | 0.10 | 4.00 | 0.00 | 0.14 | | 100.0% | 0.39 | 0.00 | | 15.20 | 7.6 |
| 36+64.13 | 115 | | 0.10 | 0.94 | 5511.70 | 5.00 | 4.58 | 0.43 | 0.67 | 0.020 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.13 | 5.24 | 2.32 | 0.56 | 0.27 | 74.9% | 0.50 | 0.17 | | 19.70 | 9.85 |
| 38+60.00 | 195.87 | | 0.16 | 0.86 | 5511.29 | 5.00 | 4.58 | 0.63 | 0.80 | 0.018 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.14 | 5.73 | 2.32 | 0.52 | 0.27 | 72.2% | 0.58 | 0.22 | 6.00 | 12.00 | 12 |
| 41+63.00 | 303 | | 0.35 | 0.78 | 5506.70 | 8.77 | 3.53 | 0.96 | 1.19 | 0.015 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 6.97 | 2.40 | 0.44 | 0.26 | 65.1% | 0.78 | 0.42 | 6.00 | 12.00 | 12 |
| 43+87.00 | 224 | | 0.22 | 0.84 | 5503.27 | 6.10 | 4.27 | 0.79 | 1.21 | 0.015 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 6.98 | 2.41 | 0.44 | 0.26 | 65.0% | 0.79 | 0.42 | 6.00 | 12.00 | 12 |
| 46+02.00 | 215 | | 0.18 | 0.86 | 5499.97 | 5.52 | 4.44 | 0.69 | 1.11 | 0.015 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.16 | 6.75 | 2.36 | 0.45 | 0.26 | 66.4% | 0.74 | 0.37 | 6.00 | 12.00 | 12 |
| 48+00.00 | 198 | | 0.17 | 0.86 | 5496.90 | 5.28 | 4.50 | 0.66 | 1.03 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.16 | 6.50 | 2.35 | 0.47 | 0.26 | 67.7% | 0.70 | 0.33 | 6.00 | 12.00 | 12 |
| 50+55.15 | 255.15 | | 0.21 | 0.86 | 5492.71 | 5.88 | 4.34 | 0.78 | 1.12 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.16 | 6.63 | 2.45 | 0.46 | 0.25 | 66.4% | 0.74 | 0.38 | 6.00 | 12.00 | 12 |
| 52+84.00 | 228.85 | | 0.19 | 0.86 | 5487.97 | 5.16 | 4.54 | 0.74 | 1.12 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.16 | 6.60 | 2.47 | 0.46 | 0.25 | 66.4% | 0.74 | 0.37 | 6.00 | 12.00 | 12 |
| 52+94.00 | 10 | | 0.01 | 0.86 | 5487.81 | 5.00 | 4.58 | 0.04 | 0.41 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.11 | 4.40 | 1.98 | 0.64 | 0.33 | 82.9% | 0.34 | 0.07 | 6.00 | 12.00 | 12 |
| 54+60.00 | 166 | | 0.16 | 0.86 | 5485.73 | 5.18 | 4.53 | 0.62 | 0.69 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.14 | 5.45 | 2.22 | 0.54 | 0.28 | 74.5% | 0.52 | 0.18 | 6.00 | 12.00 | 12 |
| 54+70.00 | 10 | | 0.01 | 0.86 | 5485.60 | 5.00 | 4.58 | 0.04 | 0.22 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.09 | 3.31 | 1.72 | 0.78 | 0.39 | 91.8% | 0.20 | 0.02 | 6.00 | 12.00 | 12 |
| 56+60.00 | 190 | | 0.18 | 0.86 | 5482.27 | 5.00 | 4.58 | 0.71 | 0.73 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.14 | 5.55 | 2.24 | 0.54 | 0.28 | 73.7% | 0.54 | 0.19 | 6.00 | | 6 |
| 56+70.00 | 10 | | 0.01 | 0.86 | 5482.10 | 5.00 | 4.58 | 0.04 | 0.23 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.10 | 3.43 | 1.73 | 0.76 | 0.38 | 91.0% | 0.21 | 0.02 | 6.00 | | 6 |
| 58+31.00 | 161 | | 0.14 | 0.86 | 5479.31 | 5.00 | 4.58 | 0.55 | 0.57 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.13 | 5.05 | 2.11 | 0.58 | 0.30 | 77.7% | 0.44 | 0.13 | 6.00 | | 6 |
| 60+17.00 | 186 | | 0.15 | 0.86 | 5476.09 | 5.00 | 4.58 | 0.59 | 0.72 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.14 | 5.55 | 2.22 | 0.54 | 0.28 | 73.9% | 0.53 | 0.19 | 6.00 | | 6 |
| 60+27.00 | 10 | | 0.01 | 0.86 | 5475.92 | 5.00 | 4.58 | 0.04 | 0.23 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.09 | 3.40 | 1.72 | 0.76 | 0.39 | 91.2% | 0.21 | 0.02 | 6.00 | | 6 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

$E_o$= Ratio of frontal flow to total gutter flow
$R_s$= Ratio of side flow intercepted to total side flow
E= Grate efficiency
$Q_i$= Interception capacity of grate (cfs)
$Q_{bp}$**= Bypass flow (cfs)

26.00

**FOR LAST GRATE ON RUN OF GUTTER, IF SPREADSHEET SHOWS A VALUE FOR Vside, CHECK Vside AND Qbp (COLUMN S) FOR COMPLIANCE. OTHERWISE, CHECK Vcontinuous AND Qbp (COLUMN L) FOR COMPLIANCE.

## MDT INLET SPACING - CURB AND GUTTER SPREADSHEET (ENGLISH UNITS)

Frequency 5
Billings

Project Name: Red Lodge - 2 Mi Rd
Project #: MT 28-2(34)70
CN 09069
Engineer: ALK
Date: 6/29/2011
**Instructions:** Red Text is automatically calculated. Black Text should be input.
Move mouse over column titles for a detailed description of each

Right Side Mainline

Mannings n 0.016

| Station Ft | Distance Ft | Width Ft | Area Acres | C | Elevation | Tc Minutes | Intensity In/Hr | Q CFS | Total Q CFS | Grade At Inlet | Cross Slope | Gutter Cross Slope | Gutter Width | Grate Type | Inlet Type | Grate Width Ft | Grate Length Ft | Depth | Flow Width | $Q_{bp}$** | Vcontinuous** | $E_o$ | $R_s$ | E | $Q_i$ | $Q_{bp}$** | Shoulder Width | Lane Width | Allowable Width |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | --------- | | | | | | | ------- | ------- | | | | | | | | | | | ------- | | | | | | | | | |
| 20+32.00 | | | 0.22 | 0.98 | 5538.85 | 9.00 | 3.47 | 0.75 | 1.36 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 7.15 | 0.73 | 2.59 | 0.43 | 0.23 | 62.7% | 0.85 | 0.51 | 10.00 | | 10 |
| 23+90.00 | 358 | | 0.68 | 0.60 | 5533.72 | 15.17 | 2.57 | 1.05 | 1.56 | 0.013 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.18 | 7.99 | 0.89 | 2.38 | 0.39 | 0.26 | 60.6% | 0.94 | 0.61 | 10.00 | | 10 |
| 26+00.00 | 210 | | 0.22 | 0.87 | 5530.58 | 5.27 | 4.51 | 0.86 | 1.48 | 0.013 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.18 | 7.83 | 0.84 | 2.35 | 0.39 | 0.26 | 61.4% | 0.91 | 0.57 | 10.00 | | 10 |
| 27+68.55 | 168.55 | | 0.14 | 0.96 | 5528.50 | 5.00 | 4.58 | 0.62 | 1.18 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.16 | 6.88 | 0.74 | 2.43 | 0.44 | 0.25 | 65.0% | 0.77 | 0.42 | 10.00 | | 10 |
| 29+05.00 | 136.45 | | 0.28 | 0.96 | 5526.43 | 5.00 | 3.18 | 0.86 | 1.42 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 7.38 | 0.60 | 2.55 | 0.42 | 0.24 | 61.9% | 0.88 | 0.54 | 10.00 | | 10 |
| 31+25.00 | 220 | | 0.25 | 0.66 | 5522.87 | 10.05 | 4.14 | 0.68 | 1.10 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.16 | 6.66 | 0.56 | 2.40 | 0.45 | 0.26 | 66.2% | 0.73 | 0.37 | | 14.40 | 7.2 |
| 33+25.00 | 200 | | 0.15 | 0.81 | 5520.03 | 6.60 | 4.58 | 0.56 | 1.10 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.16 | 6.66 | 0.35 | 2.40 | 0.45 | 0.26 | 66.2% | 0.73 | 0.37 | | 14.40 | 7.2 |
| 34+37.32 | 112.32 | | 0.08 | 0.87 | 5518.36 | 5.00 | 4.58 | 0.32 | 0.69 | 0.006 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.16 | 6.74 | 0.23 | 1.47 | 0.45 | 0.45 | 74.9% | 0.52 | 0.17 | | 14.40 | 7.2 |
| 34+47.32 | 10 | | 0.02 | 0.77 | 5518.35 | 5.00 | 4.58 | 0.07 | 0.44 | 0.006 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.14 | 5.65 | 0.00 | 1.33 | 0.52 | 0.50 | 81.1% | 0.36 | 0.08 | | 14.40 | 7.2 |
| 34+57.32 | 10 | | 0.08 | 0.88 | 5518.34 | 5.00 | 5.58 | 0.39 | 0.57 | 0.001 | 0.020 | 0.040 | 1.210 | SAFE BAR P-1-7/8-4 | GRATE IN SAG | 1.50 | 3.00 | 0.13 | 5.12 | 0.00 | 0.00 | | | 100.0% | 0.57 | 0.00 | | | |
| 36+64.12 | 115 | | 0.10 | 0.86 | 5511.70 | 5.00 | 4.58 | 0.39 | 0.39 | 0.020 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.11 | 4.20 | 0.12 | 2.06 | 0.66 | 0.31 | 83.5% | 0.33 | 0.06 | | | |
| 38+60.00 | 195.88 | | 0.17 | 0.86 | 5511.29 | 5.00 | 4.58 | 0.67 | 0.73 | 0.018 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.14 | 5.56 | 0.32 | 2.27 | 0.53 | 0.28 | 73.1% | 0.54 | 0.20 | 6.00 | 12.00 | 12 |
| 41+63.00 | 303 | | 0.34 | 0.90 | 5506.70 | 5.48 | 4.45 | 1.36 | 1.56 | 0.015 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.18 | 7.75 | 0.88 | 2.55 | 0.40 | 0.24 | 60.3% | 0.95 | 0.62 | 6.00 | 12.00 | 12 |
| 43+87.00 | 224 | | 0.26 | 0.83 | 5503.27 | 6.34 | 4.21 | 0.91 | 1.53 | 0.015 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.18 | 7.67 | 0.86 | 2.54 | 0.40 | 0.24 | 60.7% | 0.93 | 0.60 | 6.00 | 12.00 | 12 |
| 46+02.00 | 215 | | 0.21 | 0.86 | 5499.97 | 5.52 | 4.44 | 0.80 | 1.40 | 0.015 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 7.41 | 0.77 | 2.49 | 0.41 | 0.24 | 62.1% | 0.87 | 0.53 | 6.00 | 12.00 | 12 |
| 48+00.00 | 198 | | 0.20 | 0.86 | 5496.90 | 5.28 | 4.50 | 0.77 | 1.31 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 7.15 | 0.70 | 2.48 | 0.43 | 0.25 | 63.3% | 0.83 | 0.48 | 6.00 | 12.00 | 12 |
| 50+55.15 | 255.15 | | 0.24 | 0.86 | 5492.71 | 5.88 | 4.34 | 0.90 | 1.37 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 7.21 | 0.74 | 2.57 | 0.42 | 0.23 | 62.5% | 0.86 | 0.52 | 6.00 | 12.00 | 12 |
| 53+00.10 | 244.95 | | 0.24 | 0.86 | 5487.97 | 5.45 | 4.45 | 0.92 | 1.43 | 0.017 | 0.020 | 0.040 | 1.210 | MDT TYPE IV | GRATE ON GRADE | 2.00 | 2.00 | 0.17 | 7.30 | 0.61 | 2.62 | 0.42 | 0.10 | 67.3% | 0.97 | 0.47 | 6.00 | 12.00 | 12 |
| 53+20.83 | 20.73 | | 0.02 | 0.86 | 5487.81 | 5.00 | 4.58 | 0.08 | 0.55 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.12 | 4.97 | 0.21 | 2.09 | 0.58 | 0.31 | 77.9% | 0.43 | 0.12 | 6.00 | 12.00 | 12 |
| 54+60.00 | 139.17 | | 0.14 | 0.87 | 5485.73 | 5.00 | 4.58 | 0.56 | 0.68 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.13 | 5.42 | 0.29 | 2.20 | 0.54 | 0.29 | 74.4% | 0.50 | 0.17 | 6.00 | 12.00 | 12 |
| 54+70.00 | 10 | | 0.01 | 0.87 | 5485.60 | 5.00 | 4.58 | 0.04 | 0.21 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.09 | 3.33 | 0.04 | 1.70 | 0.77 | 0.39 | 91.5% | 0.20 | 0.02 | 6.00 | 12.00 | 12 |
| 56+60.00 | 190 | | 0.17 | 0.86 | 5482.27 | 5.00 | 4.58 | 0.67 | 0.69 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.13 | 5.45 | 0.29 | 2.21 | 0.54 | 0.29 | 74.1% | 0.51 | 0.18 | 6.00 | | 6 |
| 56+70.00 | 10 | | 0.01 | 0.86 | 5482.10 | 5.00 | 4.58 | 0.04 | 0.22 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.09 | 3.37 | 0.05 | 1.70 | 0.76 | 0.39 | 91.3% | 0.20 | 0.02 | 6.00 | | 6 |
| 58+31.00 | 161 | | 0.11 | 0.94 | 5479.31 | 5.00 | 4.58 | 0.47 | 0.49 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.12 | 4.77 | 0.18 | 2.03 | 0.60 | 0.32 | 79.6% | 0.39 | 0.10 | 6.00 | | 6 |
| 60+17.00 | 186 | | 0.12 | 0.95 | 5476.09 | 5.00 | 4.58 | 0.52 | 0.62 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.13 | 5.25 | 0.25 | 2.14 | 0.56 | 0.30 | 75.8% | 0.47 | 0.15 | 6.00 | | 6 |
| 60+27.00 | 10 | | 0.01 | 0.95 | 5475.92 | 5.00 | 4.58 | 0.04 | 0.19 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.09 | 3.20 | 0.04 | 1.66 | 0.79 | 0.40 | 92.6% | 0.18 | 0.01 | 6.00 | | 6 |

$E_o$= Ratio of frontal flow to total gutter flow
$R_s$= Ratio of side flow intercepted to total side flow
E= Grate efficiency
$Q_i$= Interception capacity of grate (cfs)
$Q_{bp}$**= Bypass flow (cfs)

## MDT INLET SPACING - CURB AND GUTTER SPREADSHEET (ENGLISH UNITS)

Left Side Mainline

Frequency 10
Billings

Project Name: Red Lodge - 2 Mi Rd
Project #: MT 28-2(34)70
CN 09069
Engineer: ALK
Date: 6/29/2011
**Instructions:** Red Text is automatically calculated. Black Text should be input.
Move mouse over column titles for a detailed description of each

Mannings n 0.016

| Station Ft | Distance Ft | Width Ft | Area Acres | C | Elevation | Tc Minutes | Intensity In/Hr | Q CFS | Total Q CFS | Grade At Inlet | Cross Slope | Gutter Cross Slope | Gutter Width | Grate Type | Inlet Type | Grate Width Ft | Grate Length Ft | Depth | Flow Width | Vcontinuous** | $E_o$ | $R_s$ | E | $Q_i$ | $Q_{bp}$** | Shoulder Width | Lane Width | Allowable Width |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | --------- | | | | | | | | ------- | ------- | | | | | | | | | | | | | | | | | | |
| 20+32.00 | | | 0.30 | 0.89 | 5538.85 | 9.00 | 4.16 | 1.11 | 1.88 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.19 | 8.12 | 2.78 | 0.38 | 0.21 | 57.7% | 1.08 | 0.80 | 10.00 | | 10 |
| 23+90.00 | 358 | | 0.43 | 0.91 | 5533.72 | 5.76 | 5.31 | 2.08 | 2.87 | 0.013 | 0.030 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.25 | 7.88 | 3.06 | 0.37 | 0.25 | 58.4% | 1.68 | 1.19 | 10.00 | | 10 |
| 26+00.00 | 215 | | 0.18 | 0.98 | 5530.58 | 5.00 | 5.58 | 0.98 | 2.18 | 0.013 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.21 | 9.08 | 2.60 | 0.34 | 0.23 | 55.2% | 1.20 | 0.98 | 10.00 | | 10 |
| 27+59.37 | 159.37 | | 0.13 | 0.95 | 5528.50 | 5.00 | 5.58 | 0.69 | 1.66 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.18 | 7.86 | 2.64 | 0.39 | 0.23 | 59.3% | 0.99 | 0.68 | 10.00 | | 10 |
| 29+05.00 | 145.63 | | 0.12 | 0.95 | 5526.43 | 5.00 | 5.58 | 0.64 | 1.31 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 7.16 | 2.49 | 0.43 | 0.24 | 63.2% | 0.83 | 0.48 | 10.00 | | 10 |
| 31+25.00 | 220 | | 0.15 | 0.84 | 5522.87 | 5.94 | 5.25 | 0.66 | 1.14 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.16 | 6.78 | 2.41 | 0.45 | 0.26 | 65.5% | 0.75 | 0.39 | | 15.20 | 7.6 |
| 33+25.00 | 200 | | 0.15 | 0.87 | 5520.03 | 5.23 | 5.50 | 0.72 | 1.11 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.16 | 6.71 | 2.39 | 0.45 | 0.26 | 66.0% | 0.73 | 0.38 | | 15.20 | 7.6 |
| 34+37.32 | 112.32 | | 0.08 | 0.87 | 5518.36 | 5.00 | 5.58 | 0.39 | 0.77 | 0.006 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.16 | 7.03 | 1.51 | 0.43 | 0.44 | 73.4% | 0.56 | 0.20 | | 15.20 | 7.6 |
| 34+47.32 | 10 | | 0.01 | 0.66 | 5518.35 | 5.37 | 5.45 | 0.04 | 0.24 | 0.006 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.11 | 4.39 | 1.16 | 0.64 | 0.56 | 88.6% | 0.21 | 0.03 | | 15.20 | 7.6 |
| 34+57.32 | 10 | | 0.10 | 0.82 | 5518.34 | 5.00 | 5.58 | 0.46 | 0.48 | 0.001 | 0.020 | 0.040 | 1.210 | SAFE BAR P-1-7/8-4 | GRATE IN SAG | 1.50 | 3.00 | 0.12 | 4.63 | 0.00 | 0.14 | | 100.0% | 0.48 | 0.00 | | 15.20 | 7.6 |
| 36+64.13 | 115 | | 0.10 | 0.94 | 5511.70 | 5.00 | 5.58 | 0.52 | 0.76 | 0.020 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.13 | 5.51 | 2.39 | 0.53 | 0.26 | 72.7% | 0.55 | 0.21 | | 19.70 | 9.85 |
| 38+60.00 | 195.87 | | 0.16 | 0.86 | 5511.29 | 5.00 | 5.58 | 0.77 | 0.97 | 0.018 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.15 | 6.21 | 2.43 | 0.49 | 0.25 | 68.8% | 0.67 | 0.30 | 6.00 | 12.00 | 12 |
| 41+63.00 | 303 | | 0.35 | 0.78 | 5506.70 | 8.77 | 4.25 | 1.16 | 1.46 | 0.015 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.18 | 7.57 | 2.53 | 0.41 | 0.24 | 61.6% | 0.92 | 0.57 | 6.00 | 12.00 | 12 |
| 43+87.00 | 224 | | 0.22 | 0.84 | 5503.27 | 6.10 | 5.19 | 0.96 | 1.53 | 0.015 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.18 | 7.65 | 2.54 | 0.40 | 0.24 | 61.1% | 0.93 | 0.60 | 6.00 | 12.00 | 12 |
| 46+02.00 | 215 | | 0.18 | 0.86 | 5499.97 | 5.52 | 5.40 | 0.84 | 1.43 | 0.015 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.18 | 7.45 | 2.50 | 0.41 | 0.24 | 62.2% | 0.89 | 0.54 | 6.00 | 12.00 | 12 |
| 48+00.00 | 198 | | 0.17 | 0.86 | 5496.90 | 5.28 | 5.48 | 0.80 | 1.34 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 7.22 | 2.50 | 0.43 | 0.24 | 63.3% | 0.85 | 0.49 | 6.00 | 12.00 | 12 |
| 50+55.15 | 255.15 | | 0.21 | 0.86 | 5492.71 | 5.88 | 5.27 | 0.95 | 1.45 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 7.34 | 2.61 | 0.42 | 0.23 | 62.1% | 0.90 | 0.55 | 6.00 | 12.00 | 12 |
| 52+84.00 | 228.85 | | 0.19 | 0.86 | 5487.97 | 5.16 | 5.53 | 0.90 | 1.45 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 7.32 | 2.63 | 0.42 | 0.23 | 62.0% | 0.90 | 0.55 | 6.00 | 12.00 | 12 |
| 52+94.00 | 10 | | 0.01 | 0.86 | 5487.81 | 5.00 | 5.58 | 0.05 | 0.60 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.13 | 5.13 | 2.15 | 0.57 | 0.30 | 76.9% | 0.46 | 0.14 | 6.00 | 12.00 | 12 |
| 54+60.00 | 166 | | 0.16 | 0.86 | 5485.73 | 5.18 | 5.52 | 0.76 | 0.90 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.15 | 6.04 | 2.35 | 0.50 | 0.26 | 70.1% | 0.63 | 0.27 | 6.00 | 12.00 | 12 |
| 54+70.00 | 10 | | 0.01 | 0.86 | 5485.60 | 5.00 | 5.58 | 0.05 | 0.32 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.10 | 3.91 | 1.87 | 0.70 | 0.35 | 86.9% | 0.27 | 0.04 | 6.00 | 12.00 | 12 |
| 56+60.00 | 190 | | 0.18 | 0.86 | 5482.27 | 5.00 | 5.58 | 0.86 | 0.91 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.15 | 6.07 | 2.36 | 0.50 | 0.26 | 70.0% | 0.63 | 0.27 | 6.00 | | 6 |
| 56+70.00 | 10 | | 0.01 | 0.86 | 5482.10 | 5.00 | 5.58 | 0.05 | 0.32 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.11 | 3.95 | 1.86 | 0.69 | 0.35 | 86.7% | 0.28 | 0.04 | 6.00 | | 6 |
| 58+31.00 | 161 | | 0.14 | 0.86 | 5479.31 | 5.00 | 5.58 | 0.67 | 0.71 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.14 | 5.53 | 2.22 | 0.54 | 0.28 | 74.0% | 0.53 | 0.19 | 6.00 | | 6 |
| 60+17.00 | 186 | | 0.15 | 0.86 | 5476.09 | 5.00 | 5.58 | 0.72 | 0.91 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.15 | 6.09 | 2.34 | 0.50 | 0.27 | 70.0% | 0.63 | 0.27 | 6.00 | | 6 |
| 60+27.00 | 10 | | 0.01 | 0.86 | 5475.92 | 5.00 | 5.58 | 0.05 | 0.32 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.11 | 3.95 | 1.86 | 0.69 | 0.35 | 86.7% | 0.28 | 0.04 | 6.00 | | 6 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

$E_o$= Ratio of frontal flow to total gutter flow
$R_s$= Ratio of side flow intercepted to total side flow
E= Grate efficiency
$Q_i$= Interception capacity of grate (cfs)
$Q_{bp}$**= Bypass flow (cfs)

26.00

**FOR LAST GRATE ON RUN OF GUTTER, IF SPREADSHEET SHOWS A VALUE FOR Vside, CHECK Vside AND Qbp (COLUMN S) FOR COMPLIANCE. OTHERWISE, CHECK Vcontinuous AND Qbp (COLUMN L) FOR COMPLIANCE.

