FINAL ENVIRONMENTAL ASSESSMENT

Lucky Minerals (Montana), Inc.
Lucky Minerals Project, Park County, MT
Exploration License Application #00795

Prepared by
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1 PURPOSE AND NEED FOR ACTION

1.1 SUMMARY

This final environmental assessment (EA) was prepared for the proposed exploration activities of Lucky Minerals (Montana), Inc. (Lucky Minerals) on the western flank of the Absaroka Mountains in Park County, Montana (Figure 1.3). On February 17, 2015 Lucky Minerals submitted an exploration license application seeking authorization to conduct exploration activities within its privately-owned patented St. Julian mine claim block (St. Julian Claim Block) located in the Emigrant Mining District approximately 12 miles southeast of Emigrant, Montana. The St. Julian Claim Block consists of eight patented mining claims surrounded by the Custer Gallatin National Forest (CGNF).

The original exploration proposal included CGNF lands in the Plan of Operations (April 2015). As a result, the Department of Environmental Quality (DEQ) partnered with the CGNF to conduct a joint scoping period to receive public comment. The two agencies determined that the intent of both the National Environmental Policy Act (NEPA) and the Montana Environmental Policy Act (MEPA) would be better served by considering the impacts of the two proposals in a single analysis document. On November 30, 2015, Lucky Minerals withdrew its application and resubmitted a revised proposal for exploration on private patented claims only, on the St. Julian Claim Block. As a result, the CGNF suspended work on the project shortly thereafter. The revised application is still a state action under the Metal Mines Reclamation Act (MMRA) which requires DEQ to continue the MEPA analysis.

DEQ prepared a Draft EA to present the analysis of possible environmental consequences of three exploration alternatives: the No Action Alternative, the Proposed Action, and the Agency-Modified Alternative. The Agency-Modified Alternative includes additional mitigation measures developed by DEQ. The Draft EA was submitted for public review and comment on October 12th, 2016. There was a 60-day public comment period. This Final EA includes DEQ’s response to public comments received and revisions to the Draft EA as a result of these comments.

Lucky Minerals proposes to drill up to 46 drill holes from 23 drill pads (two/pad) over two field seasons (Updated Figure 1.4). The anticipated field season would be from mid-July to mid-October. The total project disturbance area, including access roads, laydown areas, and drill pads within the St. Julian Claim Block, would be approximately 4.8 acres (See Table 2.1). In order to keep disturbance to a minimum, all drill holes and associated sumps would be located within the previously disturbed prism of existing roads. The sumps would be used for collection and disposal of drill cuttings. Lucky Minerals would use two drills running two ten-hour shifts per day. Lucky Minerals estimates that a maximum of four drill sites would be in use at any one time. Results from this preliminary phase of the project would be used to model the subsurface geology and associated mineralization, if any.
1.2 PURPOSE AND NEED

DEQ's purpose and need in conducting the environmental review is to act upon Lucky Minerals' proposal to conduct mineral exploration at the St. Julian Claim Block in compliance with the Metal Mine Reclamation Act (MMRA). Under 82-4-332 (1), Montana Code Annotated (MCA), DEQ is required to issue an exploration license to an applicant upon (1) the applicant’s payment of the $100 fee, (2) agreement to reclaim any surface area damaged by the applicant during exploration operations as may be reasonably required by the Department, and (3) confirmation that the applicant is not in default of any other reclamation obligation under the MMRA.

Prior to the issuance of an exploration license, Lucky Minerals will be required to post a reclamation bond in a form and amount as determined by DEQ in accordance with 82-4-338, MCA.

1.3 HISTORICAL MINING AND PREVIOUS EXPLORATION DISTURBANCE

The Emigrant Mining District has been the site of small scale lode and placer operations since the 1870’s. During the period 1864 to 1935 an estimated 40,000 ounces of gold was produced dominantly from placer operations. The most recent phase of modern exploration started in 1990 when Kennecott drilled six helicopter supported core holes on the south flank of DUV Ridge.

Emigrant Mining District Chronology (Geologic Systems Ltd., 2015)

1864 Placer gold discovered in Emigrant Creek.

1885 Lode gold discovered at St. Julian claims, followed by minor production from underground workings.

1864 -1930 An estimated 40,000 oz. gold produced principally from placer deposits.
1963  American Metal Climax, Inc. (AMAX) drilled one exploration hole on the east side of Emigrant Peak (hole E-1) and another near the junction of Emigrant Creek and the East Fork of Emigrant Creek (hole E-2).

1966  Minerals Exploration, Inc. a subsidiary of Union Oil Corporation sampled the Allison prospect area as part of a regional molybdenum exploration program.

1970  Basic Metals, Inc. drilled approximately 15 holes in the Great Eastern (or Base Metals) breccia pipe in Emigrant Creek.

1971-1973  Duval Corporation explored for Cu-Mo-Au porphyry by drilling 10 core holes (holes MED 1-10) in the Emigrant District about seven of which were located along the East Fork of Emigrant Creek both north (in the DUV Ridge area) and south (St. Julian area) of the creek; in addition Duval conducted approximately four linear miles of induced polarization geophysical surveys.

1975  Duval Corporation drilled one additional hole in a joint venture agreement with Gulf Mineral Resources, Inc. in 1975 as part of the same program.

1980  Bear Creek Mining Company a subsidiary of Kennecott Copper conducted a copper/molybdenum exploration program on the east flank of Emigrant Peak.

1987  Montana Mining and Reclamation (MM&R) began testing placer deposits along Emigrant Creek and consolidated a land position including lode mining claims.

1988-1990  Sandhurst Mining NL, in a joint venture with Montana Mining and Reclamation, began a gold exploration program in 1988 which included geologic mapping and sampling of both lode (DUV Ridge and St. Julian target areas) and placer deposits in the Emigrant Creek drainage. The joint venture was terminated in 1990.

1990  Kennecott Exploration obtained an option from Montana Mining and Reclamation through Fischer-Watt Gold Company and began a gold exploration program. Before the option was terminated, Kennecott had drilled six core holes on the DUV deposit.

1991  Harrison Western Environmental Services, Inc., began evaluating the gold placer deposits along the upper part of Emigrant Creek, the East Fork Emigrant Creek, and Huckleberry Gulch; they completed 10 sonic drill holes.

1991-1993  Pegasus Gold Inc. acquired Kennecott’s interest in the MM&R properties and entered a joint venture, also with Fischer-Watt Gold Company; to conduct a gold exploration program in the district on the DUV Ridge Target Area and on patented mining claims in the St. Julian area. Pegasus drilled 26 helicopter supported core holes (13,774 feet) and 24 reverse circulation holes with a track mounted drill (9,400 feet) in six target areas. Approximately $4.8M in work was completed in the district from late 1980’s to early 1990’s by Kennecott Exploration and Pegasus Gold.

2007  NewEdge Gold Corp acquired a lease/option on several properties in the Emigrant District. NewEdge dropped the project in 2008 as a result of collapse in the market.
The Iron Cap Placer operation was located on the Mint 35 claim held by Montana Mining and Reclamation in 2011 (MMC92323). Principle operators were Donavon Russell and Bill Ogg. The Mint 35 unpatented claim is located in T7S, R9E, Section 7 on the East Fork of Emigrant Creek. The site was reclaimed and the joint bond for Exploration License 00713 held by MDEQ and the FS Plan of Ops has been released in full. (Grosvenor, 2017a)

**St. Julian Claim Block**

The St. Julian Claim Block was first identified in 1885 and has a history of sporadic production up until 1903. It is estimated that 395 ounces of gold were produced between 1901 and 1903. The area contains the major mine workings in the Emigrant Mining district. The St. Julian is covered by eight patented mineral claims under option to Lucky Minerals. Underground workings at the St. Julian Claim Block consisted of 12 adits (total length about 1,060 feet) and three shafts.

### 1.4 PROJECT LOCATION

The St. Julian Claim Block is situated in Section 5, Township 7 South, Range 9 East, on private land surrounded by the CGNF in the Emigrant Creek area. The St. Julian Claim Block is approximately 12 miles southeast of the town of Emigrant and 22 miles northeast of Gardiner (See Figure 1.3). Table 1.1 provides a listing of the patented minerals claims in the St. Julian Claim Block, provided by Lucky Minerals. The patented claims are in the process of being transferred and registered to Lucky Minerals, under a purchase agreement.

<table>
<thead>
<tr>
<th>Mineral Survey</th>
<th>Lot Name</th>
<th>Surface Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>9015</td>
<td>Copper King</td>
<td>20.3</td>
</tr>
<tr>
<td>9015</td>
<td>Bercry</td>
<td>16.3</td>
</tr>
<tr>
<td>9015</td>
<td>Bullion</td>
<td>20.0</td>
</tr>
<tr>
<td>9015</td>
<td>Josephine</td>
<td>16.0</td>
</tr>
<tr>
<td>9015</td>
<td>Helen</td>
<td>13.3</td>
</tr>
<tr>
<td>6706</td>
<td>St. Julian</td>
<td>16.1</td>
</tr>
<tr>
<td>6707</td>
<td>Bottler</td>
<td>11.2</td>
</tr>
<tr>
<td>6705</td>
<td>St. Julian Mill</td>
<td>17.7</td>
</tr>
</tbody>
</table>
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Figure 1.4
St. Julian Exploration Project, Park County, Montana
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1.5 AUTHORIZING ACTION

DEQ is responsible for issuing exploration licenses under the MMRA. The exploration license application must contain an exploration plan of operations stating the type of exploration techniques that would be used in disturbing the land. It also must include a reclamation plan in sufficient detail to allow DEQ to determine whether reclamation and performance requirements of the MMRA would be satisfied.

DEQ is also responsible for protecting air quality under the Clean Air Act of Montana, and water quality and quantity under the Montana Water Quality Act. The options that DEQ has for decision-making upon completion of the EA are (1) denying the application if the proposed operation would violate MMRA, the Clean Air Act, or the Water Quality Act; (2) approving the application as submitted; (3) approving the application with agency mitigations; or (4) determining the need for further environmental analysis to disclose and analyze potentially significant environmental impacts. Table 1.2 provides a listing of any state, local, or federal agencies that may have overlapping or additional jurisdiction or environmental review responsibility for the proposed action and the permits, licenses and other authorizations required.

<table>
<thead>
<tr>
<th>Action</th>
<th>Regulatory Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploration License</td>
<td>DEQ-Hard Rock Mining Bureau</td>
</tr>
<tr>
<td>General Permit Storm Water Discharges Associated with Construction Activity</td>
<td>DEQ-Water Protection Bureau</td>
</tr>
<tr>
<td>310 Permit (Montana Natural Streambed and Land Preservation Act)</td>
<td>Park County Conservation District</td>
</tr>
<tr>
<td>318 Authorization (Short-Term Water Quality Standard for Turbidity)</td>
<td>DEQ-Water Protection Bureau</td>
</tr>
<tr>
<td>Forest Service Road Use Permit and Weed Management</td>
<td>Custer Gallatin National Forest</td>
</tr>
<tr>
<td>124 Stream Permit (Montana Stream Protection Act)</td>
<td>Montana Fish, Wildlife, and Parks (FWP)</td>
</tr>
<tr>
<td>Water Right Permit</td>
<td>Montana Department of Natural Resources (DNRC)</td>
</tr>
<tr>
<td>County Road Access and Maintenance, Land Use, Waste Management, Noxious Weed Plan</td>
<td>Park County</td>
</tr>
</tbody>
</table>

1.6 PUBLIC PARTICIPATION

1.6.1 SCOPING

DEQ considers public participation a crucial component in defining the scope of the environmental analysis process. Consequently, DEQ worked to ensure the public was informed about Lucky Minerals’ proposal and the opportunities available for participating in the environmental analysis process.

The original exploration proposal included CGNF lands in the area proposed to be covered by the exploration license (Plan of Operations, April 2015). As a result, DEQ partnered with the
CGNF to conduct a joint scoping period to receive public comment. The CGNF and DEQ first informed the public of the proposal by mailing the project's scoping document to potentially interested or affected persons on June 2, 2015. This document described Lucky Minerals' original proposal, the agencies' responsibilities, and the approval and environmental review process. It also requested scoping comments by July 15, 2015. DEQ received a concurrent proposal from Lucky Minerals to conduct exploration drilling on private lands surrounded by the CGNF. The two agencies determined that the National Environmental Policy Act (NEPA) and MEPA would be best served by considering the impacts of the two proposals in a single analysis document. Consequently, the agencies informed the public of this in a joint news release that extended the public scoping period until August 20, 2015.

On November 30, 2015, Lucky Minerals withdrew its application and resubmitted a revised proposal for exploration on private patented claims only, called the St. Julian Claim Block. As a result, CGNF suspended work on the project. The revised application is still a State action requiring DEQ to continue the MEPA analysis.

DEQ received approximately 6,250 scoping comments pertaining to Lucky Minerals' Proposed Action. These comments formed the basis of the issues analyzed and alternatives evaluated throughout the document. DEQ reviewed and analyzed the comments received during the scoping process using three steps. First, specific comments were arranged into groups of common concerns. Next, a primary issue statement was prepared for each group of comments. Finally, the issue statements were evaluated for applicability to this MEPA analysis. Overall, there were 18 preliminary issue areas identified in the comments. Eleven of the 18 issues raised in scoping were identified as issues to be studied in detail (Table 1.3).

1.6.2 DRAFT EA PUBLIC COMMENT PERIOD

From October 12 through December 12, 2016, members of the public submitted comments on the Draft EA during a public comment period. DEQ reviewed the comments received and responded to comments in Section 8 of this final EA. Some responses required changes in the Final EA. Modifications are indicated in the comment response.

1.7 ISSUES AND CONCERNS

1.7.1 ISSUES STUDIED IN DETAIL

DEQ conducted scoping to identify potential issues and other concerns with the proposed action. A summary of the key issues is provided in Table 1.3. This table also provides references to sections of this EA that respond to each issue raised.
## TABLE 1.3
Scoping Issues

*Exploration License Application 00795*

<table>
<thead>
<tr>
<th>Scoping Issue</th>
<th>Concern</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Quality</td>
<td>There is a concern that the Lucky Minerals proposal may create fugitive dust and air borne pollutants (such as exhaust and from drilling activities) that impact air quality and be a nuisance to residents and recreationists in the area.</td>
<td>Impacts to air quality from mineral exploration are analyzed and disclosed. (See Section 3.11)</td>
</tr>
<tr>
<td>Aquatic Species</td>
<td>There is a concern that the Lucky Minerals proposal may degrade water quality and reduce water quantity, thus negatively affecting populations and habitat of fish and aquatic species. The Lucky Minerals proposal may also impact fishing experience down gradient of the St. Julian Claim Block (Yellowstone River).</td>
<td>Impacts to fish and aquatic species from mineral exploration are analyzed and disclosed. (See Section 3.5)</td>
</tr>
<tr>
<td>Cultural / Historical Properties</td>
<td>There is a concern that the St. Julian Claim Block has not been adequately surveyed for cultural and historical resources. The analysis should disclose potential impacts to these resources, and the project must comply with cultural and historical preservation laws.</td>
<td>Impacts to cultural and historical resources from mineral exploration are analyzed and disclosed. (See Section 3.6)</td>
</tr>
<tr>
<td>Cumulative Impacts</td>
<td>There is a concern that the analysis may not address the cumulative impacts of minerals exploration on both public and private lands, and that the analysis may exclude reasonably foreseeable exploration activities.</td>
<td>Cumulative impacts are included in the environmental review. (See Section 4.1)</td>
</tr>
<tr>
<td>Geothermal</td>
<td>There is a concern that mineral drilling and road maintenance/construction proposed by Lucky Minerals may negatively impact geothermal resources, which could impact Chico Hot Springs, Mammoth Hot Springs, Corwin Springs, and the State designated controlled groundwater area.</td>
<td>Impacts to geothermal resources from mineral exploration are analyzed and disclosed. (See Section 3.7)</td>
</tr>
<tr>
<td>Land Use, Recreation, and Noise</td>
<td>There is a concern that the Lucky Minerals proposal may restrict public access through the St. Julian Claim Block for recreationists (including but not limited to hiking, camping, hunting, horseback riding, back country skiing, All Terrain Vehicles (ATVs), and photography). There is a concern that project traffic will negatively affect the recreation experience (solitude, peace, and tranquility) provided by the Absaroka.</td>
<td>Impacts from mineral exploration to land use, recreation, and noise are analyzed and disclosed. (See Section 3.8)</td>
</tr>
<tr>
<td>Section</td>
<td>Concern</td>
<td>Impacts to section from mineral exploration are analyzed and disclosed in the section.</td>
</tr>
<tr>
<td>----------------</td>
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<td>---------------------------------------------------------------------------------------</td>
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<tr>
<td>Socioeconomics</td>
<td>There is a concern that the Lucky Minerals proposal will harm the local economy (jobs, recreation and tourism, hunting &amp; guiding, fishing, agriculture, property values). There is a concern that the Lucky Minerals proposal may impact Paradise Valley communities, disrupting the lives and livelihoods of the community and impacting sense of place.</td>
<td>(See Section 3.13)</td>
</tr>
<tr>
<td>Transportation</td>
<td>There is a concern that increased exploration traffic may create safety hazards for local residents, recreationists and local businesses. There is a concern that increased exploration traffic will create a safety hazard on the Chico Road for guests of Chico Hot Springs. There is a concern that the roads in Emigrant Gulch (particularly Road 3273 on Emigrant Peak) are a safety hazard, and frequently flood (in particular the culvert above White City). There is a concern that the planned road maintenance and improvements, including stream crossings, will be more extensive than what has been described, roads will be widened, and there is no standard for returning roads to their “original condition.” Additional information on planned road maintenance should be provided, including stream crossings. There is a concern that vehicles or equipment may fall into Emigrant Creek or its tributaries resulting in spills that could be disastrous to downstream users.</td>
<td>(See Section 3.10)</td>
</tr>
<tr>
<td>Issue Area</td>
<td>Concern</td>
<td>Impacts to terrestrial wildlife are analyzed and disclosed. (See Section 3.4)</td>
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<td>-----------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
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<tr>
<td>Terrestrial Wildlife</td>
<td>There is a concern that project activities may negatively impact threatened, endangered, or sensitive species including grizzly bear, lynx, and wolverine, and the agency must consult with US Fish and Wildlife Service.</td>
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<tr>
<td></td>
<td>There is a concern that the Lucky Minerals proposal may negatively impact numerous species of wildlife and their habitat, including management indicator species, public interest (including commonly hunted) species, and migratory birds.</td>
<td></td>
</tr>
<tr>
<td>Vegetation and Soils</td>
<td>There is a concern that the Lucky Minerals proposal will impact sensitive plants and introduce weeds and cause them to spread.</td>
<td>Impacts to vegetation and soils from mineral exploration are analyzed and disclosed. (See Sections 3.9)</td>
</tr>
<tr>
<td></td>
<td>There is a concern that the proposal may contaminate soils from spills and reduce soil productivity and cause soil loss.</td>
<td></td>
</tr>
<tr>
<td>Water Quality / Quantity (Surface and Groundwater)</td>
<td>There is a concern that the project may impact surface and groundwater quality and quantity in the St. Julian Claim Block. There is a concern that water use by Lucky Minerals may impact others’ water use.</td>
<td>Impacts to water quality / quantity from mineral exploration are analyzed and disclosed. (See Section 3.7)</td>
</tr>
<tr>
<td></td>
<td>There is a concern that drilling may cause groundwater contamination through cross contamination with surface and groundwater.</td>
<td></td>
</tr>
<tr>
<td>Yellowstone National Park</td>
<td>There is a concern that the project’s proximity to Yellowstone National Park (YNP) will harm both geothermal and wildlife resources, visitor experience, and the tourist economy.</td>
<td>Geothermal, wildlife, and recreation are covered in their own issue areas. Socioeconomics is included in Sections 3.4, 3.7, and 3.8.</td>
</tr>
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</table>
There was a comment that the CGNF and DEQ should identify the National Park Service as a cooperating agency under NEPA given the proximity of the proposed mineral exploration to Yellowstone National Park and its potentially significant impacts on resources within and adjacent to the Park.

A Yellowstone National Park representative participated in a site tour conducted by DEQ. The Yellowstone National Park Superintendent also submitted a letter to DEQ during scoping. A electronic copy of the Draft EA was sent to the National Park Service for its review and comment.

1.7.2 ISSUES CONSIDERED BUT DISMISSED

DEQ has identified resources that would not be affected by the Proposed Action and issues that were considered and eliminated from detailed review. A summary of these issues is provided in Table 1.4.

<table>
<thead>
<tr>
<th>Scoping Issue</th>
<th>Considered But Dismissed</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonding</td>
<td>There is a concern that the Plan of Operations should include information on project timelines, spill containment, monitoring, proposed bonds, season of use, stream protection, etc.</td>
<td>Information requested is included within the Plan of Operations. In the event that Lucky Minerals cannot post the reclamation bond, DEQ will not issue the exploration license pursuant to 82-4-322(3), MCA.</td>
</tr>
<tr>
<td></td>
<td>There is a concern that Lucky Minerals does not have adequate financial resources to post an adequate reclamation bond.</td>
<td></td>
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<tr>
<td>Climate Change</td>
<td>There was a comment to disclose impacts of the project on climate change and carbon storage potential.</td>
<td>Environmental reviews under MEPA may not include a review of actual or potential impacts beyond Montana’s borders. It may not include actual or potential impacts that are regional, national, or global in nature. (Section 75-1-201 (2)(a), MCA.)</td>
</tr>
<tr>
<td>Helicopters</td>
<td>There is a concern that low level, high frequency or extended duration helicopter flights may disturb and displace grizzly bears and Canada lynx, and impact their habitat, resulting in adverse impacts and take under the Endangered Species Act.</td>
<td>The exploration application does not propose helicopter-supported drilling activities.</td>
</tr>
<tr>
<td>Land Designations</td>
<td>There is a concern that the Lucky Minerals proposal may impact future designation of the St. Julian Claim Block as wilderness, or future designation of the Yellowstone River as a Wild and Scenic River.</td>
<td>Future land designations are speculative and beyond the scope of this analysis. This issue will not be analyzed.</td>
</tr>
<tr>
<td>Public Involvement</td>
<td>There is a concern that the scoping comment period was not adequate to</td>
<td>The comment period was extended for a total of 80 days. During the Joint Scoping</td>
</tr>
<tr>
<td>Comment Period</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Right of Way** | **There is a concern that Lucky Minerals doesn’t have legal access through private, patented mining claims.**  
One landowner does not consent to any access or road work on his property.  
Other commenters questioned whether Park County has authorized maintenance across county maintained roads and if easements were in place through private property. | **Period with the CGNF and DEQ, the agencies received approximately 6,000 comments. There was additional opportunity for comment on the draft Environmental Assessment document.**  
The access route proposed by Lucky Minerals is described in Section 2.3.1 of this EA. Ownership of the road and whether Lucky Minerals has a right to use the road are legal issues that, should there be a dispute, must be resolved in a civil action between the affected parties. DEQ does not have authority to resolve property disputes. |
2 DESCRIPTION OF ALTERNATIVES

2.1 INTRODUCTION

This chapter summarizes alternatives to the proposed plan including the No Action Alternative required by MEPA. Other alternatives required by MEPA include the Proposed Action, and the Agency-Modified Alternative.

2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, Lucky Minerals would not obtain an exploration license and therefore, could not conduct the exploration activities described in its exploration license application. However, the company would still be allowed to stake claims, map the local geology, and collect surface samples.

2.3 PROPOSED ACTION

Under the Proposed Action, Lucky Minerals would explore the extent of copper, gold, silver, and molybdenum mineralization in the St. Julian Claim Block by drilling and recovering core samples that, when analyzed, will allow modeling of the subsurface geology, reveal any fault structures, and further define any mineralization. The St. Julian Claim Block was first identified in 1885 and has a history of sporadic production up until 1903. It is estimated that 395 ounces of gold were produced between 1901 and 1903. The area contains the major mine workings in the Emigrant Mining district. The St. Julian Claim Block is covered by eight patented mineral claims under option to Lucky Minerals. Underground workings at the St. Julian Claim Block consist of 12 adits (total length is approximately 1,060 feet) and three shafts.

The Proposed Action would consist of two approximately three-month field seasons of exploration-related activities on the private patented claims as depicted on the updated Figure 1.4. Lucky Minerals field season would be from about July 15th to October 15th each year depending on snow levels as Lucky Minerals would not plow snow to conduct exploration activities (Dykes, 2016b). Total disturbance for the Proposed Action on the St. Julian Claim Block is estimated to be 4.8 acres. This includes 3.48 acres of disturbance on access roads within the St. Julian Claim Block, 0.8 acre for the laydown areas located near the old mill site at the St. Julian Claim Block, and 0.52 acre for the drill pads (See Table 2.1). The water drafting sites would be about 0.02 acre and are included within the total disturbance area. The following subsections describe the Proposed Action in more detail.

<table>
<thead>
<tr>
<th>Table 2.1</th>
<th>Total Disturbance in the St. Julian Claim Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Disturbance</td>
<td>Approximate Area in Acres</td>
</tr>
<tr>
<td>Drill Pads</td>
<td>0.52</td>
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<tr>
<td>Laydown Area</td>
<td>0.8</td>
</tr>
<tr>
<td>Access Roads</td>
<td>3.48</td>
</tr>
<tr>
<td>Total Disturbance</td>
<td>4.8</td>
</tr>
</tbody>
</table>
2.3.1 ROAD ACCESS AND MAINTENANCE

The project area would be accessed by Emigrant Creek Road and then by the road designated Forest Service Road 3272. Access to the Emigrant Creek Road is from the town of Emigrant by way of the Chico Road (See Figure 3.19). The number of trips to the project following the initial mobilization of the drilling equipment would be approximately four to five round trips per day. There may be localized disturbances on Emigrant Creek Road and Forest Service Road 3272 to facilitate mobilization of equipment and to improve safety. Although Lucky Minerals does not anticipate conducting any work or improvements to any of the stream crossings, the company would be required to obtain any permits required by County, State, or Federal agencies.

The Proposed Action does not include any new road construction. Access roads and the existing road network within the St. Julian Claim Block would be maintained through grading in localized areas, as necessary, in order to keep them serviceable for the type of vehicles that would be involved with the Proposed Action. However, the roads would not be made wider. All roads would be cleared of rock and other debris within their original configuration, some of which may require hand picking to ensure safety and minimize disturbance (Dykes, 2016c). Wherever practicable, the roads will be sloped to enhance drainage and prevent channeling. Flaggers with portable radios would monitor and control traffic along those stretches of road during road cleaning. Flaggers and/or pilot cars would also be used when large equipment is being mobilized and demobilized from the area.

2.3.2 EQUIPMENT AND FIRE SAFETY

In order to protect existing vegetation and to not contribute to additional erosion within the St. Julian Claim Block, Lucky Minerals would be required to confine all wheeled vehicles and equipment to existing roads and trails or other overland travel routes. If crews need to access outcrops or any mineral exposures that are not immediately adjacent to roads, access to these features would be by foot travel. Equipment would not be operated when ground and road conditions are such that excessive damage would occur (i.e.; saturated road or soil conditions).

Proposed Equipment:

- A D-7 type dozer or equivalent to clear roads and work on private land.
- A G-12-14 type grader or equivalent for surface finishing the various roads.
- A JD-50 or equivalent type track mounted excavator or tractor mounted back-hoe to dig mud pits.
- Two LF-70 track mounted diamond drilling machines; used fulltime (See Figure 2.1).
- Three diesel- or gas-powered solid displacement “Bean” water pumps for delivering water to the sites using high pressure rubber coated woven steel water hose. Only two pumps would be used at any given time, the third pump would serve as backup.
- Two service trucks and small haulage trailers.
- One 4x4 pickup or similar vehicle for site visits and field work.
- Two ATVs for travelling around the St. Julian Claim Block.
Lucky Minerals would maintain all equipment operating in good repair and free of abnormal leakage of lubricants, fuel, coolants, and hydraulic oil and furnish containers or oil adsorbing mats, for use under all stationary equipment or equipment being serviced to prevent leaking or spilled petroleum-based products from contaminating soil and water resources. Lucky Minerals would be required to properly dispose of contaminated debris, vehicle oil filters (drained of free flowing oil), batteries, oily rags, and waste oil resulting from use, servicing, repair, or abandonment of equipment in conformity with any applicable state, county, and local requirements.

In order to reduce or eliminate potential for a wildfire associated with the Proposed Action; Lucky Minerals would be required to adhere to current and imposed fire restrictions that are enacted by the Forest Supervisor and Park County. Additionally, Lucky Minerals would ensure that all vehicles are equipped with a functional spark arrestor and baffled muffler, and are equipped with an axe, bucket, shovel, and fire extinguisher. All support or crew transport vehicles would be parked in an area in which the natural vegetation does not directly contact the catalytic converter of the vehicle. Lucky Minerals would also be required to comply with CGNF regulations regarding fire rules and/or closures. All pumps/generators and other combustion engines would be placed away from combustibles and be equipped with functional spark arrestors and fire suppression kits.

Warming fires in self-contained 55 gallon drums would be used at drill sites and laydown areas. It is not anticipated that Lucky Minerals would use warming fires during the summer months when fire danger is at its highest. Lucky Minerals proposes to use warming fires in the fall and cooler months when cold nights occur (Dykes, 2017a). Lucky Minerals would be required to adhere to all burn restrictions in the area. Appropriate fire protection equipment (axe, bucket, shovel and fire extinguisher) would be present at such sites. Warming fires would not be left unattended. No green trees would be cut for firewood, but slash and downed wood from site clearing or dead or down trees in the vicinity may be used for warming fires on the St. Julian Claim Block.
2.3.3 DRILL SITE/PAD CONSTRUCTION

Lucky Minerals proposes to construct 23 drill pads along on the existing road network within the St. Julian Claim Block (See Updated Figure 1.4 and Figure 2.2). The drill pads would be approximately 50 feet long by 20 feet wide and would be constructed within the existing road prism. A minimum of leveling would be required to make the site safe, accommodate the drill, and provide room for other equipment and vehicles. Drill pads would be located a minimum of 100 feet away from all perennial streams and 50 feet away from other riparian or wetland areas. Drilling operations would include storm water and sediment controls to prevent pollutants or debris from entering streams and wetlands.