## MDT INLET SPACING - CURB AND GUTTER SPREADSHEET (ENGLISH UNITS)

Right Side Mainline

Frequency 10
Billings

Project Name: Red Lodge - 2 Mi Rd
Project #: MT 28-2(34)70
CN 09069
Engineer: ALK
Date: 6/29/2011
**Instructions:** Red Text is automatically calculated. Black Text should be input.
Move mouse over column titles for a detailed description of each

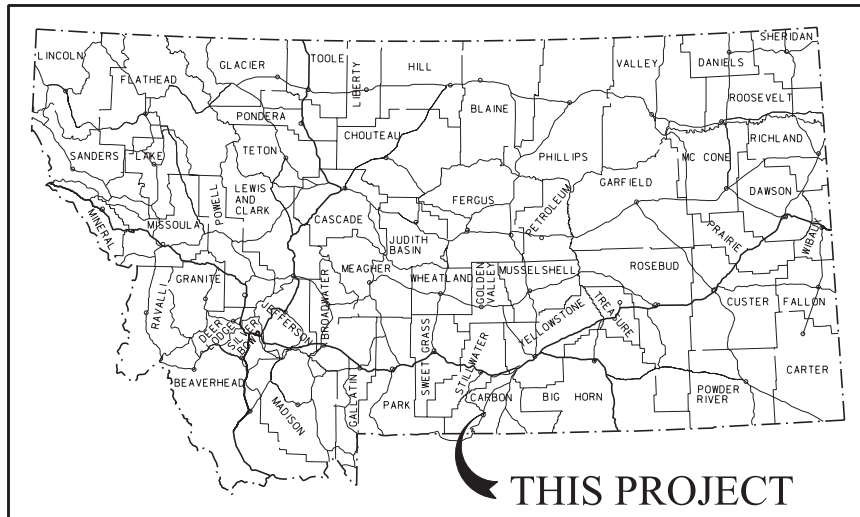
Mannings n 0.016

| Station Ft | Distance Ft | Width Ft | Area Acres | C | Elevation | Tc Minutes | Intensity In/Hr | Q CFS | Total Q CFS | Grade At Inlet | Cross Slope | Gutter Cross Slope | Gutter Width | Grate Type | Inlet Type | Grate Width Ft | Grate Length Ft | Depth | Flow Width | $Q_{bp}$** | Vcontinuous** | $E_o$ | $R_s$ | E | $Q_i$ | $Q_{bp}$** | Shoulder Width | Lane Width | Allowable Width |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | --------- | | | | | | | ------- | ------- | | | | | | | | | | | -------- | | | | | | | | | |
| 20+32.00 | | | 0.22 | 0.98 | 5538.85 | 9.00 | 4.16 | 0.90 | 1.36 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 7.15 | 0.73 | 2.59 | 0.43 | 0.23 | 62.7% | 0.85 | 0.51 | 10.00 | | 10 |
| 23+90.00 | 358 | | 0.68 | 0.60 | 5533.72 | 15.17 | 3.09 | 1.26 | 1.77 | 0.013 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.19 | 8.40 | 1.05 | 2.46 | 0.37 | 0.25 | 58.5% | 1.03 | 0.73 | 10.00 | | 10 |
| 26+00.00 | 210 | | 0.22 | 0.87 | 5530.58 | 5.27 | 5.48 | 1.05 | 1.78 | 0.013 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.19 | 8.42 | 1.06 | 2.46 | 0.37 | 0.25 | 58.4% | 1.04 | 0.74 | 10.00 | | 10 |
| 27+68.55 | 168.55 | | 0.14 | 0.96 | 5528.50 | 5.00 | 5.58 | 0.75 | 1.49 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 7.53 | 0.98 | 2.57 | 0.41 | 0.23 | 61.1% | 0.91 | 0.58 | 10.00 | | 10 |
| 29+05.00 | 136.45 | | 0.28 | 0.96 | 5526.43 | 5.00 | 3.80 | 1.02 | 1.76 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.18 | 8.01 | 0.81 | 2.68 | 0.39 | 0.22 | 58.4% | 1.03 | 0.73 | 10.00 | | 10 |
| 31+25.00 | 220 | | 0.25 | 0.66 | 5522.87 | 10.05 | 5.02 | 0.83 | 1.41 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 7.34 | 0.77 | 2.54 | 0.42 | 0.24 | 62.1% | 0.87 | 0.53 | | 14.40 | 7.2 |
| 33+25.00 | 200 | | 0.15 | 0.81 | 5520.03 | 6.60 | 5.58 | 0.68 | 1.41 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 7.35 | 0.50 | 2.55 | 0.42 | 0.24 | 62.0% | 0.88 | 0.54 | | 14.40 | 7.2 |
| 34+37.32 | 112.32 | | 0.08 | 0.87 | 5518.36 | 5.00 | 5.58 | 0.39 | 0.92 | 0.006 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.18 | 7.55 | 0.34 | 1.58 | 0.41 | 0.42 | 70.7% | 0.65 | 0.27 | | 14.40 | 7.2 |
| 34+47.32 | 10 | | 0.02 | 0.77 | 5518.35 | 5.00 | 5.58 | 0.09 | 0.62 | 0.006 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.15 | 6.47 | 0.00 | 1.44 | 0.47 | 0.47 | 76.4% | 0.48 | 0.15 | | 14.40 | 7.2 |
| 34+57.32 | 10 | | 0.08 | 0.88 | 5518.34 | 5.00 | 5.58 | 0.39 | 0.66 | 0.001 | 0.020 | 0.040 | 1.210 | SAFE BAR P-1-7/8-I | GRATE IN SAG | 1.50 | 3.00 | 0.14 | 5.67 | 0.00 | 0.00 | | | 100.0% | 0.66 | 0.00 | | | |
| 36+64.12 | 115 | | 0.10 | 0.86 | 5511.70 | 5.00 | 5.58 | 0.48 | 0.48 | 0.020 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.12 | 4.56 | 0.17 | 2.15 | 0.62 | 0.30 | 80.4% | 0.39 | 0.09 | | | |
| 38+60.00 | 195.88 | | 0.17 | 0.86 | 5511.29 | 5.00 | 5.58 | 0.82 | 0.91 | 0.018 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.16 | 6.97 | 0.48 | 2.59 | 0.44 | 0.23 | 63.5% | 0.82 | 0.47 | 6.00 | 12.00 | 12 |
| 41+63.00 | 303 | | 0.34 | 0.90 | 5506.70 | 5.48 | 5.41 | 1.66 | 2.13 | 0.015 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.20 | 8.74 | 1.29 | 2.75 | 0.36 | 0.21 | 55.3% | 1.19 | 0.96 | 6.00 | 12.00 | 12 |
| 43+87.00 | 224 | | 0.26 | 0.83 | 5503.27 | 6.34 | 5.11 | 1.10 | 2.06 | 0.015 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.20 | 8.61 | 1.24 | 2.73 | 0.36 | 0.22 | 55.9% | 1.15 | 0.91 | 6.00 | 12.00 | 12 |
| 46+02.00 | 215 | | 0.21 | 0.86 | 5499.97 | 5.52 | 5.40 | 0.97 | 1.88 | 0.015 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.22 | 9.99 | 1.22 | 3.00 | 0.31 | 0.19 | 49.9% | 1.52 | 1.52 | 6.00 | 12.00 | 12 |
| 48+00.00 | 198 | | 0.20 | 0.86 | 5496.90 | 5.28 | 5.48 | 0.94 | 2.46 | 0.016 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.21 | 9.15 | 1.53 | 2.89 | 0.34 | 0.20 | 53.1% | 1.31 | 1.16 | 6.00 | 12.00 | 12 |
| 50+55.15 | 255.15 | | 0.24 | 0.86 | 5492.71 | 5.88 | 5.27 | 1.09 | 2.24 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.20 | 8.73 | 1.36 | 2.89 | 0.36 | 0.20 | 54.5% | 1.22 | 1.02 | 6.00 | 12.00 | 12 |
| 53+00.10 | 244.95 | | 0.24 | 0.86 | 5487.97 | 5.45 | 5.42 | 1.12 | 2.14 | 0.017 | 0.020 | 0.040 | 1.210 | MDT TYPE IV | GRATE ON GRADE | 2.00 | 2.00 | 0.19 | 8.53 | 1.05 | 2.88 | 0.36 | 0.09 | 60.2% | 1.29 | 0.85 | 6.00 | 12.00 | 12 |
| 53+20.83 | 20.73 | | 0.02 | 0.86 | 5487.81 | 5.00 | 5.58 | 0.10 | 0.95 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.15 | 6.19 | 0.45 | 2.38 | 0.48 | 0.26 | 68.8% | 0.65 | 0.30 | 6.00 | 12.00 | 12 |
| 54+60.00 | 139.17 | | 0.14 | 0.87 | 5485.73 | 5.00 | 5.58 | 0.68 | 0.98 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.18 | 7.67 | 0.55 | 2.70 | 0.40 | 0.22 | 59.7% | 0.97 | 0.65 | 6.00 | 12.00 | 12 |
| 54+70.00 | 10 | | 0.01 | 0.87 | 5485.60 | 5.00 | 5.58 | 0.05 | 0.70 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.13 | 5.50 | 0.30 | 2.22 | 0.54 | 0.28 | 73.8% | 0.52 | 0.18 | 6.00 | 12.00 | 12 |
| 56+60.00 | 190 | | 0.17 | 0.86 | 5482.27 | 5.00 | 5.58 | 0.82 | 1.00 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.17 | 7.47 | 0.55 | 2.66 | 0.41 | 0.22 | 60.8% | 0.92 | 0.59 | 6.00 | | 6 |
| 56+70.00 | 10 | | 0.01 | 0.86 | 5482.10 | 5.00 | 5.58 | 0.05 | 0.64 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.13 | 5.32 | 0.27 | 2.16 | 0.55 | 0.29 | 75.2% | 0.48 | 0.16 | 6.00 | | 6 |
| 58+31.00 | 161 | | 0.11 | 0.94 | 5479.31 | 5.00 | 5.58 | 0.58 | 0.74 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.16 | 6.87 | 0.38 | 2.50 | 0.44 | 0.24 | 64.5% | 0.79 | 0.43 | 6.00 | | 6 |
| 60+17.00 | 186 | | 0.12 | 0.95 | 5476.09 | 5.00 | 5.58 | 0.64 | 1.07 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.15 | 6.52 | 0.53 | 2.43 | 0.46 | 0.25 | 66.7% | 0.71 | 0.36 | 6.00 | | 6 |
| 60+27.00 | 10 | | 0.01 | 0.95 | 5475.92 | 5.00 | 5.58 | 0.05 | 0.41 | 0.017 | 0.020 | 0.040 | 1.210 | CURVED VANE | GRATE ON GRADE | 1.50 | 3.00 | 0.16 | 6.65 | 0.21 | 2.46 | 0.46 | 0.25 | 65.9% | 0.74 | 0.38 | 6.00 | | 6 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

$E_o$= Ratio of frontal flow to total gutter flow
$R_s$= Ratio of side flow intercepted to total side flow
E= Grate efficiency
$Q_i$= Interception capacity of grate (cfs)
$Q_{bp}$**= Bypass flow (cfs)

# MONTANA DEPARTMENT OF TRANSPORTATION

## FEDERAL AID PROJECT NO. MT 28-2(49)70
## GRADE, GRAVEL, PL. MIX SURF. & C&G
## RED LODGE - 8TH - ROBINSON (A LIMITED ACCESS FACILITY)
## CARBON COUNTY




### DESIGN DATA

**8TH STREET TO 3RD STREET (RP 69.8 (RP 70.2)**

PRESENT 2009 A.D.T. = 4,380
LETTING 2013 A.D.T. = 4,560
DESIGN 2033 A.D.T. = 5,570
D.H.V. = 670
T. = 2.4%
V. = 35 MPH
18 KIP ESAL'S = 43 DLY.
GROWTH RATE = 1.0%

**3RD STREET TO 2 MILE ROAD (RP 70.2) (RP 71.6)**

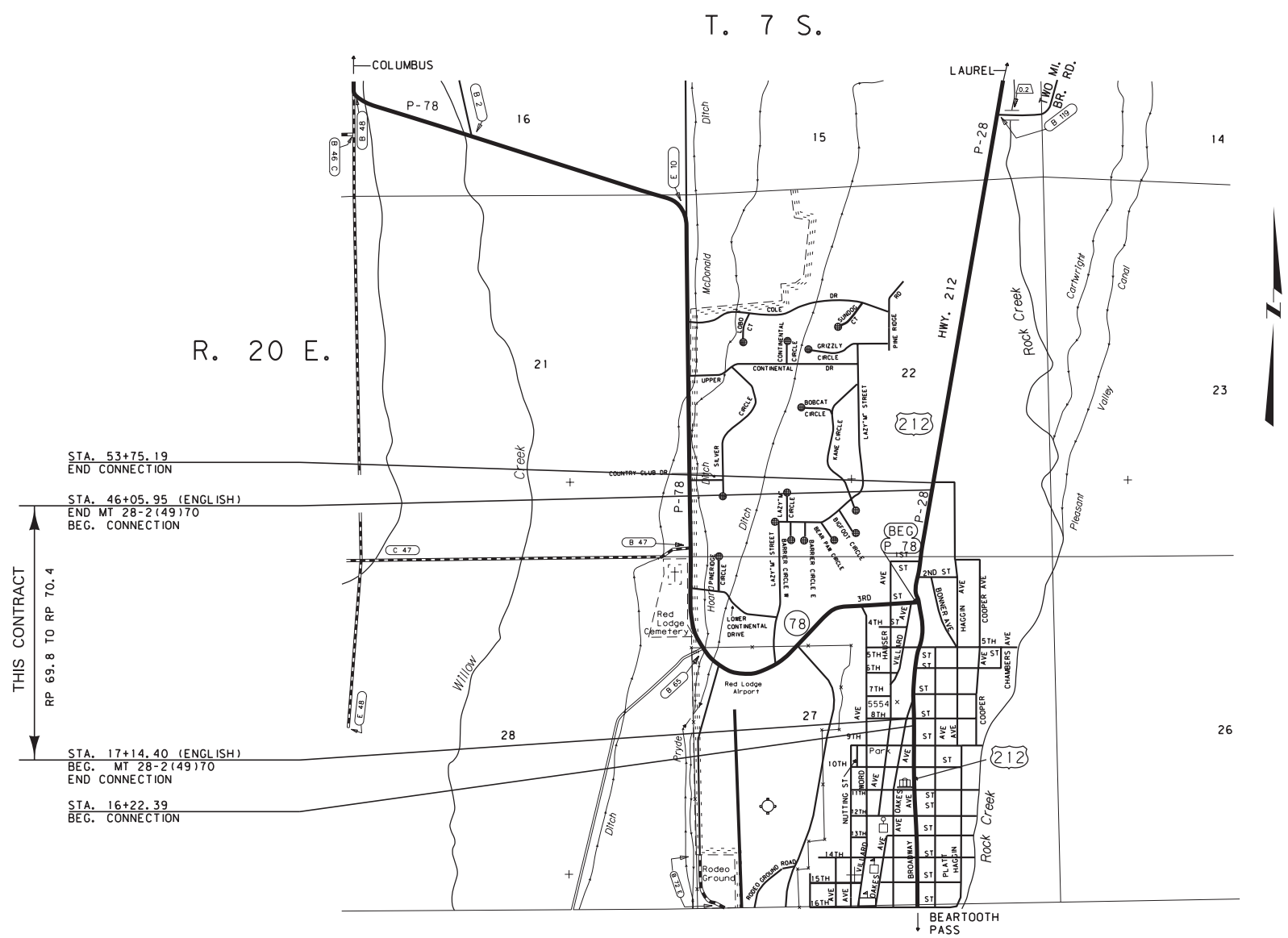
PRESENT 2009 A.D.T. = 2,910
LETTING 2013 A.D.T. = 3,060
DESIGN 2033 A.D.T. = 3,980
D.H.V. = 580
T. = 3.6%
V. (RP 70.19 TO RP 70.68) = 35 MPH
V. (RP 70.68 TO RP 71.61) = 45 MPH
18 KIP ESAL'S = 41 DLY.
GROWTH RATE = 1.3%

LENGTH 0.5 MILES

SURFACING SOURCES - CONTRACTOR FURNISHED

LETTING DATE - January 16, 2014
COMPLETION DATE - December 7, 2016
EPM NAME - Jeff Dyekman

CSF=0.999627000




**CARBON COUNTY**

PLANS PREPARED BY

SANDERSON STEWART
1300 North Transtech Way
Billings, Montana 59102
Phone: 406.656.5255
www.sandersonstewart.com

RELATED PROJECTS

STPP 78-1(17)0
STPP 28-2(42)64

ASSOCIATED PROJECT AGREEMENT NUMBERS

R/W & I.C. MT 28-2(38)70
P.E. MT 28-2(33)70

SANDERSON STEWART

BY _____
DATE _____

MONTANA PROFESSIONAL ENGINEER
KIRK A. SPALDING
12596 PE
LICENSED

MONTANA DEPARTMENT OF TRANSPORTATION

RECEIVED :
BY _____ _____
CONSULTANT DESIGN ENGINEER DATE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED :
_____ _____
DIVISION ADMINISTRATOR DATE

| | | | | |
|---|---|---|---|---|
| 3 | MDT MONTANA DEPARTMENT OF TRANSPORTATION | C:\DGN\4375005rdttl001ab.dgn | SANDERSON STEWART | ROAD PLANS |
| 2 | | 12/18/2017 | | UPN 4375005 |
| 1 | | 8:48:21 AM CPS - U1754 | | **AS-BUILTS** |

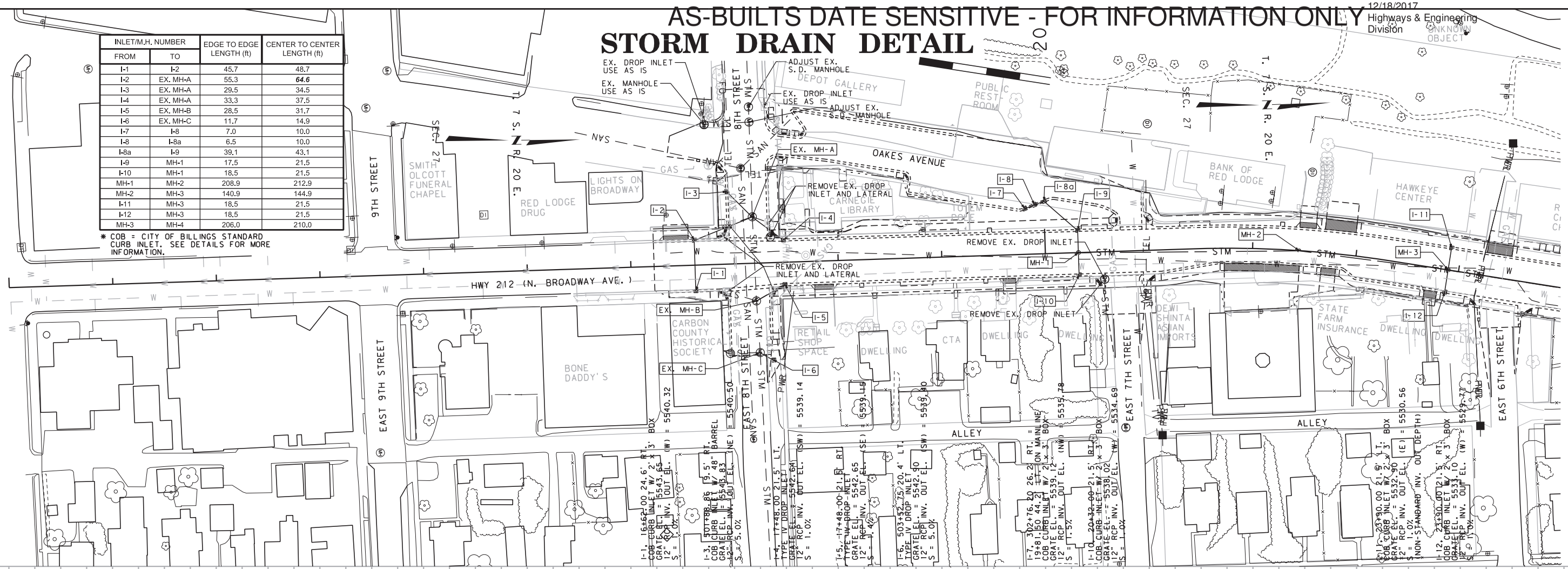
AS-BUILTS DATE SENSITIVE - FOR INFORMATION ONLY

12/18/2017
Highways & Engineering Division

# STORM DRAIN DETAIL

| INLET/M.H. NUMBER | | EDGE TO EDGE LENGTH (ft) | CENTER TO CENTER LENGTH (ft) |
|---|---|---|---|
| FROM | TO | | |
| I-1 | I-2 | 45.7 | 48.7 |
| I-2 | EX. MH-A | 55.3 | ***64.6*** |
| I-3 | EX. MH-A | 29.5 | 34.5 |
| I-4 | EX. MH-A | 33.3 | 37.5 |
| I-5 | EX. MH-B | 28.5 | 31.7 |
| I-6 | EX. MH-C | 11.7 | 14.9 |
| I-7 | I-8 | 7.0 | 10.0 |
| I-8 | I-8a | 6.5 | 10.0 |
| I-8a | I-9 | 39.1 | 43.1 |
| I-9 | MH-1 | 17.5 | 21.5 |
| I-10 | MH-1 | 18.5 | 21.5 |
| MH-1 | MH-2 | 208.9 | 212.9 |
| MH-2 | MH-3 | 140.9 | 144.9 |
| I-11 | MH-3 | 18.5 | 21.5 |
| I-12 | MH-3 | 18.5 | 21.5 |
| MH-3 | MH-4 | 206.0 | 210.0 |

* COB = CITY OF BILLINGS STANDARD CURB INLET. SEE DETAILS FOR MORE INFORMATION.




| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | MDT MONTANA DEPARTMENT OF TRANSPORTATION | C:\DGN\4375005rddet001ab.dgn | SANDERSON STEWART | ROAD PLANS | **AS-BUILTS** | RED LODGE - 8TH - ROBINSON | MT 28-2(49)70 |
| 2 | | 12/18/2017 | | CARBON COUNTY | | CSF= 0.999627000 / UPN 4375005 | SHEET 25 OF 77 |
| 1 | | 8:50:22 AM CPS - U1754 | | | | | |

AS-BUILTS DATE SENSITIVE - FOR INFORMATION ONLY

12/18/2017

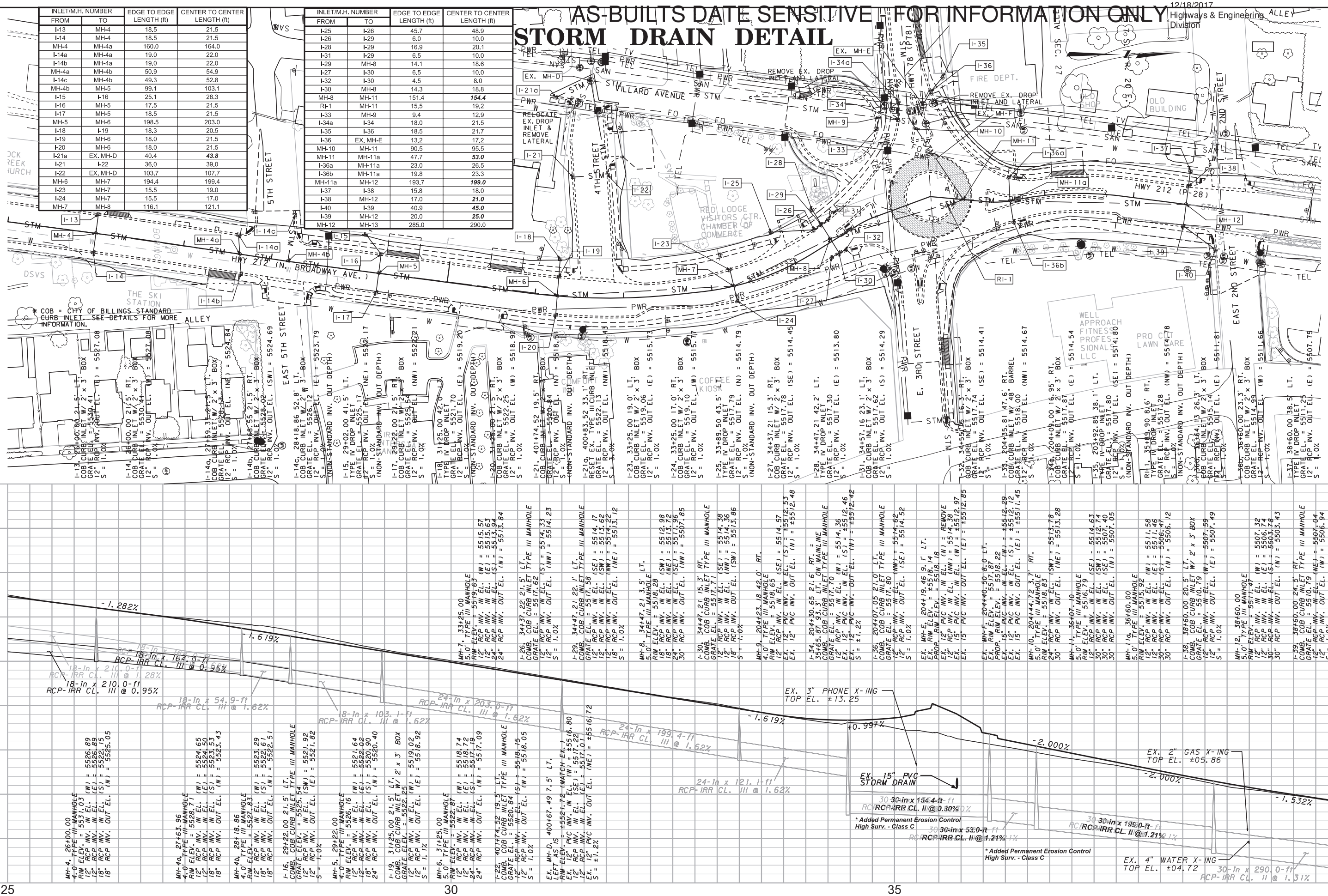
Highways & Engineering Division

# STORM DRAIN DETAIL

| INLET/M.H. NUMBER | | EDGE TO EDGE | CENTER TO CENTER |
|---|---|---|---|
| FROM | TO | LENGTH (ft) | LENGTH (ft) |
| I-13 | MH-4 | 18.5 | 21.5 |
| I-14 | MH-4 | 18.5 | 21.5 |
| MH-4 | MH-4a | 160.0 | 164.0 |
| I-14a | MH-4a | 19.0 | 22.0 |
| I-14b | MH-4a | 19.0 | 22.0 |
| MH-4a | MH-4b | 50.9 | 54.9 |
| I-14c | MH-4b | 49.3 | 52.8 |
| MH-4b | MH-5 | 99.1 | 103.1 |
| I-15 | I-16 | 25.1 | 28.3 |
| I-16 | MH-5 | 17.5 | 21.5 |
| I-17 | MH-5 | 18.5 | 21.5 |
| MH-5 | MH-6 | 198.5 | 203.0 |
| I-18 | I-19 | 18.3 | 20.5 |
| I-19 | MH-6 | 18.0 | 21.5 |
| I-20 | MH-6 | 18.0 | 21.5 |
| I-21a | EX. MH-D | 40.4 | ***43.8*** |
| I-21 | I-22 | 36.0 | 39.0 |
| I-22 | EX. MH-D | 103.7 | 107.7 |
| MH-6 | MH-7 | 194.4 | 199.4 |
| I-23 | MH-7 | 15.5 | 19.0 |
| I-24 | MH-7 | 15.5 | 17.0 |
| MH-7 | MH-8 | 116.1 | 121.1 |

| INLET/M.H. NUMBER | | EDGE TO EDGE | CENTER TO CENTER |
|---|---|---|---|
| FROM | TO | LENGTH (ft) | LENGTH (ft) |
| I-25 | I-26 | 45.7 | 48.9 |
| I-26 | I-29 | 6.0 | 10.0 |
| I-28 | I-29 | 16.9 | 20.1 |
| I-31 | I-29 | 6.5 | 10.0 |
| I-29 | MH-8 | 14.1 | 18.6 |
| I-27 | I-30 | 6.5 | 10.0 |
| I-32 | I-30 | 4.5 | 8.0 |
| I-30 | MH-8 | 14.3 | 18.8 |
| MH-8 | MH-11 | 151.4 | ***154.4*** |
| RI-1 | MH-11 | 15.5 | 19.2 |
| I-33 | MH-9 | 9.4 | 12.9 |
| I-34a | I-34 | 18.0 | 21.5 |
| I-35 | I-36 | 18.5 | 21.7 |
| I-36 | EX. MH-E | 13.2 | 17.2 |
| MH-10 | MH-11 | 90.5 | 95.5 |
| MH-11 | MH-11a | 47.7 | ***53.0*** |
| I-36a | MH-11a | 23.0 | 26.5 |
| I-36b | MH-11a | 19.8 | 23.3 |
| MH-11a | MH-12 | 193.7 | ***199.0*** |
| I-37 | I-38 | 15.8 | 18.0 |
| I-38 | MH-12 | 17.0 | ***21.0*** |
| I-40 | I-39 | 40.9 | ***45.0*** |
| I-39 | MH-12 | 20.0 | ***25.0*** |
| MH-12 | MH-13 | 285.0 | 290.0 |

* COB = CHY OF BILLINGS STANDARD CURB INLET. SEE DETAILS FOR MORE INFORMATION.

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|---|---|---|---|---|---|---|
| 3 | MDT MONTANA DEPARTMENT OF TRANSPORTATION | C:\DGN\4375005rddet001ab.dgn | SANDERSON STEWART | ROAD PLANS | **AS-BUILTS** | RED LODGE - 8TH - ROBINSON / MT 28-2(49)70 |
| 2 | | 12/18/2017 | | CARBON COUNTY | | CSF= 0.999627000 / UPN 4375005 |
| 1 | | 8:50:25 AM CPS - U1754 | | | | SHEET 26 OF 77 |

AS-BUILTS DATE SENSITIVE - FOR INFORMATION ONLY

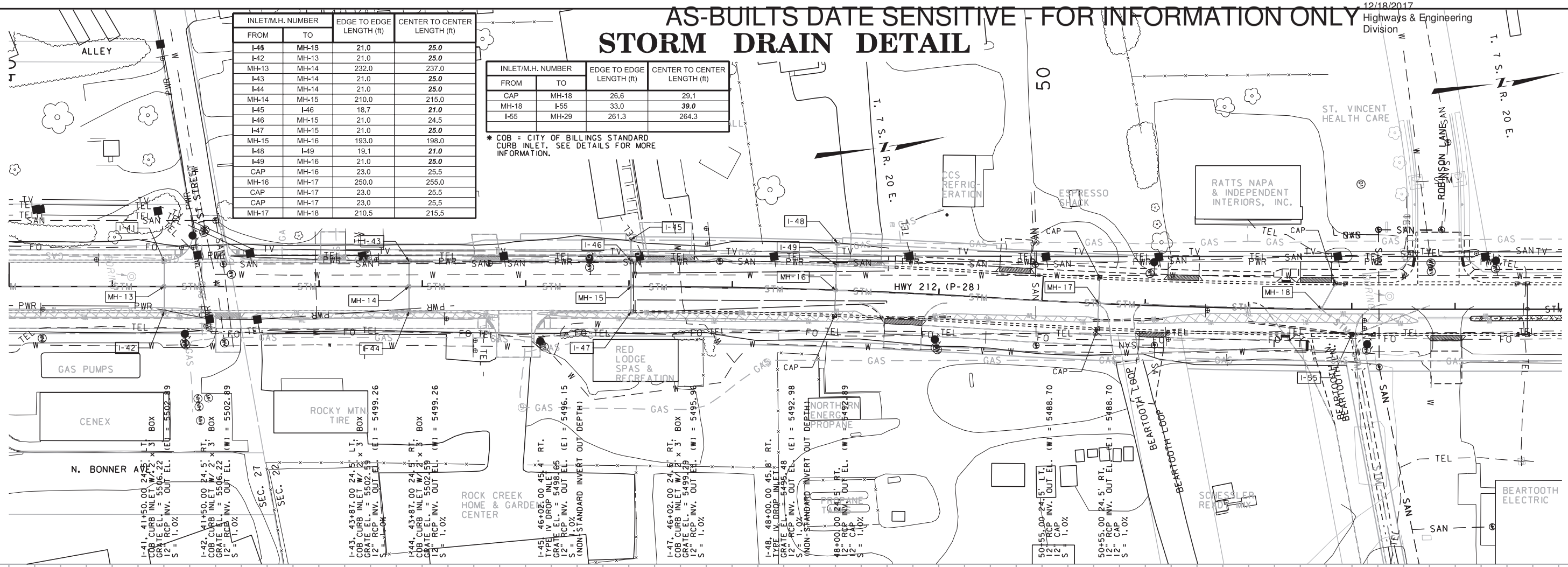
12/18/2017
Highways & Engineering Division

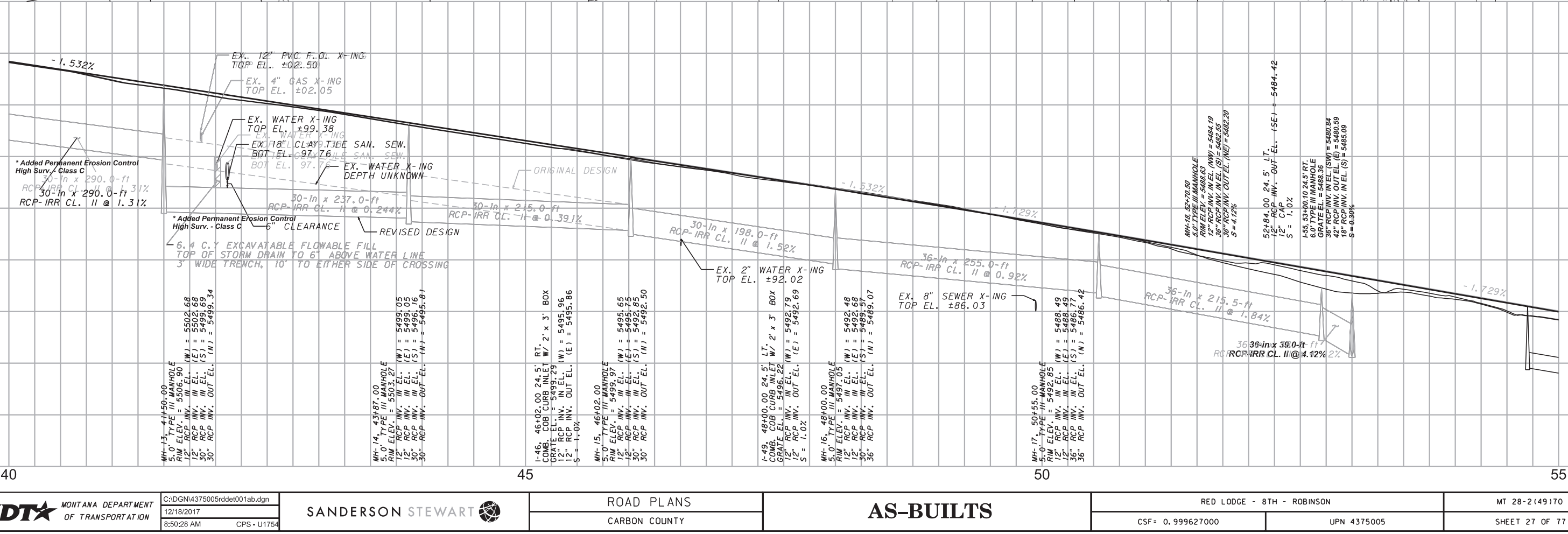
# STORM DRAIN DETAIL

| INLET/M.H. NUMBER | | EDGE TO EDGE LENGTH (ft) | CENTER TO CENTER LENGTH (ft) |
|---|---|---|---|
| FROM | TO | | |
| I-46 | MH-13 | 21.0 | ***25.0*** |
| I-42 | MH-13 | 21.0 | ***25.0*** |
| MH-13 | MH-14 | 232.0 | 237.0 |
| I-43 | MH-14 | 21.0 | ***25.0*** |
| I-44 | MH-14 | 21.0 | ***25.0*** |
| MH-14 | MH-15 | 210.0 | 215.0 |
| I-45 | I-46 | 18.7 | ***21.0*** |
| I-46 | MH-15 | 21.0 | 24.5 |
| I-47 | MH-15 | 21.0 | ***25.0*** |
| MH-15 | MH-16 | 193.0 | 198.0 |
| I-48 | I-49 | 19.1 | ***21.0*** |
| I-49 | MH-16 | 21.0 | ***25.0*** |
| CAP | MH-16 | 23.0 | 25.5 |
| MH-16 | MH-17 | 250.0 | 255.0 |
| CAP | MH-17 | 23.0 | 25.5 |
| CAP | MH-17 | 23.0 | 25.5 |
| MH-17 | MH-18 | 210.5 | 215.5 |

| INLET/M.H. NUMBER | | EDGE TO EDGE LENGTH (ft) | CENTER TO CENTER LENGTH (ft) |
|---|---|---|---|
| FROM | TO | | |
| CAP | MH-18 | 26.6 | 29.1 |
| MH-18 | I-55 | 33.0 | ***39.0*** |
| I-55 | MH-29 | 261.3 | 264.3 |

* COB = CITY OF BILLINGS STANDARD CURB INLET. SEE DETAILS FOR MORE INFORMATION.

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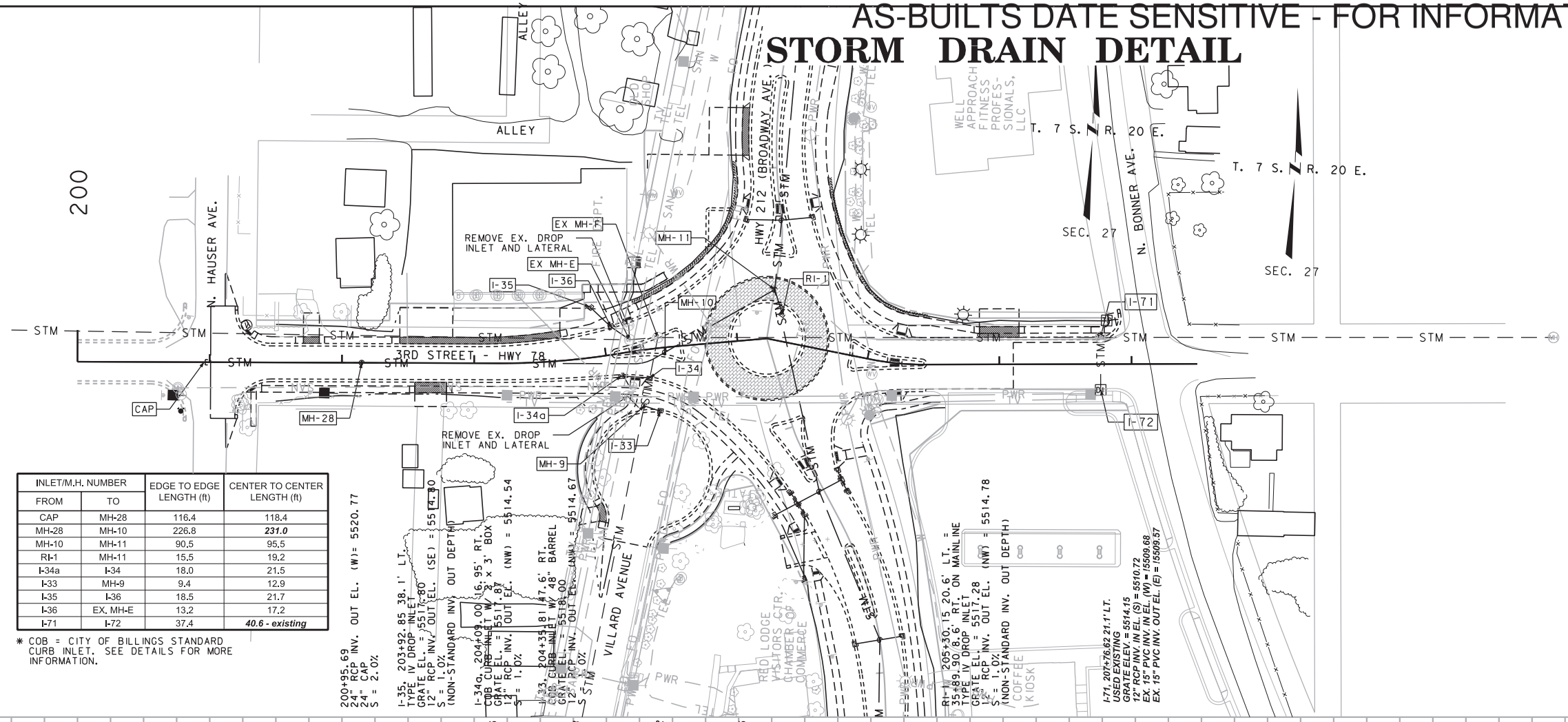
|---|---|---|---|---|---|---|
| 3 | MDT MONTANA DEPARTMENT OF TRANSPORTATION | C:\DGN\4375005rddet001ab.dgn | SANDERSON STEWART | ROAD PLANS | **AS-BUILTS** | RED LODGE - 8TH - ROBINSON / MT 28-2(49)70 |
| 2 | | 12/18/2017 | | CARBON COUNTY | | CSF= 0.999627000 / UPN 4375005 / SHEET 27 OF 77 |
| 1 | | 8:50:28 AM CPS - U1754 | | | | |

AS-BUILTS DATE SENSITIVE - FOR INFORMATION ONLY

12/18/2017
Highways & Engineering Division

# STORM DRAIN DETAIL




| INLET/M.H. NUMBER | | EDGE TO EDGE LENGTH (ft) | CENTER TO CENTER LENGTH (ft) |
|---|---|---|---|
| FROM | TO | | |
| CAP | MH-28 | 116.4 | 118.4 |
| MH-28 | MH-10 | 226.8 | ***231.0*** |
| MH-10 | MH-11 | 90.5 | 95.5 |
| RI-1 | MH-11 | 15.5 | 19.2 |
| I-34a | I-34 | 18.0 | 21.5 |
| I-33 | MH-9 | 9.4 | 12.9 |
| I-35 | I-36 | 18.5 | 21.7 |
| I-36 | EX. MH-E | 13.2 | 17.2 |
| I-71 | I-72 | 37.4 | ***40.6 - existing*** |

* COB = CITY OF BILLINGS STANDARD CURB INLET. SEE DETAILS FOR MORE INFORMATION.