Each site would have a sump lined with a synthetic liner to contain the drill cuttings. Each sump would be 3 feet long by 2 feet wide and 3 feet deep, and would collect dry to damp drill cuttings as they are separated from fluids, thus creating a closed system. The fluids are recirculated and used as the drilling process continues to cool the bit, lubricate the advancing drill hole, and remove cuttings from the bit face to the surface. The drilling fluids are not just water, but a combination of water and a synthetic, non-toxic biodegradable polymer mud product used to increase the viscosity of the water to get the desired effect, depending on the downhole conditions.

2.3.4 CORE DRILLING

Lucky Minerals proposes to drill up to 46 drill holes from 23 drill pads (two/pad) over two three-month field seasons on the private land (patented claims). The proposed drill holes would be located on private land within the existing road network of the St. Julian Claim Block (See Updated Figure 1.4). The locations of the proposed drill sites are conceptual and may change as new information is acquired. Additional holes may be required on a specific area or direction, as other locations earlier thought practical are found to be not important. Drill holes would be either vertical or angled holes designed to best investigate the subsurface geology. Most of these drill holes are planned to be angled. However, geologic trends may dictate that vertical drilling may be more effective.
The drill holes would be drilled by track-mounted diamond coring machines. Average depth is expected to be around 1,000 feet, though some holes may be up to 2,000 feet. Upon completion, there would be an effort to pump the remaining drill cuttings down the drill hole before plugging the hole with bentonite and cement. It may not always be possible to completely pump the drill cuttings into the hole, due to rubble or blockages from the sides of the hole. In the event that all of the cuttings cannot be pumped back down the drill hole, there are several options available with respect to the disposal of the cuttings. These options include: burying them in the sump, placing them in underground adits within the St. Julian Claim Block, or taking them to an approved waste disposal site (Dykes, 2016d). Cuttings would be required to be disposed of in compliance with applicable State regulations (ARM 17.24.107) and in consultation with DEQ.

The Proposed Action would use two drills and run them two shifts per day, usually 10 hour shifts with time for shift change and drill maintenance between shifts. Night drilling would require the use of small light plants similar to the ones used by highway construction crews. During drilling operations, Lucky Minerals would have 10 workers for exploration activities (Dykes, 2016d).

2.3.5 WATER USE

Lucky Minerals proposes to obtain water for drilling either from existing artesian boreholes or from the East Fork of Emigrant Creek (Updated Figure 1.4), utilizing the existing water right that is attached to the St. Julian Mine patented claims. The artesian boreholes are located on CGNF administered land and Lucky Minerals would be required to obtain permission prior to using that water supply. Spillage containment and clean up kits or materials would be provided for each water pump set-up to handle at least 90 gallons of fuel which is 1.5 times the estimated fuel that would be at that location. The pump itself would be contained within a lined berm to prevent any spillage. The berm would be able to handle at least 1.5 times the volume of fuel contained in the pump (15 gallons) and in the attached 45 gallon drum (1.5 x 60 gallons= 90 gallons). The pump would be located on the existing disturbed ground and set back approximately five to 15 feet from the creek (Dykes, 2016d).

2.3.6 NOXIOUS WEEDS

Lucky Minerals proposes to wash all equipment listed in Section 2.3.2 prior to mobilization. Lucky Minerals would be required to bond for potential treatment of weeds in the event that noxious weeds are noted within the St. Julian Claim Block the following growing season. Lucky Minerals would propose to conduct annual field inspections of drill sites and laydown areas which are used and occupied by Lucky Minerals under this Plan of Operations to monitor for noxious weed infestations for a three year period. In the event that noxious weeds are noted at a site, Lucky Minerals would be required to conduct appropriate weed treatment in conformity with any County or Forest Service requirements. The company would be responsible for the treatment of the noxious weeds.

2.3.7 BUILDING STRUCTURES

There would be no permanent physical structures placed or fabricated on the private land within the St. Julian Claim Block. Any temporary camp or laydown structures would be located
on private land owned by Lucky Minerals. Cold weather or heavy rain periods may dictate that some sort of temporary shelter be provided for the water pumps. All other temporary structures would also be located on the private land.

2.3.8 RECLAMATION

Reclamation measures would be concurrent with operations and/or begin immediately upon completion of operations at each site. Disturbed areas would be kept to the minimum size necessary to accommodate the exploration operation. If ground-leveling activities are needed or sumps are dug, all suitable on-site organic litter layer, soil, and soil material would be salvaged prior to any other site disturbance (such as drilling or leveling), and either stockpiled or used for immediate reclamation. Felled or cut vegetative material (trees, logs, brush, etc.) would be stockpiled in amounts adequate for reclamation. Lucky Minerals would be responsible for any necessary reclamation resulting from activities of contracted and/or sub-contracted employees.

While completion of final reclamation as soon as possible is preferable, this may not always be possible due to seasonal weather events. In such an event, interim reclamation would be required for the purposes of erosion control on all exploration disturbance areas. This may include draining sumps, erosion control measures such as constructing or installing water bars, scarifying compacted surfaces, placement of woody debris, and interim revegetation.

Each exploration drill hole would be filled with a bentonite-cement mixture and plugged at the surface five to ten feet deep with cement, pursuant to ARM 17.24.106. Drill-hole collar pipe or casing would be removed or cut off below ground level. In the event that all of the cuttings cannot be pumped back down the drill hole, there are several options available with respect to the disposal of the cuttings. These options include: burying them in the sump, placing them in underground adits within the St. Julian Claim Block, or taking them to an approved waste disposal site (Dykes, 2016d).

Non-toxic lubricants in sumps would be allowed to percolate into the ground prior to backfilling. Excavations would be backfilled with excavated spoil material and topped with salvaged organic and soil material. Compacted surfaces created by exploration activities would be loosened and disturbed areas would be recontoured to original condition to the extent possible by reapplying salvaged material over disturbance areas. This includes reapplication of mineral soil, topped with organic soil material, woody debris, and slash. Upon completion of reclamation, any excess salvaged material (rock, soils, slash, woody debris, etc.) would be scattered in the vicinity. Excess rock or soils would not be placed or scattered in streams or wetlands.

2.4 AGENCY-MODIFIED ALTERNATIVE

DEQ developed an Agency-Modified Alternative to address potential impacts identified in the impacts analysis of the Proposed Action and in response to public comment. These mitigations are described in the resource subsections below. Some of the mitigations identified in this alternative are not within DEQ’s regulatory authority and, therefore, cannot be imposed without the consent of Lucky Minerals. Lucky Minerals has consented to implement all listed mitigation measures into their Plan of Operations (Dykes, 2016e and Dykes, 2017b).
2.4.1 DRILL SITE/PAD CONSTRUCTION

2.4.1.1 Drill Site Locations

Same as the Proposed Action, with the exception that Lucky Minerals would be required to relocate the drill sites to the patented claims or remove them from the proposed drilling plan as indicated on the updated drill site location map (Updated Figure 1.4). The figure provided in the Plan of Operations (Original Figure 1.4) does not align with actual site topography and road locations when the image is georeferenced to established claim boundaries. When the roads and drill sites are mapped in comparison to the georeferenced claim boundaries, there are three drill sites that are located on CGNF administered land, to the southwest of the Bercry and St. Julian claims (pads #20, 22, 23). Access to those sites and any exploration drilling there would require approval from the Forest Service.

Lucky Minerals would also commit to a 100 foot buffer from the East Fork of Emigrant Creek for drill pad #1 as illustrated in the updated drill site location map (Updated Figure 1.4). The figure provided in the Plan of Operations (Original Figure 1.4) showed drill pad #1 located within 50 feet of the East Fork of Emigrant Creek, this contradicts the 100 feet buffer proposed by Lucky Minerals.

2.4.2 CULTURAL AND HISTORIC

2.4.2.1 Historic Mining Features

Same as the Proposed Action, with the exception that all known cultural and historic resources, recorded or identified, would be avoided during the exploration activity. This would include historic mining features within the St. Julian Claim Block. This would preclude any damage to historic features and prevent an inadvertent release of historic mine waste or water. Even though the proposed drill sites do not overlap with any known historic mine workings (Updated Figure 1.4), drilling would be conducted carefully at all times. In the circumstance that any void spaces are encountered while drilling, DEQ would be notified and the hole should be assessed for the potential to release any water, and to determine the necessity for abandoning and plugging the hole.

2.4.3 WATER

2.4.3.1 Artesian Boreholes

Same as described in Section 2.3.5 of the Proposed Action, with the additional requirement that Lucky Minerals would develop a plan to effectively contain flow from artesian boreholes, which may exceed the volume of what is expected to be handled by storm runoff BMPs. The procedures for artesian flow containment would be developed prior to commencing drilling operations, and any necessary equipment would be readily available onsite, if those conditions were encountered during drilling. Containment of flow from an artesian borehole during the entire period of time it is producing water would prevent any potential discharge of water or sediment to surface waters or wetlands, prior to plugging and abandoning the drill hole in accordance with ARM 17.24.106.
2.4.3.2 **Water Use**

In response to public comments, Lucky Minerals would be required to only use the surface water rights associated with the St. Julian Claim Block. The existing artesian boreholes located on CGNF administered land would not be used. The artesian boreholes produce very little flow (≤5 gpm) which would not be sufficient to support drilling operations. Instead, the surface water right associated with the St. Julian Claim Block would allow for the withdrawal of adequate volumes of water.

2.4.3.3 **Water Monitoring**

In response to public comments, regular water quality monitoring and contingency sampling (Section 3.7.3.3) in the East Fork of Emigrant Creek would be required. Lucky Minerals would establish two sites for water quality monitoring, one upstream and one downstream from activities in the St. Julian Claim Block. Water samples would be required from the locations prior to the start of drilling to establish baseline data. During active drilling operations, weekly water monitoring would be required at the two locations. This compliance monitoring is described in more detail in Section 3.7.3.3, and would more quickly identify potential impacts to the stream adjacent to the St. Julian Claim Block.

2.4.3.4 **Spill Reporting and Containment**

Lucky Minerals would be required to comply with the Spill Management and Reporting Policy established by DEQ which states that spills of any petroleum product should be reported when the volume is greater than 25 gallons. The reporting limit was incorrectly stated in the proposed Plan of Operations – stating that the limit in the Spill Management and Reporting Policy was 10 barrels (420 gallons) for crude oil, produced water, and/or injection water.

In addition, spill kit materials for additional drill fluid containment would be readily available on-site for any inadvertent release. This equipment may include, but is not limited to, straw wattles and staking, absorbent pads, silt fence, plastic sheeting, shovels or hand tools, and buckets. As the clay-rich material dries, it could be scooped or shoveled off of the ground surface and placed into a sump with the cuttings. The drilling fluid components are non-toxic and biodegradable and pose little environmental risk, and any cuttings contained in the slurry would be returned to the suitable disposal location.

2.4.4 **RECLAMATION**

2.4.4.1 **Drilling Waste Disposal**

Instead of retaining the proposed option to dispose of cuttings in underground adits, Lucky Minerals would be required to primarily pump the cuttings back downhole prior to plugging, or when that is not possible, the cuttings in the sumps would be compacted, covered, and revegetated. As stated in 2.4.2.1, historic mining features would be avoided during exploration drilling. This would prevent any attempt to re-open or utilize historic workings that could result in an inadvertent release of historic mine waste or water.
2.4.4.2 *Vegetation*

Lucky Minerals would be required to seed after any road maintenance disturbance to limit invasion by noxious weeds. Lucky Minerals would also be required to seed other disturbances caused by the drilling project, including berms around the water withdrawal pump site, drill sites, and laydown areas to limit invasion by noxious weeds.

2.4.5 **TRANSPORTATION**

2.4.5.1 *Road Access and Maintenance*

Lucky Minerals would be required to access the St. Julian Claim Block for mobilization and demobilization of exploration equipment using Murphy Road, Old Cemetery Road, Emigrant Creek Road, and the road designated Forest Service Road 3272/3272B. Whenever possible, Lucky Minerals would also use this access route for traffic associated with shift changes. However, other routes may be used for incidental travel, i.e., emergencies and personal travel (See Figure 3.19).

Travel speeds on all access roads and within the existing road network of the St. Julian Claim Block would be limited to 25 mph. This mitigation was added to reduce the potential for fugitive dust. In addition, although vehicular collisions with wildlife would be minimal as a result of the localized improvements proposed by Lucky Minerals in the Proposed Action, the 25 mph speed limit was added out of an abundance of caution.

In addition to posting signs, as described in the Proposed Action, Lucky Minerals would be required to monitor access and, if needed, install a gate or other type of road barrier at the boundary of the St. Julian Claim Block to restrict public access to the privately-owned roads on the project area.

2.4.6 **WILDLIFE**

2.4.6.1 *Wildlife Awareness Plan*

A wildlife awareness plan would be included in Lucky Minerals’ training of its employees. The plan would include the following guidelines:

- Worker Environmental Awareness Program (WEAP) training would be required to educate all personnel about the existing on-site and surrounding wildlife resources and the measures required to protect these resources. Information on whom to contact if a federally or state listed species or their sign is observed would be provided as part of the WEAP training.

- All project personnel would be required to be educated on being bear aware. This includes storing all food or other bear attractants in properly secured bear-proof containers at all times, abiding by the Forest Service’s food storage order (#001-14-11-00-02) and 87-3-130, Montana Code Annotated.
• Lucky Minerals would be required to implement a waste management plan that would minimize refuse to avoid attracting wildlife. All garbage, refuse, and waste would be contained in appropriate bear-proof containers and removed from the site weekly.

• Employees would be prohibited from feeding or harassing wildlife on the site. This would include a requirement that Lucky Minerals implement a “No Pets” policy in the St. Julian Claim Block.

• Employees would be required to report sightings or sign of Federally and State-listed wildlife to supervisory personnel and record the observation on a wildlife observation form.

2.4.6.2 Wildlife Avoidance

Lucky Minerals would be required to conduct pre-exploration surveys prior to each field season to identify potential areas of western toad habitat, bat habitat, and nesting birds in areas of new disturbance on drill pads and laydown area. If any of these habitats are found near the drilling areas Lucky Minerals will consult Montana Fish, Wildlife, and Parks (FWP) to determine avoidance or mitigation measures.

To avoid disturbing nesting eagles, other raptors, owls, or songbirds, Lucky Minerals would maintain natural forested (or vegetative) buffers around nest trees. The buffer areas would be consistent with USFWS guidelines and would serve to minimize visual and auditory impacts associated with human activities near nest sites.

If a raptor nest is built or discovered within the St. Julian Claim Block, Lucky Minerals would consult with FWP to determine avoidance or mitigation measures. Any spatial buffers required through consultation with local FWP biologists would be in accordance with the Montana Bald Eagle Guidelines (2010).

To avoid take, as defined by the Migratory Bird Treaty Act (MBTA), Lucky Minerals would refer to the current list of species covered, and those not covered, by the MBTA, prior to initiating project activities (USFWS 2013).

Project design features would be modified in the Plan of Operations to consider what lighting is necessary and reduce any unnecessary lighting, both temporally and spatially. Nighttime lighting would be shielded, and directed to where it is needed to avoid light spillage, and only be bright enough to maintain crew safety. Lucky Minerals would also be required to follow recommended bat lighting minimization measures, by directing temporary lighting away from suitable habitat during the active season.

Standing snags, dead or downed wood, beyond what Project personnel cut during site clearing, would not be cut or removed for use in warming fires.

2.5 ALTERNATIVES CONSIDERED BUT DISMISSED

Additional alternatives were considered, but were dismissed from further study for the reasons listed below.
2.5.1 LIMIT EXPLORATION LICENSE TO ONE FIELD SEASON

LIMIT EXPLORATION LICENSE TO ONE FIELD SEASON

Under an alternative requiring Lucky Minerals to complete its exploratory drilling program in one field season, Lucky Minerals would be required to increase its drilling activity in order to complete the proposed drilling program in one three-month field season. Under a worst case scenario, Lucky Minerals would use four, rather than two, drill rigs. Use of four drill rigs would require Lucky Minerals to use two additional small lights to facilitate night drilling and to increase traffic accessing the site from approximately four to five round trips or eight to ten one-way trips per day.

An alternative requiring Lucky Minerals to complete its exploration drilling program in one field season would result in substantially the same impacts as the alternatives allowing Lucky Minerals to complete its proposed drilling program in two field seasons, except that the impacts would occur in a single three-month period rather than two field seasons. The use of two additional drill rigs, two additional lights to illuminate night drilling, and the increased traffic would result in the same impacts to geology and minerals; fish and aquatic insects; cultural and historical resources; water and geothermal resources, soils, and vegetation and reclamation as under the Agency Modified Alternative. While the use of two additional rigs, two additional lights to illuminate night drilling, and the increased traffic may incrementally increase noise levels and visibility of the proposed exploration program, the impacts to wildlife; transportation, recreation and visuals would be substantially the same.

With the exception that the impacts would occur in a single three-month field season, the impacts resulting from an alternative requiring Lucky Minerals to complete its exploratory drilling in one field season would be substantially the same as alternatives allowing Lucky Minerals to complete its exploration program in two years. Therefore, an alternative requiring Lucky Minerals to complete its exploration program in one three-month field season was not considered in detail.

2.5.2 ELIMINATE NIGHT DRILLING

The primary impacts from night drilling result from the illumination of the drill rigs to provide a safe working environment. Lucky Minerals has proposed to use small lights similar to those used by highway crews when conducting drilling activity at night. The lighting would be localized to the drill area only. When in use, lighting would be directed to where it is needed to avoid light spillage, and only be bright enough to maintain crew safety.

The elimination of night drilling would avoid impacts that the proposed exploration project would have on bats. As discussed in Section 3.4.4.2, the use of lights at night to illuminate the drill sites may result in potential changes in distribution, migration, and foraging behavior of bats. Additionally, bat strikes to drill rigs are possible if bats are drawn to forage on insects attracted to the artificial light source, potentially leading to injury or death. In addition, the elimination of night drilling would avoid any auditory or visual impacts at night, which are discussed in Section 3.8 and 3.12, respectively. Finally, elimination of night drilling would
reduce increased traffic on the access roads from approximately four to five round trips to approximately two to three round trips per day.

The remaining impacts on geology and minerals; wildlife; fish and aquatics; cultural and historic resources; water and geothermal resources; land use, noise and recreation; soils, vegetation and reclamation; transportation; air quality; visuals; and cumulative impacts would be the same as under the Agency Modified Alternative with one exception. Because night drilling would be eliminated, Lucky Minerals may require additional field seasons to complete the proposed exploration program. The majority of Lucky Minerals drilling is expected to be achieved during the night shift as repairs, maintenance, and set-up are performed during the day. Lucky Minerals has indicated that during its last exploration project, an average of 32 feet of drill core was obtained during the day shift and average 123 feet of drill core was obtained during the night shift. Thus, the impacts on these resources would be the same as the Agency Modified Alternative, but potentially extended for an additional three or four field seasons. With the exceptions noted, because the impacts from an alternative that eliminates night drilling are substantially the same as the Agency Modified Alternative, an alternative that eliminates night drilling was not considered in detail.
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3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES BY RESOURCE

3.1 INTRODUCTION

The affected environment and potential direct, secondary, and cumulative impacts of the Proposed Action, No Active Alternative, and the Agency-Modified Alternative are described in this section.

3.2 LOCATION DESCRIPTION AND STUDY AREA

The Proposed Action location is confined to private land situated on the St. Julian Claim Block in Section 5, Township 7 South, Range 9 East, accessed through and surrounded by the CGNF. The St. Julian Claim Block is approximately 12 miles southeast of the town of Emigrant and 22 miles northeast of Gardiner (See Figure 1.3). The associated study area for the Proposed Action includes all lands and resources in the St. Julian Claim Block, plus those additional areas identified by technical disciplines as "resource analysis areas" that are beyond the St. Julian Claim Block. Resource analysis areas are based on the predicted locations of direct and secondary impacts that could result from the Proposed Action. A detailed description of the Proposed Action is included in Chapter 2.

3.3 GEOLOGY AND MINERALS

3.3.1 ANALYSIS AREA AND METHODS

The analysis area for geology and mineral resources includes the Emigrant Mining District, specifically in the area of the St. Julian Claim Block and the roads that are proposed for site access (Figure 3.1 and 3.19). The general geology of Yellowstone National Park was also reviewed and included in the analysis to address public comments about potential impacts to the Yellowstone caldera system. The analysis methods for geology and minerals included reviewing publications from the United States Geological Survey (USGS), Montana Bureau of Mines and Geology (MBMG), and other published research sources, as well as the associated geologic maps and drawings. Historical mining in the area is discussed in further detail in Section 3.6.2.1. Surface geology for the region surrounding the St. Julian Claim Block is shown in Figure 3.1 (modified from Berg et al., 1999), and the proposed exploration area and access road are highlighted for context. The exploration area is identified to be located within Tertiary granodiorite and dacite porphyry, as well as undivided surficial glacial deposits.

3.3.2 AFFECTED ENVIRONMENT

The Emigrant Mining District occurs along the western edge of the Absaroka Range and the Beartooth Plateau in south-central Montana. This physiographic province is a fault-bounded, northwest-trending structural block of Precambrian basement rock, which was uplifted nearly to its current elevation during the Laramide orogeny (approximately 40 to 70 million years ago).
Precambrian crystalline rocks are exposed on most of the Beartoth uplift except for the southwestern and southern areas, which are covered with Paleozoic sedimentary rocks from a shallow seaway, and Tertiary igneous rocks of the Absaroka-Gallatin volcanic province (Elliot et al., 1983).

The volcanic province consists of deeply eroded andesitic, dacitic, and basaltic volcanoes and the deposits of epiclastically reworked material derived from them, consolidated tuffs, and a variety of related intrusive rocks. These volcanic rocks constitute the main mass of the Absaroka Range, as well as much of the northern Gallatin Range, and are estimated to have formed during the mid- to early-Eocene, 45 to 55 million years ago (Smedes and Prostka, 1972). A more silica-rich, multiphase complex (e.g. granite to quartz monzonite) then intruded into the slightly older volcanic units. Many of the historical mining districts in northwestern Wyoming and south-central Montana are located around these intrusive centers, including the Emigrant Peak, Mill Creek, and Sixmile Creek areas (Elliott et al., 1983).

It is important to note that these volcanic units, intrusive units, and subsequent mineralization events are much older than, and completely unrelated to, the Yellowstone volcanic system. Although there is ongoing debate about the source and mechanism controlling the movement of the Yellowstone mantle plume or “hotspot” (Fouch, 2012), it is clear that the earliest eruption events related to the Yellowstone hotspot occurred in southeastern Oregon/southwestern Idaho between 12 and 15 million years ago. These earlier eruptions, coupled with the slow migration of the North American tectonic plate over this hotspot, have resulted in an elongated volcanic field which is identified as the Snake River Plain in Idaho. The oldest caldera-forming eruption that took place in the current location (northwestern Wyoming) occurred approximately 2.1 million years ago and produced the Huckleberry Ridge Tuff (USGS, 2012). Subsequent eruptions created the Mesa Falls Tuff (1.3 million years ago) and the Lava Creek Tuff (640,000 year ago). The latter eruption formed a 1,500 square mile caldera in the present-day Yellowstone Plateau, and the northern rim of this caldera is located approximately 35 miles south of the Emigrant Mining District.

Extensive deposits of glacially-derived talus and alluvium cover some slopes and canyons in the Emigrant Mining District. To the northwest of the St. Julian Claim Block, the Paradise Valley forms the western margin of the Absaroka Range, Beartooth uplift, and the Emigrant Mining District. This region of Paradise Valley is considered to be a complex, northeast-southwest striking half-graben, bounded on its southeast margin by faults which generally dip to the northwest (Personius, 1982). The Deep Creek fault is the primary fault at this margin, separating the flat surface of the valley floor from the steep western piedmont of the Beartooth uplift. The Luccock Park fault occurs at the valley margin as well, and it likely merges with the Deep Creek fault in the vicinity of Mill Creek, approximately five miles to the northeast of Chico Hot Springs and the Emigrant Mining District (Wu, 1995). The valley generally contains deep deposits of eroded volcanics and alluvium from the Yellowstone River channel and floodplain, undivided glacial till, and Pliocene basalt flows. Some gravity data collected near Chico Hot Springs suggest that the bottom of the valley could be as deep as 2.5 miles (Bonini et al., 1972 in Wu, 1995).

Mineralization in the Emigrant Mining District is associated with the dacite-rhyodacite of the Emigrant Stock, with influence from late-stage granitic porphyries. The stock is elongated,
trending to the northwest-southeast and is about four miles wide and seven miles long. The associated alteration exhibits a pattern of zoning that is typical of copper-molybdenum porphyry systems. The metals occurring around the Emigrant Stock are crudely zoned accordingly, with a core of molybdenum with minor copper, an inner zone of copper-gold, and an outer zone of copper-silver-base metals (all from Stotelmeyer et al., 1983). A bounding fault occurs between the older volcanics and the Emigrant Stock, which appears to follow a collapsed and resurgent caldera complex. Subsequent activity produced fracture systems (autobreccias and hydrothermal breccias) that became the hosts for mineralizing fluids, resulting in mineral deposits in the district. These deposits occur as disseminated sulfides and in stockwork and veins in quartz-sericite-pyrite and argillically altered zones. The observed ore minerals vary with zoning but include gold, molybdenite, chalcopyrite, chalcocite, covellite, sphalerite, and galena in a variable gangue of quartz-pyrite veinlets, cementing clasts of silicified and sericitic wall rock, often with disseminated sulfides. The proposed exploration targets are located within the St. Julian Mine zone, where previous exploration work indicated that a coarse, multi-stage breccia is present with moderate to strong argillic alteration. Within certain areas, coarse pyrite has been observed in the siliceous matrix. Minerals of potential economic interest were also identified, replacing some sections of the rhyodacite near high angle faults and shear zones (all from Geologic Systems Ltd., 2015).

Some of the mineralized geologic materials in the Emigrant Mining District are potentially reactive and may produce acid rock drainage or mobilize metals under near-neutral pH conditions. Some water quality samples within the district reflect the reactive nature of the geology (e.g. elevated sulfate and metals concentrations, decreased pH), and in some cases, these reactions occur naturally and are not connected to any type of human disturbance. See the Water and Geothermal Section 3.7 for a more detailed description of the implications of reactive geologic materials on water quality in the area.

The surface geology has been disturbed by construction activities associated with mining and homesteading in the district, including buildings (e.g. mills, offices, houses) and roads. On the southeastern edge of Paradise Valley, the village of Chico was established by 1865 at the mouth of Emigrant Gulch on a placer mining claim. Public access roads to this location still exist, including Chico, Conlin, and Old Cemetery Roads (See Figure 3.19), which cut across glacial and alluvial deposits within Paradise Valley. The Chico Road also crosses an exposure of undivided Paleozoic sediments near Chico Hot Springs. From Old Chico, the road follows undivided glacial and alluvial deposits near the stream, all overlying Precambrian metamorphic rocks of the Beartooth uplift and portions of the Absaroka-Gallatin volcanics. Between the Great Western and Great Eastern Mine claims and the St. Julian Claim Block, Forest Service Road 3272 cuts across some steep, unvegetated slopes of very coarse volcanic talus. On the north side of the road, some of the talus slopes show evidence of widespread oxidation on rock surfaces (i.e. red/orange iron crust). On the private land encompassing the St. Julian Mine and Mill area (Section 3.6.2.1), the remnants of abandoned structures exist along the access road. The switchback road and the adjoining drill pads that were used during exploration of the St. Julian Claim Block in the 1970s and 1990s are cut into the volcanics and thin glacial deposits.

Subsurface geology and mineral resources have also been disturbed by historical placer and underground mining. Placer mining began in the Emigrant Mining District in the 1860s and continued into the 1940s, while lode mining did not begin until 1885. The mineral potential in
the St. Julian Mine area was first identified in 1887 and the area has a history of sporadic production (Section 3.6.2.1). Many of the major underground mine workings in the district occur around the St. Julian Mine and patent survey plats drawn in 1910 showed at least three shafts and eight adits, with a total estimated length of about 1,060 feet (GLO, 1910; Stotelmeyer et al., 1983; Updated Figure 1.4). Small waste rock dumps remain at the surface near collapsed adits and shafts. Waste rock and some mill concentrates may also be found in the old mill area (Stotelmeyer et al., 1983), but because a tailings impoundment was never constructed, any tailings that may have been produced at the site were likely disposed of in the nearby East Fork of Emigrant Creek, consistent with the methods of that time period.

There are two collapsed shafts near the top of the hill at the St. Julian Mine area, one of which is reported to be at least 100 feet deep (Stotelmeyer et al., 1983). Rock in one of the associated dumps is likely representative of the material at depth. The dump consists primarily of altered rhyodacite, strongly cut by veins of aphanitic silica to white crystalline quartz. The veins often exhibit voids lined with drusy quartz with occasional pyrite. Many fracture planes host fine quartz with up to 30 percent limonite or hematite, following pyrite oxidation. Along the upper switchback road which leads to the No. 3 adit, the rhyodacite volcanics are dominant, with flow-banded and autobrecciated phases. The nearby waste rock contains examples of finely fragmented pieces of rhyodacite in a siliceous matrix, and a weathered crust of limonite from the oxidation of pyrite within the breccia. The dump is evenly covered in a layer of fine clay, with a light grey or faint blue color, possibly indicating the condition of altered rock at the end of the adit (all from Geologic Systems Ltd., 2015). More recent exploration began in the 1970s, when Duval Corporation drilled five holes and conducted induced polarization geophysical surveys. This work was later followed by Pegasus Gold Corporation, who drilled 22 reverse circulation holes by 1992. Based on data compiled by Lucky Minerals, a total of 14,255 feet of drilling was completed with these 27 holes (Geologic Systems Ltd., 2015).