209+95.69 INV. OUT EL. (W)= 5520.77
24" CAP
S = 2.0%

I-35, 203+92.85 38.1' LT.
TYPE IV DROP INLET
GRATE EL. = 5517.80
12" RCP INV. OUT EL. (SE) = 5514.80
S = 1.0%
(NON-STANDARD INV. OUT DEPTH)

I-34a, 204+03.00 16.95' RT.
COB CURB INLET W/ 48" BARREL
GRATE EL. = 5511.87 (NW) = 5514.54
12" RCP INV. OUT EL. (NW) = 5514.54
S = 1.0%

I-33, 204+33.18 47.6' RT.
COB CURB INLET W/ 48" BARREL
GRATE EL. = 5512.00 (NW) = 5514.67
12" RCP INV. OUT EL. (NW) = 5514.67
S = 1.0%

RI-1, 205+30.15 20.6' LT. =
55+89.90 8.6' RT. ON MAINLINE
TYPE IV DROP INLET
GRATE EL. = 5517.28
12" RCP INV. OUT EL. (NW) = 5514.78
S = 1.0%
(NON-STANDARD INV. OUT DEPTH)

I-71, 207+76.62 21.1' LT.
USED EXISTING
GRATE ELEV. = 5514.15
EX. 12" PVC INV. IN EL. (S) = 5510.72
EX. 15" PVC INV. IN EL. (W) = 5509.68
EX. 15" PVC INV. OUT EL. (E) = 5509.57

I-36, 204+07.05 21.0' LT.
COB CURB INLET TYPE III MANHOLE
GRATE EL. = 5518.80
12" RCP INV. OUT EL. (NW) = 5514.62
S = 1.0%
(SE) = 5514.52

EX. MH-E, 204+19.46 9.1' LT.
EX. RIM ELEV. = 5518.14
PROP. RIM ELEV. = 5518.18
EX. 12" RCP INV. IN EL. (W) = REMOVE
12" RCP INV. OUT EL. (NW) = 5514.38
EX. 15" RCP INV. IN EL. (W) = ±5512.97
EX. 15" RCP INV. OUT EL. (E) = ±5512.85
(FILL AND REINFORCE EX. LATERAL HOLE)

MH-9, 204+23.18 42.0' RT.
4.0' TYPE III MANHOLE
RIM ELEV. = 5518.65 (SE) = 5514.57
12" RCP INV. IN EL. (S) = ±5512.53
12" RCP INV. OUT EL. (N) = ±5512.48

I-34, 204+30.65 21.6' RT. =
55+25.28 3.3' LT. ON MAINLINE
COB CURB INLET TYPE III MANHOLE
GRATE EL. = 5517.70
12" RCP INV. IN EL. (W) = 5514.36
EX. 12" PVC INV. IN EL. (S) = ±5512.46
EX. 12" PVC INV. OUT EL. (N) = ±5512.42
S = ±1.2%

EX. MH-F, 204+40.50 8.0 LT.
RIM ELEV. = 5517.87
EX. 12" RCP INV. IN EL. (W) = ±5512.29
PROP. 15" PVC INV. IN EL. (S) = ±5512.29
EX. 15" PVC INV. IN EL. (E) = ±5512.21
EX. 15" PVC INV. OUT EL. (E) = ±5511.45

MH-10, 204+44.72 3.1' RT.
5.0' TYPE III MANHOLE
RIM ELEV. = 5518.83
24" RCP INV. IN EL. (SW) = 5513.78
30" RCP INV. OUT EL. (NE) = 5513.28

MH-11, 36+07.10 (ON MAINLINE)
5.0' TYPE III MANHOLE
RIM ELEV. = 5516.79
12" RCP INV. IN EL. (SE) = 5514.63
24" RCP INV. IN EL. (SW) = 5512.40
30" RCP INV. IN EL. (SE) = 5507.40
30" RCP INV. OUT EL. (N) = 5507.05

I-72, 207+76.78 19.5' RT.
EX. CURB INLET
USE AS IS

18-in x 260.9-ft RCP-IRR CL. III @ 5.2%
STA. 209+95.69
24" RCP STUB & CAP
INV. ELEV. = 5520.76
24-in x 118.4-ft RCP-IRR CL. III @ 1.3%
24-in x 42.6-ft RCP-IRR CL. III @ 2.0%
24-in x 119.3-ft RCP-IRR CL. III @ 2.0%
STA. 200+96.60
CONNECTION TO 24" RCP STUB INSTALLED WITH RED LODGE - BREWERY HILL PROJECT STPP 78-1(17)0
INV. ELEV. = 5518.34
MH-7, 14+95.20 ON STPP 78-1(17)0 = 200+52.00 ON MT 28-2(49)70
4.0' TYPE III MANHOLE
24" RCP INV. IN EL. (E) = 5527.93
24" RCP INV. OUT EL. (E) = 5527.83
30-in x 86.5-ft RCP-IRR CL. III @ 0.6%
24-in x 231.3-ft RCP-IRR CL. III @ 2.0%
(GRADUAL HORIZ. CURVE MADE WITH ((4)) 7.5° WMTPACHER TIGHT ELBOWS
DEFLECTION POINT STA. = 204+68.77 O/S = 7.29 LT. INV. EL. = 5513.14
EX. 3" PHONE X-ING TOP EL. ±12.90
EX. 12-in LATERAL
EX. 12" PVC SEWER (INV. EL. 8.98±)
EX. 12" PVC STORM (INV. EL. 12.29±)
EX. 15" PVC STORM DRAIN (INV. EL. 11.12±)
EX. F.O. X-ING TOP EL. ±13.40
30-in x 69.0-ft RCP-IRR CL. III @ 1.67%
MH-28, 202+15.00 4.0' TYPE III MANHOLE
RIM ELEV. = 5524.18
24" RCP INV. IN EL. (W) = 5516.83
24" RCP INV. OUT EL. (E) = 5516.73

5540 5535 5530 5525 5520 5515 5510 5505 5500
200 205

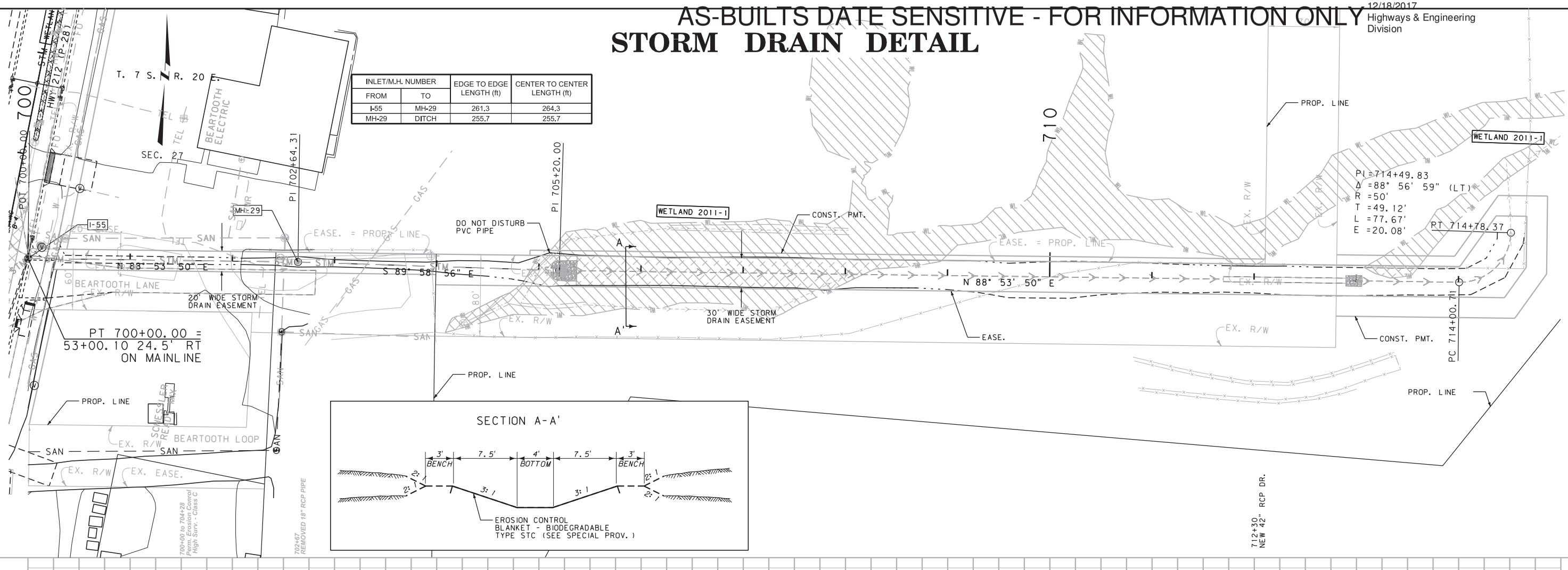
| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | MDT MONTANA DEPARTMENT OF TRANSPORTATION | C:\DGN\4375005rddet003ab.dgn | SANDERSON STEWART | ROAD PLANS | AS-BUILTS | RED LODGE - 8TH - ROBINSON / MT 28-2(49)70 |
| 2 | | 12/18/2017 | | CARBON COUNTY | | CSF= 0.999627000 / UPN 4375005 / SHEET 28 OF 77 |
| 1 | | 8:50:36 AM CPS - U1754 | | | | |

AS-BUILTS DATE SENSITIVE - FOR INFORMATION ONLY

12/18/2017
Highways & Engineering Division

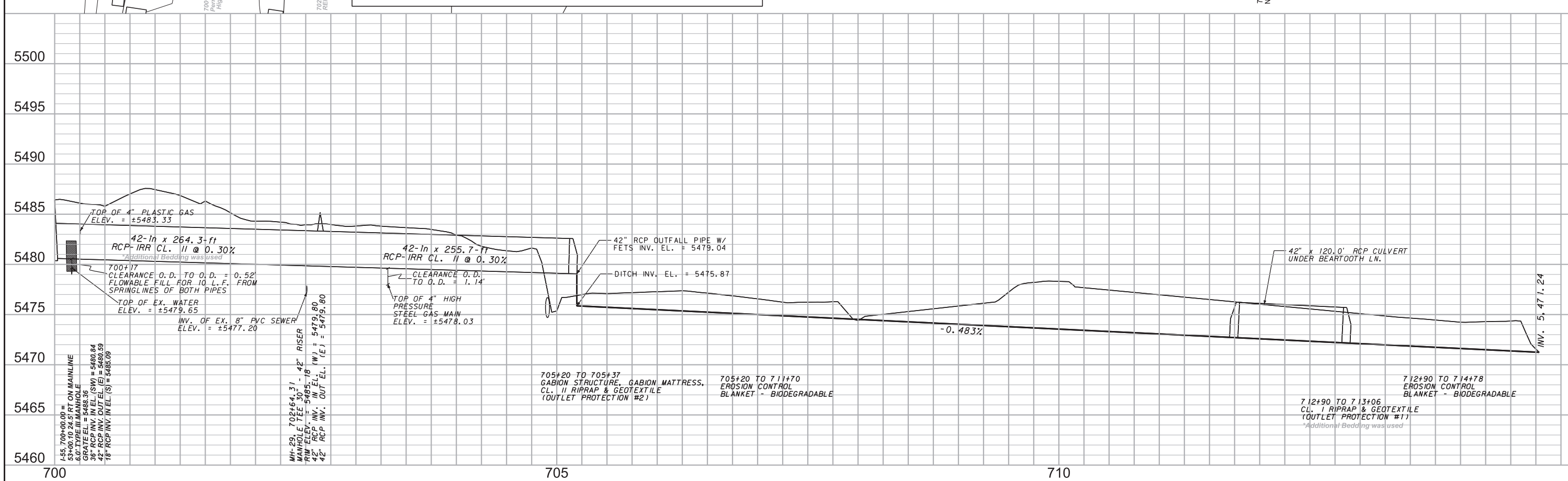
# STORM DRAIN DETAIL

| INLET/M.H. NUMBER | | EDGE TO EDGE LENGTH (ft) | CENTER TO CENTER LENGTH (ft) |
|---|---|---|---|
| FROM | TO | | |
| I-55 | MH-29 | 261.3 | 264.3 |
| MH-29 | DITCH | 255.7 | 255.7 |




SECTION A-A'

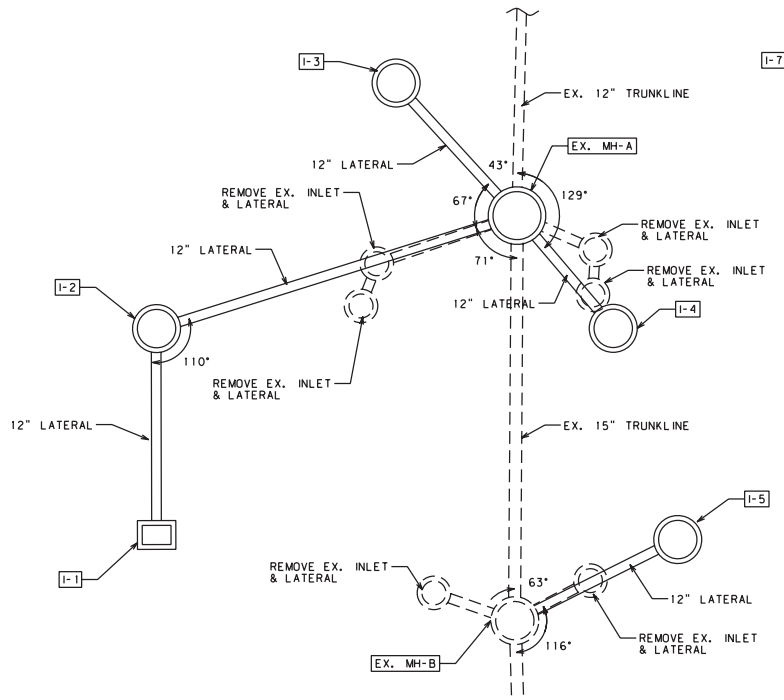


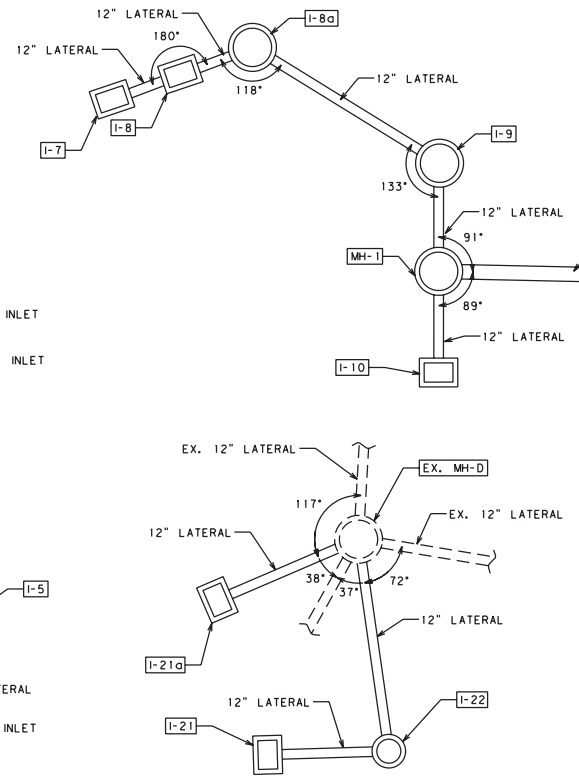

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | MDT MONTANA DEPARTMENT OF TRANSPORTATION | C:\DGN\4375005rddet003ab.dgn | SANDERSON STEWART | ROAD PLANS | AS-BUILTS | RED LODGE - 8TH - ROBINSON / MT 28-2(49)70 |
| 2 | | 12/18/2017 | | CARBON COUNTY | | CSF= 0.999627000 / UPN 4375005 / SHEET 29 OF 77 |
| 1 | | 8:50:39 AM CPS - U1754 | | | | |

12/18/2017
Highways & Engineering Division

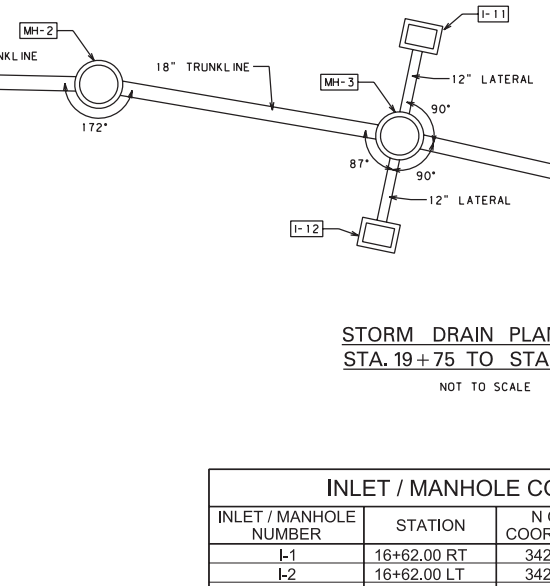
# STORM DRAIN PLAN VIEW DETAIL



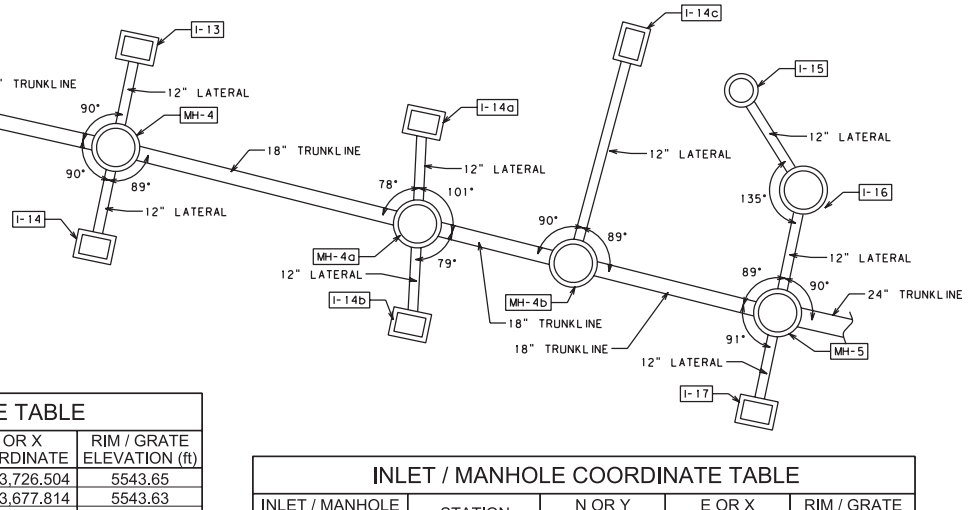

STORM DRAIN PLAN VIEW
STA. 16+50 TO STA. 17+50
NOT TO SCALE




STORM DRAIN PLAN VIEW
STA. 31+00 TO STA. 32+00
(4TH STREET STA. 400+67 TO STA. 401+75)
NOT TO SCALE




STORM DRAIN PLAN VIEW
STA. 19+75 TO STA. 29+05
NOT TO SCALE




## INLET / MANHOLE COORDINATE TABLE

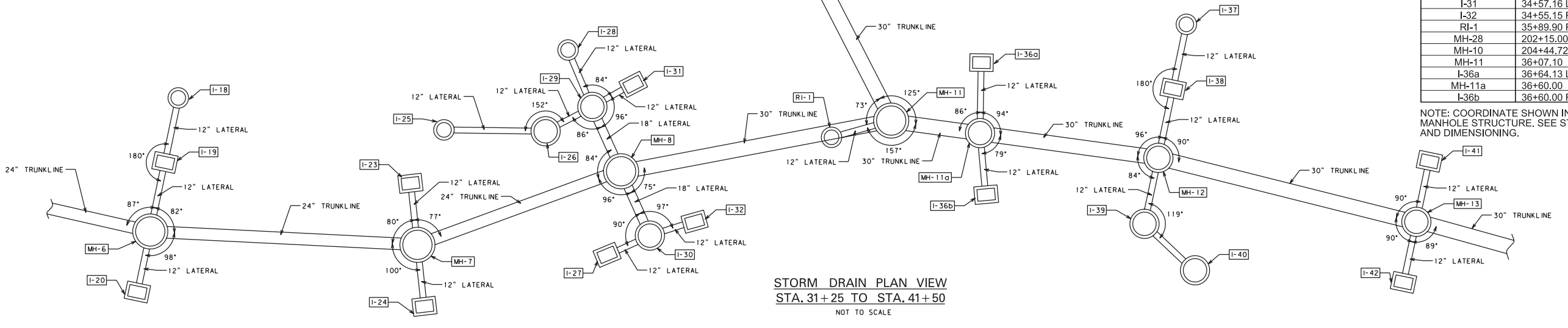
| INLET / MANHOLE NUMBER | STATION | N OR Y COORDINATE | E OR X COORDINATE | RIM / GRATE ELEVATION (ft) |
|---|---|---|---|---|
| I-1 | 16+62.00 RT | 342,787.427 | 2,033,726.504 | 5543.65 |
| I-2 | 16+62.00 LT | 342,786.432 | 2,033,677.814 | 5543.63 |
| I-3 | 501+88.86 RT | 342,818.388 | 2,033,631.292 | 5543.83 |
| EX. MH-A | 502+13.99 LT | 342,842.600 | 2,033,655.930 | 5543.46 |
| I-4 | 17+48.00 LT | 342,872.467 | 2,033,678.657 | 5542.64 |
| I-5 | 17+48.00 RT | 342,873.346 | 2,033,721.648 | 5542.65 |
| EX. MH-B | 502+95.20 LT | 342,845.660 | 2,033,737.100 | 5543.13 |
| EX. MH-C | 503+45.09 LT | 342,848.690 | 2,033,786.940 | 5543.37 |
| I-6 | 503+52.75 LT | 342,861.634 | 2,033,794.328 | 5542.90 |
| I-7 | 302+76.20 RT | 343,105.458 | 2,033,651.191 | 5539.12 |
| I-8 | 302+84.86 RT | 343,114.828 | 2,033,647.698 | 5539.00 |
| I-8a | 302+93.52 RT | 343,124.199 | 2,033,644.206 | 5538.87 |
| I-9 | 20+32.00 LT | 343,156.408 | 2,033,672.855 | 5538.02 |
| MH-1 | 20+32.00 | 343,156.847 | 2,033,694.351 | 5538.64 |
| I-10 | 20+32.00 RT | 343,157.286 | 2,033,715.846 | 5538.02 |
| MH-2 | 22+45.00 | 343,369.740 | 2,033,695.052 | 5535.58 |
| I-11 | 23+90.00 LT | 343,516.827 | 2,033,694.290 | 5532.90 |
| MH-3 | 23+90.00 | 343,513.227 | 2,033,715.486 | 5533.72 |
| I-12 | 23+90.00 RT | 343,509.627 | 2,033,736.683 | 5533.10 |
| I-13 | 26+00.00 LT | 343,723.862 | 2,033,729.456 | 5530.41 |
| MH-4 | 26+00.00 | 343,720.261 | 2,033,750.652 | 5531.03 |
| I-14 | 26+00.00 RT | 343,716.661 | 2,033,771.849 | 5530.41 |
| I-14a | 27+59.37 LT | 343,881.016 | 2,033,758.088 | 5528.17 |
| MH-4a | 27+63.96 | 343,881.557 | 2,033,780.066 | 5528.71 |

NOTE: COORDINATE SHOWN IN TABLE REFERS TO THE CENTER OF THE INLET OR MANHOLE STRUCTURE. SEE STORM DRAIN DETAILS FOR ADDITIONAL INFORMATION AND DIMENSIONING.

## INLET / MANHOLE COORDINATE TABLE

| INLET / MANHOLE NUMBER | STATION | N OR Y COORDINATE | E OR X COORDINATE | RIM / GRATE ELEVATION (ft) |
|---|---|---|---|---|
| I-14b | 27+68.55 RT | 343,882.098 | 2,033,802.044 | 5528.02 |
| I-14c | 28+18.86 LT | 343,945.257 | 2,033,738.314 | 5526.12 |
| MH-4b | 28+18.86 | 343,935.509 | 2,033,790.202 | 5527.83 |
| I-15 | 29+02.00 LT | 344,024.422 | 2,033,763.241 | 5525.17 |
| I-16 | 29+22.00 LT | 344,040.787 | 2,033,786.330 | 5525.54 |
| MH-5 | 29+22.00 | 344,037.186 | 2,033,807.527 | 5526.16 |
| I-17 | 29+22.00 RT | 344,033.586 | 2,033,828.723 | 5525.54 |
| I-18 | 31+25.00 LT | 344,242.398 | 2,033,798.918 | 5521.70 |
| I-19 | 31+25.00 LT | 344,239.987 | 2,033,819.268 | 5522.25 |
| MH-6 | 31+25.00 | 344,237.458 | 2,033,840.619 | 5522.87 |
| I-20 | 31+25.00 RT | 344,234.928 | 2,033,861.970 | 5522.25 |
| I-21 | 401+74.52 RT | 344,260.515 | 2,033,707.183 | 5520.84 |
| I-21a | 400+83.52 RT | 344,244.164 | 2,033,616.632 | 5522.13 |
| I-22 | 401+74.52 LT | 344,299.497 | 2,033,706.020 | 5520.84 |
| EX. MH-D | 400+67.49 LT | 344,284.260 | 2,033,599.400 | 5521.72 |
| I-23 | 33+25.00 LT | 344,433.107 | 2,033,818.379 | 5519.06 |
| MH-7 | 33+25.00 | 344,436.797 | 2,033,836.978 | 5519.63 |
| I-24 | 33+25.00 RT | 344,440.108 | 2,033,853.672 | 5519.10 |
| I-25 | 33+89.50 LT | 344,480.861 | 2,033,777.869 | 5517.79 |
| I-26 | 34+37.22 LT | 344,529.782 | 2,033,776.934 | 5517.62 |
| I-27 | 34+37.21 RT | 344,548.073 | 2,033,808.907 | 5517.78 |
| I-28 | 34+47.21 LT | 344,528.169 | 2,033,754.018 | 5517.30 |
| I-29 | 34+47.21 LT | 344,538.141 | 2,033,771.436 | 5517.58 |
| MH-8 | 34+47.21 LT | 344,547.407 | 2,033,787.619 | 5518.26 |
| I-30 | 34+47.21 RT | 344,556.755 | 2,033,803.945 | 5517.71 |
| I-31 | 34+57.16 LT | 344,546.303 | 2,033,765.657 | 5517.62 |
| I-32 | 34+55.15 RT | 344,564.126 | 2,033,800.834 | 5517.74 |
| RI-1 | 35+89.90 RT | 344,680.841 | 2,033,755.243 | 5517.28 |
| MH-28 | 202+15.00 | 344,633.623 | 2,033,438.589 | 5524.18 |
| MH-10 | 204+44.72 RT | 344,648.932 | 2,033,667.582 | 5518.83 |
| MH-11 | 36+07.10 | 344,698.996 | 2,033,748.950 | 5516.79 |
| I-36a | 36+64.13 LT | 344,751.308 | 2,033,725.991 | 5515.14 |
| MH-11a | 36+60.00 | 344,751.602 | 2,033,752.487 | 5515.92 |
| I-36b | 36+60.00 RT | 344,754.534 | 2,033,775.598 | 5514.99 |

NOTE: COORDINATE SHOWN IN TABLE REFERS TO THE CENTER OF THE INLET OR MANHOLE STRUCTURE. SEE STORM DRAIN DETAILS FOR ADDITIONAL INFORMATION AND DIMENSIONING.

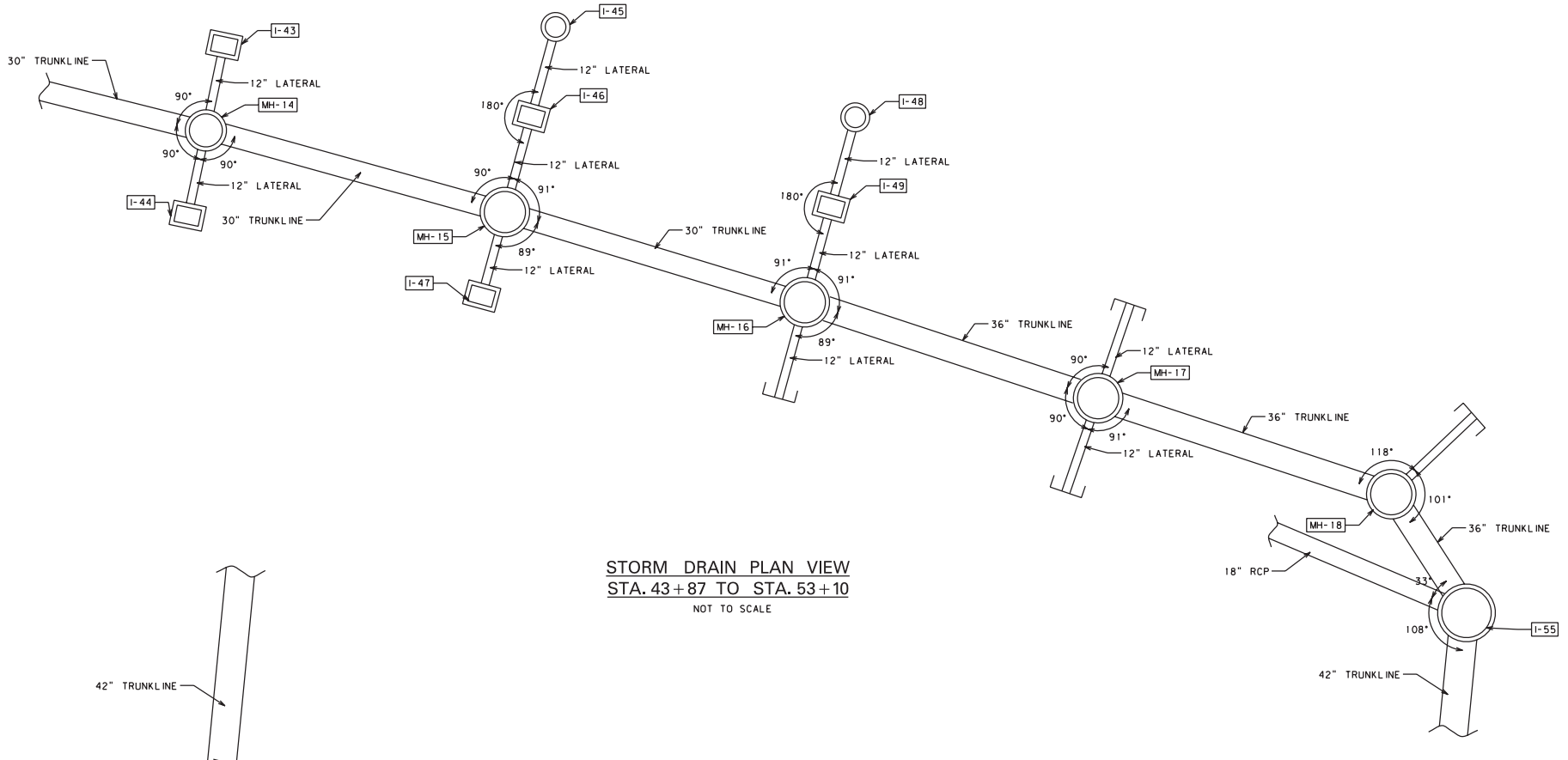



STORM DRAIN PLAN VIEW
STA. 31+25 TO STA. 41+50
NOT TO SCALE

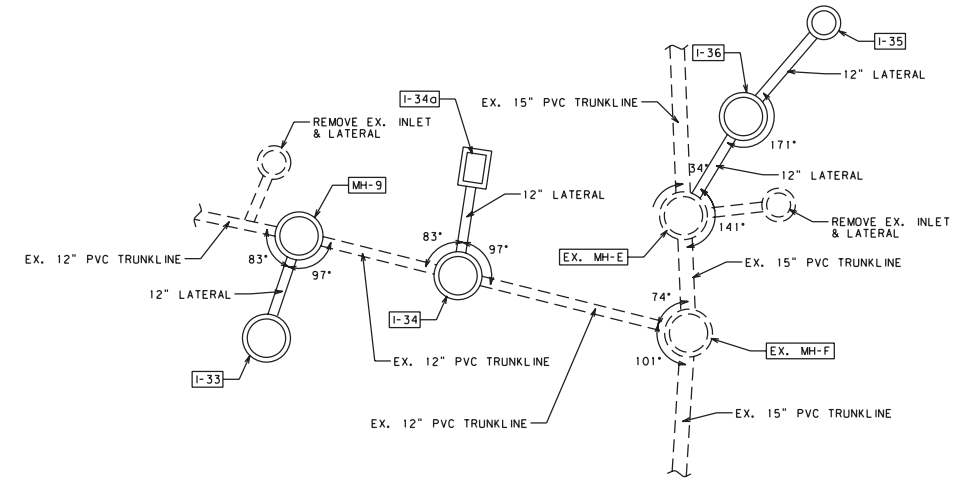
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3 | MDT MONTANA DEPARTMENT OF TRANSPORTATION | C:\DGN\4375005rddet004ab.dgn | SANDERSON STEWART | ROAD PLANS | AS-BUILTS | RED LODGE - 8TH - ROBINSON | MT 28-2(49)70 |
| 2 | | 12/18/2017 | | CARBON COUNTY | | CSF= 0.999627000 / UPN 4375005 | SHEET 30 OF 77 |
| 1 | | 8:50:47 AM CPS - U1754 | | | | | |

12/18/2017
Highways & Engineering Division

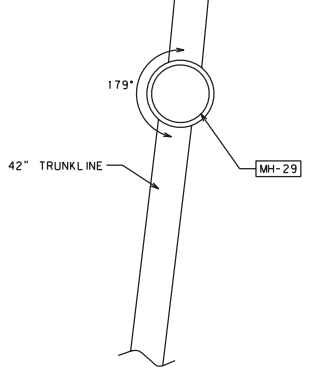
# STORM DRAIN PLAN VIEW DETAIL



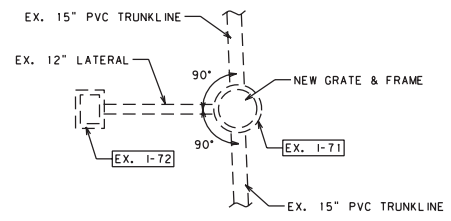

STORM DRAIN PLAN VIEW
STA. 43+87 TO STA. 53+10
NOT TO SCALE




STORM DRAIN PLAN VIEW
STA. 203+91 TO STA. 204+36
NOT TO SCALE




STORM DRAIN PLAN VIEW
EAST OF HIGHWAY 212
STATION 702+64.31
NOT TO SCALE

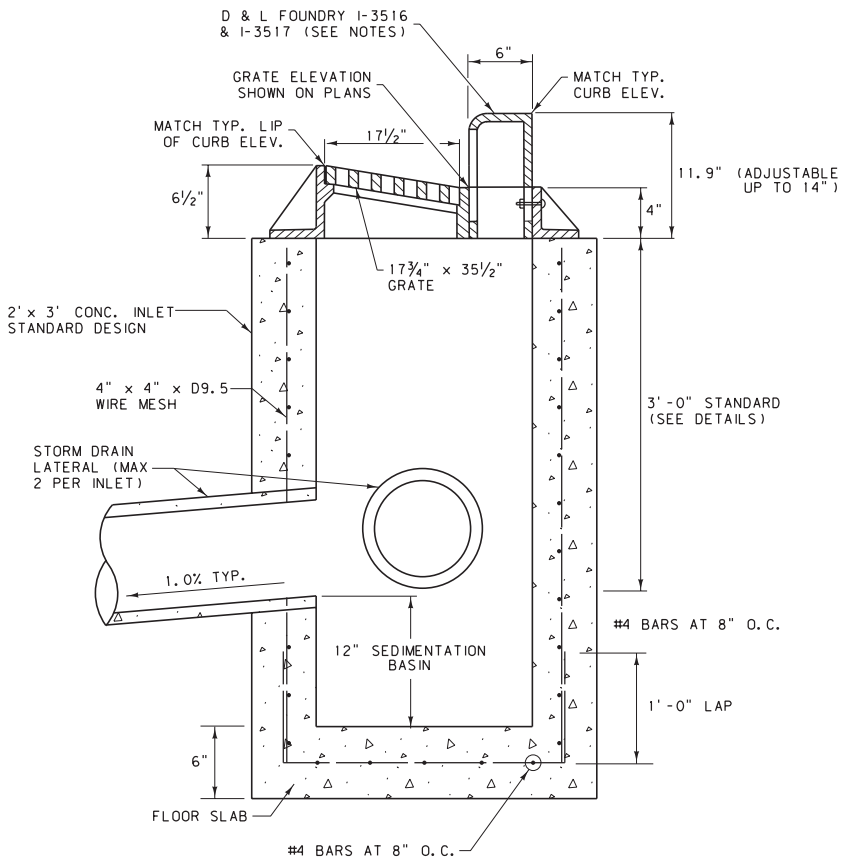



STORM DRAIN PLAN VIEW
STA. 207+77
NOT TO SCALE

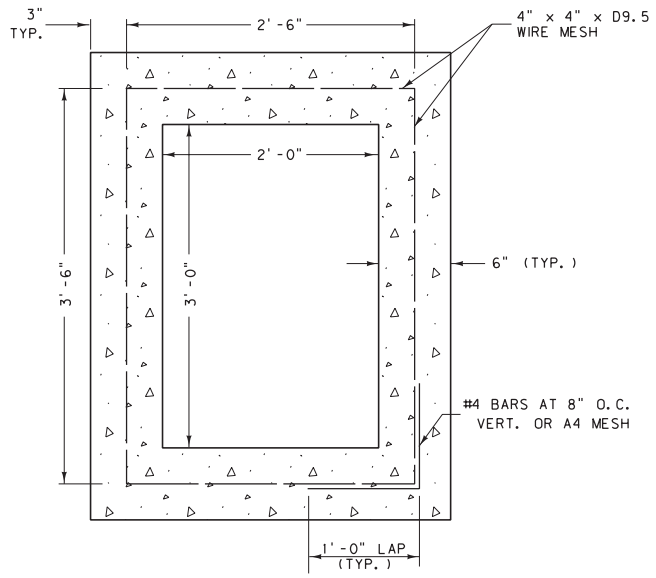
## INLET / MANHOLE COORDINATE TABLE

| INLET / MANHOLE NUMBER | STATION | N OR Y COORDINATE | E OR X COORDINATE | RIM / GRATE ELEVATION (ft) |
|---|---|---|---|---|
| I-37 | 38+60.00 LT | 344,956.327 | 2,033,725.801 | 5511.25 |
| I-38 | 38+60.00 LT | 344,953.359 | 2,033,743.554 | 5510.79 |
| MH-12 | 38+60.00 | 344,959.979 | 2,033,763.774 | 5511.47 |
| I-39 | 38+60.00 RT | 344,945.939 | 2,033,787.938 | 5510.79 |
| I-40 | 38+99.31 RT | 344,981.133 | 2,033,815.833 | 5509.78 |
| I-41 | 41+50.00 LT | 345,240.049 | 2,033,787.426 | 5506.22 |
| MH-13 | 41+50.00 | 345,236.010 | 2,033,811.590 | 5506.90 |
| I-42 | 41+50.00 RT | 345,231.970 | 2,033,835.755 | 5506.22 |
| I-43 | 43+87.00 LT | 345,473.805 | 2,033,826.503 | 5502.59 |
| MH-14 | 43+87.00 | 345,469.766 | 2,033,850.668 | 5503.27 |
| I-44 | 43+87.00 RT | 345,465.726 | 2,033,874.833 | 5502.59 |
| I-45 | 46+02.00 LT | 345,689.334 | 2,033,841.345 | 5498.65 |
| I-46 | 46+02.00 LT | 345,685.876 | 2,033,861.957 | 5499.29 |
| MH-15 | 46+02.00 | 345,681.823 | 2,033,886.118 | 5499.97 |
| I-47 | 46+02.00 RT | 345,677.769 | 2,033,910.282 | 5499.29 |
| I-48 | 48+00.00 LT | 345,885.628 | 2,033,877.384 | 5495.48 |
| I-49 | 48+00.00 LT | 345,881.376 | 2,033,898.255 | 5496.22 |
| MH-16 | 48+00.00 | 345,876.486 | 2,033,922.262 | 5497.05 |
| MH-17 | 50+55.00 | 346,125.546 | 2,033,976.950 | 5492.85 |
| MH-18 | 52+70.50 | 346,337.116 | 2,034,017.852 | 5488.63 |
| I-55 | 53+00.10 RT | 346,362.218 | 2,034,047.003 | 5488.36 |
| MH-29 | 702+64.31 | 346,367.305 | 2,034,311.264 | 5485.18 |
| I-33 | 204+35.81 RT | 344,604.299 | 2,033,665.475 | 5518.00 |
| MH-9 | 204+23.18 RT | 344,607.944 | 2,033,653.116 | 5518.65 |
| I-34a | 204+09.00 RT | 344,630.000 | 2,033,635.146 | 5517.87 |
| I-34 | 204+30.65 RT | 344,629.190 | 2,033,656.642 | 5517.70 |
| I-35 | 203+92.85 LT | 344,681.343 | 2,033,609.761 | 5517.80 |
| I-36 | 204+07.05 LT | 344,666.885 | 2,033,625.998 | 5517.80 |
| EX. MH-E | 204+19.46 LT | 344,657.570 | 2,033,640.490 | 5518.18 |
| EX. MH-F | 204+40.50 LT | 344,659.970 | 2,033,661.750 | 5518.22 |
| EX. I-71 | 207+76.62 LT | 344,671.684 | 2,033,996.373 | 5514.15 |
| EX. I-72 | 207+76.78 RT | 344,630.378 | 2,033,997.963 | 5513.94 |

NOTE: COORDINATE SHOWN IN TABLE REFERS TO THE CENTER OF THE INLET OR MANHOLE STRUCTURE. SEE STORM DRAIN DETAILS FOR ADDITIONAL INFORMATION AND DIMENSIONING.




## COB STANDARD CURB INLET WITH SUMP

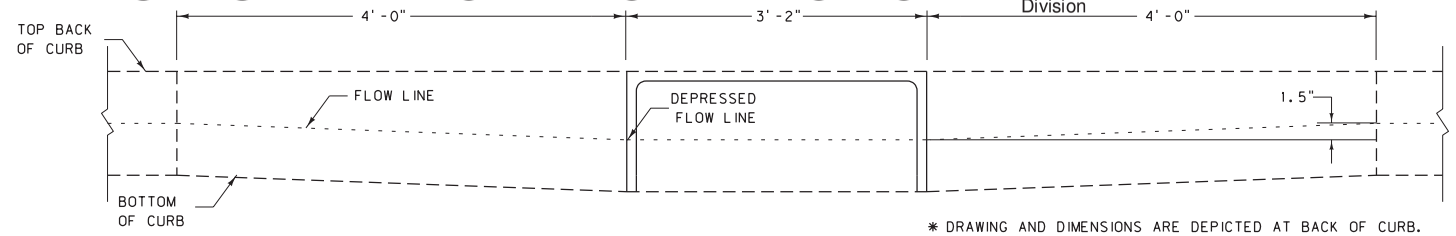



## COB STANDARD CURB INLET WITH SUMP PLAN VIEW

NOTES:

- ALL CONCRETE IS CLASS "DD" OR APPROVED EQUAL.
- PROVIDE THE SEDIMENTATION BASIN ON ALL INLETS AND COMBINATION MANHOLE/INLETS.
- USE VANED TYPE "L" I-3517 GRATES FOR ON-GRADE INLETS. USE RETICULINE TYPE "A" I-3516 GRATES IN SAGS. (SEE TABLE THIS SHEET)
- PROVIDE TWO 2" ADJUSTING RINGS FOR FUTURE GRADE ADJUSTMENT ON ALL NEW INLETS, MANHOLES, AND COMB. MANHOLE/INLETS.

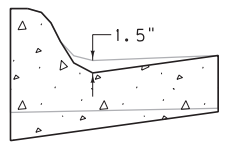
| TYPE "A" I-3516 (SAG) LOCATIONS | | |
|---|---|---|
| STATION | LT | RT |
| 34+47.21 | 22.2' | 15.3' |
| 38+99.31 | | 46.2' |




* DRAWING AND DIMENSIONS ARE DEPICTED AT BACK OF CURB.

## CURB FLOW LINE TRANSITION AT CURB INLETS

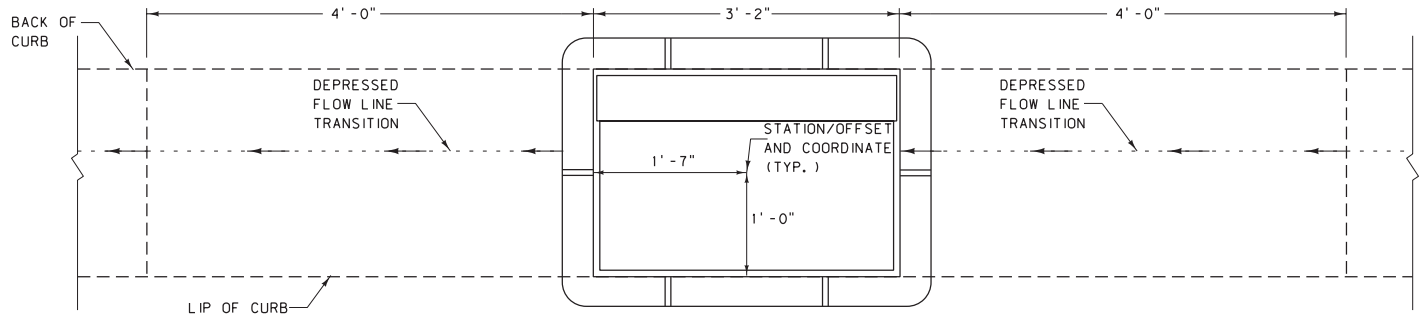
(ELEVATION)




## DEPRESSED CURB SECTION

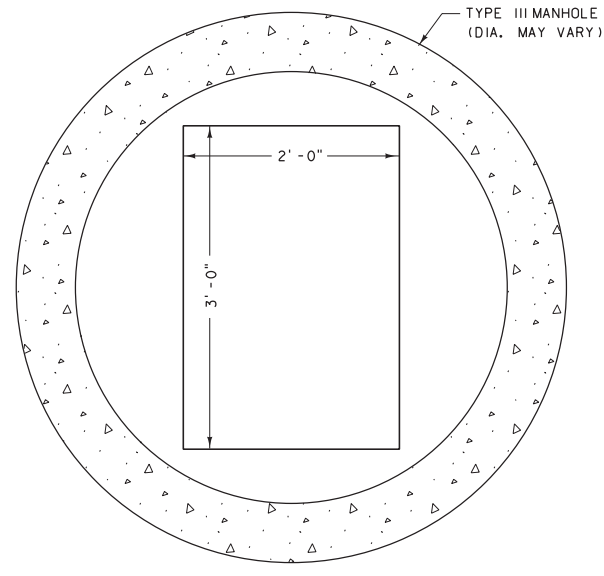
NOTE:

- WHERE TWO INLETS OCCUR 10-ft. (TYP.) APART, CONTINUE USING THE DEPRESSED CURB AND GUTTER SECTION BETWEEN INLETS.