3.3.3 DIRECT AND SECONDARY IMPACTS

3.3.3.1 No Action Alternative

Under the No Action Alternative, Lucky Minerals would not obtain an exploration license and therefore, could not conduct the exploration activities described in its exploration license application. However, the company would still be allowed to stake claims, map the local geology, and collect surface samples.

The geologic materials left on the surface due to erosion or from historical operations may be reactive and mobilize metals under acidic or near-neutral pH conditions, depending on the minerals present. However, even though weathering occurs on the surface of these materials, there is no evidence of continual water discharge from these materials or associated impacts to surface water. In contrast, it appears that groundwater quality is affected by the mineralized rocks that remain in the subsurface, particularly in the area to the north of the East Fork of Emigrant Creek (Section 3.7). The natural acid rock drainage that occurs within that slope contributes acidity and metals to the local groundwater and eventually to the stream below. Ferricrete deposits have formed in some places in the channel of the East Fork of Emigrant Creek as a result of this acidic drainage. The reactivity of that slope is likely associated with the locally-intense pyrite alteration noted through historical mining (Hargrave et al., 2000).
Figure 3.1
Surface Geology
St. Julian Exploration Project, Park County, Montana

Modified from: Berg, Lonn, and Locke, 1999

Proposed Exploration Area
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Other groundwater data from the area indicate that this acidic chemical signature is certainly not reflective of all subsurface materials in the East Fork of Emigrant Creek drainage (Section 3.7).

Under the No Action Alternative, no drill pads would be constructed on the road network that currently accesses the St. Julian Claim Block. Therefore, no road grading would be conducted and the roads would exist in their current condition. No drilling would occur under the No Action Alternative, so no drill cuttings would be generated and mud sumps would not be excavated to contain the cuttings, nor would the sumps need to be reclaimed. Any naturally exposed sulfides along talus slopes or waste rock material generated by historical mining and milling would remain exposed at the surface and continue to weather under current conditions. In some areas, groundwater resources would continue to be impacted by local acid rock drainage resulting from subsurface mineralization.

### 3.3.3.2 Proposed Action

Under the Proposed Action, Lucky Minerals would explore the St. Julian Claim Block for the extent of copper, gold, silver, and molybdenum mineralization within the previously described volcanics. This work would involve drilling and recovering core samples that would later be analyzed and used to model subsurface geology, reveal any structural features, and further define the extent of mineralization.

The Proposed Action does not include any new road construction, but the access roads and the existing road network on the privately patented claims would be improved through grading in localized areas, in order to keep them serviceable for the type of vehicles described in the proposed action. All roads would be cleared of loose rock and other debris, but they would not be made wider. The impacts to geology and minerals from over-road transportation and limited grading of existing roads would be consistent with the current condition of those surfaces, and are considered minimal. The geologic materials that could be exposed by surface grading through the Proposed Action are the same materials that were disturbed by the initial construction of the roads, most of which have been in existence for over a century.

There are 23 pad locations proposed and there may be up to two holes drilled at each pad. The drill holes would be either vertical or angled holes that could extend 1,000 to 2,000 feet from the ground surface, depending on the observed geologic trends and the most effective approach to investigate the subsurface at each site. The disturbance at each drill pad would be minimized by conducting drilling operations in the prism of the existing road, within an area approximately 50 feet long by 20 feet wide (1,000 ft²). The potential impacts to geology and minerals from pad surface preparation are minimal and identical to the impacts from localized road grading and maintenance.

The core that is extracted from the drill holes would have a diameter less than or equal to 3.5 inches and would be transferred into designated boxes for logging and analysis at a later time. The core samples would be transported away from the site and therefore would not have any potential to impact the area. Even with target depths exceeding 1,000 feet, the amount of rock removed from each drill hole (around 100 cubic feet) would be very small compared to the
volume of the intrusive host rocks (scale of cubic miles). This would be a negligible depletion of the geologic resources in the area.

Each drill pad would have a mud sump constructed near the drill machines for the disposal of dry to damp drill cuttings, and the sump will have an approximate volume of 18 cubic feet or less. Prior to excavating the sump, all suitable subsoil, soil, and organic debris would be salvaged and either stockpiled or used for immediate reclamation. The drill cuttings would be the only solid waste generated from drilling, and would consist of ground rock, with a mixed composition that is representative of the lithology encountered within the drill hole. Following standard drilling practices, the drill fluid would be recirculated at the surface and the cuttings would be separated using cyclone technology, so no fluids would be stored in the sumps.

Upon completion, there would be an effort made to pump the drill cuttings down the drill hole, although it may not always be possible due to blockages within the hole or the rheology of the cuttings. The cuttings that remain in the sumps could be covered and compacted by a dozer and contoured to match the previous site conditions, placed in underground adits within the St. Julian Claim Block, or taken to an approved waste disposal site (Dykes, 2016d). On-site compaction and burial would include the reapplication of subsoil, topped with soil, organic material, woody debris, and slash. The drill holes would be filled with a bentonite-cement mixture designed to effectively seal and stabilize down-hole conditions, and the surface of the drill hole would be sealed with 5 to 10 feet of cement. These practices are consistent with State requirements for exploration reclamation (ARM 17.24.107) and are designed to limit the reactivity and mobility of minerals within the buried cuttings and sealed borehole walls as well as to prevent cross contamination of aquifers.

### 3.3.3.3 Agency-Modified Alternative

The Agency-Modified Alternative would be the same as Proposed Action.

### 3.3.4 Secondary Impacts

Based on the MEPA model rules definition, secondary impacts are further impacts to the human environment that may be stimulated or induced by, or otherwise result from a direct impact of the action. No secondary impacts to geology and mineral resources are predicted.

### 3.4 WILDLIFE

#### 3.4.1 INTRODUCTION

This section analyzes the potential impacts of the proposed Lucky Minerals exploration project (Project) on Federal and State listed terrestrial wildlife and Gallatin National Forest Plan Management Indicator Species (MIS) occurring or with the potential to occur within the St. Julian Mine patented claims in Park County, Montana.

#### 3.4.1.1 Key Issues

The analysis of impacts on terrestrial wildlife was framed around concerns identified during scoping, and considers the effect of the alternatives on these factors. These factors include:
• Exploration activities proposed by Lucky Minerals may affect populations of and habitat for area wildlife, including Federal or State listed species.

• The entire proposed project boundary is within occupied grizzly bear habitat, wolverine habitat, and Canada lynx designated critical habitat. Further, exploratory drilling on the St. Julian Claim Block is close to the current Primary Conservation Area (PCA) boundary for grizzly bear.

• The proposed project may fragment or degrade habitat, resulting in the interruption of normal daily routines, declines in breeding success, and physiological stress responses that can lead to behavioral changes, and even direct mortality.

• The increased human presence, traffic / machinery / drilling, and associated noise of the proposed project may change the way wildlife use the area. Adverse effects may include disruption of migratory corridors and big game security areas.

3.4.1.2 Regulatory Framework

Although a variety of sources are used to assess wildlife species and habitat, including historic records, current databases, large-scale assessments, scientific studies, and management recommendations, the regulatory framework providing direction for the protection and management of wildlife and habitat comes from the following principal sources:

• Endangered Species Act of 1973 (ESA)
• Migratory Bird Treaty Act (MBTA)
• The Bald and Golden Eagle Protection Act (BGEPA)
• National Forest Management Act of 1976
• Gallatin National Forest Plan as Amended, 2015 (GNFP)
• Migratory Bird Executive Order
• Conservation Agreements and Strategies

The U.S. Fish and Wildlife Service (USFWS) typically becomes involved in a project when a federal action is being evaluated under the National Environmental Policy Act (NEPA). There is no federal action invoking NEPA for the Lucky Minerals exploration project. However, the USFWS may still play a role as administrators of the following wildlife laws:

Endangered Species Act

Section 9 of the ESA of 1973 (16 U.S.C. 1531-1544) prohibits individual private parties and Federal agencies, from "taking" endangered or threatened wildlife or plants. "Take" includes "harming" a listed species and "harm" is defined by USFWS to include habitat alteration. Any party engaging in an activity that might incidentally harm a listed species may apply for an “incidental take permit” from the USFWS. Parties may also apply for “enhancement of survival” permits. These are agreements to encourage landowners to take actions to benefit species while providing assurances they would not be subject to additional regulatory restrictions.
**Migratory Bird Treaty Act**

The MBTA (16 U.S.C. 703-712) declares that it is unlawful to take, kill, or possess migratory birds. The Secretary of the Interior through the USFWS is authorized to determine when, to what extent, and by what means, it is compatible with the terms of the conventions to allow taking or killing of migratory birds. For projects such as exploratory drilling, USFWS would make a determination based on the good faith effort of the project operator to minimize and avoid such take.

**Bald and Golden Eagle Protection Act**

The BGEPA (16 U.S.C. 668-668d, 54 Stat. 250) as amended, provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds. This act is enforced by the Secretary of the Interior via the USFWS. In determining the amount of the penalty, the gravity of the violation, and the demonstrated good faith of the person charged shall be considered by the Secretary.

### 3.4.2 ANALYSIS AREA AND METHODS

The analysis area for direct and secondary impacts on wildlife is defined as the St. Julian Claim Block boundary, and the road corridor along Emigrant Creek. The cumulative impacts area is the broader project region and is defined as the general geographic area up to a four-mile radius of the St. Julian Claim Block and adjacent private land. The analysis was completed using existing data. No field surveys were completed in support of this EA. The temporal analysis of each alternative would be included as part of the cumulative impacts discussion, as the response of species and populations after a disturbance event is species-specific and could depend on the disturbance type and its impacts to the microsite, and the tolerance of the species to disturbance.

#### 3.4.2.1 Species Considered

Although the proposed drilling is proposed on private, patented claims, equipment and personnel would travel through CGNF-managed land. As a result, federally listed threatened and endangered, state sensitive, and Gallatin Forest National Plan MIS species were considered in the analysis, as well as game species such as mule deer and moose. Current MIS species identified in the Gallatin National Forest Plan include grizzly bear, bald eagle, elk, northern goshawk, and pine marten.

#### 3.4.2.2 Probability of Occurrence

Searches of the Montana Natural Heritage Program (MNHP) species occurrence database, and current Forest Service sensitive and MIS species lists reveal a broader assemblage of species than are likely to occur on or near the project. The probability of a species occurring within the St. Julian Claim Block is based on records of species sightings, presence of suitable habitat, and the potential of the area under consideration to provide suitable habitat in the future. Following is an explanation of the categories for probability of occurrence:
No probability of occurrence – No suitable habitat occurs in the area, and/or the area is outside the known range of the species, and there are no recorded observations in or near the area.

Low probability of occurrence – Marginally suitable habitat is limited, isolated, and there are no recorded observations of the species in or near the area.

Moderate probability of occurrence – Suitable habitat exists in the area and it is within the known range of the species, but there are no confirmed observations in or near the resource area.

High probability of occurrence – Suitable habitat is present in the area and/or there have been confirmed observations of the species using similar habitat in or near the resource area.

3.4.3 AFFECTED ENVIRONMENT

3.4.3.1 Existing Environment

The St. Julian Claim Block is located within the Northern Rocky Mountain physiographic province (McNab and Avers, 1994). The St. Julian Mine claims are approximately 7.2 miles from the Yellowstone River. Emigrant Creek, a tributary to the Yellowstone River, parallels Emigrant Gulch Road from Old Chico to the northern edge of the property (See Figure 1.3). Elevations in the St. Julian Claim Block range from 4,960 feet at the intersection of Chico Cemetery Road and East River Road, to approximately 9,069 feet above mean sea level at the end of the developed road on the St. Julian Mine claims. Lower elevations are primarily used for private home sites, cattle grazing, and hay production. Upon entering Emigrant Gulch, the landscape transitions to a narrow v-shaped glacial valley with steep side slopes and rocky outcrops. The slope terrain is rugged, with stands of tree cover interspersed amid broad expanses of exposed scree. The St. Julian Mine claim property is situated on a densely forested north-facing slope. Surrounding the property are treeless, rocky alpine ridgelines, and cirques with short, broad valleys.

Primary habitats in the St. Julian Claim Block are comprised of montane sagebrush steppe, lower montane-foothill riparian woodlands, mixed conifer forests, and subalpine woodland and parklands. Based on these habitat types, the site is expected to provide habitat primarily for species associated with riparian habitats along Emigrant Creek and tributary watercourses; lodgepole, spruce, and fir dominated forests; and subalpine to alpine exposures. The following is a brief discussion of the habitat components analyzed for sensitive species.

3.4.3.2 Habitats

Montane Sagebrush Steppe

This system dominates the montane and subalpine landscape of southwestern Montana from valley bottoms to subalpine ridges. The sagebrush steppe on the flanks of the Yellowstone River valley is generally dominated by mountain big sagebrush. Other co-dominant shrubs include silver sagebrush, subalpine big sagebrush, three-tip sagebrush and antelope bitterbrush. Because of the mesic site conditions, most occurrences of this system support a diverse
herbaceous undergrowth of grasses and forbs. Shrub canopy cover is extremely variable, ranging from 10 percent to as high as 40 or 50 percent (MNHP, 2016a). Other shrubs may be present, but usually at low cover values (5–10%). Species include rabbitbrush, wax currant, Woods rose, deerbrush ceanothus, snowberry, and serviceberry. The herbaceous layer is usually well represented. Graminoids can be abundant, and are dominated by fescues and wheatgrasses. Forb diversity is moderate to high. Species may include arrowleaf balsamroot, Indian paintbrush, cinquefoil, fleabane, phlox, milkvetch, prairie smoke, lupine, buckwheat, yarrow, rosy pussytoes, wild strawberry, western sagewort, and prickly pear cactus (MNHP, 2016a). Federal and state-listed wildlife species associated with this habitat type in the project region include grizzly bear, little brown myotis, hoary bat, Townsend's big-eared bat, golden eagle, peregrine falcon, green-tailed towhee, and western toad. Elk are also common.

**Lower Montane-Foothills Riparian Woodlands**

This ecological system is found throughout the Rocky Mountains, characteristically occurring as a mosaic of multiple communities that are tree-dominated with a diverse shrub component. Riparian systems are dependent on a natural hydrologic regime. Within the project region they are found within the flood zone, cobble bars, and immediate streambanks along Emigrant Creek and its tributaries, and near seeps and springs. Dominant trees may include cottonwood, Douglas-fir, and willow. Dominant shrubs include Rocky Mountain maple, thinline alder, river birch, red-osier dogwood, hawthorn, chokecherry, skunkbush, willows, silver buffaloberry, rose, and snowberry. The herbaceous understory usually includes colonizing native forbs such as yarrow, goldenrod, American licorice, and Canada horseweed (MNHP, 2016b). In general, some stands may have a small component of native graminoid species like reedgrasses or wheatgrasses. Exotic grasses such as redtop, Canada bluegrass, Kentucky bluegrass, common timothy, and reed canarygrass can dominate the graminoid layer if this system adjoins cultivated areas or disturbed upland communities (MNHP, 2016b). Federally and state-listed wildlife species associated with this habitat type in the project region include: grizzly bear, little brown myotis, hoary bat, Townsend's big-eared bat, bald eagle, great gray owl, pinyon jay, veery, evening grosbeak, Clark's nutcracker, green-tailed towhee, and western toad. Elk are also common. Wolverines are occasionally associated with this habitat.

**Mature Conifer Forests**

Many wildlife species occurring in the project region prefer or occur only in mature and old forests. In forest habitats, snags (dead trees), broken-topped live trees, downed logs, and other woody material are required by a wide variety of species for nesting, denning, roosting, perching, feeding, and cover (Bull et al., 1997). Small mammals and birds use standing and downed dead material for food storage and for hunting. Downed logs and stumps are important for travel, both under the snow in the winter and as cover throughout the year. It is estimated that about one-third of the bird and one-third of the mammal species that live in the forests of the Rocky Mountains use snags for nesting or denning, foraging, roosting, cover, communication, or perching. As down woody material further decays, it plays an important role in nutrient cycling, soil fertility, and erosion control. Although various sizes of snags and down wood are used, larger birds and mammals require larger-diameter downed trees, which provide stable and lasting structures and offer protection from weather extremes (Bull, 2002). Longer down woody pieces provide superior runways, shelter, and under-snow access.
Mixed conifer forests in the project region are often dominated by Douglas-fir forests with lodgepole pine frequent in stands at higher elevations. Engelmann spruce is found in some stands within the upper montane zone (MNHP, 2016c, d). While whitebark pine is found in mixed conifer forests at higher elevations, the understory of mixed conifer forests often supports diverse stands of ericaceous shrubs, such as rusty leaf menziesia, dwarf huckleberry, mountain huckleberry, and mountain heath. Other common shrubs include juniper, Rocky Mountain maple, serviceberry, Utah honeysuckle, ninebark, currant, thimbleberry, birch leaf spiraea, creeping Oregon grape, and common snowberry. Common graminoids may include pinegrass, Ross’s sedge, bluebunch wheatgrass and Idaho fescue. Forb diversity varies depending on moisture conditions, and may include baneberry, arnica, pussytoes, wild strawberry, fragrant bedstraw, twinflower, clasp-leaf twisted stalk, and western meadow rue (MNHP, 2016c, d). Federal and state-listed wildlife species associated with this habitat type in the project region include grizzly bear, Canada lynx, wolverine, pine marten, little brown myotis, hoary bat, Townsend’s big-eared bat, bald eagle, northern goshawk, great gray owl, brown creeper, Cassin’s finch, evening grosbeak, Clark’s nutcracker, green-tailed towhee, varied thrush, and western toad. Elk are also common. Veeries are occasionally associated with this habitat.

**Subalpine and Alpine Woodlands**

This system includes all subalpine and tree-line forest associations of Montana’s Rocky Mountains. Found at elevations above 8,800 feet, it is characteristically a high-elevation mosaic of stunted tree clumps, open woodlands, and herb- or dwarf-shrub-dominated openings, occurring above closed forest ecosystems and below alpine communities. The climate is typically cold in winter and dry in summer. Landforms associated with this system in the project region include ridgetops, mountain slopes, glacial trough walls and moraines, talus slopes, landslides and rockslides, and cirque headwalls and basins. Characteristic of the habitat are open areas with stands of whitebark pine, subalpine fir, and Engelmann spruce. The understories of subalpine and alpine systems tend to be sparse; moister sites support mats of ericaceous plants, such as tall huckleberry, dwarf bilberry, or most often, grouse whortleberry, while alpine currant, short-fruited willow, planeleaf willow, mountain heath and mountain heather may also be present (MNHP, 2016e). The herbaceous layer is sparse under dense shrub or tree canopies, but may be dense where the shrub canopy is open or absent. Common graminoids include purple mountain hairgrass, Hitchcock’s woodrush, alpine bluegrass, Sandberg’s bluegrass, alpine timothy, pinegrass, Parry’s rush, and sedges. A wide diversity of forbs is present in open meadows among or adjacent to these forests, and typically include arnica, subalpine wandering daisy, arrowleaf groundsel, aster, sibbaldia, glacier lily, western windflower, and penstemon (MNHP, 2016e). Federal and state-listed wildlife species associated with this habitat type in the project region include grizzly bear, wolverine, pine marten, little brown myotis, hoary bat, golden eagle, peregrine falcon, Cassin’s finch, evening grosbeak, Clark’s nutcracker, varied thrush, and western toad. Elk are also common. Canada lynx,
Townsend’s big-eared bat, northern goshawk, great gray owl, brown creeper, and black rosy-finch are occasionally associated with this habitat.

3.4.3.3 Wildlife

The St. Julian Claim Block has habitat suitable for marten, bobcat, black bear, mountain lion, and grizzly bear populations. Based on observation and radio-tracking data, wolverines have also been documented in the vicinity and have potential to use this area. Although lynx and fisher have not been observed in the St. Julian Claim Block, there is a potential for them to exist. The St. Julian Claim Block habitat provides cover for an abundant prey base including snowshoe hares, jackrabbits, red squirrels, and small mammals for many forest carnivores. Although the St. Julian Claim Block is generally within reach of nearby wolf packs and dispersing wolves, there has not been a documented pack overlapping with this specific area for over five years. While wolves tend to use more moderately sloped terrain, and likely would not select such a steep area, there is a wolf pack that has been documented to use territory within three straight-line miles of the claim. The St. Julian Claim Block and road corridor along Emigrant Creek provides habitat for mule deer and moose in addition to elk discussed under Management Indicator Species below.

The valley bottom, riparian, and forested habitat types, as well as associated edge habitat, collectively provide valuable habitat for a variety of game and nongame birds. Additional species guilds are found within the rocky cliffs and associated high alpine habitat of the proposed area. Overall these collective habitat types provide important nesting, feeding, and/or protective cover for migratory birds, game birds, and a diversity of non-game birds, including owls and a large number of raptors such as red-tailed hawk, Swainson’s hawk, ferruginous hawk, foraging peregrine falcons, and wintering rough-legged hawks. These areas support and are of great value for foraging, migrant, and nesting bald eagles and golden eagles. The mosaic structure of the mixed conifer vegetation provides nesting habitat for northern goshawks, sharp-shinned hawks, and Cooper’s hawks. Golden eagles, bald eagles and peregrine falcons have been documented nesting near to the St. Julian Claim Block (MNHP, 2016 data, as cited in FWP, 2016), however MNHP has no records of peregrine falcon eyries within five miles of the St. Julian Claim Block (MNHP 2017).

THREATENED AND ENDANGERED WILDLIFE SPECIES

The ESA was passed to protect threatened and endangered species, and their habitats. Under the ESA, endangered species are defined as species that are likely to become extinct throughout all or a large portion of their range. Threatened species include species that are likely to become

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1 Montana Fish, Wildlife and Parks noted the St. Julian Claim Block also contains potential habitat for fisher (Gower, pers. comm 2016). However, they have not been documented in the area and have a low probability of occurrence. As a result, they are not considered in this analysis.
endangered in the near future. Critical habitat is habitat that is determined to be vital to the survival of endangered or threatened species. A search of the MNHP database revealed three federally listed wildlife species with a moderate to high probability occurrence in the project region.

Table 3.1

<table>
<thead>
<tr>
<th>Species</th>
<th>USFWS</th>
<th>CGNF</th>
<th>Probability of Occurrence on St. Julian Claim Block</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bald eagle</td>
<td>BGEPA, MBTA, BCC*</td>
<td>Sensitive</td>
<td>High</td>
<td>Federally delisted on June 28, 2007. USFWS monitoring for 5-year intervals after delisting.</td>
</tr>
<tr>
<td>Canada lynx</td>
<td>Threatened</td>
<td>Threatened</td>
<td>High</td>
<td>USFWS revised critical habitat for the contiguous United States distinct population segment of Canada lynx, and revised the boundary of the distinct population segment (USFWS 2014).</td>
</tr>
<tr>
<td>Grizzly bear</td>
<td>Threatened</td>
<td>Threatened</td>
<td>High</td>
<td>USFWS proposed the removal of the Greater Yellowstone Ecosystem population of grizzly bears from the federal list of endangered and threatened wildlife (USFWS 2016).</td>
</tr>
</tbody>
</table>

*BCC: Bird of Conservation Concern

**Bald Eagle**

The bald eagle is primarily a species of riparian and lacustrine habitats, frequenting large lakes, reservoirs, and major rivers. Wetlands, rivers, spring spawning streams, ungulate winter ranges and open water areas are important year-round habitat (Bureau of Land Management [BLM], 1986). Wintering habitat may extend from the riparian corridor to upland sites. Nesting sites are generally located within larger forested areas near large lakes and rivers where nests are usually built in older, large-diameter trees. Nesting site selection is dependent upon maximum local food availability and minimum disturbance from human activity (Montana Bald Eagle Working Group, 1994).

The bald eagle was delisted by the USFWS in 2007, but is still protected under the Migratory Bird Treaty Act of 1918 and the Bald and Golden Eagle Protection Act of 1940. The USFWS (2007) has developed management recommendations for active nests. The Montana Bald Eagle Working Group also developed management guidelines, which are followed by state agencies (MBEWG, 1994).

Bald eagles generally nest in mature or old-growth trees, snags, cliffs, and rock promontories near coastlines, rivers, and large lakes where there is an adequate food supply. In forested areas, bald eagles often select the tallest trees with limbs strong enough to support a nest that can weigh more than 1,000 pounds. Nest sites typically include at least one perch with a clear view of the water, where eagles forage. Bald eagles occur in the project region year-round.

**Canada Lynx**

Canada lynx are secretive forest carnivores found in the boreal forests of northern latitudes and high mountains. In the northern Rocky Mountains, the majority of lynx occurrences are
associated with conifer forests above 4,101 feet (USFWS, 2014). The dominant vegetation types
that constitute lynx habitat include dry-mesic subalpine fir-Engelmann spruce forest and
woodland, and lodgepole pine forests. Lynx habitat in Montana occurs primarily in the high-
elevation mountains associated with conifer forests, from 4,260 to 6,900 feet elevation. Lynx
habitat in Montana is primarily the moist subalpine fir vegetation type, which is found above
the dry ponderosa pine and Douglas-fir vegetation types, and below the alpine zone, a habitat
that occurs in the St. Julian Claim Block and surrounding region. Dominant species include
mature Engelmann spruce and subalpine fir trees with lesser components of lodgepole pine,
Douglas-fir, and western larch (Interagency Lynx Biology Team, 2013). Lynx habitat in the
western U.S. is a mosaic of structurally different forest types occurring at opposite ends of the
stand age gradient. Lynx require early successional forests that contain high numbers of prey
(especially snowshoe hares) for foraging, and late-successional forests that contain cover for
denning and rearing kittens (Koehler and Brittell, 1990, as cited in Koehler and Aubry, 1994).

Intermediate successional stages may serve as travel cover for lynx but function primarily to
provide connectivity within a forest landscape. While such habitats are not required by lynx,
these intermediate stages "fill in the gaps" between foraging and denning habitat. The common
component of natal den sites appears to be large woody debris, either downed logs or root
wads (Koehler, 1990). Den sites may be located in older forests, mature forests, or any
regenerating stand with large amounts of debris.

As a mid-size carnivore, lynx target smaller prey species that reproduce relatively quickly.
Landscapes with high snowshoe hare densities are optimal for lynx survival, reproduction, and
population persistence. While they primarily feed upon snowshoe hare, which live in dense
thickets of young trees and shrubs, other important alternate prey species include tree squirrels,
voles, and mice (Koehler and Aubry, 1994). In Montana, the highest densities of snowshoe hares
were found in regenerating forest stands with high sapling density and in uncut, mature multi-
story stands with abundant saplings (Interagency Lynx Biology Team, 2013). Lynx often travel
long distances during hunts, depending on availability of prey. Documented home ranges of
lynx can vary from three to 300 square miles, depending on the animal’s gender, abundance of
prey, the season, and the density of populations (Slough and Mowat, 1996; Poole, 2003).

In 2014, the USFWS designated critical habitat for Canada lynx including portions of the CGNF.
The Emigrant Gulch Road corridor and St. Julian Claim Block lie within the bounds of
designated lynx critical habitat (Figure 3.2). While lynx may be present along the road corridor
in Emigrant Gulch, and in the project area, there has been no documented observance on the St.
Julian Claim Block. There is anecdotal evidence documenting the presence of a resident female
in the Mill Creek drainage between 2003 and 2009, approximately five miles northeast of the St.
Julian Claim Block. Given their large territory, and the project’s proximity to designated
wilderness and inventoried roadless areas contiguous with the Mill Creek drainage, it is
probable lynx are present in the St. Julian Claim Block.

Grizzly Bear

Grizzly bears, a threatened species under the ESA (USFWS, 1975), use a wide variety of habitats,
depending on season, local population, and individuals. Home ranges are variable in size
(seven to 1,245 square miles) depending on food availability and distribution. A seasonal
elevation gradient is often used including low elevation riparian areas, snow chutes, and meadows in spring and fall; and higher elevation habitats such as subalpine forests, alpine tundra, and boulder fields in summer, early fall and winter (Natural Resources Conservation Service, 2011). Typical habitats used for feeding, foraging, and resting include mixed shrub fields, seeps, grasslands, mixed conifer woodland and parkland, and old burns. Dense-timbered habitats are often used for denning and daytime bed sites. In summary, moist open-land habitats in combination with timbered areas are essential for optimum grizzly bear habitat.

On March 11, 2016, the USFWS proposed removing the Greater Yellowstone Ecosystem (GYE) population of grizzly bears from the federal list of endangered and threatened wildlife. The proposed rule change reflects the best available scientific and commercial data, indicating the GYE population of grizzly bears has recovered and no longer meets the definition of an endangered or threatened species under the ESA (USFWS, 2016). In June of 2017, the Department of Interior announced removal of the Yellowstone grizzly bear from Endangered Species Status protection, giving Wyoming, Montana and Idaho the responsibility for managing its future.