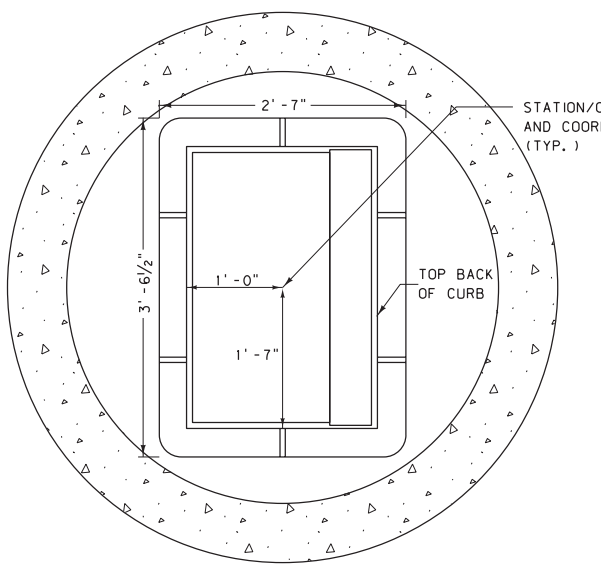



## CURB FLOW LINE TRANSITION AT CURB INLETS

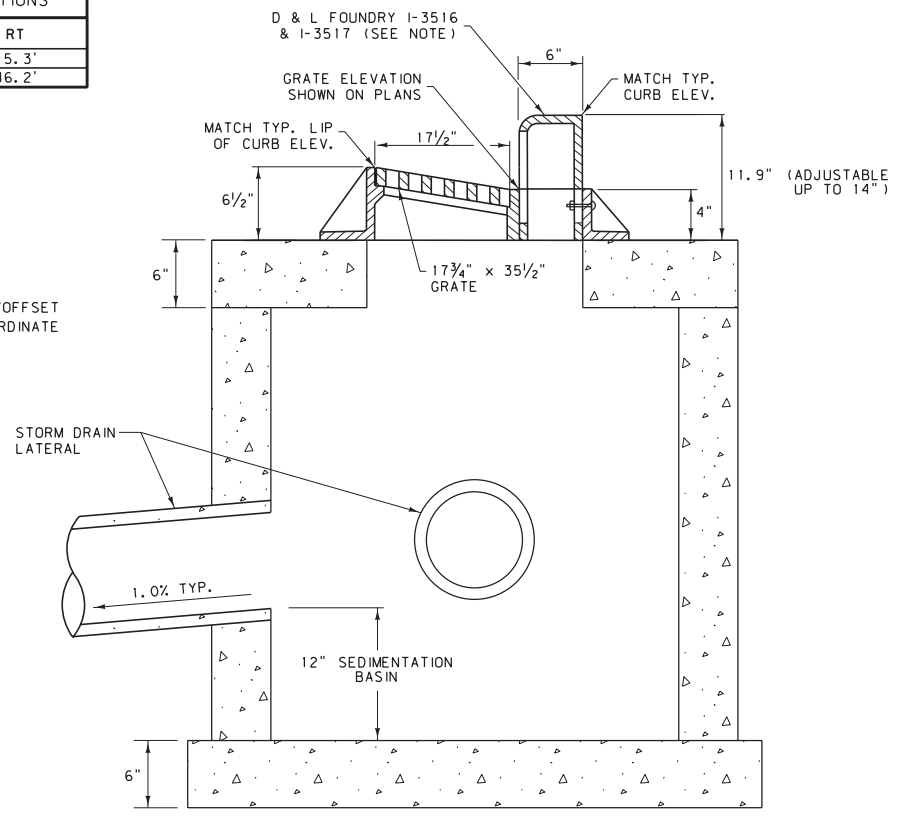
(PLAN)



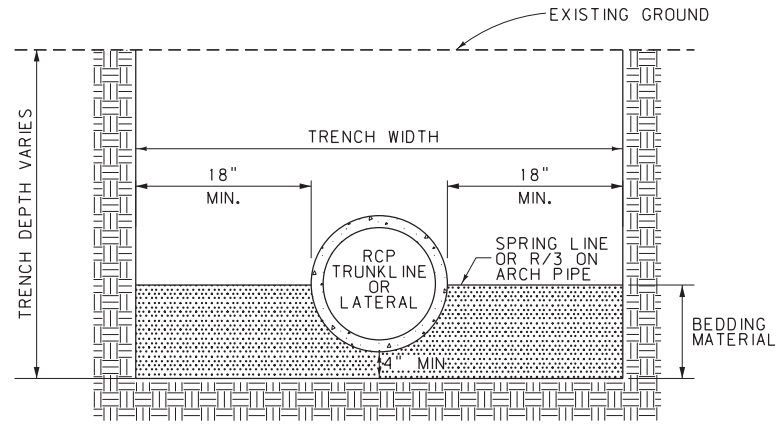

## COMBINATION TYPE III MANHOLE COB CURB INLET ROOF SLAB PLAN




## COMBINATION TYPE III MANHOLE COB CURB INLET GRATE PLAN




## COMBINATION TYPE III MANHOLE COB CURB INLET SECTION




## STORM DRAIN BEDDING DETAIL FOR RCP

NOTES:

- BED ALL STORM DRAIN PIPE AS DETAILED. USE CONCRETE COARSE AGGREGATE NO. 2 PER STANDARD SPECIFICATION SECTION 701.01.2 FOR ALL STORM DRAIN BEDDING.

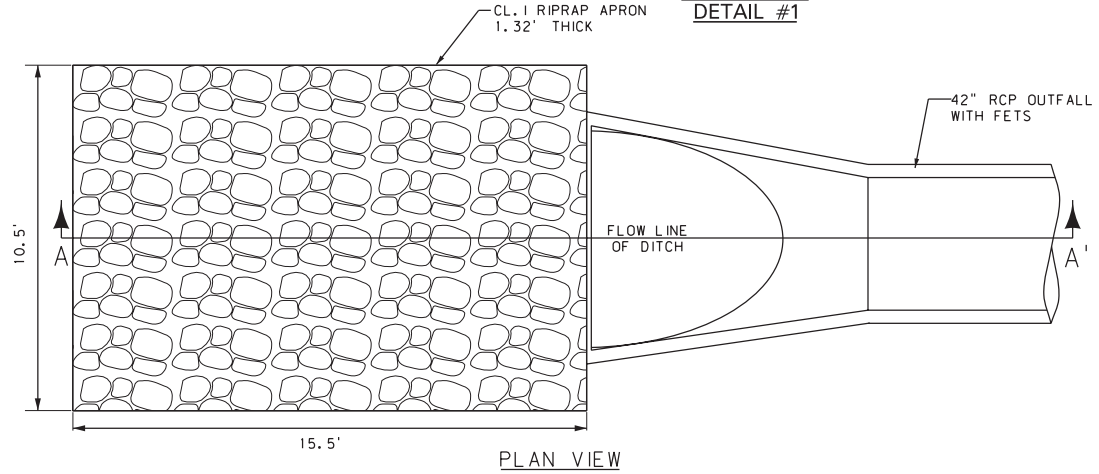
# MISC. STORM DRAIN DETAILS

NOT TO SCALE

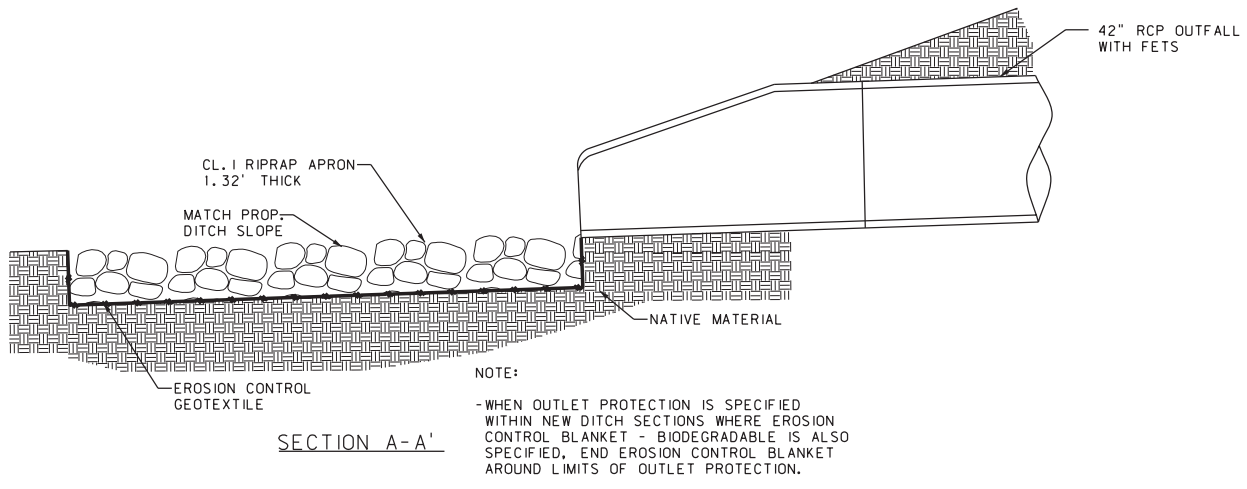
AS-BUILTS DATE SENSITIVE - FOR INFORMATION ONLY

12/18/2017
Highways & Engineering Division

## TYPICAL OUTLET PROTECTION DETAIL #1




PLAN VIEW




SECTION A-A'

NOTE:

- WHEN OUTLET PROTECTION IS SPECIFIED WITHIN NEW DITCH SECTIONS WHERE EROSION CONTROL BLANKET - BIODEGRADABLE IS ALSO SPECIFIED, END EROSION CONTROL BLANKET AROUND LIMITS OF OUTLET PROTECTION.

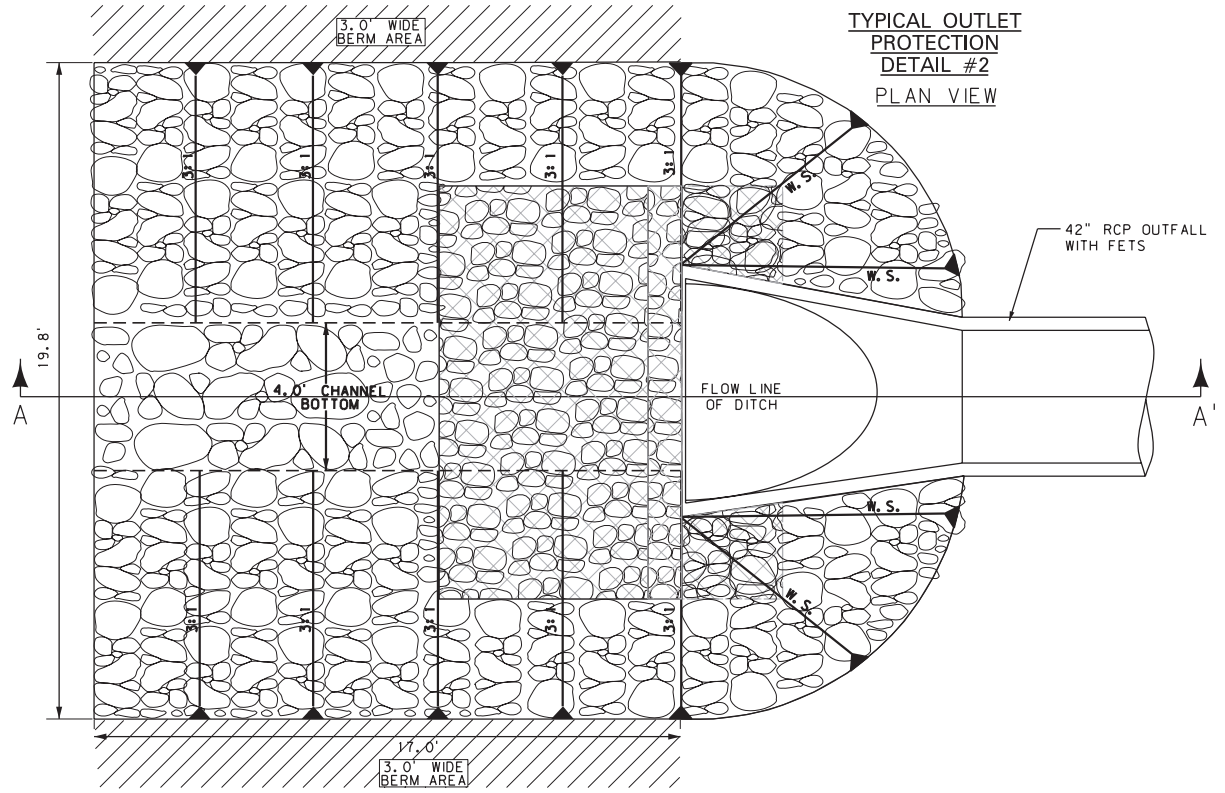
| STATION | OFFSET | OFFSET |
|---|---|---|
| # 712+90 | N/A | |
| | | |
| | | |

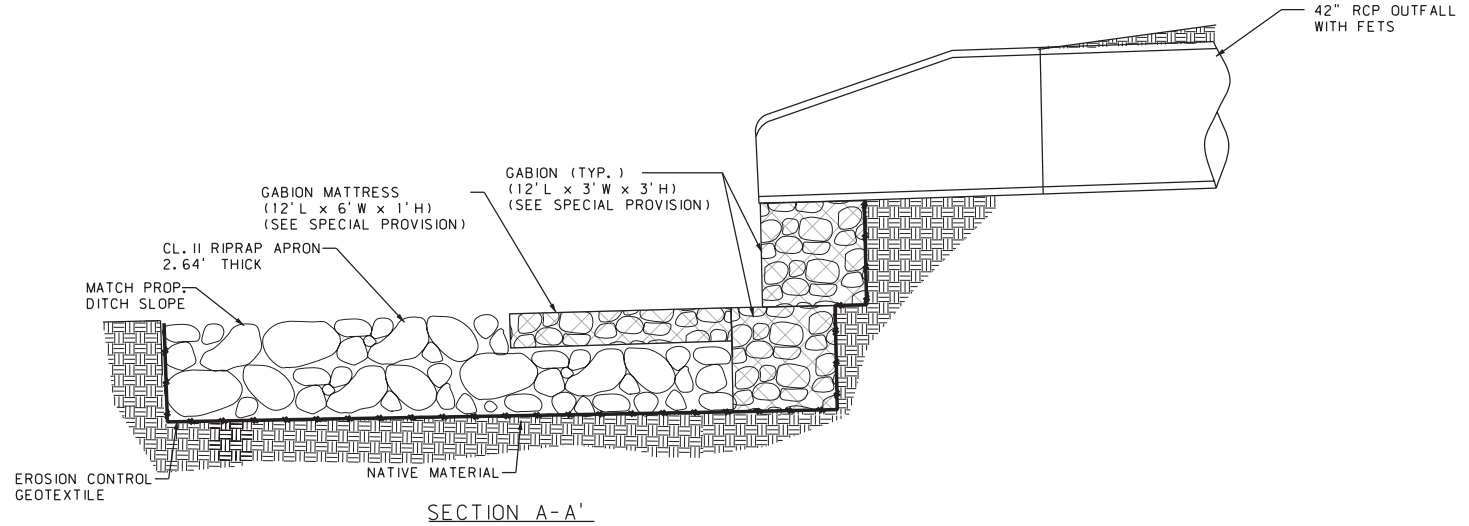
# LOCATED ON STORM OUTFALL ALIGNMENT

OUTLET PROTECTION #1 LOCATION

## TYPICAL OUTLET PROTECTION DETAIL #2

PLAN VIEW




SECTION A-A'

| STATION | OFFSET | OFFSET |
|---|---|---|
| # 705+20 | N/A | |
| | | |
| | | |

# LOCATED ON STORM OUTFALL ALIGNMENT

OUTLET PROTECTION #2 LOCATION

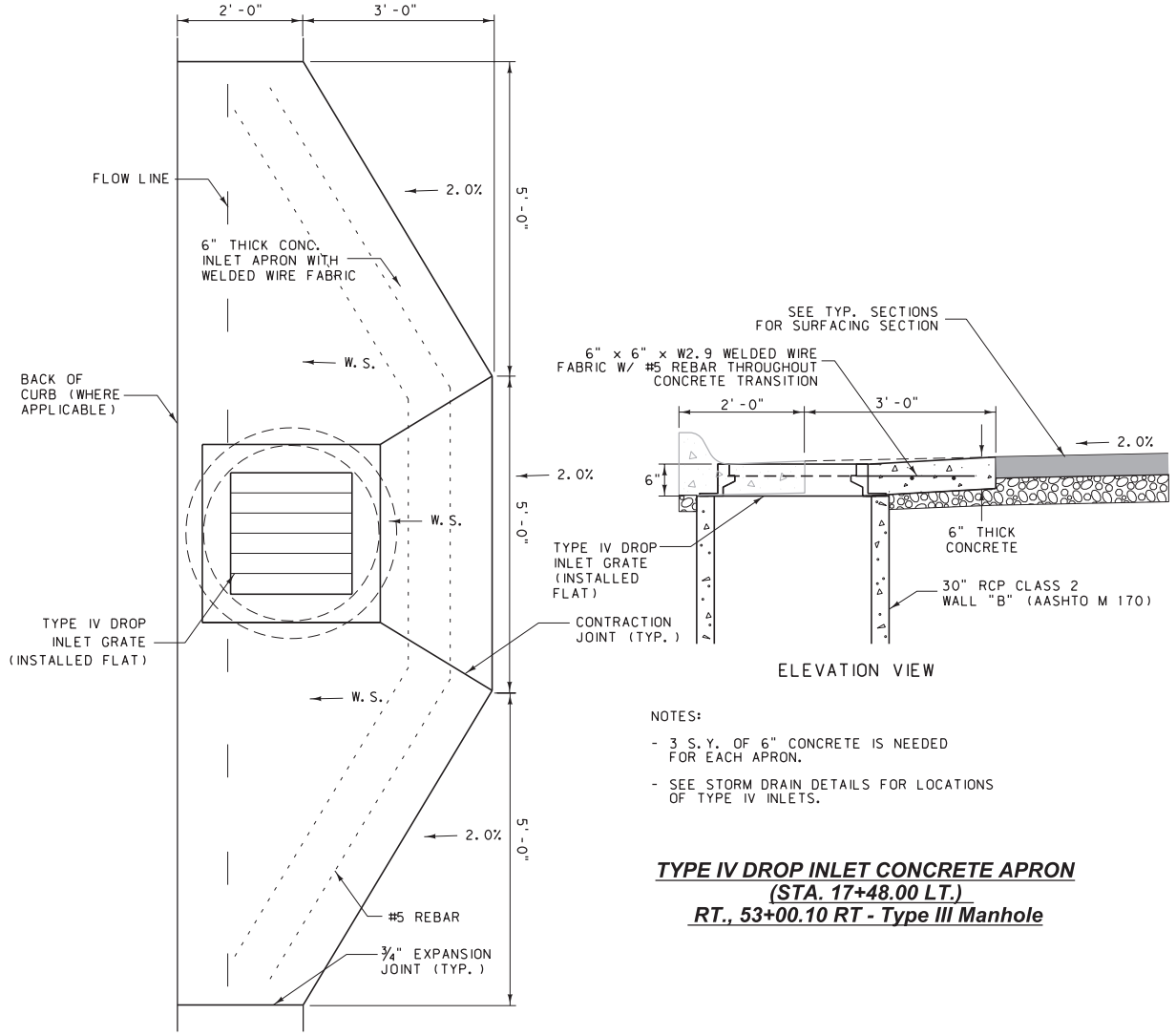
NOTE:

- WHEN OUTLET PROTECTION IS SPECIFIED WITHIN NEW DITCH SECTIONS WHERE EROSION CONTROL BLANKET - BIODEGRADABLE IS ALSO SPECIFIED, END EROSION CONTROL BLANKET AROUND LIMITS OF OUTLET PROTECTION.

# MISC. STORM DRAIN DETAILS

NOT TO SCALE

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | MDT MONTANA DEPARTMENT OF TRANSPORTATION | C:\DGN\4375005rddet005ab.dgn | SANDERSON STEWART | ROAD PLANS | AS-BUILTS | RED LODGE - 8TH - ROBINSON | MT 28-2(49)70 |
| 2 | | 12/18/2017 | | CARBON COUNTY | | CSF= 0.999627000 / UPN 4375005 | SHEET 33 OF 77 |
| 1 | | 8:51:00 AM CPS-U1754 | | | | | |







ELEVATION VIEW

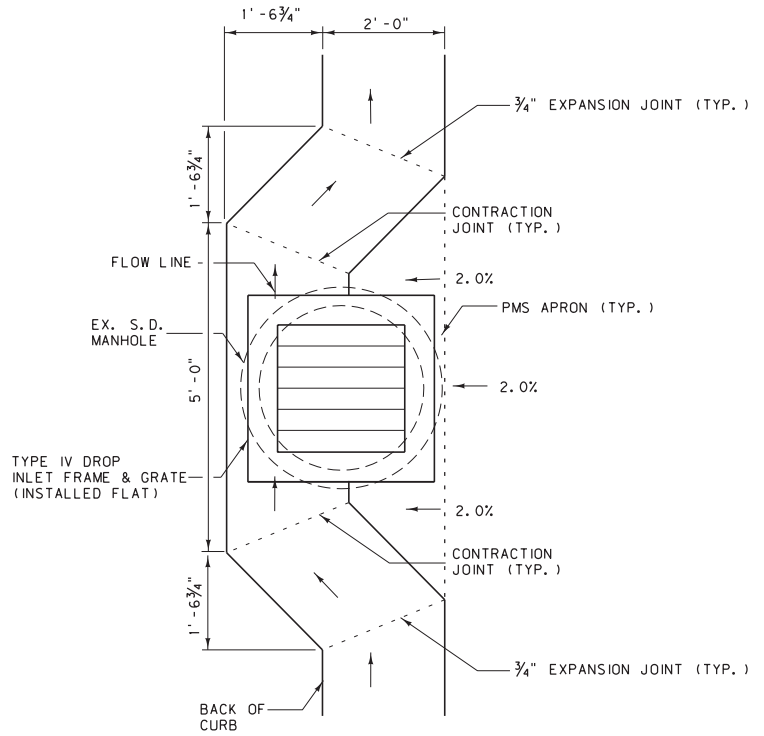
NOTES:

- 3 S.Y. OF 6" CONCRETE IS NEEDED FOR EACH APRON.
- SEE STORM DRAIN DETAILS FOR LOCATIONS OF TYPE IV INLETS.

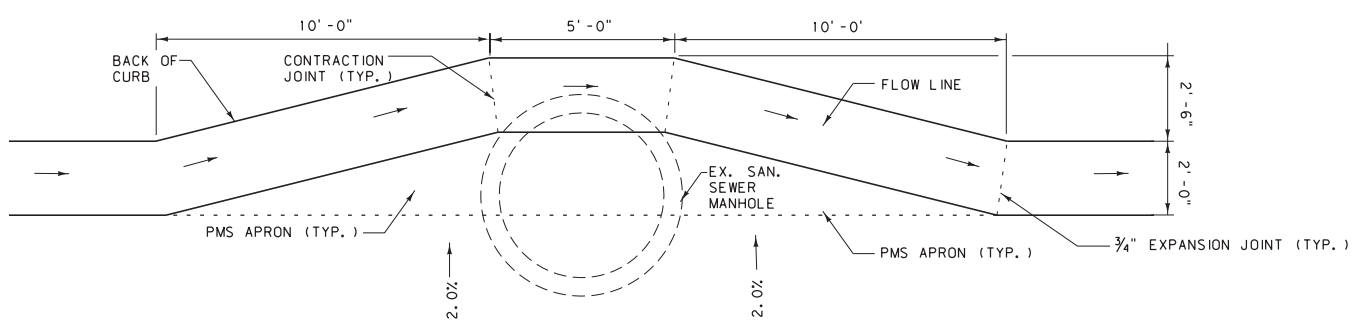
***TYPE IV DROP INLET CONCRETE APRON (STA. 17+48.00 LT.) RT., 53+00.10 RT - Type III Manhole***

| TYPE IV INLET LOCATIONS IN SAGS | | |
|---|---|---|
| STATION | LT | RT |
| 17+48.00 | 21.5' | 21.5' |
| 29+02.00 | 41.5' | |
| 31+25.00 | 42.0' | |
| 33+89.50 | 43.5' | |
| 34+47.21 | 42.2' | |
| 35+89.90 | | 8.6' |
| 38+60.00 | 38.5' | |
| 46+02.00 | 45.4' | |

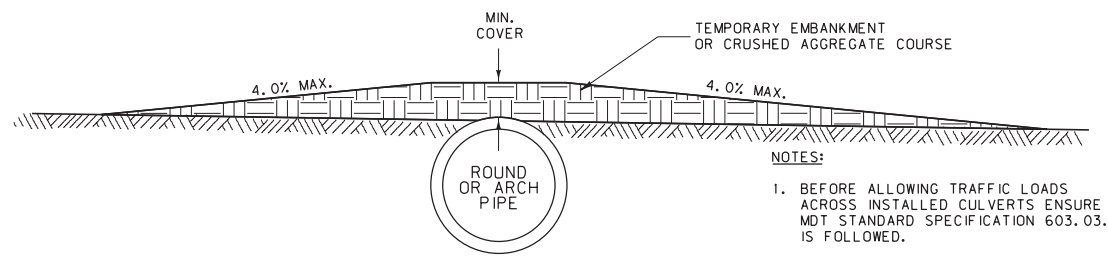
NOTE: USE NON-VANED, BICYCLE SAFE GRATE ON ALL TYPE IV INLETS IN SAGS.




CURB & GUTTER FLARE
STA. 207+76.63 LT.
PLAN VIEW




CURB & GUTTER FLARE
STA. 46+87.47 LT.
PLAN VIEW




NOTES:

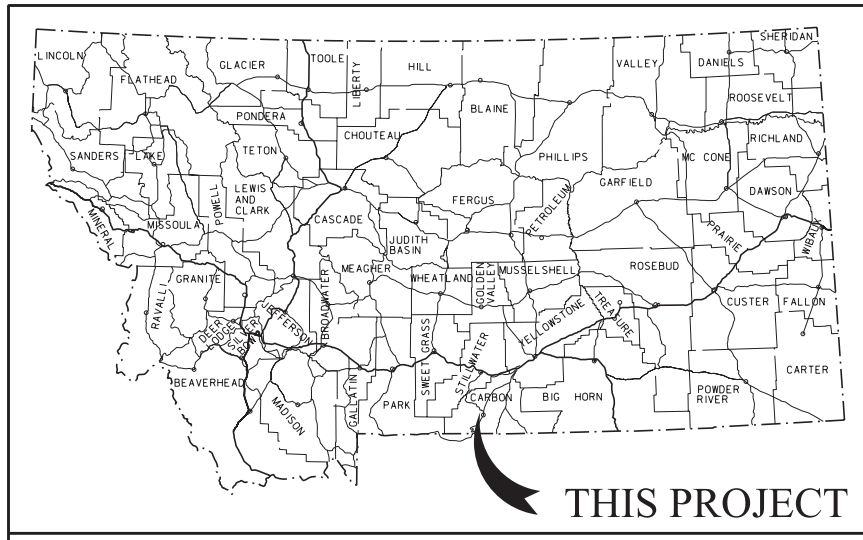
1. BEFORE ALLOWING TRAFFIC LOADS ACROSS INSTALLED CULVERTS ENSURE MDT STANDARD SPECIFICATION 603.03.4 IS FOLLOWED.
2. PROVIDE A ROUNDED OR FLAT TRANSITION AT THE TOP OF THE RAMP.
3. COST INCIDENTAL TO OTHER ITEMS.

TEMPORARY (DURING CONSTRUCTION) RAMP DETAIL
(MINIMUM COVER FOR CULVERTS)

MISC. STORM DRAIN DETAILS

NOT TO SCALE

# MONTANA DEPARTMENT OF TRANSPORTATION




## FEDERAL AID PROJECT STPP 78-1(17)0
## GRADE, GRAVEL, PLANT MIX SURF.
## RED LODGE - BREWERY HILL
## CARBON COUNTY

**AS–BUILTS**

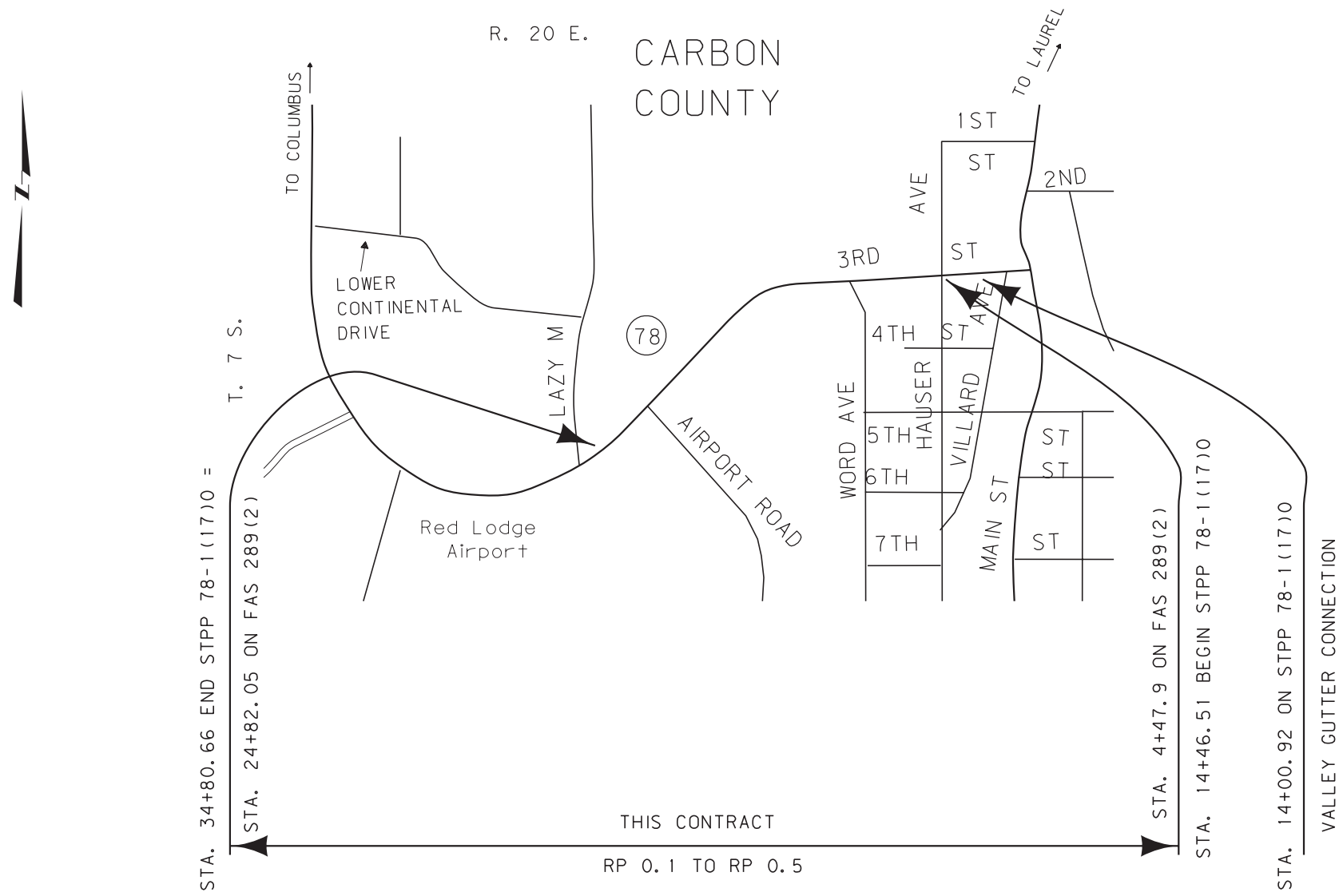
LENGTH 0.4 MILES

PRESENT 2010 A.D.T. = 1770
LETTING 2012 A.D.T. = 1870
DESIGN 2032 A.D.T. = 3290
D.H.V. = 530
TRUCKS = 2.8%
V. = 55 MPH
18 KIP ESAL'S = 25
GROWTH RATE = 2.9%

CSF= 0.99961552

*LETTING DATE:* January 16, 2014
*COMPLETION DATE:* December 7, 2016
*EPM NAME:* Jeff Dyekman

SURFACING SOURCES - CONTRACTOR FURNISHED




| RELATED PROJECTS |
|---|
| MT 28-2(49)70 |
| STPP 28-2(42)64 |

| ASSOCIATED PROJECT AGREEMENT NUMBERS | |
|---|---|
| R/W | STPP 78-1(19)0 |
| I.C. | STPP 78-1(21)0 |
| P.E. | STPP 78-1(8)0 |

MONTANA DEPARTMENT OF TRANSPORTATION

APPROVED : _____ 20 ____

MICHAEL T. TOOLEY
DIRECTOR OF TRANSPORTATION

BY _____
HIGHWAYS ENGINEER

MONTANA PAUL R. FERRY 8425PE PENNSYLVANIA PROFESSIONAL ENGINEER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED : _____ _____
DIVISION ADMINISTRATOR DATE

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | MDT MONTANA DEPARTMENT OF TRANSPORTATION | C:\DGN\4890001rdttl001ab.dgn | DESIGNED BY | KEVIN ST. GEORGE | | AS–BUILTS |
| 2 | | 12/6/2017 | REVIEWED BY | RYAN DAHLKE | | |
| 1 | | 10:45:26 AM CPS - U1754 | CHECKED BY | KEVIN FARRY | | |

AS-BUILTS DATE SENSITIVE - FOR INFORMATION ONLY

12/06/2017
Highways & Engineering Division

UTILITY CROSSINGS - TRUNKLINE, INLETS AND LATERALS
14+61.79, 0.0' WATER MAIN X-ING, 8" STEEL - APPROX. 6.3' DEEP
14+95.20, 16.1' RT. GASLINE X-ING DROP INLET, 4" PLASTIC - 4.4' DEEP
19+33.42, 25.7' LT. SANITARY X-ING DROP INLET, 12" PVC - APPROX. 3.5' DEEP
19+41.65, 14.8' RT. GASLINE X-ING LATERAL PIPE, 4" PLASTIC - 3.8' DEEP
22+39.93, 11.0' LT. GASLINE X-ING, 1.5" PLASTIC - 3.5' DEEP
23+60.46, 7.0' LT. IRRIGATION PIPE X-ING, 24" RCP IRR - INV. ELEV.=5587.15'
23+81.30, 5.0' LT. SANITARY X-ING, 12" PVC - 7.7' DEEP
24+09.00, 13.6' LT. 25PR TELEPHONE X-ING DROP INLET - 3.0' DEEP
24+09.00, 16.3' LT. 30OPR TELEPHONE X-ING DROP INLET - 1.3' DEEP

POT 14+46.51
HASUER AVE.
15+00
PC 17+76.99
WORD AVE.
20+00
PI=22+01.23
Δ =42° 10' 51" (LT)
R =1,100'
T =424.24'
L =809.81'
E =78.98'
S = 2%
S 87° 56' 27" W
STATION 14+46.1 RT TO STATION 18+22 RT DO NOT DISTURB EXISTING 24" STORM DRAIN TRUNKLINE
STATION 14+46.1 RT TO STATION 18+22 RT DO NOT DISTURB EXISTING 24" STORM DRAIN TRUNKLINE
STA. 14+69.82 LT ABANDON AND FILL STORM DRAIN LATERAL
STA. 14+73.46 RT ABANDON AND FILL STORM DRAIN LATERAL
STA. 14+69.82, 24.4' LT. REMOVE EXISTING DROP INLET SEE SPECIAL PROVISIONS
STA. 14+73.46, 19.2' RT. REMOVE EXISTING DROP INLET SEE SPECIAL PROVISIONS
DI-11, STA. 14+95.20, 14.50' LT. NEW TYPE 5 DROP INLET GRATE ELEV.= 5531.50' INV. OUT ELEV.= 5528.00'
MH-7, STA. 14+95.20, 0.00' NEW 48" TYPE 3 MH RIM ELEV.= 5531.82' INV. IN ELEV.= 5527.90' INV. OUT ELEV.= 5518.86'
DI-10, STA. 14+95.20, 14.50' RT. NEW TYPE 5 DROP INLET GRATE ELEV.= 5531.50' INV. OUT ELEV.= 5528.00'
MH-6, STA. 17+50.00, 5.21' LT NEW 48" TYPE 3 MH RIM ELEV.= 5546.72 INV. IN ELEV.= 5543.00' INV. OUT ELEV.= 5540.90'
DI-9, STA. 17+50, 14.50' LT. NEW TYPE 5 DROP INLET GRATE ELEV.= 5546.50' INV. OUT ELEV.= 5543.00'
DI-8, STA. 19+50, 14.50' LT. NEW TYPE 5 DROP INLET GRATE ELEV.= 5560.84' INV. OUT ELEV.= 5555.80' NON-STANDARD DEPTH INLET
MH-5, STA. 19+50.00, 4.71' LT NEW 60" TYPE 3 MH RIM ELEV.= 5561.04' INV. IN ELEV.= 5557.38' INV. OUT ELEV.= 5552.48'
C-1, STA. 19+28.06, 28.90' LT. (STATION AND OFFSET TO PIPE END) NEW 18" RCP IRR. INLET EL.=5556.10' OUTLET EL.=5555.80'
C-2, STA. 19+35.60, 29.4' RT. (STATION AND OFFSET TO PIPE END) NEW 18" RCP IRR.' INLET EL.=5553.1' OUTLET EL.=5552.6' CAPPED END, SEE SPECIAL PROVSIONS
MH-4, STA. 21+48.40, 5.21' LT NEW 48" TYPE 3 MH RIM ELEV.= 5576.78' INV. IN ELEV.= 5573.22' INV. OUT ELEV.= 5571.36'
DI-7, STA. 21+48.40, 14.50' LT. NEW TYPE 5 DROP INLET GRATE ELEV.= 5576.57' INV. OUT ELEV.= 5573.07'
MH-3, STA. 24+09.00, 1.61' LT NEW 48" TYPE 3 MH RIM ELEV.= 5597.62' INV. IN ELEV.= 5592.88' INV. OUT ELEV.= 5585.63'
DI-6, STA. 24+09.00, 14.50' LT. NEW TYPE 5 DROP INLET GRATE ELEV.= 5597.29' INV. OUT ELEV.= 5593.79'

DI-11 DI-10 MH-7 DI-9 MH-6 C-1 DI-8 DI-7 MH-5 C-2 MH-4 DI-6 MH-3

MH-5
EXISTING GRADE
INV. IN EL.=5557.38'
INV. OUT EL.=5552.48'
MH-6
18"x 199' RCP IRR. CL.3 @ 4.9%
PROPOSED GRADE
INV. IN EL.=5543.00'
INV. OUT EL.=5540.90'
MH-7
18"x 255' RCP IRR. CL.3 @ 5.2%
14+61.79, 0.0' WATER MAIN - 8" STEEL APPROX. TOP EL.=5523.47'
24"X 45' RCP IRR. CLASS 3 @ 1.3%
INV. IN EL.=5527.90'
CONNECTION TO 24" RCP IRR STUB INSTALLED WITH RED LODGE-8th TO ROBINSON PROJECT MT 28-2(49)70
INV. EL.= 5518.34'
INV. OUT EL.=5518.86'
MH-3
23+81.30, 5.0' LT SAN. - 12" PVC TOP EL.= 5587.55'
23+60.46, 7.0' LT. NEW 24" RCP IRR. PIPE INV. EL.=5587.15'
INV. IN EL.=5592.88'
22+39.93, 11.0' LT. GAS - 1.5" PVC TOP EL.=5579.01'
INV. OUT EL.=5585.63'
MH-4
18"x 259.3' RCP IRR. CL.3 @ 4.9%
INV. IN EL.=5573.22'
INV. OUT EL.=5571.36'
18"x 197' RCP IRR. CL.3 @ 7.2%

5558 5548 5538 5528 5518
5600 5590 5580 5570 5560
15+00 20+00

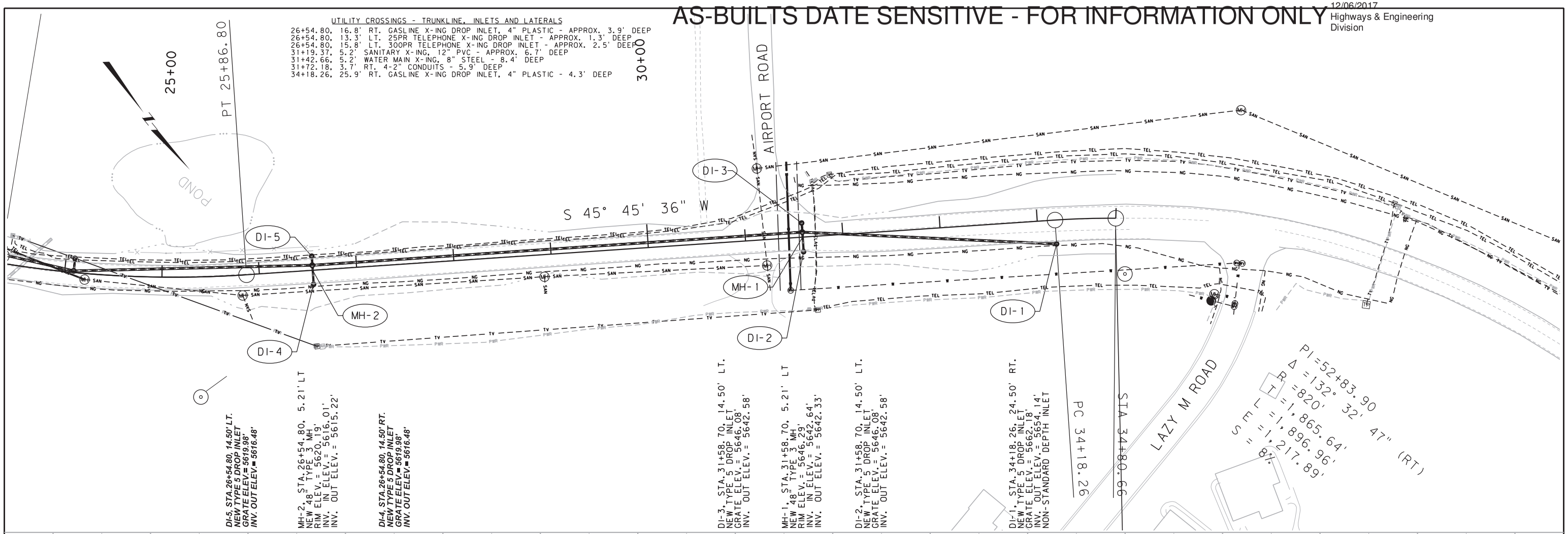
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3 2 1 | MDT MONTANA DEPARTMENT OF TRANSPORTATION | C:\DGN\4890001rdplphy1ab.dgn<br>12/6/2017<br>10:46:45 AM CPS-U1754 | DESIGNED BY JR TAYLOR<br>REVIEWED BY<br>CHECKED BY | JR TAYLOR | HYDRAULICS PLANS<br>CARBON COUNTY | **AS-BUILTS** | RED LODGE - BREWERY HILL<br>CFS = 0.99961552 UPN 4890001 | STPP 78-1(17)0<br>SHEET NO. 14 |

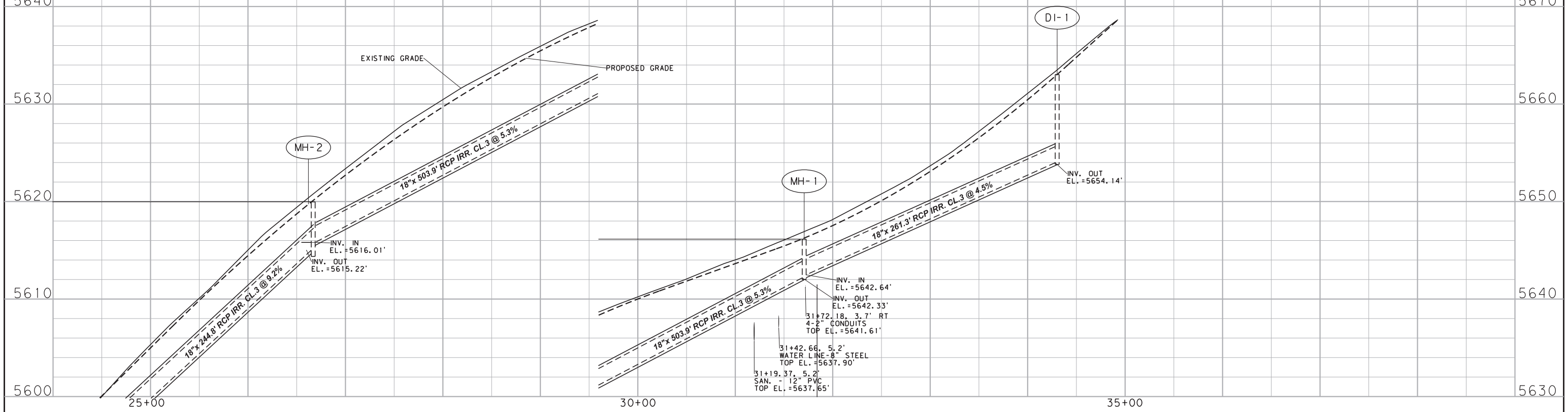
AS-BUILTS DATE SENSITIVE - FOR INFORMATION ONLY

12/06/2017
Highways & Engineering Division

UTILITY CROSSINGS - TRUNKLINE, INLETS AND LATERALS

26+54.80, 16.8' RT. GASLINE X-ING DROP INLET, 4" PLASTIC - APPROX. 3.9' DEEP
26+54.80, 13.3' LT. 25PR TELEPHONE X-ING DROP INLET - APPROX. 1.3' DEEP
26+54.80, 15.8' LT. 300PR TELEPHONE X-ING DROP INLET - APPROX. 2.5' DEEP
31+19.37, 5.2' SANITARY X-ING, 12" PVC - APPROX. 6.7' DEEP
31+42.66, 5.2' WATER MAIN X-ING, 8" STEEL - 8.4' DEEP
31+72.18, 3.7' RT. 4-2" CONDUITS - 5.9' DEEP
34+18.26, 25.9' RT. GASLINE X-ING DROP INLET, 4" PLASTIC - 4.3' DEEP