Grizzly bears are opportunistic and adaptable omnivores, adapted to woodlands, forests, alpine meadows, and prairies. In many habitats they prefer riparian areas along rivers and streams. The St. Julian Claim Block lies within fully occupied grizzly bear habitat. While not included in the designated grizzly bear Primary Conservation Area (PCA) for the GYE population, the St. Julian Claim Block is approximately one mile to the east (See Figure 3.3) and is within the grizzly bear Demographic Monitoring Area (DMA). Outside of the PCA in the DMA the management objective is to maintain existing resource management and recreational uses, to allow agencies to respond to demonstrated problems with appropriate management actions, and to provide for bears to use lands that are not managed solely for bears but in which their needs are considered along with other uses. (2016 Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Ecosystem). Figure 3.4 illustrates the species use of the landscape surrounding the St. Julian Claim Block. The figure depicts recent survey data (2009 -2015) and delineates where grizzly were recorded via GPS, telemetry flights, or through reported human-bear conflicts, capture, or mortality. Included in Figure 3.4 is an overlay of whitebark pine distribution, an important food source for the species.
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Figure 3.2

LEGEND
- Lucky Minerals Exploration
- Lynx Critical Habitat

St. Julian Exploration Project
Critical Lynx Habitat

Figure 3.2
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Figure 3.3

St. Julian Exploration Project
Grizzly Bear Habitat

LEGEND
- Lucky Minerals Exploration
- Grizzly Suitable Habitat
- Grizzly Bear PCA
- Grizzly Distribution 2000-2014

0 10 miles
0 16 kilometers
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Figure 3.4
St. Julian Exploration Project, Park County, Montana
Courtesy of FWP
STATE SENSITIVE SPECIES (SPECIES OF CONCERN)

State-listed sensitive wildlife species are those species that may show evidence of a current or predicted downward trend in population numbers or in habitat suitability that could substantially reduce species distribution. The MNHP employs a standardized ranking system to denote a species status. Based on the relative degree of risk to an individual species’ viability, species are assigned numeric ranks ranging from 1 (highest risk, greatest concern) to 5 (demonstrably secure, least concern). Species of concern with low or no probability of occurring in the St. Julian Claim Block are not addressed in this EA. Species known to occur, or those with a moderate to high probability of occurrence, are listed in Table 3.2 below and are addressed in detail.

<table>
<thead>
<tr>
<th>Species of Concern</th>
<th>State Ranking</th>
<th>Forest Service Sensitive</th>
<th>Probability of Occurrence on St. Julian Claim Block</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BIRDS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern goshawk</td>
<td>S3</td>
<td>Sensitive (MIS)</td>
<td>High</td>
</tr>
<tr>
<td>Golden eagle</td>
<td>S3</td>
<td></td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Veery</td>
<td>S3B</td>
<td></td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Brown creeper</td>
<td>S3</td>
<td></td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Evening grosbeak</td>
<td>S3</td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Peregrine falcon</td>
<td>S3</td>
<td>Sensitive</td>
<td>Moderate</td>
</tr>
<tr>
<td>Pinyon jay</td>
<td>S3</td>
<td></td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Cassin’s finch</td>
<td>S3</td>
<td></td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Bald eagle</td>
<td>S4</td>
<td>Sensitive</td>
<td>High</td>
</tr>
<tr>
<td>Varied thrush</td>
<td>S3B</td>
<td></td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Black rosy-finches</td>
<td>S2</td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Clark’s nutcracker</td>
<td>S3</td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Green-tailed towhee</td>
<td>S3B</td>
<td></td>
<td>Moderate to High</td>
</tr>
<tr>
<td>Great gray owl</td>
<td>S3</td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Pacific wren</td>
<td>S3</td>
<td></td>
<td>Moderate to High</td>
</tr>
<tr>
<td><strong>MAMMALS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Townsend’s big-eared bat</td>
<td>S3</td>
<td>Sensitive</td>
<td>High</td>
</tr>
<tr>
<td>Wolverine</td>
<td>S3</td>
<td>Sensitive</td>
<td>High</td>
</tr>
<tr>
<td>Fisher</td>
<td>S3</td>
<td>Sensitive</td>
<td>Low</td>
</tr>
<tr>
<td>Hoary bat</td>
<td>S3</td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Canada lynx</td>
<td>S3</td>
<td>Threatened</td>
<td>High</td>
</tr>
<tr>
<td>Little brown myotis</td>
<td>S2</td>
<td>Sensitive</td>
<td>High</td>
</tr>
<tr>
<td>Grizzly bear</td>
<td>S2S3</td>
<td>Threatened</td>
<td>High</td>
</tr>
<tr>
<td><strong>AMPHIBIANS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western toad</td>
<td>S2</td>
<td>Sensitive</td>
<td>High</td>
</tr>
</tbody>
</table>

**Table 3.2**
State-listed Species of Concern

- **S1** At high risk because of extremely limited and/or rapidly declining population numbers, range and/or habitat, making it highly vulnerable to global extinction or extirpation in the State.
- **S2** At risk because of very limited and/or potentially declining population numbers, range and/or habitat, making it vulnerable to global extinction or extirpation in the state.
- **S3** Potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas.
- **S4** Apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining.
- **B** Breeding - Rank refers to the breeding population of the species in Montana. Appended to the state rank, e.g., S2B,55N = At risk during breeding season, but common in the winter.
- **MIS** Forest Service Management Indicator Species
BIRDS

Migratory birds participate in a regular, seasonal movement, often north and south along a flyway, between breeding and wintering grounds. Many species migrate north of Mexico to breed and nest, and then return to Mexico, Central America, or South America to spend the winter. Resident songbirds may only migrate between lower and higher elevations, depending on the season, remaining in the State year round. Within Park County, there are 25 migratory or resident bird species the State has designated as species of concern. These birds are impacted in a variety of ways, including loss of habitat due to agriculture, logging, natural and prescribed fires, and urbanization. Fifteen of the 25 listed bird species have a moderate to high probability of occurrence within the Emigrant Gulch road corridor and St. Julian Claim Block. Changes in habitats that may favor less desirable species or that may lead to fewer of the more desirable species are discussed in a qualitative manner. It must be noted that there are many species of migratory birds for which there are few population or habitat data available, and changes that may benefit one species may, at the same time, have undesirable effects on other species.

Bird species of special concern with the potential to occur in the St. Julian Claim Block utilize a variety of nesting habitats. For example, green-tailed towhee, veery, and varied thrush are most likely to nest at lower elevations along the ecotone of mixed-species shrub communities such as chokecherry, snowberry, serviceberry, and mountain mahogany, as well as the riparian corridor along Emigrant Creek and its tributaries. Pinyon jays would most likely nest in lower elevation ponderosa pine woodlands. Evening grosbeak, brown creeper, Cassin’s finch, Pacific wren, great gray owls, and Clark’s nutcracker prefer nest sites in the higher elevation mixed conifer forest habitats found in the St. Julian Claim Block. Black rosy-finches are known to nest in crevices in cliffs and talus, while golden eagles and peregrine falcons are cliff nesters. These species would most likely nest along the rocky outcrops along Emigrant Gulch.

Although peregrine falcons are year-round residents in Montana, they do not appear to overwinter in southern Park County, and there are no known eyries within five miles of the St. Julian Claim Block (MNHP 2017; Gower pers. comm., Sumner pers. comm.). Ideal nesting locations would include undisturbed areas with a wide view, near water, and close to plentiful prey. Golden eagles are year-round residents in Montana. MNHP reports numerous observations of overwintering, nesting, and transient use of Park County, inclusive of the St. Julian Claim Block (MNHP, 2016f). In addition to cliff sites, golden eagles may also nest in mature conifers. Two golden eagle nest sites have been documented near the St. Julian Claim Block in the headwaters of Passage and Arrastra creeks, in the Mill Creek drainage (Gower, pers. comm.). The Passage Creek nest, active in 2010 is approximately 7.2 miles from the St. Julian Mine property. The Arrastra Creek nest, documented in 2005, is located approximately 3.2 miles southeast of the St. Julian Claim Block.

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2 Nest location records from the MNHP database erroneously noted the Arrastra Creek nest was near Dillon, MT. However, the recorded location in T7S, R10E, S30 is actually in the Mill Creek Drainage in Park County, MT.
MAMMALS

Bats

Nocturnal activity is a major feature of the behavioral pattern of bats with nearly all species resting in dark conditions during the day, and emerging to forage at night. Bats choose a variety of roosts, with each species favoring a particular kind of roost. Outside of the human environment (building crevices, culverts, etc.), many species, such as Townsend’s big-eared bat and little brown myotis, prefer isolated or secure roosts such as caves, crevices in cliff faces, the interstices of boulder heaps, tree hollows, or animal burrows. Species such as the hoary bat roost externally on tree trunks or in the branches of trees, under palm-shaped leaves, in unopened tubular leaves, or on the surface of rocks. Bats forage along forest edges, over riparian areas, along forest roads and trails, and in natural forest gaps or harvest-created openings (Taylor, 2006). Feeding strategies vary greatly among forest-dwelling species, with some foraging around ground-level shrubs, while others prefer to forage under, within, or above the tree canopy (Taylor, 2006).

Townsend’s big-eared bats and little brown myotis bats are year-round residents in Montana. Female Townsend’s big-eared bats form maternity colonies of 20 to 180 individuals during the spring and summer, while both sexes congregate at cooler caverns (called swarming sites) in late summer and early fall (MNHP, 2016g). Townsend's big-eared bat feeds on various nocturnal flying insects near the foliage of trees and shrubs, but appears to specialize on small moths, lacewings, beetles, true flies, and wasps (MNHP, 2016g). Little brown myotis nursery colonies feed over water, while non-reproductive little brown myotis hunt in a wide variety of habitats, including stream and forest borders, cliff faces, meadows, and forests, with favored prey including midges, mayflies, mosquitoes, and caddis flies (Taylor, 2006).

The hoary bat is migratory and only a summer resident in Montana, with records from early June through September. They occur in a broad elevation range in Montana (1,900 to 9,100 feet), though they are probably most common throughout summer at lower elevations (MNHP, 2016h). Hoary bats hunt relatively large insects, mostly moths, in open areas in meadows and parklands, over streams, or above stands of trees at canopy level; they are highly territorial and will return to established feeding sites night after night (Taylor, 2006). The St. Julian Claim Block contains habitat elements preferred by each of the State listed bat species, such as roosting, foraging, and resting areas. Caves are present within the project region that could serve as overwintering hibernacula for little brown myotis and Townsend’s big-eared bats.

Wolverine

Wolverines tend to live in remote and inhospitable places away from human populations, preferring coniferous forest-dominated habitats with subalpine parkland/krummholtz at upper elevations. Engelmann spruce and subalpine fir are the dominant species and lodgepole pine is the common seral tree species. Wolverines have large home ranges with prey resources distributed over large areas, and are known for wide-ranging movements. The mean annual home range of males is 163 square miles in Montana (MNHP, 2016i). Wolverines naturally occur at low densities, and due to their elusive nature, they are rarely and unpredictably encountered where they do occur. Young are born January through April, though mainly in
February or March; maternal den sites may be located among rocks or tree roots, in hollow logs, under fallen trees, or in dense vegetation, including sites under snow (MNHP, 2016i).

The St. Julian Claim Block is within the home range distance for wolverines that have been documented in the area. However, specific knowledge of the importance of the St. Julian Claim Block to the wolverines that use it is not known. In October 2016, the FWS reopened the public comment period on a proposed rule to list the North American wolverine as threatened under the Endangered Species Act (ESA; 2016).

**Fisher**

Fishers occur primarily in dense coniferous or mixed forests, including early successional forests with dense overhead cover. They commonly use hardwood stands in summer but prefer coniferous or mixed forests in winter and avoid open areas. A dense understory of young conifers, shrubs, and herbaceous cover is important in summer. When inactive, they occupy dens in tree hollows (where young are usually born), under logs, or in ground or rocky crevices, or they rest in branches of conifers (in the warmer months) (MNHP, 2017). They are associated with a prey base such as snowshoe hare or porcupines.

Documented locations of fisher in Montana are only in the northwestern part of the state (MNHP, 2017). However fisher have been documented to occur in the northeastern part of Yellowstone National Park (Gehman, 1995) and the possibility exists they could occur in the St. Julian Claim area.

**AMPHIBIANS**

**Western Toad**

Adult western toads are largely terrestrial, may travel considerable distances from water, and are found in a variety of habitats from valley bottoms to high elevations. They breed in lakes, ponds, slow streams, and roadside ditches, where they prefer shallow areas with mud bottoms. In Montana, the species has been documented across the mountainous portion of the State west of the Beartooth Plateau at elevations up to 9,500 feet (Maxell, 2000). Toads are less common in heavily forested areas, instead selecting for habitat based on open canopy sites, south-facing slopes, occurrence of water, and proximity to high densities of refugia (downed woody debris, etc.) (McGee and Keinath, 2004). Western toads in the vicinity of the St. Julian Claim Block may breed in temporary and permanent ponds, Emigrant Creek, or shallow, warm water in road ditches.

**MANAGEMENT INDICATOR SPECIES**

The National Forest Management Act (NMFA) requires that fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species. The concept of MIS was adopted by the Forest Service to serve in part as a barometer for species viability at the forest level. In essence, MIS are species whose presence indicates the presence of a particular habitat or set of other species, and whose absence indicates the lack of the particular habitat or suite of species. The CGNF has identified five species, listed in Table
3.3, as MIS because their population changes are believed to indicate the impacts of land management activities on the forest.

Table 3.3
Gallatin National Forest Management Indicator Species

<table>
<thead>
<tr>
<th>Species</th>
<th>Indicative of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grizzly bear</td>
<td>Threatened and endangered species</td>
</tr>
<tr>
<td>Bald eagle</td>
<td>Threatened and endangered species</td>
</tr>
<tr>
<td>Elk</td>
<td>Big game species</td>
</tr>
<tr>
<td>Goshawk</td>
<td>Mature forest related species</td>
</tr>
<tr>
<td>Pine marten</td>
<td>Mature forest related species</td>
</tr>
</tbody>
</table>

Bald eagle, grizzly bear, and lynx are discussed in the “Threatened and Endangered Species” sub-section. Below are the remaining three listed species.

Elk

Elk are listed as MIS for commonly hunted big game species on the CGNF (USDA, 2016). Meeting the habitat needs for elk indicates that the habitat needs for other commonly hunted big game species, such as black bear, mountain lion, and moose, would also be met. Habitat needs which each of these species shares include cover (hiding and thermal), forage, and security.

Habitats favored by elk during the summer months include moist parks, meadows, and riparian areas, which offer succulent forage and bedding sites. Elk are also commonly associated with shrub, seedling, and sapling habitats. The elevational range for elk is dictated by food availability and weather conditions—they tend to remain on higher elevation summer ranges until forced down to lower elevations by snow and severe weather. The St. Julian Claim Block lies within the boundary of the Absaroka Elk Management Unit (EMU) and close to the boundary of the Northern Yellowstone EMU. The Absaroka EMU is 2,420-square-miles located on the north and west flanks of the Beartooth and Absaroka Mountains and includes the north portion of the Absaroka-Beartooth Wilderness. The area is a mixture of public (68%) and private (32%) lands. Much of the EMU (62%) falls within the boundaries of the CGNF; however, the majority of the 341 square miles of elk winter range occurs on small parcels of privately owned land used for cattle grazing and hay production. About 77% of the EMU is elk habitat. It is likely elk from both EMUs use the St. Julian Claim Block.

Northern Goshawk

Throughout their range, northern goshawk (goshawk) nest in mature and old-growth mixed conifer forests with more than 60 percent closed canopy. Goshawks are generalists when it comes to foraging. Goshawks are known to hunt in forests, along riparian corridors, and in more open habitat. These habitat elements are all present in the St. Julian Claim Block. The size of the typical home range and foraging area for goshawk ranges between 1,409 to 8,649 acres, and may vary depending on a number of factors such as age and sex of the bird, prey abundance, prey availability, and local habitat conditions (Kennedy, 2003). In addition to its
sensitive species status with the State, the CGNF has designated goshawk as an MIS in their land and resource management plan.

**Pine Marten**

As discussed in Ruggiero et al., (1994), because martens are shy, inconspicuous, primarily nocturnal, occur at low densities, and are now rarely trapped in the contiguous United States, reliable data on current distribution are often unavailable. Martens in the Rocky Mountains occupy most of their historic range, which includes the St. Julian Claim Block. The apparent patchy distribution of American martens reflects the patchy distribution of forested montane islands and is little changed from its historic pattern (Kucera and Zielinski, 1995). Martens generally avoid habitats that lack overhead cover, and most often travel along forest cover / open area ecotones.

Martens use a variety of structures for their dens, with trees, logs, and rocks accounting for 70 percent of reported den structures; in virtually all cases involving standing trees, logs, and snags, dens were found in large structures that are characteristic of late-successional forests (Ruggiero, in review, as cited by Buskirk and Ruggiero, 1994).

**OTHER WILDLIFE**

The St. Julian Claim Block area provides important habitat for mule deer and moose. Populations of both of these species have declined in recent years (FWP, 2017a and 2017b). In summer mule deer are widely distributed in forest and subalpine habitats such as the St. Julian Claim area. Moose use mountain meadows, river valleys, swampy areas, and clearcuts in summer and in winter, willow flats or mature coniferous forests. Coniferous cover, uneven plant age composition and willows are important habitat components. Closed canopy stands may be important in late winter (MNHP 2017).

3.4.4  **DIRECT AND SECONDARY IMPACTS**

3.4.4.1  **No Action Alternative**

Under the No Action Alternative, Lucky Minerals would not obtain an exploration license and therefore, could not conduct the exploration activities described in its exploration license application. However, the company would still be allowed to stake claims, map the local geology, and collect surface samples. Road maintenance / grading would not occur and access would be by four-wheel drive, ATV, and by foot.

Under the No Action Alternative, the habitats available to wildlife are not expected to change. Any disruption and disturbance impacts to wildlife would be temporary and would be the result of increased human presence. Because existing roads are not regularly maintained, travel speeds are limited by current conditions. The potential for collisions with wildlife would be similar to baseline conditions. Bow and rifle hunting opportunities are not expected to be reduced in the area if Lucky Minerals extended into the fall ungulate hunting season with activities that do not require an exploration license. The type of activities that do not require an exploration license from the State of Montana would include geologic mapping, claim staking, and sampling.
THREATENED AND ENDANGERED SPECIES

**Bald Eagle**

The potential for disturbances resulting from the No Action Alternative would be minimal. Impacts from vehicle traffic are expected to be insignificant as Lucky Minerals personnel would be travelling existing roads between East River Road and the St. Julian Mine property sporadically. It has been observed that vehicular traffic traveling along prescribed routes or within strict spatial limits and at relatively predictable frequencies is least disturbing to bald eagles (Stalmaster 1987, McGarigal et al., 1991). While bald eagles may be present along the road corridor in Emigrant Gulch, and on the St. Julian Mine property, nesting in these areas has not been documented.

Foraging behavior may be disrupted by the presence of Lucky Minerals personnel on site, but any impacts to foraging would be of short duration and similar to other recreational activities in the area. It is unlikely that bald eagle soaring behavior, flight patterns, and use of Emigrant Gulch and the St. Julian Mine property would be adversely affected by the activities that would occur under the No Action Alternative.

**Canada Lynx**

While increased human presence and activity may be disturbing to sensitive forest species, the likelihood of displacement or mortality to lynx under the No Action Alternative would be temporary and minimal, as it would be similar to other recreational activities in the area. It is likely that lynx would successfully avoid interaction with project personnel while they were on site staking claims, taking samples, and mapping the geology. No road improvements would occur, and there would be no sensory disturbances above vehicle traffic and noise associated with the performance of the activities under the No Action Alternative. Any displacement due to human presence would revert to baseline conditions at the completion of the activities associated with the No Action Alternative. As a result, there would be no direct or secondary impacts to Canada lynx or critical habitat.

**Grizzly Bears**

While increased human presence and activity may be disturbing to sensitive forest species, the likelihood of displacement or mortality to grizzly bear under the No Action Alternative would be temporary and minimal, as it would be similar to other recreational activities in the area. It is likely that grizzly bear would successfully avoid interaction with project personnel while they were on site staking claims, taking samples, and mapping the geology. A food storage order is in place on the CGNF. Proper food storage and leaving no trash behind would reduce the potential for some forms of human-bear conflict. No road improvements would occur, and there would be no sensory disturbances above vehicle traffic and noise associated with the performance of activities associates with the No Action Alternative. Any displacement due to human presence would revert to baseline conditions at the completion of the activities associated with the No Action Alternative. As a result, there would be no direct or secondary impacts to grizzly bear or their habitat.
STATE SENSITIVE SPECIES (SPECIES OF CONCERN)

BIRDS

No road improvements along the riparian corridor or on the St. Julian Mine property would occur under the No Action Alternative. Further, there would be no sensory disturbances above vehicle traffic and noise associated with mapping the geology, taking samples, and staking claims. Any displacement due to human presence would be temporary, and conditions would return to baseline once any activities associated with the No Action Alternative are complete. Impacts to nesting birds would be minimized or eliminated if project operations were scheduled outside the breeding and nesting period.

MAMMALS

Bats

All three state-listed sensitive bat species are likely to occur in the St. Julian Claim Block. The No Action Alternative is not expected to have any direct impacts to bats or their habitat. Activities associated with the No Action Alternative would all be performed during daylight hours. Travel to and from the St. Julian Mine property may occur during crepuscular hours, but collisions with vehicle traffic are unlikely.

Wolverine and Fisher

The impacts of land-use activities on wolverines and fisher are likely similar to those on grizzly bears, as these species are most affected by activities that disrupt and disturb habitat, such as human settlement, extensive logging, oil and gas development, mining, recreational developments, and the accompanying access (Jalkotzy et al., 1997). It is assumed that due to the project site elevation, the activities associated with the No Action Alternative would not occur during the winter months. Under the No Action Alternative, no road improvements would occur. Disturbances would be limited to vehicle traffic and the sight and sounds of humans during the life of the project. Any displacement due to human presence would revert to pre-activity conditions at the completion of the activities. As a result, there would be no direct or secondary impacts to wolverine, fisher, or their habitat.

AMPHIBIANS

Western Toad

Under the No Action Alternative, no western toad habitat alteration from road maintenance, grading and drill pad development would occur. Accessing the St. Julian Mine property to stake claims, map the geology, and take samples may result in an increase in human use of the St. Julian Claim Block. Mortality to dispersing toads from vehicles is possible under the No Action Alternative.

Western toads tend to be active during the day and night; juveniles are largely diurnal while adults tend to be nocturnal except in spring (Maxell, 2000). The active period begins in April or May and extends to September or October, depending on elevation and latitude (Werner et al.,
Western toads are especially vulnerable to disturbances during the period from breeding to metamorphosis (May–September); during this time period larvae and eggs can be destroyed by direct disturbance of wetland habitats or changes in the hydrology which may cause breeding ponds to dry up before larvae mature (McGee and Keinath, 2004). The availability of breeding seeps and streams in the St. Julian Claim Block has remained reasonably constant but is generally limited due to the dry nature of the area. Avoidance of breeding areas, and preventing disturbances to wet areas and land adjacent to the wet areas, which are important to the western toad would minimize any impact to the species.

**MANAGEMENT INDICATOR SPECIES**

**Elk**

Little or no impacts to elk are anticipated under the No Action Alternative. Elk may disperse when project personnel access the St. Julian Mine property to stake claims, map the geology, and take samples, but this impact would be temporary, and would not be adverse. There would be no changes in habitat or security areas under this alternative. The No Action Alternative would have no direct or secondary impacts.

**Northern Goshawk**

No road improvements along the riparian corridor or on the St. Julian Mine property would occur under the No Action Alternative. Further, there would be no sensory disturbances above vehicle traffic and noise associated with mapping the geology, taking samples, and staking claims. Any displacement due to human presence would be temporary, and conditions would return to pre-activity levels once the activities are complete. No direct impacts to northern goshawk or their habitat are anticipated from the No Action Alternative. Because goshawks are protected under the MBTA, Lucky Minerals may consider consulting with FWP if active nests are discovered while conducting activity in the area.

**Pine Marten**

No road improvements along the riparian corridor or on the St. Julian Mine property would occur under the No Action Alternative. Further, there would be no sensory disturbances above vehicle traffic and noise associated with mapping the geology, taking samples, and staking claims. Any displacement due to human presence would be temporary, and conditions would return to pre-activity levels once the activities are complete. No direct impacts to pine martens or their habitat are anticipated.

**OTHER WILDLIFE**

Little or no impacts to mule deer or moose are anticipated under the No Action Alternative. Individuals may disperse when Lucky Minerals personnel access the St. Julian Mine property to stake claims, map the geology, and take samples, but this impact would be temporary, and would not be adverse. There would be no changes in habitat under this alternative. The No Action Alternative would have no direct or secondary impacts.
3.4.4.2 Proposed Action

Under the Proposed Action, Lucky Minerals would engage in a two approximately three-month field seasons of exploration-related activities located on the St. Julian Mine property. The Proposed Action does not include any new road construction, but the access roads and the existing road network on the privately patented claims would be improved through grading in localized areas, in order to keep them serviceable for the type of vehicles described in the proposed action. All roads would be cleared of loose rock and other debris, but they would not be made wider. As a result, there would be no net increase in road densities within the project area. Core drilling would take place on drill pads in the road prisms after site leveling/clearing has taken place. On the St. Julian Claim Block, it is anticipated that 4.8 acres of new ground disturbance would be associated with road improvement and maintenance, laydown areas, and drill pad site preparations. Reclamation measures would be concurrent with operations and/or begin immediately upon completion of operations at each site. Disturbed areas would be kept to the minimum size necessary to accommodate the exploration operation.

Wildlife species may be negatively affected by project activities associated with the Proposed Action. Sensory disturbances to local wildlife as the result of heavy equipment/vehicle use, localized road improvements and maintenance, pad development, core drilling, and associated human activity would primarily be auditory but disturbances may also include olfactory (i.e., smell) as well as visual (i.e., light) and tactile (i.e., vibration) disturbances. Within a certain zone of influence, sensory disturbance may result in the loss or alteration of available habitat due to displacement or avoidance, or decreased or less effective use of preferred habitats. Any disturbances would be short-term due to the limited duration of the proposed project.

Vehicles would access the St. Julian Claim Block by using the existing roads between East River Road and the St. Julian Mine Claim Block. The Proposed Action does not include any new road construction. The approximate four-mile length of Emigrant Creek Road from Old Chico to the St. Julian Claim Block would be cleared of rock and debris within its original configuration, some of which would include hand picking. The road would not be widened. Emigrant Creek Road may be graded in localized areas in order to keep it serviceable for the type of vehicles that would be involved in the project. The clearing and localized improvements to Emigrant Creek Road, however, will not materially change its character of an unimproved forest road. The clearing and localized grading should not facilitate traffic on Emigrant Creek Roads at appreciably higher speeds than the current traffic. Given the low number of round trips to be made each day and the speed at which a vehicle can travel on Emigrant Creek Road, vehicular collisions with wildlife should only have a minimal increase over the existing state of the road.

Water used for drilling would be pumped either from existing artesian wells existing on the private land or Emigrant Creek utilizing the existing water right on the creek that is attached to the St. Julian Mine patented claims. Lucky Minerals proposes two 10-hour shifts per day during the field season. It is reasonable to assume there may be a continuous human presence on the St. Julian Mine property. Fuel used in the water pump, and vehicle/equipment maintenance fluids could spill and contaminate soil, vegetation, and water, coolants could be lethal if accessed by wildlife. Spillage and cleanup kits would be readily available for use to minimize any impact. Sump pits and drilling mud could also pose a risk to wildlife. Lucky Minerals proposes digging sumps three feet deep. This depth could entrap small mammals if no escape mechanism is provided. Lucky Minerals indicates the synthetic polymer product used to increase viscosity of the drilling water is non-toxic and biodegradable.
Habitat in the St. Julian Claim Block currently provides wildlife with cover (hiding and thermal), forage, and security. The public currently has access to the base of the St. Julian Claim Block via Emigrant Creek Road. Therefore, the improvements to Emigrant Creek Road discussed above would not lead to access to higher elevations and more remote habitat than existed before. The removal of rocks and debris and localized grading of the approximately four-mile long Emigrant Creek Road may marginally make access to the area easier for hunters and may marginally increase higher mortality. Bow and rifle hunting opportunities could be reduced in the area during the two field seasons if Lucky Minerals operations extended into the fall ungulate hunting season. Further, because of the increase in human presence under the Proposed Action, the harassment or poaching of wildlife may also increase.

In general, disturbance to wildlife would be greater under the Proposed Action than under the No Action Alternative. Disturbance to wildlife would primarily be the result of an adverse response to auditory, visual, olfactory, and tactile sensory stimuli. In response to activities associated with the Project, species of concern would likely avoid the area.

**THREATENED AND ENDANGERED SPECIES**

**Bald Eagle**

As with the No Action Alternative, the potential for disturbances resulting from the Proposed Action are most likely to occur to eagles nesting or foraging along the Yellowstone River, and along the valley floor. Their sensitivity to humans varies seasonally, and is often influenced by courtship and nest building, egg laying, incubation and hatching, early nestling period, and late nestling periods. Eagles appear most sensitive to human disturbance during the courtship and nest-building phase, but their response is often site, pair, and activity-specific, and is a function of the type, intensity, and proximity of the human disturbance (MBEWG, 1994). Some pairs, for example, nest successfully near human activity, while others abandon nest sites in response to activities much farther away. This variability in sensitivity may be related to a number of factors, including the visibility of the activity, its duration and noise level, the extent of the area affected by the activity, and the nesting pair’s prior experiences with and tolerance of humans. While bald eagles may be present along the road corridor in Emigrant Gulch, and on the St. Julian Mine property, nesting in these areas has not been documented. If a bald eagle nest is built or discovered within the St. Julian Claim Block, Lucky Minerals would be required to consult with USFWS to determine avoidance or mitigation measures.

Foraging behavior may be disrupted by the presence of Lucky Minerals personnel on site, and may lead to avoidance of the St. Julian Mine property. It is unlikely that bald eagle soaring behavior, flight patterns, and use of Emigrant Gulch and the St. Julian Mine Claim Block would be adversely affected. The response is often site, pair, and activity specific and is a function of type, intensity, and proximity of the disturbance (MBEWG, 1994). Individuals would most likely avoid the St. Julian Claim Block during the field season.

**Canada Lynx**

It is likely that lynx would successfully avoid interaction with project personnel. The activity and noise associated with localized road improvements, maintenance, and drilling rigs is likely to cause displacement and disturbance. The use of lights during nighttime drilling may also
disrupt lynx use of the area. Sensory disturbance is expected to be temporary, and should not result in permanent avoidance of the area.