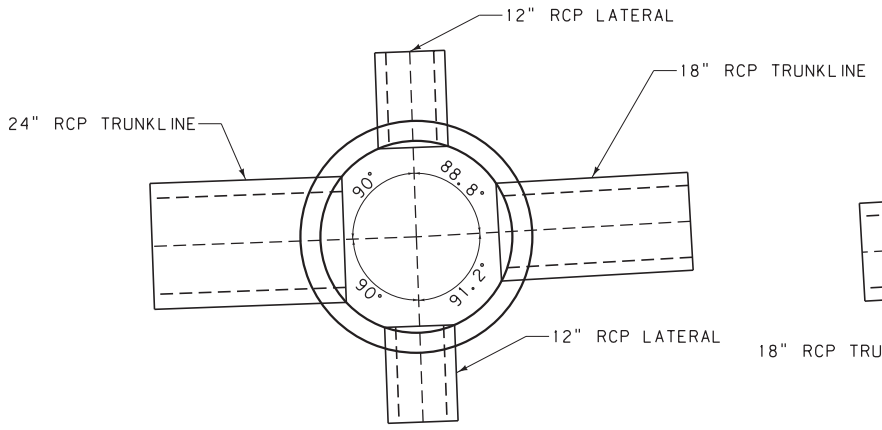

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3 | MDT MONTANA DEPARTMENT OF TRANSPORTATION | C:\DGN\4890001rdplphy1ab.dgn | DESIGNED BY | JR TAYLOR | 10-5-11 | HYDRAULICS PLANS | AS-BUILTS |
| 2 | | 12/6/2017 | REVIEWED BY | | | CARBON COUNTY | |
| 1 | | 10:46:48 AM CPS-U1754 | CHECKED BY | | | | |

| | | |
|---|---|---|
| RED LODGE - BREWERY HILL | | STPP 78-1(17)0 |
| CFS = 0.99961552 | UPN 4890001 | SHEET NO. 15 |

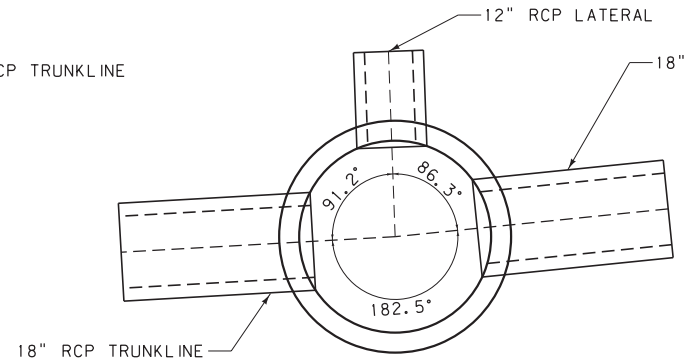
AS-BUILTS DATE SENSITIVE - FOR INFORMATION ONLY

12/06/2017
Highways & Engineering Division

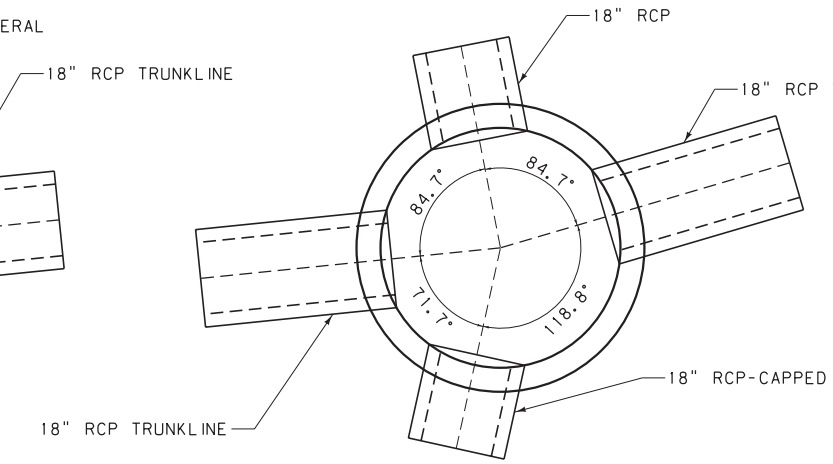
# MANHOLE ANGLES DETAIL



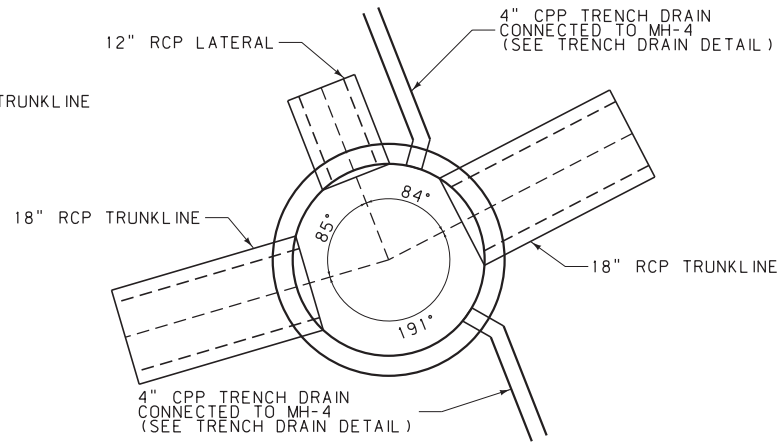

STA. 14+95.2: MH-7



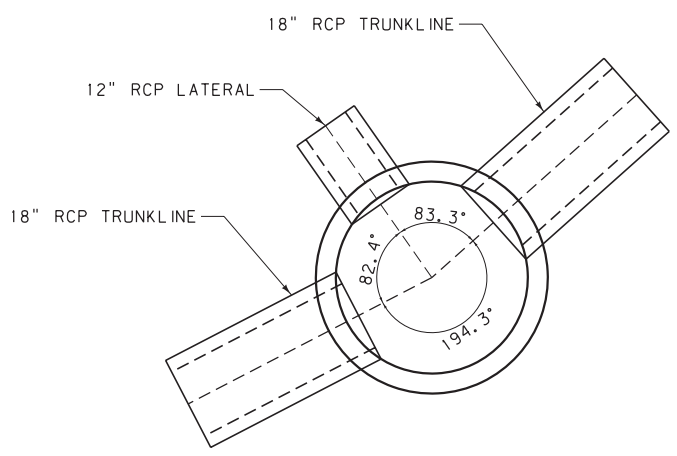

STA. 17+50.0: MH-6



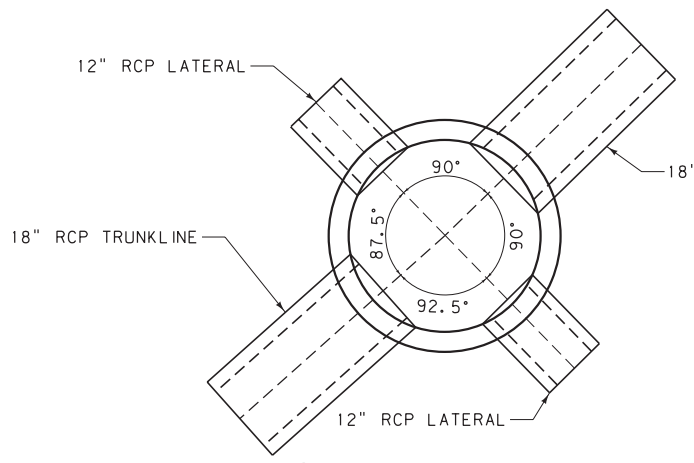

STA. 19+50.0: MH-5 - 60"



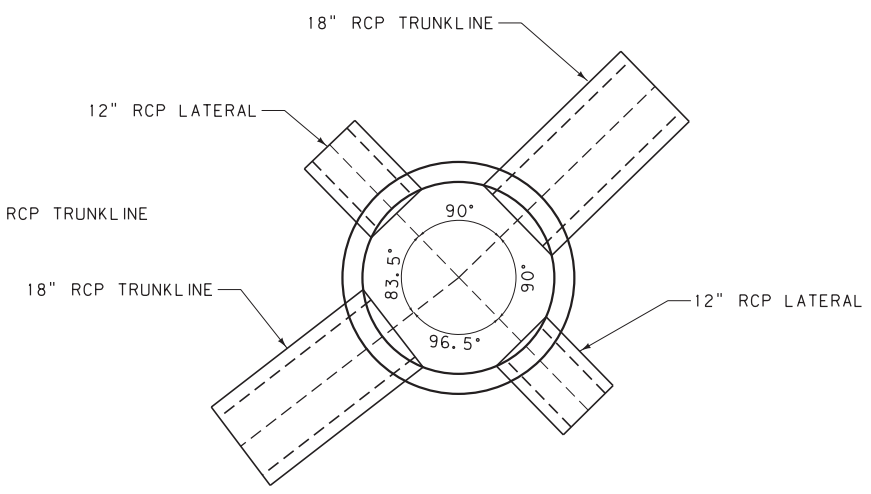

STA. 21+48.4: MH-4




STA. 24+09: MH-3




STA. 26+54.8: MH-2




STA. 31+58.7: MH-1

NOTES:
1. SEE STORM DRAIN DETAILS AND CORR SECTIONS FOR ELEVATIONS OF LATERAL AND TRUNKLINE PIPE OPENINGS IN MANHOLES.
2. ALL MANHOLES ORIENTED LOOKING AHEAD ON LINE.

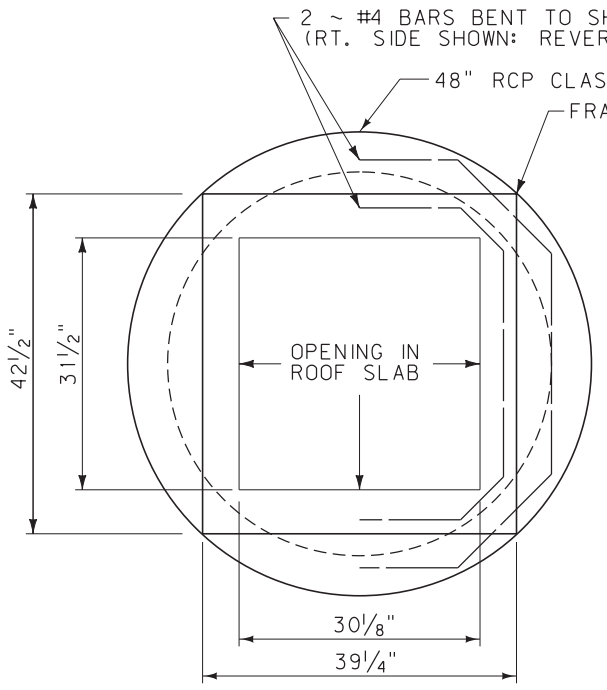
## MANHOLE DETAILS

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 3 | MDT MONTANA DEPARTMENT OF TRANSPORTATION | C:\DGN\4890001rddethy1ab.dgn | DESIGNED BY | JR TAYLOR | 10-4-11 | HYDRAULICS PLANS | **AS-BUILTS** | RED LODGE - BREWERY HILL | STPP 78-1(17)0 |
| 2 | | 12/6/2017 | REVIEWED BY | | | | | | |
| 1 | | 10:46:31 AM CPS-U1754 | CHECKED BY | | | CARBON COUNTY | | CSF = 0.99961552 / UPN 4890001 | SHEET NO. 12 |

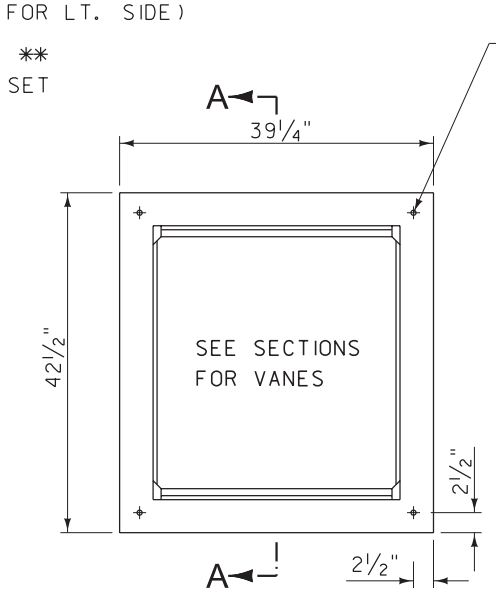
AS-BUILTS DATE SENSITIVE - FOR INFORMATION ONLY

12/06/2017
Highways & Engineering Division

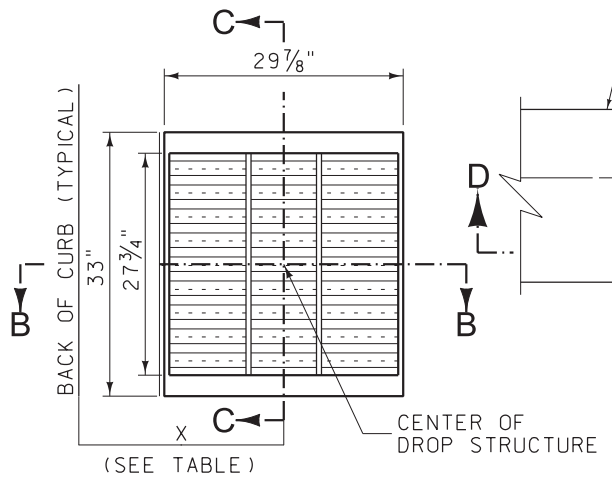
# TYPE V DROP INLET AND DROP INLET CONCRETE APRON DETAIL




TOP VIEW

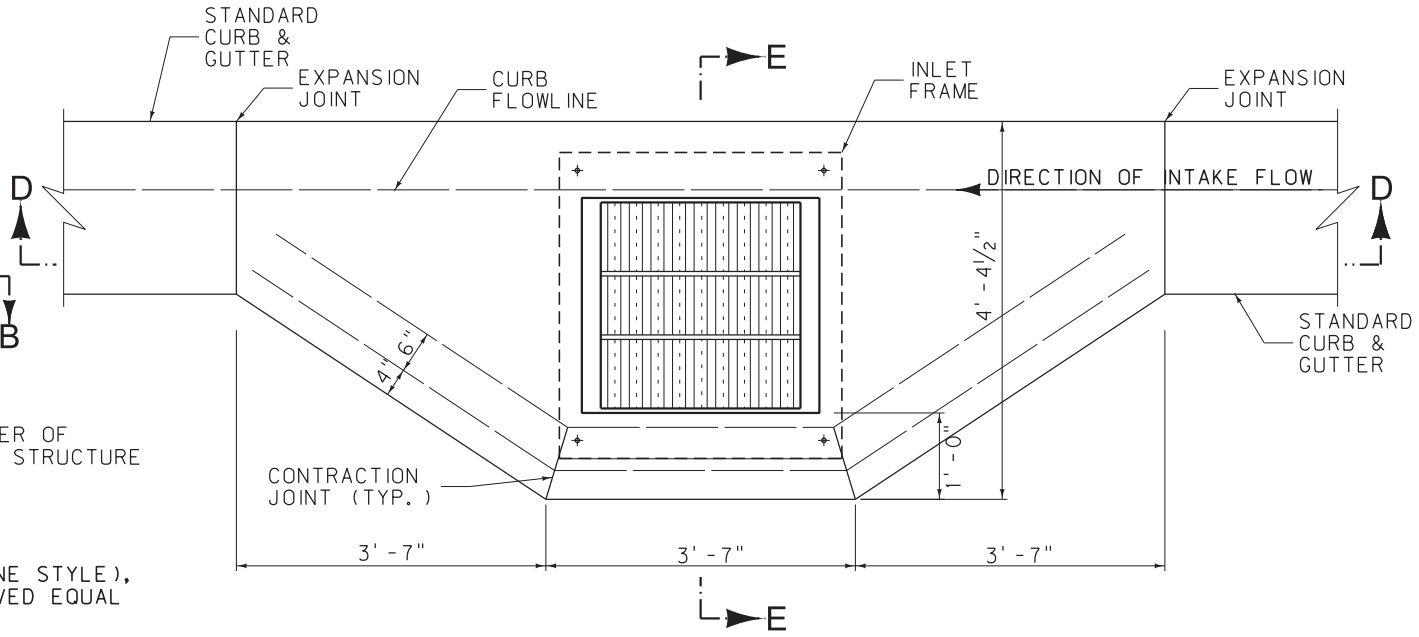



PLAN

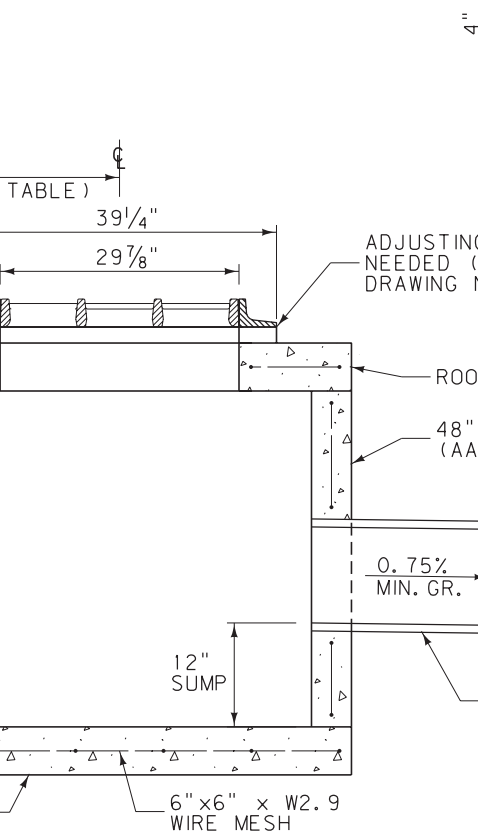



GRATE

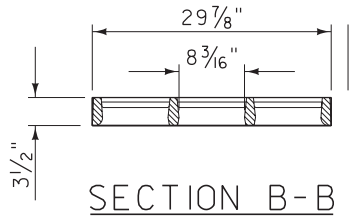
D & L FOUNDRY MODEL I-3420V (VANE STYLE), NEENAH CASTING R-3540, OR APPROVED EQUAL



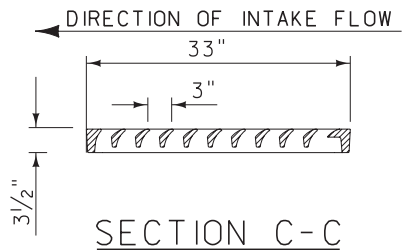

TYPE V DROP INLET CONCRETE APRON



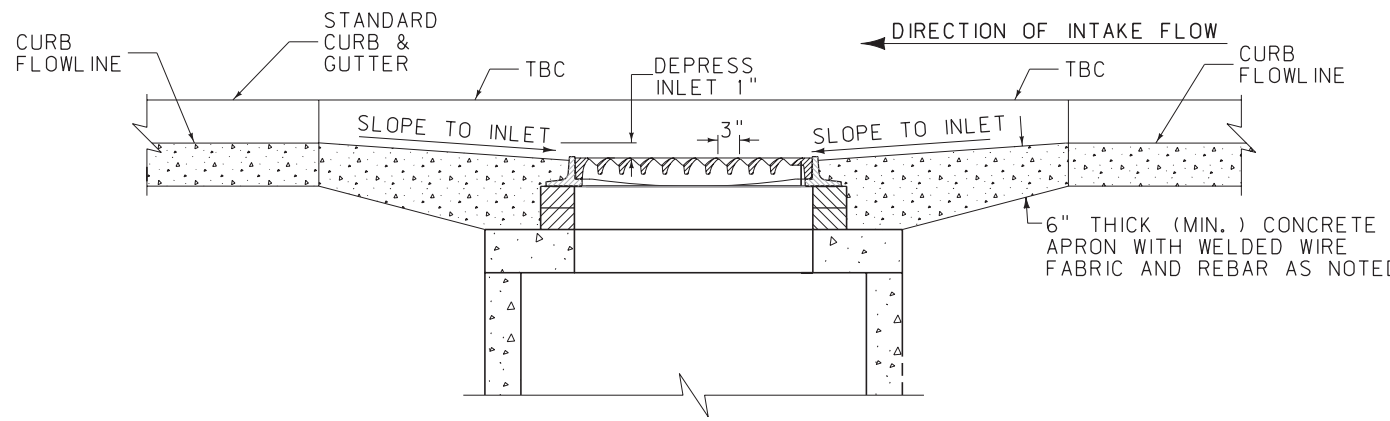

SECTION A-A




SECTION B-B




SECTION C-C




SECTION D-D




TYPE V DROP INLET
WITH FRAME AND GRATE

STRUCTURE OFFSET FROM BACK OF CURB

| GRATE TYPE | X → |
|---|---|
| NEENAH R-3540 | 25⅜16" |
| D & L FOUNDRY I-3420 V | 24¹⁄₃₂" |

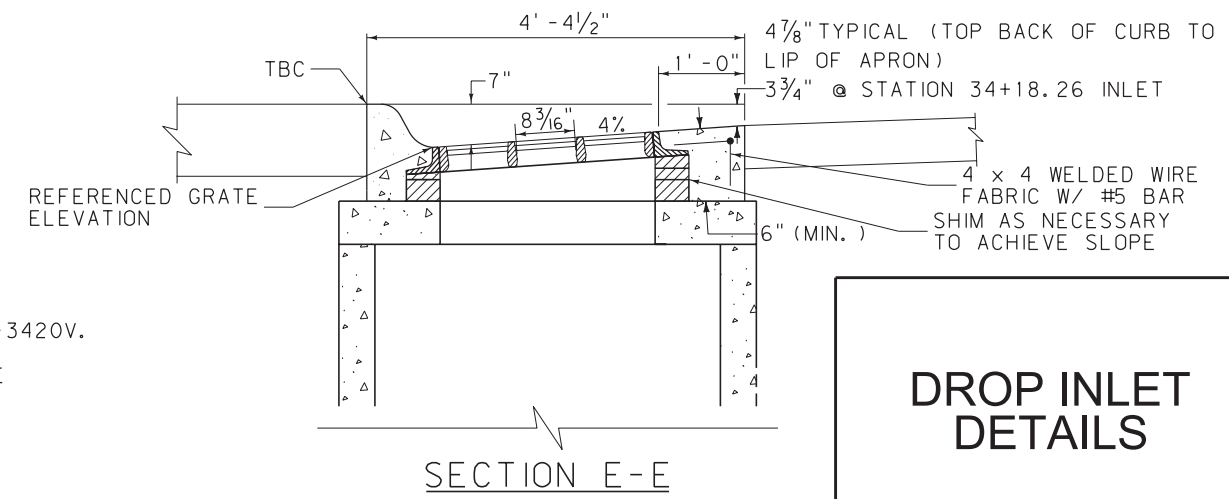
NOTES: ALL CONCRETE IS CLASS "DD" OR APPROVED EQUAL.

SEE PLANS FOR LOCATIONS AND QUANTITIES.

PLAN STATION AND OFFSET FOR THE TYPE V DROP INLETS IS BASED ON D & L FOUNDRY GRATE I-3420V.

SET ALL FINAL INLET GRATE ELEVATIONS TO ENSURE THAT POSITIVE DRAINAGE IS PROVIDED FROM THE FLOWLINE OF THE CURB AND GUTTER SECTION INTO THE INLET.

* STANDARD UNLESS OTHERWISE NOTED ON PLANS.




SECTION E-E

# DROP INLET DETAILS

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 3 | MDT MONTANA DEPARTMENT OF TRANSPORTATION | C:\DGN\4890001rddethy1ab.dgn | DESIGNED BY JR TAYLOR | 10-5-11 | HYDRAULICS PLANS | AS-BUILTS | RED LODGE - BREWERY HILL | STPP 78-1(17)0 |
| 2 | | 12/6/2017 | REVIEWED BY | | CARBON COUNTY | | CSF = 0.99961552 / UPN 4890001 | SHEET NO. 13 |
| 1 | | 10:46:34 AM CPS-U1754 | CHECKED BY | | | | | |