The likelihood of permanent displacement or mortality to lynx under the Proposed Action alternative would be minimal.

**Grizzly Bears**

The local abundance of grizzly bears is likely to be reduced for the duration of the Proposed Action. The activity and noise associated with localized road improvements, maintenance, and drilling rigs is likely to cause displacement and disturbance. The use of lights during nighttime drilling may also disrupt grizzly bear use of the area. Any sensory disturbance would be temporary, and should not result in permanent avoidance of the area. Ceasing operations prior to November would minimize impacts to bears during the fall season, as grizzly prepare for winter denning.

Grizzly bears are unlikely to habituate due to the infrequent vehicle and human access currently visiting Emigrant Gulch, St. Julian Mine property, and the surrounding area. However, the Proposed Action increases the potential for human/bear conflicts to occur, possibly leading to injury, harm, direct, or secondary mortality of grizzly bears—as well as risks to human safety, particularly during the critical fall season. Regular spacing (temporal) of vehicles is likely to contribute more toward habituation than the same volume of traffic concentrated in a brief period (Jalkotzy et al., 1997). Habituation may allow bears to continue to use desired habitats near roadsides.

The presence of project personnel on the site may contribute to habituation. However, because of its likelihood of contributing to negative bear-human interactions, habituation in general is not beneficial to bears. A food storage order is in place on the CGNF. Good housekeeping and proper food storage could reduce the potential for some forms of human-bear conflict.

**STATE SENSITIVE SPECIES**

**BIRDS**

The activity and noise associated with localized road improvements, maintenance, and drilling rigs is likely to cause displacement and disturbance of resident and migratory birds. The use of lights during nighttime drilling may also disrupt bird use of the area. Any displacement is expected to be temporary, and conditions would return to baseline once the project was complete. While the St. Julian Claim Block can be considered prime golden eagle habitat, both recorded golden eagle nests are too far away to be directly impacted by the Project. If a peregrine falcon, eagle, or great gray owl nest is built or discovered within the St. Julian Claim Block, Lucky Minerals would be required to consult with FWP to determine avoidance or mitigation measures. Nests of other breeding birds would be avoided.

Many bird species avoid human disturbance (habitat avoidance). Individual disruption of birds often involves disturbing individuals at nesting sites, resulting in birds temporarily leaving their nest sites. When birds are disturbed at nest sites, parental care of young, feeding
efficiencies, and feeding frequency may be affected (Jalkotzy et al., 1997). Virtually all species appear to be susceptible to this type of disturbance.

Direct impacts to migratory birds during localized road improvements, drill pad construction, and core drilling may minimally increase mortality or injury from collisions with crew vehicles and machinery. Songbirds could also be killed or injured when machinery disturbs ground vegetation.

MAMMALS

Bats

All three state-listed sensitive bat species are likely to occur in the St. Julian Claim Block. Travel to and from the St. Julian Mine property may occur during crepuscular hours, but collisions with vehicle traffic are unlikely. Little or no bat mortality is expected during road clearing and grading, drill pad construction, or reclamation operations. Bats would likely be able to avoid non-moving objects such as parked vehicles.

The Proposed Action would use two drills and run them two shifts per day. Night drilling would require the use of small lights similar to the ones used by highway crews. Nocturnal activity is a major feature of the behavioral pattern of bats. Many species of bats are known to sample the light levels before emerging from their roost; only emerging for their night’s hunting when the light intensity outside reaches a critical level after sunset (Swift, 1980). Direct impacts to bats from the use of lights during nighttime drilling would likely be manifested through potential changes in distribution, migration, and foraging behavior. The London Biodiversity Project (LBP, 2016) found the use of lights could disrupt the normal 24-hour pattern of light and dark, potentially affecting the natural behavior of bats. Artificial light near a roost access point may delay bats from emerging and shorten the amount of time available to them for foraging, and directly illuminating a bat roost may cause the bats to desert the roost (LBP, 2016). Bright light may reduce social flight activity and cause bats to move away from the light area to an alternative dark area (LBP 2016). Bat strikes to drill rigs are possible if bats are drawn to forage on insects attracted to the artificial light source. These strikes could lead to injury or death.

Impacts could be minimized by the number and types of lighting used. Lucky Minerals would be required to carefully consider what lighting is necessary and reduce any unnecessary lighting, both temporally and spatially. When in use, lighting would be directed to where it is needed to avoid light spillage, and only be bright enough to maintain crew safety. Drill rigs in operation would be spaced far enough apart to separate the influence of lighting. Two smaller “islands” of light would be less of a barrier to foraging than one large island. Bats may avoid the area during exploration activities due to noise levels.

Wolverine and Fisher

The impacts of land-use activities on wolverines and fisher are likely similar to those on grizzly bears, as these species are most affected by activities that disrupt and disturb habitat. The local abundance of wolverines is likely to be reduced for the duration of project. The activity and noise associated with localized road improvements, road maintenance, and drilling rigs is likely to cause displacement and disturbance. The use of lights during nighttime drilling may also
disrupt wolverine use of the area. Sensory disturbance is expected to be temporary and should not result in permanent avoidance of the area. Because of the uncertainty of fisher presence in the area, it is unlikely they would be affected. If they do occur, impacts would be similar as for wolverine and pine marten.

The Proposed Action would represent a disturbance to wolverines and likely would deter wolverines from using the area. While individual sensitivity to disruptions is not well documented in the literature, a radio-telemetry study in Idaho raised the possibility that human disturbance at natal den sites may cause den abandonment (Copeland, 1996). Copeland (1996) documented three instances when a female and her kits abandoned an area after researchers disturbed wolverines at maternal den sites. Given the low reproductive potential of wolverines (Weaver et al., 1996), the impacts of improved access to more remote areas may be detrimental to regional populations. Females use secluded high-elevation cirque basins for natal den sites, and an increase in human disturbance may cause den abandonment (Copeland, 1996).

Lucky Minerals has proposed cutting slash and downed wood from site clearing for warming fires. If wood cutting extends to standing snags, dead or downed wood beyond what is cut for site clearing purposes, the project may impact wolverine and fisher habitat. Improvements to the existing roads would facilitate an increase in motorized access and hunter access into higher, more remote areas in the drainage.

AMPHIBIANS

**Western Toad**

Habitat alteration from localized road improvements, maintenance, and drill pad development would occur, potentially impacting western toad habitat. Project activities on the St. Julian Mine property would result in an increase in human use of the St. Julian Claim Block. Activities associated with drill pad construction and road maintenance could result in direct mortality of individual toads. However, it is likely any mortality to dispersing toads from vehicles would occur under any alternative. Sump pits could entrap western toads unless an escape route is provided. Entrapment could lead to increased predation. Spent drilling fluid may have an adverse effect on western toads; however, drilling fluid would not be stored in the sumps.

Lucky Minerals has proposed cutting slash and downed wood from site clearing for warming fires. If wood cutting extends to standing snags, dead or downed wood beyond what is cut for site clearing purposes, the project may impact western toad habitat. Disturbance to wet areas may also increase as a result of the Proposed Action. Project activities are not projected to damage or destroy montane wetland habitats and would not have the potential to displace western toads or cause local populations to become extinct. Similar to the No Action Alternative, avoidance of breeding areas, and minimizing any disturbance to wet areas, and land adjacent to the wet areas would minimize any impact to the species.
MANAGEMENT INDICATOR SPECIES

Elk

Habitat alteration from localized road improvements, maintenance, and drill pad development may occur, potentially impacting elk habitat and security. Elk may disperse, or avoid the St. Julian Claim Block during the field season. The local abundance and availability of elk is likely to be reduced during the months of drilling activity. The activity and noise associated with localized road improvements, maintenance, and drilling rigs is likely to cause displacement and disturbance to elk. The Proposed Action would increase motorized travel and human presence in the St. Julian Claim Block. If project operations continue into fall, elk security may be affected. Hillis et al., (1991) cautioned security is that combination of variables that provides protection for vulnerable animals during the hunting season, with the foremost factor influencing vulnerability being road access. The improvements to Emigrant Creek Road discussed above would not lead to access to higher elevations and more remote habitat.

The Proposed Action is not anticipated to impact elk calving areas. Elk calve in areas of low snowpack or activity during calving season (mid-May to mid-June). Lucky Minerals field season would be between mid-July and early October. Once the proposed exploration began in mid-July, elk would most likely avoid the St. Julian Claim Block due to human presence and project activity. This displacement and disturbance could have negative consequences. Human activity has been documented to stress animals, affecting available energy reserves.

The St. Julian Claim Block and surrounding land is popular for deer and elk hunting during the archery and general rifle seasons (September – November), and provides for mountain lion hunting opportunities during December through April. The Proposed Action could impact wildlife use of the surrounding area. As a result, bow and rifle hunting opportunities could be reduced in the area during the two approximately three-month field seasons if Lucky Minerals operations extended into the fall ungulate hunting season, however, mountain lion hunting opportunities are not expected to be affected due to the later season.

Northern Goshawk

Localized road improvements along the Emigrant Creek riparian corridor and drill pad construction on the St. Julian Mine Claim Block would occur under the Proposed Action. Sensory disturbances from heavy machinery, increased human presence (not only in numbers but duration, and use of lights during night drilling) could directly impact northern goshawks. These disturbances may also impact their prey base. Raptor avoidance of human disturbance is particularly well-documented. Sensory disturbance is expected to result in the displacement of non-breeding individuals. Any displacement is expected to be temporary, and goshawk occupancy would return to pre-activity levels once the project is complete.

Non-breeding goshawks do not appear to tolerate human disturbance and may avoid areas of human activity. Although otherwise secretive, goshawks can be fierce and vocal when defending their nest and young, and will attack human intruders and kill neighboring raptors, including owls and hawks, they perceive as threats (Squires and Reynolds, 1997). Disturbance of nesting goshawks, particularly during incubation, can cause nest failure. For example, heavy
equipment operation within 330 feet of a nest has been shown to result in the adults abandoning the nest area, even with 20-day old nestlings present (Squires and Kennedy, 2006). If adults abandon a nest with eggs or nestlings present, the eggs or nestlings may die from exposure, starvation, and/or predation (Brewer et al., 2009).

**Pine Marten**

Given the wide range in possible avoidance behavior, it is possible that the local pine marten population may be reduced within the zone of impacts from sensory disturbance, and would likely remain at reduced levels for the duration of road maintenance and exploratory drilling activities. Any displacement due to human presence is expected to be temporary, and pine marten occupancy would return to pre-activity levels once the project is complete.

Martens use a variety of structures for their dens, with trees, logs, and rocks accounting for 70% of reported den structures. Lucky Minerals has proposed cutting slash and downed wood from site clearing for warming fires. If wood cutting extends to standing snags, dead or downed wood beyond what is cut for site clearing purposes, the project may impact the marten.

**OTHER WILDLIFE**

Habitat alteration from localized road improvements, maintenance, and drill pad development may occur, potentially impacting deer and moose habitat. Individuals may disperse, or avoid the St. Julian Claim Block during the field season. The activity and noise associated with localized road improvements, maintenance, and drilling rigs may cause displacement or disturbance to deer and moose. The Proposed Action would increase motorized travel and human presence in the St. Julian Claim Block.

The Proposed Action is not anticipated to impact fawning and calving areas. Lucky Minerals field season would be between mid-July and early October. Once the proposed exploration began in mid-July, deer and moose would most likely avoid the St. Julian Claim Block due to human presence and project activity. This displacement and disturbance could have negative consequences. Human activity has been documented to stress animals, affecting available energy reserves. Impacts to mule deer have implications for mountain lion populations in the area.

3.4.4.3 **Agency-Modified Alternative**

**WILDLIFE**

A wildlife awareness plan would be included in Lucky Minerals’ training of its employees. The plan would include the following guidelines:

- Worker Environmental Awareness Program (WEAP) training would be required to educate all personnel about the existing on-site and surrounding wildlife resources and the measures required to protect these resources. Information on whom to contact if a federally or state listed species or their sign is observed would be provided as part of the WEAP training.
• All project personnel would be required to be educated on being bear aware. This includes storing all food or other bear attractants in properly secured bear-proof containers at all times, abiding by the Forest Service’s food storage order (#001-14-11-00-02) and Montana Code Annotated 87-3-130.

• Lucky Minerals would be required to implement a waste management plan that would minimize refuse to avoid attracting wildlife. All garbage, refuse, and waste would be contained in appropriate bear-proof containers and removed from the site weekly.

• Employees would be prohibited from feeding or harassing wildlife on the site. This would include a recommendation that Lucky Minerals implement a “No Pets” policy in the St. Julian Claim Block.

• Employees would be required to report sightings or sign of Federally and State-listed wildlife to supervisory personnel and record the observation on a wildlife observation form.

WILDLIFE AVOIDANCE

Lucky Minerals would be required to conduct pre-exploration surveys prior to each field season to identify potential areas of western toad habitat, bat habitat, and nesting birds in areas of new disturbance on drill pads and laydown area. If any of these habitats are found near the drilling areas Lucky Minerals will consult Montana Fish, Wildlife, and Parks (FWP) to determine avoidance or mitigation measures.

To avoid disturbing nesting eagles, other raptors, owls, or songbirds, Lucky Minerals would maintain natural forested (or vegetative) buffers around nest trees. The buffer areas would be consistent with USFWS guidelines and would serve to minimize visual and auditory impacts associated with human activities near nest sites.

If a raptor nest is built or discovered within the St. Julian Claim Block, Lucky Minerals would consult with FWP to determine avoidance or mitigation measures. Any spatial buffers required through consultation with local FWP biologists would be in accordance with the Montana Bald Eagle Guidelines (2010).

To avoid take, as defined by the Migratory Bird Treaty Act (MBTA), Lucky Minerals would refer to the current list of species covered, and those not covered, by the MBTA, prior to initiating project activities (USFWS 2013).

Project design features would be modified in the Plan of Operations to consider what lighting is necessary and reduce any unnecessary lighting, both temporally and spatially. Nighttime lighting would be shielded, and directed to where it is needed to avoid light spillage, and only be bright enough to maintain crew safety. Lucky Minerals would also be required to follow standard bat lighting recommendations.

Standing snags, dead or downed wood, beyond what Project personnel cut during site clearing, would not be cut or removed for use in warming fires.
3.4.4.4 **Secondary Impacts**

Based on the MEPA model rules definition, secondary impacts are further impacts to the human environment that may be stimulated or induced by, or otherwise result from a direct impact of the action.

The improvements that Lucky Minerals has proposed to make on the access roads to the St. Julian Claim Block include grading in localized areas, clearing of rock and other debris, and sloping of roads to enhance drainage and prevent channeling. The access roads to the St. Julian Claim Block will not be made wider. Currently, a four-wheel drive high clearance vehicle is required to get to the St. Julian Claim Block. It is anticipated that the same type of vehicle will be required after Lucky Minerals makes the road improvements and completes its exploration activities. Thus, there are not expected to be any significant secondary impacts to wildlife.

### 3.5 FISH AND AQUATIC INSECTS

#### 3.5.1 ANALYSIS AREA AND METHODS

The analysis area includes Emigrant Creek and the East Fork of Emigrant Creek (East Fork). Baseline data for fish and aquatic insects are limited within this area, but electrofishing surveys were conducted on multiple stream reaches by the CGNF in 2013 and 2015 (See Figure 3.5). The survey reaches on Emigrant Creek were located near the Great Western Mine claim boundary (T6S, R8E, S36). The upper survey reach on the East Fork was located directly below the slope of the Proposed Action area, and the other East Fork reach was below the upper stream crossing and approximately 2,000 feet downstream from the upper reach (See Figure 3.5). Following the Draft EA public comment period, FWP also provided information about a fish survey that was conducted in the lower reach of Emigrant Creek in 2005, adjacent to the dredge waste piles located to the west of Old Chico (T6S, R8E, S14). The analysis methods included reviewing the field sheets generated during the electrofishing surveys and interpreting those results along with the available water quality data.

#### 3.5.2 AFFECTED ENVIRONMENT

In 2013, one reach of Emigrant Creek (265 feet) was surveyed near the boundary of the Great Western Mine claim and CGNF land. A longer reach (584 feet) was surveyed across this same area of Emigrant Creek in 2015, and both reaches are upstream from the point where the access road crosses the stream (See Figure 3.5). No fish were observed or sampled during either of these two surveys, and a waterfall in Emigrant Creek was noted near the Great Western Mine claim boundary. This waterfall acts as a physical barrier that effectively prevents the upstream migration of fish within Emigrant Creek. Very few small mayflies and caddisflies were present in this reach, but a quantitative measurement of insects or other macroinvertebrates was not conducted. The surveys also noted some iron staining on the stream substrate.

Over one mile upstream of the fish barrier, there were two reaches along the East Fork that were also surveyed in 2015 (See Figure 3.5). No fish were observed or sampled from either of the locations on the East Fork, likely a result of the physical barrier located on Emigrant Creek. The elevated metals concentrations in Emigrant Creek and the East Fork may also inhibit fish
populations, even if fish were able to seasonally navigate beyond the lower physical barrier (Section 3.7.2). One reach (426 feet) was located near a former placer mining operation, midway between the Emigrant Creek confluence and the St. Julian Mine claim area (T7S, R9E, S6). This reach is located within the area that is impacted by acidic groundwater from the northern slope (Section 3.7.2.4), and the survey noted “white and orange sludge” mineralization along the bank and the formation of ferricrete on the stream substrate. The banks were also described as unconsolidated and unstable, spawning gravel is limited, and pronounced incision was noted along this reach. There were no aquatic insects or other macroinvertebrates noted on the CGNF field sheet for this reach.

The second survey reach from 2015 (272 feet) was located on the East Fork directly at the base of the slope of the St. Julian Claim Block, upstream from the point where the access road crosses the stream (See Figure 3.5). Minor iron staining on the substrate and unconsolidated banks were also noted in this location, but to a lesser degree than at the previous survey reach. This upper reach also contained abundant mayflies and a few caddisflies, but a quantitative measurement of insects or other macroinvertebrates was not conducted. In addition to the absence of fish, the upper reach was also noted for steep topography and the presence of step pools. Wood and other debris were observed along the banks, likely remnants from previous flooding events.

Anecdotal evidence about Eastern Brook Trout and Rocky Mountain Sculpin populations was included in comments provided for the Draft EA, and later discussed with FWP (FWP, 2017). A fish survey was conducted by FWP in 2005, in lower Emigrant Creek, which is found within the Dry Creek-Yellowstone River subwatershed. Two reaches were surveyed near the dredge waste piles west of Old Chico, with each survey reach extending 500 feet on either side of a nearby irrigation diversion channel. Details within the provided survey tables indicate that Eastern Brook Trout were identified but no information concerning Rocky Mountain Sculpin or aquatic insects was found. In the reach below the irrigation diversion, 72 Eastern Brook Trout individuals were collected, and they ranged in length from 2.5 to 11.8 inches and in mass from 0.02 to 0.5 lbs. The irrigation diversion may have some effect on the fish population, because in contrast, only eight individuals were collected above the diversion, and they ranged in length from 3.3 to 8.7 inches and in mass from 0.04 to 0.3 lbs (FWP, 2005).

FWP confirmed that it is likely that the physical barriers and degraded stream conditions reported by USFS in the upper reaches would limit the up-stream movement of fish away from the lower dredge piles area (Opitz Pers. Comm. 3/2/17). FWP also confirmed that lower Emigrant Creek is greatly impacted by irrigation diversions and is regularly dry before its confluence with the Yellowstone River. This is a pre-existing stress to any present fish populations, but FWP noted that Eastern Brook Trout seem to be more resilient to changes in water quality and quantity, when compared to other fish species. This is especially true when compared to native species, which have not been documented in any available Emigrant Creek fish surveys.
3.5.3 DIRECT AND SECONDARY IMPACTS

3.5.3.1 No Action Alternative

Under the No Action Alternative, Lucky Minerals would not obtain an exploration license and therefore, could not conduct the exploration activities described in its exploration license application. However, the company would still be allowed to stake claims, map the local geology, and collect surface samples. Localized road improvements and maintenance would not occur and access would be by four-wheel drive, ATV, and by foot.

With no mechanized exploration taking place, any potential impacts from sedimentation or contamination of the streams, therefore impacting the fish and aquatic insect populations, would not occur. However, the existing conditions of upper Emigrant Creek and the East Fork are likely to continue. The existing conditions include the physical fish barrier near the Great Western Mine claim, no fish population supported in the upper reaches of Emigrant Creek or the East Fork, and elevated metals concentrations in some reaches of both streams (Section 3.7.2.2). There are two stream crossings within the analysis area, which consist of coarse, angular rock (See Figure 3.5). The potential for turbidity to briefly increase from public traffic-related disturbances will continue. Short-term changes in existing water quality resulting from ordinary and everyday activities do not require permits. Any potential for erosion to occur along the access road and deposit sediment in the streams will also continue.

3.5.3.2 Proposed Action

The Proposed Action would increase the traffic along the access road and stream crossings, and therefore increase the potential for brief turbidity and suspended solid load impacts to the streams. Potential sediment transport at the two stream crossings should be addressed with Best Management Practices (BMP) required in a 318/310 Authorization (Table 1.2), taking the coarse nature of the underlying material into account, while limiting the impacts to aquatic macroinvertebrates. Any improvements or mitigation measures that are developed through that permit would likely lessen the impacts from public traffic as well.

The Proposed Action would include storm water and sediment controls on the access road and drill pads, decreasing the potential for stream sedimentation from the existing road conditions. To decrease the potential for water contamination, drill pads would also be located at least 100 feet away from all streams, and 50 feet away from other ponds or wetland areas. There would be no changes made to the physical fish barrier located on Emigrant Creek, and there would be no impact on the fish population in the East Fork or upper Emigrant Creek, which appears to be non-existent.

3.5.3.3 Agency-Modified Alternative

Same as the Proposed Action. The only fish survey that identified any fish population occurred in 2005 in lower Emigrant Creek, near the dredge waste piles. Upstream from this site, the water quality at Old Chico met all aquatic life standards under the existing conditions (Section 3.7.2),
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however, any potential changes to water quality as a direct result of exploration drilling in the upper East Fork drainage should be noted through compliance monitoring adjacent to the exploration area, as discussed in the Agency Modified Alternative in Section 3.7.3.3.

### 3.5.3.4 Secondary Impacts

Based on the MEPA model rules definition, secondary impacts are further impacts to the human environment that may be stimulated or induced by, or otherwise result from a direct impact of the action. No secondary impacts to fish and aquatic resources are predicted.

### 3.6 CULTURAL AND HISTORICAL RESOURCES

#### 3.6.1 ANALYSIS AREA AND METHODS

The area of potential effect (APE) for cultural resources for the Proposed Action begins at the location of Old Chico, and follows the Emigrant Gulch road south, into the St. Julian Mine property. The St. Julian Claim Block is located in the prehistoric cultural subarea known as the Northwestern Plains. Analysis methods used included consultation with SHPO and review of existing information.

#### 3.6.2 AFFECTED ENVIRONMENT

##### 3.6.2.1 Existing Environment

The Northwestern Plains stretch from central Alberta to southern Wyoming and from western North Dakota to western Montana. Throughout the last 12,000 years, inhabitants of the Northwestern Plains have practiced a semi-nomadic hunting and gathering economy. Initially, the large and now extinct Pleistocene fauna were the principal subsistence focus. By around 10,000 years ago, the modern bison had replaced the larger Pleistocene forms as the main prey species. Although a single economic adaptation persists throughout prehistory, slightly different environmental adaptations and different tool types do serve to differentiate cultural periods and phases. The prehistory of Montana can be divided into four major traditions. These traditions include Early, Middle, and Late Prehistoric periods, as well as the Protohistoric period. The historic period begins with the introduction of early Euro-American explorers and written documentation.

#### EARLY PERIOD (PALEOINDIAN)

Paleoindian groups existed during the Pre-Boreal and Boreal climatic episodes. These post-glacial periods are commonly characterized as cool, moist, and conducive to the proliferation and expansion of the forests (Bryson et al., 1970; Reeves, 1969). The earliest defined group, Clovis, hunted a variety of now extinct fauna, including wooly mammoth. Later groups generally relied on early forms of bison as a subsistence base.

North of Livingston, a now famous Clovis burial site named the Anzick Site (AKA Myers-Hindman Site, 24PA504) included a Clovis child burial with a large number of stone, bone, and antler artifacts with a date of 10,680 Radio Carbon Years before Present (RCYBP). In 2014, a DNA study of the human remains from Anzick was reported in *Nature* (Rasmussen et al., 2014).
The results found that the Anzick child was a boy, and he (and thus Clovis people in general) is closely related to Native American groups from Central and South America, but not to later migrations of Canadian and Arctic groups.

Paleoindian point styles are rarely found on the upland prairie and usually occur as isolates, likely representing ephemeral occupations rather than occupations of an extended duration (Deaver, 1987). Frison (1991) notes the differences that existed between the foothill-mountain sites and sites located in the open plains and intermontane basins prior to the Altithermal. The dichotomy is based on projectile point types, subsistence strategies, and settlement patterns. Complexes found in the Paleo-Indian tradition include Clovis, Goshen, Folsom, Hell Gap-Agate Basin, Cody, Parallel Oblique Flaked, and Pryor Stemmed.

MIDDLE PERIOD (PLAINS ARCHAIC)

In the Northern Plains, the Plains Archaic is commonly broken down further into three smaller periods: Early Middle, Middle Middle, and Late Middle. The early part of the Middle period occurred roughly 8,500 years ago, during a relatively dry climatic episode (Atlantic, Hypsithermal or Altithermal). Groups of people were generally concentrated in protected and humid locations such as mountains, foothills, and major river valleys during the Atlantic climatic episode (Husted 1969). The Middle period is defined by a noticeable change in subsistence economies. Projectile points of this age include the Bitterroot / Mummy Cave complex, characterized by large side notched points. Local lithic materials were emphasized, with evidence of more recycling and conservation than during the Early period. Less attention was given to fine, aesthetic craftsmanship, and evidence indicates less travel and trade (Reeves, 1990).

During the middle part of the Middle period, groups began to adopt increasingly specialized subsistence and settlement strategies. The McKean complex (4,500-3,100 BP) roughly corresponds with the cool and moist Sub-Boreal climatic episode (fundamentally modern conditions). These improved climatic conditions likely led to increased resource availability, which in turn probably led to two distinguishing McKean complex characteristics: a rather dramatic increase in the number of sites (Deaver and Deaver, 1988; Frison, 1991; Gregg, 1985) and an expansion in geographic distribution. Topographically, these sites are found in foothill-mountain areas, river valleys (Davis, 1976), intermontane basins, and the open plains / prairies (Deaver and Aaberg, 1977). Artifacts of this age, Oxbow, McKean, and Duncan / Hanna points, have been recovered in greater numbers than Early or early Middle types (Deaver and Deaver, 1988).

The final part of the Middle period is marked by further adaptations toward upland living and the exploitation of open prairie resources. Groups continued to occupy river valley and foothill settings while also devoting greater time and attention to the prairies. This change of focus is illustrated by their utilization of new cooperative hunting techniques and the development of the tipi, a specialized structure suited for open plains habitation. Complexes identified include Pelican Lake and Sandy Creek.
LATE PREHISTORIC (LATE HUNTERS)

The Late Prehistoric period is characterized by an increasing specialization toward upland living and the utilization of open prairie resources, most importantly bison. The vast majority of Late Prehistoric sites occur in open prairies rather than in protected hills or river valleys. The major complexes associated with the Late Prehistoric are Besant, Avonlea, and Old Women’s.

Besant peoples were the most sophisticated pedestrian bison hunters to occupy the Northwestern Plains (Frison et al., 1996). Besant sites are ubiquitous across the Northern Plains. Based on the number of kill sites on the open prairie, Besant populations clearly favored this environment for killing bison. Besant people were not restricted to the open prairie; they also exploited the more varied resources of foothill and forested areas (Deaver and Deaver, 1988).

During the Avonlea period, use of the bow and arrow became widespread, as did an increased focus on bison as a primary resource (Reeves, 1990). Thinness, extreme symmetry and high degree of craftsmanship characterize the Avonlea projectile point. The workmanship apparent in Avonlea tool assemblages is considered the finest since the Early period, with only a small amount of variation in shape (Reeves, 1990).

The final complex associated with the Late Prehistoric period is Old Women’s. Most of the sites investigated from this complex reflect bison procurement or processing activities. The subsistence practice of Old Women’s groups was a highly specialized form of communal hunting with bison continuing to be the primary focus of hunting activities. The jump and corral methods continued to be employed through most of this complex, although the jump may have been the preferred method. The diagnostic projectile points of the phase are the Prairie side-notched and Plains side-notched points (MacNeish, 1958; Kehoe, 1973).

PROTOHISTORIC PERIOD

The Protohistoric (Equestrian Nomadic tradition) marks the transition between the Prehistoric period and the Historic period. The Protohistoric is distinguished by the introduction of Euro-American trade goods (glass beads, brass pendants, musket balls and metal projectile points [Deaver and Deaver, 1988; Duke, 1991]) and adaptations within Native American lifeways. Of all trade items, the introduction of the horse had the greatest impact on native cultures. Prior to the horse, jumps and corrals were utilized to kill bison. After the introduction of the horse, these methods were generally abandoned; the bison were chased down and killed from horseback. However, it should be noted that abandonment of the practice was not universal. Near the St. Julian Claim Block at a location known as the Emigrant Buffalo Jump complex (24PA0711, 24PA308, 24PA0309, 24PA0630, and 24PA0381), the location was known by the Crow as “Where Buffaloes Are Driven Over Cliffs at Long Ridge,” suggesting that at least in tribal memory, the practice was still known into recent times (Medicine Crow, 1992). Utilization of the horse, in combination with the bow and arrow, resulted in efficiency in bison killing previously unseen on the plains.

The appearance of guns on the Northwestern Plains occurred by the early 1700s as a result of the trading posts set up along many of the major northern rivers (Ewers, 1958). These early guns could be used for both warfare and hunting. However, a muzzle loading firearm was difficult to reload on horseback. Consequently, the bow and arrow was often used instead (Ewers, 1958).
During this time, metal points slowly replaced projectile points made from stone. Protohistoric sites are not commonly found on the Northwestern Plains. Although the use of the horse has been documented by early trappers and explorers; little can be discerned about this tradition from the archaeological record.

HISTORIC PERIOD

Park County was created by the territorial legislature on February 23, 1887. The County takes its name from the proximity to Yellowstone National Park. Though Lewis and Clark were the first Europeans in the area, Jim Bridger was the first to the Emigrant area when he wintered with the Crow in 1844-45 (Romans and Romans, 2016).

The Treaty of 1825 promised the Crow the friendship and protection of the United States in return for Crow acknowledgment of the supremacy of the federal government (Smith, 1986; Hoxie, 1995). The wording of the treaty, however, was vague, and the federal military presence in the area was virtually non-existent at the time. Thus, the treaty had little effect on the Crow. With the acceleration of westward settlement following the discovery of gold in California in the late 1840s, it was merely a matter of time before increased pressure was placed upon the Crow for more substantive treaties. In 1851, the federal government negotiated the first in a series of land tenure treaties with the Crow Indians. Signed at Fort Laramie in what is now Wyoming, the Treaty of 1851 set aside 38.5 million acres of land for the Crow nation (Smith 1896:28). This treaty remained in place until the late 1860s, when increasing Euro-American settlement in Montana territory prompted further land negotiations with the Crow.

The Emigrant Mining District is the oldest mining district in Park County. When Thomas B. Curry and his two companions discovered placer gold deposits in the area in the summer of 1863, they were the first miners to visit the area. The three men were preparing to start work in the gulch when they were interrupted [attacked] by a party of Crows who ordered them off the land (Brown, 1969). Curry and his companions left the gulch and spent the winter at Virginia City. They returned in the spring and were joined by a party of thirty men from a wagon train that Jim Bridger was guiding up the Yellowstone River. Early in the same year, Sam Word and N.P. Langford obtained a charter for a stage and telegraph line between Virginia City and Emigrant Gulch, and when this news got abroad, more men stampeded to the diggings. Their effort produced little gold although mining continued steadily until 1880. The production for that period was estimated at about $340,000. Development of copper-silver lodes began in 1885. Lode mining has been unimportant, but placer mining continued up to the 1940s with significant activity in 1931-1932 (Sahinen, 1935; Lyden, 1948).

Yellowstone City was the first camp set up in the mining district, and was already active by 1864. The town consisted of tents, dugouts, and a few cabins, but the 36 residents had already organized as the Curry Mining District, elected a justice of the peace, and drawn up a code of laws. The placers at the mouth of the gulch were nearly worked out by the fall of 1865, and Indian attacks became more prevalent. The camp was gradually abandoned. By August 1866, the camp was deserted (Wolle, 1963).

As Yellowstone City began to wane in 1865, a new, more strategic townsite called Chico began to grow (now known as Old Chico). This allowed exploration farther up Emigrant Gulch, and
greater protection from the Crow. Albert Hall started a ranch on Giesdorf Creek and raised wheat and other crops to sell to the miners. With settlement and federal pressure mounting, under the Treaty of 1868, the Crow agreed to settle permanently on a reservation approximately 8.5 million acres in size, ceding the other 30 million acres of their 1851 treaty land to the federal government. The first Crow Agency was established along Mission Creek in 1870, and became known to the Crow as “Where They Laid down Yellow Blankets” (Bradley, 1991; Voget, 1984; Medicine Crow, 1992). Ironically, the agency itself became a target of hostilities from other tribes, suffering from weekly attacks from Blackfoot, Sioux, and Cheyenne aggressors (Marquis, 1974).

In 1870 or 1871, two men, Cone and Trout, struck paydirt at bedrock at the mouth of Emigrant Gulch, and gradually opened a placer strip 400 feet wide and nine miles long. Cone reported taking about $8,000 in gold in 1880. By 1877, Old Chico boasted one general store, two boarding houses, a schoolhouse, no saloons, and a population of 60 to 70 miners. Old Chico reached its peak in population by 1900. Hydraulic operations outside of Old Chico ceased by the early 1930s (Wolle, 1963). Notably, in 1872, the US Congress created the nation’s first national park in the nearby Yellowstone National Park. In the early 1880s, the Northern Pacific Railroad completed its connections through the State, and up toward Yellowstone National Park, resulting in a boom in population and overall access.

Though mining activity continued in the area, it wasn’t until several decades later that significant production resumed. In 1932, six operators reported a production of $6,209. Much of the gold prior to 1941 was recovered by drift mining, using hydraulic giants, or ground sluicing. These operations generally accounted for one-half to two-thirds of the annual production of placer gold in the county. The district reported continuous production between 1901 and 1947, treating a total of 1,320 tons of ore and producing 395 ounces of lode gold; 15,592 ounces of placer gold; and 2,592 ounces of silver for a total value in 1950 of $536,192 (Dingman, 1932; Sahinen, 1935; Lyden, 1948; Reed, 1950; Wolle, 1963).

In 1942, the Emigrant Dredging Company assembled a Yuba connected-bucket dredge on Emigrant Creek that is reported to have cost about $600,000 and was claimed to be the largest and most expensive dredge of its kind ever used in Montana. There were 110 buckets, and each held 10 cubic feet of material. In comparison, the last electric dredge in Alder Gulch had 80 buckets, each with a 16 cubic foot capacity. The dredge worked almost continuously from August 15, 1941 to October 15, 1942, when operations were suspended due to government restrictions on gold mining. During 1942, the company recovered 4,352 fine ounces of gold, representing more than one-third of the total production for the entire county between 1904 and 1942. In April of 1946 operations were resumed, but a $13,329 loss was reported during the first five months of operation. In November 1947, the properties on Emigrant Gulch were abandoned and the dredge was sold to Nechi Consolidated Dredging Company, Ltd, of Vancouver, British Columbia for $400,000 (Lyden, 1948).

Among the numerous underground mines in the Emigrant Mining District, the Great Eastern mining claim group is located along Emigrant Creek, midway between Old Chico and the St. Julian Mine claims. Water resources around this site are discussed in Section 3.7. The Great Eastern mining claim group consists of the patented Great Eastern and Great Western claims and a block of about 54 unpatented claims (Stotelmeyer et al., 1983), located along Emigrant
Creek. The Great Eastern and Great Western mining claims were located in 1882, and the main period of their operation was between 1885 and 1901, by the National Park Mining Company. Patent survey plats drawn in 1900 show underground workings consisting of four adits and a shaft. The total length of the adits exceeded 300 feet. The shaft was at least 50 feet deep, but the collar has since been covered. All mine entrances have been obliterated by floods, snowslides, and bulldozing activities, but several tons of mineralized rock are scattered on the associated drill road (Stotelmeyer et al., 1983). The deposit consists of a brecciated porphyry, in which fine-grained molybdenite is associated with pyrite in the matrix and permeates the fragments of brecciated material (Horton, 1916). In 1974, drilling was conducted on the Great Western claim near Emigrant Creek. The upper drill road was being extended south in that area, near one of two holes that the Climax Molybdenum Co. drilled in 1963. It is likely that most drilling in the area extended below 1,200 feet from ground surface, and collars of several drill holes were also found along the creek, near the road and stream crossing (Stotelmeyer et al., 1983).

THE ST. JULIAN MINE

The St. Julian Claim Block consists of eleven patented and unpatented claims, and was discovered in 1887 by D.C. Lilly. The ore was assayed as high as $368 in gold and $40 in silver per ton. A ten-stamp gravity concentration mill operated as late as 1902. Despite promising assays, the mine's development was slow due to lack of capital (Wolle, 1963). Whithorn (2002) documented the stamp mill and concentrating equipment extant on the site as late as 1980.

Other important mines in the district include the Alice C., Barbara Anne, Emigrant Gulch Molybdenite, Galena Queen, Great Eastern, and the Mt. Cowan Molybdenite, Nancy, and North Star. There is also a rumored "lost mine" near Emigrant Peak. The mine was first discovered in 1866 by Davis B. Weaver. Samples from the lode assayed $5,000 in gold to the ton. Two years after discovery, two men who had accompanied Weaver tried for months to relocate the lode but to no avail (Wolle, 1963).

BOUNDARIES OF THE EMIGRANT MINING DISTRICT

Sahinen (1935) places the district as a station on the Northern Pacific Railroad (NPRR) about 25 miles south of Livingston. Emigrant Creek flows into the Yellowstone River a few miles above the town. Dingman (1932) locates the district four miles south of Emigrant, a station on the NPRR. Sahinen and Dingman generally are focusing on placer operations.

Most of the lode mines in the district are at the headwaters of Emigrant Gulch and Mill Creek but the placer operations, although centered along Emigrant Gulch, were active along both Mill and Sixmile Creek. Figure 1.3 shows the district as defined by the AMRB (1994) with a smaller area focused on Emigrant Gulch (Dingman, 1932).

The district is also known as the Chico, Curry, Shorthill, and/or Mill Creek Mining District, some of which were smaller defined areas now included in the larger Emigrant Mining District. The Curry Mining District was apparently the first placer mining district and probably included the area of Emigrant Gulch near the mouth of the Yellowstone River below Chico. Some of the others may be placer districts similar in size. Although the placers were by far the most significant producers in the district, several quartz lodes, primarily on Mineral Mountain, were also productive.
PREVIOUS RESEARCH

A file search was conducted with the Montana State Historic Preservation Office (SHPO) on February 18, 2016. The results indicated that there have been nine cultural resource investigations within or near the St. Julian Claim Block. These reports are summarized in Table 3.4. In addition, a total of nine previously recorded sites have been identified and are summarized in Table 3.5. All of the previously recorded sites have either unresolved, or undetermined status in regards to their individual National Register of Historic Places (NRHP) status. It should be noted that one site, 24PA0307, is a Buffalo kill/processing/pound site that may be associated with an area significant to the Crow, the Emigrant Buffalo Jump complex (Medicine Crow, 1992).

<table>
<thead>
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<th>Author</th>
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<tbody>
<tr>
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<td>1998</td>
<td>810 acres</td>
<td>11 Sites and one isolated find</td>
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<tr>
<td>Allen</td>
<td>2000, 2009</td>
<td>NA</td>
<td>Annual Report</td>
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<td>Lahren</td>
<td>2015</td>
<td>NA</td>
<td>Class I report, no inventory.</td>
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<tr>
<td>Bailey</td>
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<tr>
<td>Allen and Ballard</td>
<td>2006</td>
<td>NA</td>
<td>Annual Report</td>
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<td>1999</td>
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<td>Ryan et al.</td>
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<td>T6SR8E: 11, 12</td>
<td>Irrigation Ditch</td>
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ADDITIONAL RESEARCH

On September 22, 2015, DEQ archaeologist accompanied a group of interested parties, including CGNF archaeologist, to examine the Lucky Minerals project area. During this visit, a number of historic structures and features were observed that represent historic mining activity. In addition, a total of 18 features related to historic mining in the area were identified through a desktop exercise with the use of ArcMap and existing BLM GLO records (Table 3.6). DEQ
Table 3.6
Possible Historic Features Identified through Desktop Examination of Historic Records

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<td>Private</td>
<td>St. Julian</td>
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<td>Mill</td>
<td>T7SR9E: Sec. PB5</td>
<td>Private</td>
<td>Mill</td>
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<td>Discovery Tunnel</td>
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<td>Private</td>
<td>Bullion</td>
</tr>
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<td>Boarding House</td>
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<td>Private</td>
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<tr>
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<td>Private</td>
<td>Copper King</td>
</tr>
</tbody>
</table>

3.6.3 DIRECT AND SECONDARY IMPACTS

3.6.3.1 No Action Alternative

Under the No Action Alternative, Lucky Minerals would not obtain an exploration license and therefore, could not conduct the exploration activities described in its exploration license application. However, the company would still be allowed to stake claims, map the local geology, and collect surface samples. Road maintenance / grading would not occur and access would be by four-wheel drive, ATV, and by foot.

The current condition of cultural resources would remain as they are. However, without proper historic preservation measures, including but not limited to documentation and stabilization, some resources may be at risk for continued degradation of historical integrity from both natural and human influenced actions unrelated to the proposed project.

3.6.3.2 Proposed Action

None of the identified cultural resources have been fully evaluated for eligibility to the NRHP; therefore all of the sites are by default considered eligible for the NRHP in regards to potential impacts. Based on the Proposed Action, no impacts to cultural resources are expected. The activity proposed is temporary in nature and would not comprise any ground disturbance in or
near any previously identified cultural resources. In addition, it is anticipated that any potential secondary or visual impacts would have no adverse impact.

The State has no authority on private lands to require pedestrian survey to record or evaluate any undocumented or undiscovered cultural sites. Further, Montana DEQ has no authority to impose regulation regarding the impacts on cultural resources on private land.

3.6.3.3 **Agency-Modified Alternative**

Same as the Proposed Action, with the exception that all known cultural and historic resources, recorded or identified, would be avoided during the exploration activity. This would include historic mining features within the St. Julian Claim Block. This would preclude any damage to historic features and prevent an inadvertent release of historic mine waste or water. Even though the proposed drill sites do not overlap with any known historic mine workings (*Updated Figure 1.4*), drilling would be conducted carefully at all times. In the circumstance that any void spaces are encountered while drilling, DEQ would be notified and the hole should be assessed for the potential to release any water, and to determine the necessity for abandoning and plugging the hole.

3.6.3.4 **Secondary Impacts**

Based on the MEPA model rules definition, secondary impacts are further impacts to the human environment that may be stimulated or induced by, or otherwise result from a direct impact of the action.

The improvements that Lucky Minerals has proposed to make on the access roads to the St. Julian Claim Block include grading in localized areas, clearing of rock and other debris, and sloping of roads to enhance drainage and prevent channeling. The access roads to the St. Julian Claim Block will not be made wider. Currently, a four-wheel drive high clearance vehicle is required to get to the St. Julian Claim Block. It is anticipated that the same type of vehicle will be required after Lucky Minerals makes the road improvements and completes its exploration activities. Thus, there are not expected to be any significant secondary impacts to historic mining features.

**3.7 WATER AND GEOTHERMAL**

**3.7.1 ANALYSIS AREA AND METHODS**

The analysis area for water resources initially focused on the hydrologic unit which encompasses the Emigrant Mining District, with additional consideration given to geothermal systems in the region. Based upon public comments received on the Draft EA, additional analysis was conducted for lower Emigrant Creek and its confluence with the Yellowstone River, three miles to the south of the town of Emigrant. Due to the scale of influence that was demonstrated through that analysis, the extent of the analysis area was not further expanded to include the Yellowstone River beyond the Emigrant area.
The primary hydrologic unit for the Emigrant Mining District is designated as the Emigrant Creek subwatershed and is identified with a 12 digit number in the Hydrologic Unit Code (HUC) system established by the USGS (#100700020206). This indicates that the Emigrant Creek subwatershed is at the top of the drainage system for this region of the Absaroka-Gallatin volcanics (Figure 3.6). The climate of the area typically consists of warm summers and cold winters, with an average annual temperature of 35 °F (1.6 °C). The area receives 25 to 35 inches of precipitation annually, mainly in the form of snow (PRISM Climate Group). The Emigrant Creek subwatershed covers an area of 13,360 acres, and is one of nine subunits within the Big Creek-Yellowstone River watershed (HUC 10; 212,940 acres).

The analysis methods for water and geothermal resources included reviewing publications by the USGS and MBMG, primarily derived from fieldwork conducted in the area in 2015 by DEQ, CGNF, and MBMG (LaFave, 2016), water quality data in the Groundwater Information Center (GWIC) database, and any associated maps and figures. Figure 3.6 shows the location of all water resource sites that were considered during this analysis. These sites occur in two general clusters, one around Old Chico and the other around upper Emigrant Creek and East Fork of Emigrant Creek. The water resource sites can be categorized as streams, cold springs and seeps, hot springs and seeps (>77 °F or 25°C), private wells, existing boreholes, and drainage related to mining. The most recent data collected include: flow measurements from streams, springs, seeps, and flowing boreholes; dissolved ion and metal concentrations from most sites; and field chemical parameters from all sites (LaFave, 2016). In some cases, well logs and water quality data from the 1970s and 1990s are available in the GWIC database, but the site locations may be inaccurate and the analysis suites are relatively limited. These site data are useful for historical context, but may not be directly comparable to the current environmental conditions.
Figure 3.6
St. Julian Exploration Project, Park County, Montana

(All water resource monitoring sites in the analysis area, shown with Hydrologic Unit Code (HUC) 12 boundaries, the Proposed Action area, detailed views are shown in Figures 3.7 and 3.8)
3.7.2 AFFECTED ENVIRONMENT

3.7.2.1 Stream Hydrology

The analysis of potential impacts to surface water was prioritized to follow the primary drainage pathway, and focused on the areas adjacent to the Proposed Action site (i.e. East Fork of Emigrant Creek and Emigrant Creek above Old Chico). The headwaters for Emigrant Creek begin at high elevations (near 9,200 to 9,600 feet above mean sea level- amsl) on the western face of the Mineral Mountain ridge, located to the southeast of the St. Julian Mine area. From these meteorically derived sources, Emigrant Creek flows to the northwest for almost three miles before receiving flow from the Huckleberry Gulch drainage, and another mile before combining with the East Fork of Emigrant Creek (East Fork). This East Fork confluence is located approximately two miles to the east of Emigrant Peak, at an approximate elevation of 7,275 feet amsl. During baseflow conditions in 2015, the flow in Emigrant Creek was measured at 3.01 cubic feet per second (cfs) above the confluence with the East Fork, and increased to 4.21 cfs below the confluence (LaFave, 2016).

To the east above that confluence, the East Fork flows from east to west for approximately two miles, draining the cirque valley where the St. Julian Mine area (Proposed Action sites) is located on the southern slope of the valley. The head of the stream begins at a pond within the cirque, located near 8,950 feet amsl, approximately one mile up-gradient from the St. Julian Mine. The East Fork flows along the valley floor, roughly followed by the access road through the old St. Julian Mill area. Access to the St. Julian Claim Block would follow the road along the East Fork at the base of the mountain, before climbing switchbacks to the drill pads which would be situated up to 1,000 feet above the elevation of the East Fork. In 2015, two sites were visited on the East Fork that are located up-gradient and down-gradient of the St. Julian Mine. The flow was measured at 0.8 cfs at the site below the mine, but flow was not measured at the upper site (LaFave, 2016). There are a number of springs along the drainage to the west of the St. Julian Mine, which contribute to the higher flow that was measured in the East Fork directly above the confluence with Emigrant Creek (1.42 cfs; LaFave, 2016).

Below the East Fork confluence, Emigrant Creek flows northwest for an additional five miles before reaching the mouth of Emigrant Gulch at Old Chico. Along that reach of the stream, a number of springs were identified in the vicinity of the Great Western and Great Eastern mine claims (T06S, R08E, S36), a molybdenite property located one mile north of the East Fork confluence. Although the general location matches the description of exploration targets provided by Stotelmeyer et al. (1983), it is unclear if those springs discharge naturally through fissures, or if the water emanates from former drill holes or mining-related disturbances. Above the influence from these springs, the flow in Emigrant Creek was measured at 5.43 cfs.

Between the Great Western area and Old Chico, there are three main tributaries, Fridley Creek and Balm of Gilead Creek from the east and Blacktail Creek from the west, as well as inputs from multiple small, unnamed drainages. Flow in Emigrant Creek was then measured at a private bridge near Old Chico (14.41 cfs), representing the northern-most point on Emigrant Creek within the subwatershed and incorporating all of the tributaries north of the Great Western and Great Eastern claims. The Emigrant Creek flow that reaches Old Chico is slightly more than 10 times the total flow that exits the East Fork drainage, indicating the dominance of
the other tributaries and groundwater sources on the hydrology and chemistry of Emigrant Creek.

All of the field measurements taken by the MBMG in the fall of 2015 indicate steadily increasing flows in Emigrant Creek as it continues down-gradient through the subwatershed, without any significant losses being measured. The increasing flows within Emigrant Gulch can be attributed to the cumulative inputs from the surface tributaries and from shallow groundwater flow. Insufficient data exist to separate and estimate the contributions from each tributary drainage or groundwater source, but the MBMG measured flow and water quality from a number of springs and seeps in the vicinity of East Fork and Emigrant Creeks. The presence of these spring sites indicates that the steep topography directs shallow groundwater toward topographic lows (i.e. streams in the valley bottoms), rather than to deeper bedrock flowpaths.

Near Old Chico, Emigrant Creek continues to flow to the west-northwest and enters the Dry Creek-Yellowstone River subwatershed. Before the confluence with the Yellowstone River, Emigrant Creek flows through and around substantial piles of dredge waste from historical placer operations. These dredge waste piles cover an estimated area of 18 acres. There are also a number of diversions that direct flow out of Emigrant Creek, into irrigation ditches across the arid valley benches. Although Emigrant Creek exits the mouth of Emigrant Gulch only two miles away from the Yellowstone River, it is clear that there is seasonal disconnection between the two streams.

Aerial imagery from the National Agricultural Image Program (NAIP) clearly shows that the lower reach of Emigrant Creek is often seasonally dry, with no surface connection to the Yellowstone River. The aerial photos are taken every other year, and all of the images captured in 2005, 2011, 2013, and 2015 were taken in late August or September, with no visible water in lower Emigrant Creek. The only NAIP image that shows a flowing stream in the Emigrant Creek channel at the Yellowstone River confluence is from July, 2009. Even when there is sufficient flow in Emigrant Creek to reach the Yellowstone River, more complex monitoring would be needed to determine what fraction actually reaches the river and what fractions are lost to irrigation, infiltration, and evapotranspiration. Historic data from the USGS provide a general comparison for streamflow during times when there is a direct connection between the two streams. The baseflow measured in Emigrant Creek at Old Chico was 8.9 cfs, but down near the confluence the flow decreased by 75% to 2.2 cfs, which was then only 0.2% of the 1,090 cfs measured in the Yellowstone River (USGS, April 1977).

There are two USGS gaging stations on the Yellowstone River within Paradise Valley, one near Corwin Springs (#06191500) and one just south of Livingston (#06192500). Hourly discharge data were analyzed for the time period during the MBMG field investigation in the last week of October, 2015. The site near Livingston had a daily average flow of 1,733 cfs, while the site near Corwin Springs had a daily average flow of 1,109 cfs. This implies that there was an increase of 624 cfs due to groundwater and surface water contributions between the two sites, which are located approximately 47.5 miles apart, as measured along the river channel. Through interpolation, it was then estimated that the Yellowstone River would have had a discharge near 1,335 cfs at the confluence with Emigrant Creek, 21 miles to the north of the Corwin Springs gaging station. For temporal comparison, the baseflow in Emigrant Creek at Old Chico was measured at 14.41 cfs by MBMG at that time. If none of the water was lost to diversion and
the creek’s total flow reached the Yellowstone confluence, the hydrologic and chemical load from Emigrant Creek would account for only 1.1% of total streamflow in the Yellowstone River. This estimation agrees with the measurements taken in 1977. Considering the irrigation diversions and seasonal disconnection, even this flow assessment is overly conservative about the potential influence from Emigrant Creek on the Yellowstone River.

### 3.7.2.2 Stream Water Quality

Water quality samples from Emigrant Creek and the East Fork were collected in October 2015 at many of the same sites where flows were measured. Even if samples were not collected for detailed laboratory analysis, general chemical parameters were measured in the field at each location (e.g. temperature, pH, specific conductivity (SC), reduction potential (redox), and dissolved oxygen concentration). The water resource sites in the area of the Proposed Action are shown as the southern group in **Figure 3.6**, and are shown with more detail in **Figure 3.7**. Summarized water chemistry results are given in **Appendix A**, and complete water analysis results are on file at DEQ.

The waters in Emigrant Creek and the East Fork have chemical characteristics that are typical of high elevation streams that are influenced by a small degree of mineral weathering. All of the stream sample locations had cold temperatures (<41 °F, 5 °C), slightly acidic to neutral field pH values (6.00 to 7.78), low total dissolved solids (TDS <90 mg/L), high dissolved oxygen concentrations (>9 mg/L), and ion loads dominated by calcium, magnesium, bicarbonate, and sulfate. At every stream site that was sampled, the total nitrate/nitrite and phosphorous concentrations were below the laboratory detection limits (<0.20 mg/L and <0.020 mg/L, respectively). The concentrations of these nutrients were also below the base numeric standards that were established for the Absaroka-Gallatin Volcanic Mountains (Ecoregion 17i, level IV), with total nitrogen at 0.250 mg/L and total phosphorous at 0.105 mg/L. However, these criteria only apply during the period between July 1 and September 30 (DEQ-12A).

The uppermost sample from Emigrant Creek was collected directly above the confluence with the East Fork (GWIC #284999). A summary of water chemistry is provided in **Table A.1**, and the chronic aquatic life standards for aluminum and cadmium were exceeded at this location (DEQ-7). It should be noted that the comparison to the low cadmium standard is problematic, because although the measured value is considered detectable, it is below the analytical reporting limit that is indicated by MBMG laboratory.

Within the East Fork at the base of the St. Julian Mine area, few changes were noted in water chemistry between the up-gradient and down-gradient sites (GWIC 285007 and 285009). Within this 2,000 feet section of stream, the pH increased from 6.00 to 6.51 and the SC increased from 84 to 93 µS/cm, indicating a minor increase in alkalinity and dissolved ion load at the lower site. At the upper site, there were no exceedances of the established human health or aquatic life standards for water quality. Both of these sites are located up-gradient from a small northern tributary, as well as from the point where the access road crosses through the stream channel for approximately 10 feet (**Figure 3.7**). Although the stream crossing consists of coarse, angular rock, there is potential for turbidity and suspended solid loads to increase briefly at that point in the stream as a result of any traffic-related disturbance on the road. The degree of sedimentation or turbidity was not quantified during recent field work.
Another 0.8 mile to the west towards the confluence with Emigrant Creek, water quality in the East Fork degrades along the gulch. This is primarily due to inputs from groundwater, and surface discharge from springs and seeps, particularly from the north side of the stream. Approximately 500 feet above the Emigrant Creek confluence (GWIC #284926), the pH decreased, while the TDS, sulfate, and metal concentrations increased. Four metals exceeded the acute and/or chronic aquatic life standards at this location: aluminum, cadmium, copper, and zinc (DEQ-7).

Directly below the East Fork-Emigrant Creek confluence (GWIC #284998), the pH increased and dilution moderated the dissolved ion concentrations coming from both streams. At this site, only cadmium and zinc exceeded the chronic aquatic life standards. Again, this low cadmium concentration is considered detectable, but it is below the analytical reporting limit that is indicated by MBMG laboratory. One mile to the north, another sample was taken from Emigrant Creek directly up-gradient from the Great Western and Great Eastern molybdenite claims (GWIC #284991). Corresponding to increasing flow in this reach, there was an increase in pH and a slight decrease in most dissolved ion concentrations. With a corresponding decrease in hardness, the chronic aquatic life standards were exceeded for copper and cadmium, with this cadmium concentration also falling below the MBMG reporting limit. Within the Great Western claim, there is another point where the access road crosses through the stream channel for approximately 90 feet. Although the stream crossing consists of coarse, angular rock, there is potential for turbidity and suspended solid loads to increase briefly at that point in the stream as a result of any traffic-related disturbance on the road. The degree of sedimentation or turbidity was not quantified during recent field work.

The northern-most sample collected from Emigrant Creek was taken at a private bridge near Old Chico (GWIC #284996). This represents the furthest down-gradient stream site within the subwatershed and incorporates all of the surface and groundwater flow contributions north of the Great Western and Great Eastern claims. Between the two lower monitoring sites, the flow in Emigrant Creek more than doubled. As a result, this site had the highest concentrations of most major ions, but trace metal concentrations generally decreased. There were no metal concentrations that exceeded aquatic life standards at this location.

When comparing Emigrant Creek with the Yellowstone River, the difference in scale between the two streams is also emphasized by the available water quality data. During the same USGS investigation cited in Section 3.7.2.1, the measured total dissolved solids load in Emigrant creek was 0.59 tons/day, accounting for <0.1% of the 592 tons/day transported by the Yellowstone River (USGS, April 1977). Recent investigations by MBMG and DEQ measured arsenic concentrations of 0.47 µg/L in Emigrant Creek near Old Chico, and an average of 21.5 µg/L in the Yellowstone River at Emigrant (human health standard is 10 µg/L). This corroborates with the USGS investigation on water quality in the Yellowstone River Basin, which identified geothermal features in and around Yellowstone National Park as significant sources of nutrients, major ions, and trace elements to the Yellowstone River, with arsenic concentrations as high as 42 µg/L measured in the river near Corwin Springs (USGS Circular 1234, 2004). Similar conditions are observed for other parameters like sulfate, chloride, fluoride, sodium, magnesium, and potassium, and trace elements like aluminum, iron, and antimony. The concentrations of these parameters are many times higher in the Yellowstone River, than in Emigrant Creek at Old Chico. The chemical load from the Emigrant Creek subwatershed is very minor, but its influence on the Yellowstone River is further diminished by diversion flow losses.
Figure 3.7
St. Julian Exploration Project, Park County, Montana

Detail map near the East Fork and Emigrant Creek confluence. Stream sites are shown with selected parameters, including flow, pH, TDS, and any water quality standard exceedance.
3.7.2.3 **Groundwater Hydrology**

Groundwater information for the Emigrant Creek subwatershed is limited due to the lack of permanent wells in the area. Based on the known geology of the area, it is assumed that groundwater flow occurs in the glacial and alluvial deposits on the surface of slopes and gulches, as a result of meteoric water infiltration. In general, bedrock groundwater flow in alpine watersheds dominantly occurs in shallow, high-permeability (active) zones that overlie deeper, low-permeability (inactive) zones that host little flow (Manning and Caine, 2008). The higher permeability in the shallower zone is generally attributed to a greater degree of weathering and/or fracturing. The groundwater resource sites in the area of the Proposed Action are shown as the southern group in Figure 3.6, and are shown with more detail in Figure 3.8.

Some information about groundwater is available from four flowing boreholes that remain from previous exploration drilling; three are located to the west of the St. Julian Mine claims (Duval Corporation holes; T7S, R9E, S6) and the other is located on the Great Western claim area. However, the depths of the boreholes and the nature of the altered volcanics that were encountered are unknown. Although there may be slight seasonal variations, three of the four boreholes produced water under artesian pressure at very low flow rates, estimated to be between 0.25 and 2 gpm. The lower Duval Corporation borehole (GWIC #171924) was not flowing during 2015 field work, and there appeared to be an obstruction within the hole preventing water level measurements. Iron staining around the hole suggested relatively recent flow, and although a sample was not taken at this site, field parameters were measured from a small volume of water remaining within the hole. It is important to note that these holes were drilled in the 1970s, prior to the passage of regulations for the reclamation of exploration sites (ARM 17.24.107).

At the other Duval Corporation holes, the impacts at the surface are extremely localized and the “immediate, saturated area where the water is flowing is devoid of vegetation but the surrounding vegetation is healthy and appears unaffected by the water” (Hargrave et al., 2000). Some of this water flows down the road that connects the borehole sites, before infiltrating back into the ground. Much of the water infiltrates into the coarse surface material surrounding the holes. Under these circumstances, it is more appropriate to compare water quality data from the boreholes to the established groundwater standards in DEQ-7, even though the data also meet aquatic life criteria.

The other groundwater data that exist come from springs and seeps that occur along steep slopes in close proximity to the East Fork and Emigrant Creek. In the St. Julian Mine area, there were two water resource sites identified on the slope where the Proposed Action drill sites are located. One was a seep which occurs at the base of the mountain, on the east end of the first switchback (GWIC #285001). A small pool was noted below the head of the seep, which had an estimated flow of five gpm. This site is located approximately 10 feet above the access road, and nearly 60 feet to the west of the upper-most East Fork sampling site. To the west of this seep, the second seep was identified in the road which leads up to the other proposed drilling sites (GWIC #285011).
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Figure 3.8 St. Julian Exploration Project, Park County, Montana

(Detail map near the East Fork and Emigrant Creek confluence. Groundwater sites are shown with selected parameters, including flow, pH, TDS, and any water quality standard exceedance.)

**Water Resource Sites**

- Stream_Crossings
- Stream
- Cold Spring-Seep
- Borehole
- Mine Drainage

**GWIC # 284916**
Great Western Borehole
- Flow: 0.25 gpm
- pH: 7.53
- TDS: 177.4 mg/L

**GWIC # 284993, 284992, 284994, 284995**
Springs East #1, East #2; West #1, West #2
- Flow: 15 gpm; 10 gpm; 15 gpm; 25 gpm
- pH: 7.76; 7.79; 7.47; 7.43
- TDS: No Data; 58.5 mg/L; 66.2 mg/L; No Data

**GWIC # 285011**
St. Julian Seep #2
- Flow: 0.25 gpm
- pH: 6.18
- TDS: No Data

**GWIC # 171926**
Allison Tunnel Mine
- Flow: 30 gpm
- pH: 2.93
- TDS: 270.8 mg/L
- Al, Cd, Cu, Pb, Zn exceed

**GWIC # 284997**
Spring Below Confluence
- Flow: 75 gpm
- pH: 7.40
- TDS: 78.9 mg/L

**GWIC # 284924**
South Groundwater
- Flow: 7.5 gpm
- pH: 5.76
- TDS: 94.1 mg/L
- Cd, Zn exceed

**GWIC # 285013; 284923**
North Road Spring; North Groundwater
- Flow: 1 gpm; 7.5 gpm
- pH: 2.83; 2.89
- TDS: 206.6 mg/L; 247.4 mg/L
- Al, Cd, Cu, Pb, Zn exceed

**GWIC # 171294; 284905; 171925**
Lower, Middle, Upper Duval Boreholes
- Flow: No Data; 2 gpm; 0.75 gpm
- pH: 7.44; 7.18; 7.30
- TDS: No Data; 208.9 mg/L; 186.6 mg/L
This seep had a much lower flow, estimated at 0.25 gpm. Given the location in the road and the circular nature of the seep, this feature could be a historical drill hole, or possibly associated with a mine adit or shaft. It is unclear if the water from both of these seeps reaches the stream below, as there were no direct discharge points observed. The surface seepage likely infiltrates temporarily into the ground before any potential discharge, but the contribution to flow in that reach of the East Fork would likely not be measureable.

This seep had a much lower flow, estimated at 0.25 gpm. The water from both of these sources likely reaches the stream below, but there were no direct discharge points observed. The surface seepage may temporarily infiltrate into the ground before discharge, but the contribution to flow in that reach of the East Fork is likely not measureable.

The other springs which occur in the proximity of the East Fork are located above the confluence with Emigrant Creek, generally situated at the base of the mountain below the Duval Corporation boreholes. There are two springs that occur on the north side of the East Fork, which represent the groundwater contributions from that south-facing slope. One spring was identified within a zone of ferricrete and was estimated to flow at 7.5 gpm directly into the East Fork (GWIC #284923). The other spring was located to the west within the footprint of the access road (GWIC #285013), but the small volume of water there appeared to infiltrate back into the ground within a short distance (estimated at one gpm). One other spring was identified in this reach of the East Fork, but it was located on the southern bank (GWIC #284924), and had an estimated flow of 7.5 gpm.

To the north of the East Fork and Emigrant Creek confluence, abandoned mine drainage has been observed from the Allison Tunnel (GWIC #171926; T07S, R09E, S06) at an elevation of 7,650 feet amsl. The Allison Tunnel was driven in the early 1900s to explore for gold, silver, copper, and molybdenum, and it likely focused on the contact between Tertiary dacite and granodiorite porphyries. The tunnel encountered an area of strong pyrite alteration (Stotelmeyer et al., 1983; Hargrave et al., 2000), likely within an ore-bearing breccia pipe. The adit has now entirely collapsed, but the flow was estimated to be 30 gpm. Much of the area near the Allison Tunnel has been stained with precipitated iron minerals, but the mine discharge infiltrates back into the ground and does not directly reach Emigrant Creek.

Directly below the East Fork and Emigrant Creek confluence, a spring was identified on the south side of the stream that had an estimated flow of 75 gpm (GWIC #284997). As noted in the previous section, the flow in Emigrant Creek increased by 1.2 cfs through this stretch before reaching the Great Eastern and Great Western mine claims. Down-gradient of the stream monitoring point, four springs were identified near the Great Western claim. Two springs occur on the east side of the stream and had estimated flows of 15 gpm (GWIC #284993) and 10 gpm (GWIC #284992). The other springs were located on the west side of the stream and had estimated flows of 15 gpm (GWIC #284994) and 25 gpm (GWIC #284995) (all from LaFave, 2016). These sites are likely representative of the groundwater contribution to flow in this stretch of Emigrant Gulch, but as stated previously, it is unclear if these springs emanate from natural fissures or from former drill holes. No other springs were noted or sampled between the Great Western area and the northernmost stream site near the mouth of Emigrant Gulch, but groundwater likely contributes to the increasing flow in Emigrant Creek along that reach.
Further to the northwest, there are many private wells drilled in the Old Chico and Chico Hot Springs areas, located within the Big Creek-Yellowstone River subwatershed. There is insufficient information in the GWIC database to create potentiometric surface maps for groundwater along the margin of the valley. Many of the site locations in GWIC are unreliable due to historic or incomplete surveys, and oftentimes the ground surface elevations and/or groundwater elevations are unavailable. Some of the more reliable locations for private wells in this area and the Chico Hot Springs are shown in Figure 3.9.

The majority of private wells in the valley are completed in glacial and alluvial deposits, with a mixed lithology of clay, sand, gravel, and boulders. Two wells (GWIC #217260 and 217261) are completed in semi-fractured volcanic and intrusive rocks, described in the well logs as granite with intermittent clay zones. Many of the private wells are relatively shallow, ranging in depth from 40 to 140 feet. A few of the wells are open-bottomed, while most are screened over the bottom 10-20 feet. In some cases, the water elevations were recorded at the time the wells were drilled. These water levels ranged from 28 to 75 feet below ground surface, indicating some degree of head pressure from the lower screened depths. For the wells which received air development, the reported flow rates ranged from 20 to 40 gpm (all from GWIC).

There are also five private wells that intercept a deeper productive zone, with depths ranging from 230 to 1,600 feet. These wells are located predominantly to the west and southwest of Old Chico, and are also completed in similar glacial and alluvial deposits, with alternating zones of clay-bound material. Development data are limited, but these wells appear to produce only half as much water as the shallow neighboring wells (10-15 gpm) and static water elevations range from 50 to 250 feet below ground surface (all from GWIC)

The hydrogeological evidence does not suggest there is a direct connection between groundwater in the Emigrant Creek subwatershed and the system feeding Chico Hot Springs (LaFave, 2016). As noted before, bedrock groundwater flow in alpine watersheds occurs primarily in shallow “active zones,” while the deeper “inactive zones” host little flow and exhibit decreasing permeability with depth (Manning and Caine, 2008). This is observed in the analysis area, where the steep topography directs shallow groundwater toward topographic lows (i.e. streams in the valley bottoms). The abundance of streamside springs and the presence of low-flow artesian boreholes at lower elevations on valley slopes support this conceptual model. The flows measured in the East Fork and Emigrant Creek increase steadily, indicating contributions from surface tributaries and groundwater without measurable losses to a deeper flow system. This also suggests that the deep, inactive zones in the bedrock are unlikely environments to generate geothermal water, lacking sufficient circulation and heating at depth.

3.7.2.4 Groundwater Quality

Water quality samples were collected from the majority of groundwater sites that are discussed in the previous section. Even if samples were not collected for detailed laboratory analysis, basic chemical parameters were measured in the field at each location (e.g. temperature, pH, SC, redox, dissolved oxygen concentration). The water resource sites in the area of the Proposed Action are shown as the southern group in Figure 3.6, and are shown with more detail in Figure 3.8. Abbreviated water chemistry results are given in Tables A.2 and A.3, but complete water analysis results are provided in water chemistry technical report on file at DEQ. None of the
Figure 3.9
St. Julian Exploration Project, Park County, Montana
(Detail map around Old Chico area. Stream and groundwater analysis sites are shown with selected parameters, including flow, pH, TDS, and any water quality standard exceedance)
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identified springs or seeps had temperatures greater than 43 °F (6 °C), indicating no direct geothermal influence. Compared to the stream sites that were sampled concurrently, the seeps, springs, and flowing boreholes in the Emigrant Creek subwatershed show greater variability in water chemistry.

The sites that occur in the East Fork drainage can be divided into two general groups based on water quality data and location relative to the stream. Three sites represent the groundwater flowing on the north-northwest side of the East Fork: the Allison Tunnel mine drainage (GWIC # 171926), the ferricrete spring which discharges directly to the stream (GWIC #284923), and the low-flow seep which infiltrates back into the access road (GWIC #285013). As shown in Table A.2 and found in water chemistry technical report, these three sites had low pH values (<4.5), no measurable alkalinity, and significantly elevated concentrations of TDS and sulfate. A variety of metals also exceeded the acute and chronic aquatic life standards but not the human health standards (e.g. aluminum, cadmium, copper, lead, and zinc). The Allison Tunnel also had elevated iron and manganese concentrations that were both above 5 mg/L. Based on these chemical characteristics and the intense alteration known to occur in the volcanic host rocks, it is clear that these three water resource sites are impacted by pyrite oxidation and acid rock drainage (ARD). Coupled with the stream site water quality data, it is also clear that groundwater from this part of the drainage is predominantly responsible for the elevated concentrations of aluminum, cadmium, copper, and zinc in the adjacent reach of the East Fork and portions of Emigrant Creek.

On the south side of the East Fork, there is variability between the two sites located within the St. Julian Mine area, and the streamside spring and flowing Duval Corporation boreholes located further to the west. The St. Julian Seep #1 (GWIC #285001) had a slightly acidic pH (5.90) and elevated TDS (121.3 mg/L), but there were no exceedances of water quality standards (Table A.2). Complete samples were not collected from the nearby St. Julian Seep #2 (GWIC #285011), but field parameters indicate a higher pH (6.18), higher SC, and a lower oxygen concentration. To the west, the spring which flows along the south bank of the East Fork (GWIC #284924) had a similarly acidic pH (5.76) and elevated TDS concentration. The cadmium and zinc concentrations exceeded the respective aquatic life standards, but again, the cadmium concentration was detectable but below the analytical reporting limit for MBMG laboratory.

Directly south and up-gradient from the East Fork, the water quality data from the Duval Corp. boreholes stand out with elevated pH values (7.18-7.44), low oxygen concentrations, and high alkalinites. The lower borehole (GWIC #171924) was not flowing during the 2015 field visit and complete samples were not collected, but field parameters were measured and were similar to the other two holes. Additionally, the middle borehole (GWIC # 284905) and upper borehole (GWIC #171925) had moderate TDS and sulfate concentrations, and there were no water quality standard exceedances. In addition to the St. Julian Mine area seeps, the flowing Duval Corporation boreholes represent what is known about the groundwater flowing mid-slope on the south side of the East Fork.

Below the Emigrant Creek and East Fork confluence, a 75 gpm spring occurs on the south side of the bank (GWIC #284997) (Table A.3). The water quality measured in this spring was very similar to the springs encountered up-gradient from the Great Western/Great Eastern claims area (GWIC #284992, 284993, 284994, and 284995). All of these springs had slightly alkaline pH
values (7.40 – 7.79), high oxygen concentrations (>9.0 mg/L), and moderate TDS and sulfate concentrations. There were no water quality exceedances measured, and most metal concentrations were near or below analytical detection limits. The low-flow, artesian borehole at the Great Western claim (GWIC #284916) had similar water quality as the springs, with the exception of a low oxygen concentration and reduction potential. In addition, no water quality standard exceedances were noted for the Great Western claim borehole.

As discussed in the previous section, there are a number of private wells completed in valley sediments outside of the Emigrant Creek subwatershed. However, detailed water quality data are not available in the GWIC database for any of these sites. There is one private well (GWIC #182638) where field parameters were measured in 2000, but a completion depth and well log are not reported (Figure 3.9). The approximate location appears to be between the mouth of Emigrant Gulch and Chico Hot Springs. The limited field data include a temperature of 43 °F (6 °C), a pH of 7.60, and a moderate SC of 153 µS/cm. Although the lack of data prevents other conclusions from being made, by comparing this site to the field parameters collected at Chico Hot Springs, it seems clear that there is no direct geothermal influence at this well location. More detailed information for Chico Hot Springs is available in the GWIC database, and will be discussed further in the following section.

3.7.2.5 Geothermal Resources

CHICO HOT SPRINGS

As discussed in the Geology and Minerals section, the Paradise Valley forms the western margin of the Absaroka Range, Beartooth uplift, and the Emigrant Mining District. This region of Paradise Valley is bounded on its southeast margin by faults which generally dip to the northwest (Personius, 1982). The Deep Creek fault (also known as the Emigrant fault) is the primary fault at this margin. Some gravity data suggest that the valley fill sediments could extend more than two miles in depth (Bonini et al., 1972 in Wu, 1995). These valley margin faults can often provide a pathway and discharge point for water that is circulated and heated at depth.

As shown in geologic maps (Figure 3.1 and 3.10), the hot springs at the Chico Hot Springs Resort are located one mile to the northeast of Emigrant Gulch and emanate from Paleozoic sedimentary rocks (e.g. Madison Limestone) that occur along the Deep Creek/Emigrant fault. This fault zone extends to the east-northeast where it connects with other surface exposures of Paleozoic units at higher elevations in the Beartooth uplift. These permeable units are likely recharged with meteoric water at high elevation, and then provide a pathway for deep fluid circulation and discharge to the lower elevation surfaces under hydrostatic pressure. These geothermal circulation systems are relatively common along other valley-bounding faults in western Montana, and are not dependent upon proximity to Yellowstone National Park (YNP) (Sonderegger, 1984). An average geothermal gradient of 138 °F/mile (30 °C/km) was estimated from a survey of many Montana hot springs, though there can be deviations in the temperature gradient between different water-bearing structures (Sonderegger, 1984).

The hot springs at Chico are located directly south of the parking lot at the resort, and occur at the surface as multiple steaming pools, no more than a few feet in diameter. During a MBMG site investigation in 2011, the temperatures of the spring pools ranged from 111.8–117.1 °F (44.3–
47.3 °C), and the total flow was estimated to be 210 gpm, based on the reported filling rate for the resort swimming pool (unpublished MBMG data). A previous investigation reported similar results, and categorized Chico Hot Springs as a low-discharge high-temperature system, with a temperature of 113 °F (45 °C) and a flow of 320 gpm (Sonderegger, 1984). Deep reservoir temperatures were estimated to be between 125–154°F (52–68°C), with an average of 142°F (61°C), based on dissolved ion concentrations and geothermometry calculations (Metesh, 2000; MBMG unpublished data). Coupled with the average geothermal gradient, this indicates a circulation depth that is greater than one mile, which generally agrees with geophysical data. During the 2011 MBMG sampling, resort staff members reported that periodic earthquakes can cause fluctuations in temperature and flow, as well as the load of sediment and algae coming from the hot springs. These impacts to the springs are likely caused by changing permeability and rock surface disturbance from movement within the fault zone, and not from human activity elsewhere in the watershed.

Water chemistry for the hot spring pool with the highest temperature is summarized in Table A.3. In addition to an elevated temperature, there are a number of parameters that make the Chico Hot Spring water chemically distinct when compared to the groundwater sites in the Emigrant Creek subwatershed. The TDS concentration is elevated (269.4 mg/L), but as shown in Figure 3.11, the ratios of major dissolved ions are also different, with Chico Hot Springs having higher concentrations of sodium, potassium, and bicarbonate than the other sites. The trilinear Piper diagram indicates that groundwater and stream sites around the East Fork and Emigrant Creek drainages are generally dominated by the same dissolved ions, with varying concentrations of calcium, magnesium, and bicarbonate. The acidic water from the north of the East Fork (i.e. Allison Tunnel and north-side springs) forms a separate group with lower calcium and higher sulfate concentrations.

The trace element signature of the hot spring is also unique, with elevated concentrations of arsenic, boron, cesium, lithium, nickel, and tungsten (Table A.3). These elements occur in low or non-detectable concentrations in the other water resource sites. Conversely, the metal contaminant concentrations which are elevated in the East Fork and Emigrant Creek drainages (e.g. cadmium, copper, lead, zinc) occur in low or non-detectable concentrations in the hot spring water. It is also noted that Chico Hot Springs is the only site that exceeds the chronic aquatic life and human health water quality standards for nickel (at 0.192 mg/L). This stands out as one component of the unique chemical signature for Chico Hot Springs, as nickel was measured at concentrations less than 0.00725 mg/L (or below detection limit) at all other water resource sites in the analysis area.

The Chico Hot Springs Resort also utilizes a cold spring that is located 0.5 mile south of the hot spring, located within the Dry Creek-Yellowstone River subwatershed. The data from the cold spring were collected in 2000, and the site is classified in GWIC as a public water supply. The data indicate a much lower flow (15 gpm) and lower temperature (46 °F, 7.9 °C) than the nearby hot spring. In addition to a much higher pH value (8.90), the dissolved ion and metal concentrations are quite different than the hot spring, and indicate that the cold spring is not connected to the geothermal system. The cold spring emanates from fractures within shallow porphyritic dacite, which is recharged by the infiltration of surface water through the thin colluvium that occurs immediately above the spring (Rose, 2002). The public water supply
study also indicated that a pond which is located northeast of the spring could also potentially supply recharge to the shallow fractured rock.

The water quality data suggest that the groundwater in the Emigrant Creek subwatershed is geochemically distinct from the groundwater system feeding Chico Hot Springs (LaFave, 2016). Additionally, the requisite hydrogeological evidence to suggest these systems are connected does not exist. The prominent fault orientation in the area near Chico trends to the northeast, which is perpendicular to the profile of the Emigrant Creek subwatershed (i.e. non-conductive). Additionally, there are no sedimentary rock units identified along Emigrant Gulch, which would be necessary to serve as a conduit for the fault-bounded, sedimentary rock-sourced hot spring. Rather, it is more likely that the similarly faulted Paleozoic sediments (e.g. Madison Limestone) that are located to the east on the Beartooth Plateau act as recharge zones for the Chico Hot Springs (Figure 3.1 and Figure 3.10).

**Figure 3.11:** Ratios of major dissolved ions (in % composition) are shown for Chico Hot Springs and the major water resource sites around Emigrant Creek and the East Fork. The bottom left triangle shows dominant cations, the bottom right triangle shows dominant anions. The central diamond is a composite of the two datasets and is used to categorize water types based on all major ions. Data taken from GWIC database (http://mbmggwic.mtech.edu/).
Figure 3.10
St. Julian Exploration Project, Park County, Montana
Regional geothermal features, shown with major geologic faults, state boundary, and boundaries for Yellowstone National Park, the Controlled Groundwater Area, and the Corwin Springs Known Geothermal Resources Area.
YELLOWSTONE AREA HOT SPRINGS

There are a series of hot springs located approximately 12 to 15 miles southwest of Chico Hot Springs and the Emigrant Mining District, within a region known as the Corwin Springs Known Geothermal Resources Area (KGRA). The KGRA is contiguous to the northern boundary of YNP, and it includes the towns of Gardiner and Corwin Springs, Montana (Figure 3.10). The hot springs which discharge into the Yellowstone River within the KGRA are found at La Duke and Bear Creek springs, located at opposite ends of a two square mile Pleistocene travertine deposit along the Gardiner Fault (Struhsacker, 1976).

There are a number of private wells and springs within the area that have temperatures elevated above background, but these temperatures range from 60–72.5 °F (16–22.5 °C) and are considerably lower than those recently measured at La Duke (147.7 °F, 64.3 °C) and Bear Creek springs (90.7 °F, 32.6 °C). The private wells and springs also occur along the Gardiner fault, but the temperatures and water chemistry data suggest some degree of dilution, as most of the private sites have TDS concentrations below 600 mg/L (Figure 3.10). In contrast, the TDS concentrations at La Duke and Bear Creek springs exceed 1,900 mg/L. The nearest known hot springs within YNP are located at Mammoth Hot Springs in Wyoming (average temperature = 143.5 °F, 62 °C), approximately four miles south of Gardiner.

Geothermal leasing activities were suspended in the KGRA in 1988, with an amendment to the Geothermal Steam Act of 1970 (30 U.S.C. 1001). This was prompted by a geothermal production well that was installed by the Church Universal and Triumphant (CUT) in 1986. This well was drilled over 450 feet deep, at a location less than 1,000 feet from La Duke Hot Springs. The well was pumped at nearly 400 gpm for a 13-hour period, which significantly reduced the flow from La Duke Hot Springs for that time period (Sorey, 1991). No production of geothermal fluids has occurred in the KGRA since that time and the CUT well was eventually sealed and abandoned in 2008. In 1997, a Controlled Groundwater Area (CGWA) was also established around this region by the Montana Department of Natural Resources (DNRC) in order to “provide for the preservation of the hydrothermal system and features by allowing no impact to them within the reserved land of YNP.” The development of groundwater wells is not prohibited within the area, but different levels of permitting are required before use, based upon the water temperature and the proposed usage rate (DNRC, 1997). The Proposed Action area is located outside of both the CGWA and Corwin Springs KGRA boundaries (Figure 3.10).

Hydrogeologic investigations were conducted in the KGRA by the USGS and other scientists between 1988 and 1990, following a mandate by the U.S. Congress. These investigations were centered on the Norris-Mammoth corridor within YNP, and were meant to determine the hydrogeological connections and any potential impacts to the Park from withdrawing thermal water within the KGRA (Sorey, 1991). General descriptions of the primary geothermal springs inside and outside of the Park are provided below, followed by a discussion of water chemistry results and comparisons to sites within the Emigrant Creek subwatershed.

In 2015, the MBMG visited La Duke Hot Springs and measured a flow of 124 gpm, a temperature of 147.7 °F (64.3 °C), a pH reading of 6.93, and a TDS concentration of 2,159 mg/L.
There are other small seeps in the vicinity that have similar field parameters, and it appears that this spring system is aligned along segments of the Reese Creek fault network (Figure 3.10). These north-trending faults intersect the Gardiner fault, and are important in localizing and transmitting upward flow through the sediments on the valley margin (Pierce et al., 1991). The Gardiner fault is a high-angle reverse fault, which bounds the Precambrian crystalline rocks of the Beartooth uplift. More than 10,000 feet of Paleozoic and Mesozoic sedimentary rocks are preserved within the footwall. From a structural high within YNP, the sedimentary units dip into the Gardiner fault zone, where they are dragged up and overturned into an asymmetrical syncline (Struhsacker, 1976). These structural relationships suggest that groundwater flows down permeable Paleozoic sedimentary units from the Yellowstone upland to great depth under the Gardiner fault zone. The reservoir temperature for La Duke Hot Springs was estimated to be near 175 °F (80°C), indicating a circulation depth of at least 1.5 miles (Kharaka et al., 1991).

To the south of La Duke Hot Springs near Gardiner, the Bear Creek Hot Springs flow from three principal vents. In 2015, the combined flow was measured at just over 40 gpm, with a temperature of 90.7 °F (32.6 °C), a pH of 6.22, and a TDS concentration of 1,927 mg/L (GWIC #197921). Like La Duke Hot Springs, the flow system and reservoir rocks supplying the Bear Creek Hot Springs likely consist of Paleozoic carbonates that originate in YNP and dip into the Gardiner fault. This system has a lower surface temperature than La Duke Hot Springs, as well as a lower reservoir temperature estimate (158 °F, 70 °C; Kharaka et al., 1991). There is also the potential for La Duke and Bear Creek Hot Springs to receive flow from the adjacent Precambrian rocks of the Beartooth uplift to the north and east (Pierce, 1991). However, strontium isotope models indicate that only a small amount of flow is likely sourced from Precambrian rocks (Kharaka, 1991). The major chemical characteristics are similar between the La Duke and Bear Creek sites, indicating that the springs belong to a similar flowpath localized along the Gardiner fault (Sorey, 1991).

Another four miles to the south, hot springs discharge inside YNP from the Mammoth system with a total flow of 9,350 gpm. It is estimated that approximately 10% of the flow issues from the Mammoth Terraces, while the rest of the water flows into the nearby Gardner River (sic) (Sorey, 1991). Multiple springs and one monitoring well exist at the site, where temperatures range from 111.2-161.5 °F (44-72 °C), pH values range from 6.08 to 6.76, and TDS concentrations range from 2,121 to 3,076 mg/L (Kharaka, 2002). The water at Mammoth Hot Springs is most likely derived from a combination of northward lateral flow from the Norris-Mammoth corridor and from deep circulation of water originating from more local sources (e.g. meteoric recharge to permeable Paleozoic units). The estimated reservoir temperature for the Mammoth system is higher than any of the sites in the KGRA (212 °F, 100 °C) and reflects this deep circulation (Kharaka et al., 1991). Based on the concentrations of dissolved conservative elements, magmatic volatile gases, and the ratios of stable isotopes, about 30-40% of the water at Mammoth appears to consist of flow from the Norris area to the south (Sorey, 1991). Geophysical data and heat-balance calculations indicate that partial-melt conditions (930 – 1,110 °F; 500-600 °C) may exist underneath Norris and provide heat to this flow system at a depth of 3.5 miles, but it is not clear whether this is an independent magmatic source (Stanley et al., 1991).
CONNECTIONS BETWEEN SYSTEMS

Results from the USGS investigations indicated that there could be flow paths between Mammoth Hot Springs and La Duke Hot Springs, but there was no chemical evidence that such flow was actually occurring. This apparent lack of flow could be due either to geologic barriers or to the current distribution of hydraulic head in subsurface reservoirs (Sorey, 1991). However, there was chemical evidence of a small component of Mammoth-type water in Bear Creek Springs (0-20%) and evidence of substantially greater flow in the past (>12,000 years ago) between Mammoth and other parts of the Corwin Springs KGRA (Sorey, 1991). It was determined that large-scale geothermal development in the KGRA that caused substantial head changes could potentially result in decreased discharge from thermal springs in YNP. However, geothermal wells could still be developed within the KGRA with no discernible risk to YNP’s thermal springs, “provided the combined production from all wells was less than about 60 L/s (950 gpm)” (Sorey, 1991).

The USGS investigations identified the recharge sources and thermal systems within YNP that are responsible for the hot springs in the KGRA and the northern end of YNP. The dominant dissolved ion signatures of geothermal springs located within the Yellowstone caldera indicate volcanic reservoir rock influence (e.g. primarily sodium, chloride, and silica). Further to the north at Mammoth and the Corwin Springs KGRA, the dissolved ion signatures suggest an increasing influence from sedimentary reservoir rocks (e.g. primarily calcium, bicarbonate, and sulfate) as shown in Figure 3.12. Although a similar suite of cations is observed around the Emigrant Mining District and Chico Hot Springs, the hot springs at Mammoth and the KGRA have TDS concentrations that are significantly higher than the other sites (1,927-3,076 mg/L vs. all others <300 mg/L). The concentration ratios of magnesium, sodium, potassium, chloride, and sulfate found in the Mammoth and KGRA samples form separate clusters in the cation and anion diagrams (Figure 3.12).

The USGS also performed mixing model calculations for geothermal springs within YNP and the KGRA, based on a mass balance approach using the concentrations and isotopic ratios of conservative elements like chlorine, lithium, boron, and helium (Kharaka, 1991). These models relied on the proportional mixing of two opposite end members. Well Y-10 was selected as the monitoring point within YNP to represent the Mammoth system end member, and Chico Hot Springs was selected as the other. Chico Hot Springs was selected as the other end member because it “must not have any component of water from the Mammoth system; this requirement would rule out from consideration any sites located in the Norris-Mammoth corridor” (Kharaka, 1991). This demonstrates the disconnected nature of Chico Hot Springs from YNP, and the authors note that Chico is a better representation of geothermal water interacting with Paleozoic sediments around valley margins.

Stable isotope ratios of water were also included in this analysis, i.e. δ¹⁸O and δ²H (or “δD” for deuterium), which quantify the isotopic signatures for the atoms that make up the water molecule (H₂O). The following equation is often used to express the ratio of stable isotopes for any element (X) as a δ (delta) value, given in units of permil (‰). This equation takes the ratio of two stable isotopes (¹⁸X and ²H) within a given sample, and compares that to the ratio found in an internationally established, empirical standard (Clark and Fritz, 1997). Negative δ values indicate an abundance of the lighter isotope, while more positive values indicate increasing...
isotopic enrichment (heavier isotope). In the case of water isotopes, the ratio of $^{18}\text{O}/^{16}\text{O}$ is compared to an empirical standard to calculate $\delta^{18}\text{O}$, and the ratio of $^1\text{H}/^2\text{H}$ (or D) is used to calculate $\delta\text{D}$.

$$\delta^X = \left( \frac{^{X}_Y Y_{\text{sample}}}{^{X}_Y Y_{\text{standard}}} - 1 \right) \cdot 1000$$

When $\delta^{18}\text{O}$ and $\delta\text{D}$ values from precipitation are plotted against one another for a specific geographic area, the result is known as a local meteoric water line. These results are often compared to a Global Meteoric Water Line (GMWL), which accounts for precipitation signatures from different elevations and latitudes around the world (Craig, 1961). When sample results are compared to this line, spatial deviations can provide useful information about the origin of a water sample (e.g. elevation of recharge as snow or rain) and the evolution of that water in the hydrologic cycle (e.g. evaporation, geothermal isotope exchange, etc.).

The USGS collected precipitation samples from across the greater Yellowstone region, established a local meteoric water line that is nearly identical to the GMWL, and determined that groundwater in and around YNP is predominantly derived from cold, isotopically-light precipitation (snow) (Kharaka et al., 2002). The stable isotope data for Chico, La Duke, and Bear Creek hot springs are consistent with high elevation recharge sources, i.e. shifted to more negative oxygen values along the GMWL. This trend is also observed in the high elevation spring and borehole sites that were sampled around the Emigrant Mining District. However, this does not suggest that the Emigrant Mining District and geothermal systems are connected, but rather that the precipitation feeding those separate systems likely occurs at similar high elevations across a broad region. The effects of geothermal isotopic exchange and oxygen enrichment (i.e. positive shift in values off of the GMWL, no change in deuterium) are less prominent in the Chico, La Duke, and Bear Creek hot springs samples, but are more drastic in the samples from Mammoth Hot Springs (Figure 3.13).
FIGURE 3.12: Ratios of major dissolved ions (in % composition) are shown for Chico Hot Springs, the major sites around Emigrant Creek/East Fork drainages, and the KGRA and YNP hot springs. The bottom left triangle shows dominant cations, the bottom right triangle shows dominant anions. The central diamond is a composite of the two datasets and is used to categorize water types based on all major ions. Data taken from GWIC database (http://mbmggwic.mtech.edu/) and Kharaka et al. 2002.

YELLOWSTONE VOLCANISM

The volcanism most directly identified with YNP has built an immense volcanic plateau in northwestern Wyoming over the past 2 million years. The region has evolved through three major cycles of explosive eruptions, subsequent ground collapse, accumulation of rhyolitic lava flows and ash deposits, and uplift and extensive faulting. Although there is ongoing debate about the source and mechanism controlling the movement of the Yellowstone mantle plume or “hotspot” (Fouch, 2012), it is clear that the earliest eruption events related to the Yellowstone hotspot occurred in southeastern Oregon/southwestern Idaho between 12 and 15 million years ago. The oldest caldera-forming eruption that took place in the current location (northwestern Wyoming) occurred roughly 2.1 million years ago and produced the Huckleberry Ridge Tuff (USGS, 2012). Subsequent large eruptions created the Mesa Falls Tuff (1.3 million years ago) and the Lava Creek Tuff (640,000 year ago). The latter eruption formed a ~1,500 square mile caldera in the present-day Yellowstone Plateau. Between 180,000 and 70,000 years ago, many smaller rhyolitic eruptions occurred along two primary vents within the caldera Figure 3.14 (USGS, 2012).
FIGURE 3.13: Stable isotope data for water ($\delta^{18}O$ and $\delta D$) from Emigrant Creek/East Fork drainage sites and the major geothermal sites in the region. Data are plotted against the Global Meteoric Water Line (Craig, 1961) for reference. Many of the surface water and groundwater sites in the Emigrant Creek subwatershed cluster near the GMWL, while geothermal springs in the region have isotopically enriched signatures. Data taken from GWIC database (http://mbmgsywic.mtech.edu/) and Kharaka et al., 2002.

As discussed previously, the Absaroka-Gallatin volcanics which host the Emigrant Mining District are estimated to have formed during the mid- to early-Eocene, 45 to 55 million years ago (Smedes and Prostka, 1972). The volcanic province consists of deeply eroded andesitic, dacitic, and basaltic volcanoes and the deposits of epilasticly reworked material derived from them, consolidated tuffs, and a variety of related intrusive rocks. It is important to note that the volcanic units, intrusive units, and mineralization that would be encountered by drilling in the Emigrant Mining District area are much older than, and completely unrelated to, the volcanic system in YNP.

The northern rim of the most recently formed caldera is located near Canyon Village, Wyoming, approximately 35 miles south of the Emigrant District. As discussed in previous sections, mining and exploration drilling have already occurred within the Emigrant, Sixmile, and Mill Creek districts for over a century. There is no record of seismic activity correlated with these historic activities and the most recent volcanic activity within YNP occurred as rhyolitic lava flows on Pitchstone Plateau nearly 70,000 years ago (USGS, 2012).
Furthermore, exploratory boreholes were drilled to collect core samples within the principal thermal areas of YNP in 1967 and 1968 by the USGS, in collaboration with the National Park Service (NPS) and the National Aeronautics and Space Administration (NASA) (White et al. 1975). Thirteen holes were drilled to depths between 200 and 1,100 feet, and were located within multiple geyser basins in the caldera (White et al. 1975). Although some of the holes encountered bursts of steam and pressurized water exceeding 392 °F (200 °C), no seismic or volcanic activity was triggered. Nearly half of the holes were plugged and abandoned shortly after drilling, while the others were left open for further observation and sampling (White et al. 1975). The USGS has also directly addressed concerns about drilling into the YNP caldera: "Notwithstanding the enormous expense and technological difficulties in drilling through hot,
mushy rock, drilling is unlikely to have much effect. At near magmatic temperatures and pressures, any hole would rapidly become sealed by minerals crystallizing from the natural fluids that are present at those depths” (USGS, 2015).

3.7.3 DIRECT AND SECONDARY IMPACTS

3.7.3.1 No Action Alternative

Under the No Action Alternative, Lucky Minerals would not obtain an exploration license and therefore, could not conduct the exploration activities described in its exploration license application. However, the company would still be allowed to stake claims, map the local geology, and collect surface samples. The potential impacts related to mechanized exploration work would not occur, but the existing impacts to water resources in the Emigrant Creek subwatershed would continue in their current state.

As identified in Figure 3.7 and Table A.1, recent water quality data indicate that Emigrant Creek exceeds the acute and/or chronic aquatic life standards for metals in three out of the four sampled locations (above and below the East Fork confluence, above the Great Western Mine). Water quality exceedances were not observed in the samples taken from the upper East Fork drainage, nor from the springs within the St. Julian Mine area (Proposed Action sites). However, metal concentrations increased in the East Fork drainage further down-gradient, primarily due to the influence from groundwater on the north side of the stream. Based on the chemical characteristics of the springs and abandoned mine drainage to the north, it is clear that water resources are impacted there by the oxidation and weathering of alteration minerals that occur in the volcanics. It is assumed that similar mineral weathering, though higher in the drainage, is responsible for the degradation of water quality in Emigrant Creek above the influence from the East Fork drainage. Under the No Action Alternative, these mineral weathering processes and the degradation of water quality in Emigrant Creek and the East Fork drainage would continue into the future for an indeterminable length of time. Similarly, groundwater and smaller surface tributaries outside of the Proposed Action drainages would continue to contribute flow and variable dissolved chemical loads to Emigrant Creek.

The flowing boreholes that exist within the subwatershed would also continue to flow, although the water from the boreholes will likely continue to infiltrate into the ground instead of discharging directly to the stream. The same scenario is likely for the mine drainage discharging out of the Allison Tunnel, although there may be a time in the future at which the accumulation of ferricrete alters the flow and/or chemistry of that adit seepage.

Under the No Action Alternative, the potential impacts to water resources from road maintenance, drill pad and laydown area preparation, and increased traffic related to drilling would not occur. This also excludes the construction of erosion control structures and other best management practices (BMPs) along the roadway and pad sites, so the potential to degrade surface water quality during storm events would continue to exist. Public traffic related activities would continue along the access roads and could include stream crossings. Although the stream crossings consist of coarse, angular rock, there is potential for turbidity to increase briefly at that point in the stream as a result of traffic-related disturbance on the road. Short-term changes in existing water quality resulting from ordinary and everyday activities do not require permits.
No mechanized exploration would occur under the No Action Alternative, so water needed for drilling would not be withdrawn from boreholes or from the East Fork drainage. Similarly, there would be no potential for contamination of water by fuel or oil from pumping water or drilling operations. This also precludes the potential development of artesian groundwater flow from new exploration boreholes, and there would be no need to use a cyclone or construct sumps for cuttings and fluid management.

As discussed previously and in the Proposed Action analysis below, there does not appear to be a direct connection between the St. Julian Mine area and the groundwater resources feeding Chico Hot Springs. Furthermore, these separate systems appear to be disconnected from the geothermal resources within the Corwin Springs KGRA and YNP. The flow and water chemistry at those geothermal sites would not be affected by the No Action Alternative. The potential exists for those sites to be affected by other environmental factors (e.g. fluctuations in precipitation and recharge rates, increased well development, damage from human disturbance, and future seismic and volcanic activity in YNP), but those issues are unrelated to this proposal and the potential impacts remain the same under any alternative.

3.7.3.2 Proposed Action

Under the Proposed Action, Lucky Minerals Inc. would explore the St. Julian Mine claim area for mineralization as discussed in previous sections. The Proposed Action would consist of a two approximately three-month field seasons of exploration-related activities centered on the St. Julian Claim Block, as depicted in multiple figures. Seasonal closures or temporary cessations of drilling operations are unlikely to impact water quality in the area, as the drill sites and access roads would be stabilized to minimize the potential for sediment transport prior to cessation. The ongoing impacts to water resources that are described in the No Action Alternative section would continue to occur under the Proposed Action.

Lucky Minerals would access the drilling sites by using the existing roads which follow Emigrant Creek and the East Fork drainage and by maintaining the road within the St. Julian Claim Block. There would be potential to impact surface water with sediment and debris during road maintenance work, drill pad and laydown area preparation, and from drilling-related traffic. These road surfaces could also be susceptible to erosion from significant storm events. Lucky Minerals proposes to minimize the potential for those impacts to occur, by sloping roads to the outside wherever practical to enhance drainage and prevent channeling. Drill sites will be located a minimum of 100 feet away from all perennial streams, i.e. 100 feet of slope distance. Based on site-specific review of sediment transport potential (based on slope, proximity, existing vegetation, and soil depths), silt fences or straw wattles would be installed at drill sites where deemed necessary. In those cases, the sediment controls would be installed immediately down slope of the drill sites on the roadway. Erosion controls may also be needed around the laydown area, based upon sediment transport potential at the old mill site. Access to the proposed drilling sites would also include two existing stream crossings (Emigrant Creek below the Great Western Mine; upper East Fork drainage below the St. Julian Mine), but no additional stream crossings are proposed. Although these crossings are used regularly by the public, Lucky Minerals would be required to obtain a 318/310 Authorization for the potential streambed disturbance and short-term turbidity associated with increased traffic (Table 1.2).
Any improvements or mitigation measures that are developed through that authorization would likely lessen the impacts from public traffic as well.

Under the Proposed Action, it would be necessary to use water or some type of drilling fluid to cool the bit, to lubricate the advancing hole, and to remove cuttings from the bit face up to the surface. Current practice in the drilling industry is to use one or more types of synthetic polymer or mud products to increase the viscosity of water. The proposed drilling fluids are classified as synthetic based drilling muds, because the polymer component is often made from synthetic organic compounds like esters, ethers, or olefin isomers. Compared to traditional water- or oil-based fluids, the synthetic polymers provide high drilling efficiency, while exhibiting low toxicity and degradation to environmentally benign products (Burke and Veil, 1995).

The product mentioned in the Plan of Operations ("Poly-Plus 2000") creates long polymer chains when hydrated, giving the fluids a typical viscosity of 200-500 cP (centipoise). As a comparison, water at 68 °F has a much lower viscosity (1.002 cP), which means it has a higher fluidity than the polymer solution. In addition to the organic polymers, the drilling fluid would be thickened by using "Max Gel," which is a viscosifier or thickening/gelling agent made from 80-95% bentonite clay, with added silica sand and gypsum. Bentonite clay slurry is often used in conjunction with synthetic polymers, and one advantage to using clay is that the fluid only absorbs a short distance into the borehole wall before being sealed off (i.e. a "filter cake layer"), providing borehole stability and preventing significant fluid loss into the formation. In order to lubricate the bit and drill string, small amounts of "Rod Ease" would be added to the drilling mixture, and this product consists of 90-95% canola oil with 5-10% other vegetable oil.

These regulated, commercially-supplied additives are non-toxic and biodegradable, and are unlikely to compromise the water quality of groundwater potentially encountered during drilling. Based on the artesian hydraulic head observed on the adjacent slope in the Duval Corporation boreholes, the lack of evidence for a deep permeable aquifer, and the viscosity of the drilling fluids, it is unlikely that the fluids would circulate into the target rock. As explained in Section 3.7.2, the groundwater samples collected within the proposed drilling area show pH values between 5.90-6.18 and low metal concentrations, so there is little suggestion that drilling fluids would carry contamination sourced directly from groundwater. The drilling fluids themselves have a high buffering or neutralization capacity due to the properties of the ingredients and the inclusion of additional alkaline chemicals in drilling products (e.g. caustic soda or lime) to maintain the optimal pH for drilling efficiency, often pH > 8. An alkaline drilling fluid would diminish the potential acidifying effect from groundwater and could immobilize metals.

An inadvertent release of drilling fluid to the surface is not directly comparable to a fuel or water release. The drilling fluids would likely act as a thin mud or paste with decreased fluidity, and would likely be contained within the drill pad area by the stormwater and sediment controls. Similar to its purpose in downhole conditions, the bentonite slurry would wet the ground surface but it would be less likely than water to fully absorb into the ground (e.g. filter cake layer).
Water for drilling would be pumped from either the existing artesian boreholes or from the East Fork of Emigrant Creek, utilizing the water right that is attached to the St. Julian Mine claims. The proposed pumping location as shown in the Plan of Operations and in Figure 1.4 is accessible from the private road that crosses the Bullion and Mill Lode claims. The associated water right allows for the withdrawal of 1,122 gpm (2.5 cfs), but it is expected that drilling would only require a maximum use of 50 gpm. Any additional permitting regarding the point of diversion or point of use for this water right would be administered by the DNRC (Table 1.2). Even the withdrawal rate of 50 gpm would only occur if fluids are not recirculated at the pad as proposed. By using the cyclone technology that is proposed to separate solids from the fluid, it is likely that smaller volumes of fresh water would be needed. The baseflow rates measured in 2015 indicate that the combined East Fork of Emigrant Creek flow is less than 10% of the flow in Emigrant Creek near Old Chico. A small withdrawal in the upper East Fork of Emigrant Creek would have an indiscernible impact on the volume reaching downstream users. Water would be pumped and distributed to the drilling sites using high-pressure, rubber-coated, woven steel water hoses. Plastic or steel tanks would be used to hold the mixed drill fluids and for storing make-up water at the drill site. Water holding tanks could also be used at pumping sites. There were no water quality exceedances measured in the upper East Fork of Emigrant Creek, the two seeps near the St. Julian Mine, nor the Duval Corporation boreholes, so it is also unlikely that local groundwater quality in the boreholes would be degraded by using the water sources that are proposed for drilling purposes.

To minimize the potential for spill contamination at the pump site, containment and clean up kits would be required to handle at least 90 gallons of fuel, which is 1.5 times the estimated fuel that would be at that location. The pump itself would be contained within a lined berm to prevent any spillage, with the capacity to handle at least 1.5 times the volume of fuel contained in the pump (15 gallons) and in the attached 45 gallon drum (i.e. 1.5*60 gallons=90 gallons). The pump will also be located on the existing ground disturbance, away from the stream bank. Similar precautions would be taken at the drill pads, where each vehicle would carry a spill kit and each drill would be equipped with a large industrial spill kit capable of handling 1.5 times the total fuel located at the drill. Oil, grease, hydraulic fluid, and other petroleum products would not be intentionally released on the exploration sites. Any of these waste fluids that remain at the end of drilling would be disposed of appropriately off-site, through arrangements with Park County. The areas around the water pump and drills would be visually monitored to ensure any leaks or spills do not escape the containment systems. If a release occurred, Lucky Minerals would be required to follow the Spill Management and Reporting Policy that is provided in its proposal, and the contaminated material would be removed immediately and disposed of at a proper disposal site (ARM 17.24.105). Site hygiene measures will consist of portable toilets, which would be serviced weekly or as needed, to serve the drill site work crews. If used appropriately, these measures should prevent impacts to the quality of surface water or groundwater.

The drill system would operate with a closed-loop design, where fluids are mixed at the drill site in holding tanks, and from which fluid is pumped directly down the drill pipe. Return fluids and cuttings would be directed through a cyclone partitioning system, where the solids would be effectively removed from the fluid, and then disposed of in sumps. The fluid could then be reintroduced into the primary holding tank and reused for drilling. This system does not require water or drill fluids to be contained in the sumps, but the pits would be lined as a
precaution in case of upset conditions. Compared to other drilling and water management techniques in the industry, the cyclone system reduces the drilling water demand and potential impacts to surface water, and reduces the potential for seepage into shallow groundwater from fluid-bearing sumps.

Based on the artesian hydraulic heads observed at lower elevations on the slope adjacent to the west, it is likely that Lucky Minerals would also encounter artesian conditions during drilling, though this may not be the case at every drill pad that is proposed. Following that comparison, it is also likely that the proposed boreholes could produce water with chemistry and flow similar to the Duval Corporation boreholes and the seeps below the St. Julian Mine (≤ 5 gpm and no aquatic life standard exceedances), and that water would likely infiltrate back into the rocky ground. This would have no discernible impact on water quantity or quality in the East Fork of Emigrant Creek drainage, and even less so further downstream in Emigrant Gulch. Any local impacts from a flowing borehole would be eliminated as each hole is completed, as the holes are required to be plugged at depth (bottom to top) prior to removal of the drill rig (ARM 17.24.105). It is important that the appropriate combination of bentonite and cement be used to seal all holes, especially as dictated for flowing wells (ARM 17.24.106 and 36.21.671). The reclamation bonding must also be adequate to ensure artesian hole plugging at each site (ARM 17.24.106).

The hydrologic and chemical influence from the currently-impacted East Fork on the main stem of Emigrant Creek at Old Chico is not discernible, due to dilution by groundwater and surface water inputs from drainages not connected to the East Fork (Section 3.7.2). Further downstream, the baseflow in Emigrant Creek accounts for a very small amount (<1%) of the total flow in the Yellowstone River, and the chemical load from Emigrant Creek has been measured to be significantly less (<0.1%) than the load in the Yellowstone River. Combining these field and laboratory measurements with observations that lower Emigrant Creek is seasonally dry and lacking a surface connection to the Yellowstone River, the potential impacts to the river from Emigrant Creek’s hydrologic and chemical load are substantially diminished. Even under conditions where there is no water lost from Emigrant Creek, the potential impacts from exploration activities in the upper East Fork drainage would be indiscernible as the total drainage outflow would comprise approximately 0.1% of the flow in the Yellowstone River.

The Proposed Action area is located outside of both the CGWA and Corwin Springs KGRA boundaries (Figure 3.10). As discussed earlier in this section, multiple USGS investigations identified the recharge sources and thermal systems within YNP that are responsible for the hot springs in the KGRA and the northern end of YNP. These previous studies are consistent with more recent hydrological and chemical observations, indicating that there is no known connection between the Proposed Action area and the groundwater resources feeding Chico Hot Springs (LaFave, 2016). Furthermore, these separate systems appear to be disconnected from the geothermal resources within the Corwin Springs KGRA and YNP. Consequently, the flow, temperature, and water chemistry at those geothermal sites would not be affected by the Proposed Action.

The concerns that drilling in the St. Julian Claim Block could initiate seismic or volcanic activity within YNP have no scientific basis and are deemed unreasonable for a number of reasons. The Proposed Action area is located 35 miles from the nearest margin of the YNP caldera and the
volcanic units in the Emigrant Mining District are genetically unrelated to, and more than 40 million years older than, the Yellowstone caldera system. This distance is far too great for any discernible impacts from drilling to occur within the caldera, and there is no record of seismic or volcanic activity correlated with any mining activities in the Emigrant Mining District in the last century. There were also no impacts to the seismic and volcanic stability of the YNP thermal system when core drilling took place within the YNP caldera and geyser basins in the 1960s (White et al. 1975). Under these conditions, the potential risks to the YNP thermal systems from the Proposed Action will not be considered further.

3.7.3.3 **Agency-Modified Alternative**

**ARTESIAN BOREHOLES**

Same as described in Section 2.3.5 of the Proposed Action, with the additional requirement that Lucky Minerals would develop a mitigation plan to effectively contain flow from artesian boreholes during drilling, which may exceed the volume of what is expected to be handled by storm runoff BMPs. The procedures for artesian flow containment would be developed prior to commencing drilling operations, and any necessary equipment would be readily available onsite, if those conditions were encountered during drilling. Containment of flow from an artesian borehole during the entire period of time it is producing water would prevent any potential discharge of water or sediment to surface waters or wetlands, prior to plugging and abandoning the drill hole in accordance with ARM 17.24.106.

**WATER USE**

In response to public comments, Lucky Minerals would be required to only use the surface water rights associated with the St. Julian Claim Block. The existing artesian boreholes located on CGNF administered land would not be used. The artesian boreholes produce very little flow (≤5 gpm) which would not be sufficient to support drilling operations. Instead, the surface water right associated with the St. Julian Claim Block would allow for the withdrawal of adequate volumes of water. The cyclone system for drill fluid recovery that is described in the Proposed Action should be used at all times during drilling, in order to minimize the amount of water needed and meet the proposed usage flow of ≤50 gpm.

**WATER MONITORING**

In response to public comments, regular water quality monitoring and contingency sampling in the East Fork of Emigrant Creek would be required. Lucky Minerals would establish two sites for water quality monitoring, one upstream and one downstream from activities in the St. Julian Claim Block. Water samples would be required from the locations prior to the start of drilling to establish baseline data. During active drilling operations, weekly water monitoring would be required at the two locations. This compliance monitoring would more quickly identify potential impacts to the stream adjacent to the St. Julian Claim Block.

These locations would be roughly equivalent to GWIC sites #285007 and 285009 (Figure 3.7). If the pH at the lower site is ≥0.5 s.u. lower than the upper site (indicating acidification), or if the SC at the lower site is ≥100 µS/cm higher than the upper site (indicating increased dissolved
load), then a full suite of samples would be collected for a laboratory analysis of total and dissolved metals and ions. The necessary sampling equipment would be available during each monitoring event. Monitoring could be conducted easily with inexpensive pH and SC probes, and the equipment would be calibrated before each weekly use. The field parameters would be measured at the two sites within a relatively short time frame in order to improve accuracy, because normal diel (24-hr) cycles in stream chemistry may exhibit fluctuations outside of those parameter boundaries. Monitoring results would be reported to DEQ, and the data collected over the course of the project would help determine if monitoring is also needed during the post-drilling period, prior to any bond release inspection. This monitoring would help to identify potential impacts to the stream adjacent to the St. Julian Claim Block, but it should also be recognized that the stream water quality rapidly degrades approximately 0.5 mile downstream from the site, due to existing natural conditions.

**SPILL REPORTING AND CONTAINMENT**

Lucky Minerals would be required to comply with the Spill Management and Reporting Policy established by DEQ which states that spills of any petroleum product should be reported when the volume is greater than 25 gallons. The reporting limit was incorrectly stated in the proposed Plan of Operations – stating that the limit in the Spill Management and Reporting Policy was 10 barrels (420 gallons) for crude oil, produced water, and/or injection water.

Even though spill kits related to fuel and petroleum products are included in the Proposed Action, spill kit materials for additional drill fluid containment would be readily available on-site for any inadvertent release. This equipment may include, but is not limited to, straw wattles and staking, absorbent pads, silt fence, plastic sheeting, shovels or hand tools, and buckets. As the clay-rich material dries, it could be scooped or shoveled off of the ground surface and placed into a sump with the cuttings. The drilling fluid components are non-toxic and biodegradable and pose little environmental risk, and any cuttings contained in the slurry would be returned to the suitable disposal location.

### 3.7.3.4 Secondary Impacts

Based on the MEPA model rules definition, secondary impacts are further impacts to the human environment that may be stimulated or induced by, or otherwise result from a direct impact of the action. No secondary impacts to Water and Geothermal Resources are anticipated.

### 3.8 LAND USE, NOISE, AND RECREATION

#### 3.8.1 ANALYSIS AREA AND METHODS

The analysis area for land use, noise, and recreational resources includes the immediate area of the St. Julian Claim Block, the roads that are proposed for access to the exploration area (Emigrant Creek Road and Road 3272), the Chico Peak Inventoried Roadless Area (IRA), and the Absaroka-Beartooth Wilderness Area. The analysis methods for land use and recreational resources included reviewing the Park County Growth Policy (2006), Gallatin Forest Plan (2015), two separate field visits with interested stakeholders, and publically available
Geographic Information System (GIS) files for various land jurisdiction references. The analysis method used for noise included a qualitative analysis of similar-sized equipment to estimate noise levels that could be expected during the proposed project.

3.8.2 AFFECTED ENVIRONMENT

3.8.2.1 Land Use

The land uses in the analysis area of the proposed Lucky Minerals exploration project are generally those associated with a mountainous forested area. There are no industrial or residential land uses in or adjacent to the analysis area.

As seen in Figure 3.15, the majority of the land jurisdiction in the immediate vicinity of the St. Julian Claim Block is held by the CGNF, although there are small, dispersed inholdings of private land. This is typical of Park County, as more than half of the County is publicly owned with most of that in forest lands managed by the CGNF (Park County Growth Policy, 2006). The Forest Service lands in the analysis area are in the GNF Plan which identifies the Emigrant Creek drainage as Management Area 3 (MA3). The goals for MA3 call for lands in this area to be “managed essentially in their current condition to protect existing improvements and resources, with minimal investment for resource activities.”

Figure 3.16 shows the proposed exploration project in relation to inventoried roadless areas. The closest inventoried roadless area, the Chico Peak IRA, is located approximately 0.3 mile north of the St. Julian Claim Block.

Figure 3.16 also shows the proposed exploration project in relation to the Absaroka-Beartooth Wilderness Area. The boundary of the wilderness is approximately 2.0 miles from the St. Julian Claim Block at its closest proximity.

Park County has five zoning districts, all of which are outside the analysis area of Lucky Minerals’ proposed exploration project (Park County Growth Policy, 2006). Park County does not have any zoning in the Lucky Minerals analysis area. Also, there are no conservation easements in the land use and recreation analysis area for this project.

During scoping, the public expressed concern that Yellowstone National Park and other areas with special designation may be impacted (Figure 3.16). Table 3.7 identifies the areas and provides their approximate distance from the St. Julian Claim Block.
Table 3.7
Parks, Recreation, and Special Designation Areas Identified in Scoping and Public Comments

<table>
<thead>
<tr>
<th>Name</th>
<th>Approximate miles from St. Julian Claim Block*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chico Peak Inventoried Roadless Area</td>
<td>0.3</td>
</tr>
<tr>
<td>North Absaroka Inventoried Roadless Area</td>
<td>0.6</td>
</tr>
<tr>
<td>Absaroka-Beartooth Wilderness Area</td>
<td>2.0</td>
</tr>
<tr>
<td>Sliding Mountain Research Natural Area</td>
<td>4.5</td>
</tr>
<tr>
<td>Passage Creek Research Natural Area</td>
<td>5.4</td>
</tr>
<tr>
<td>Dome Mountain Wildlife Management Area</td>
<td>6.1</td>
</tr>
<tr>
<td>East Fork Mill Creek Research Natural Area</td>
<td>7.2</td>
</tr>
<tr>
<td>Hyalite-Porcupine-Buffalo Horn Wilderness Study Area</td>
<td>13.8</td>
</tr>
<tr>
<td>Yellowstone National Park</td>
<td>15.1</td>
</tr>
<tr>
<td>Palace Butte Research Natural Area</td>
<td>18.8</td>
</tr>
</tbody>
</table>

*Nearest area boundaries

3.8.2.2 Noise

Human and animal perception of noise is affected by intensity, pitch, duration, and by the auditory system and physiology of the animal. Although DEQ analyzes noise impacts in its MEPA environmental reviews, it does not have regulatory authority to enforce noise restrictions.

The St. Julian Claim Block currently has sound levels characteristic of rural and forested lands. Lands located in or near wilderness areas experience day-night noise levels as low as 30 to 40 dBA (EPA, 1979). Noise contributors in forest or wilderness settings typically include wind, wildlife, flowing water, overhead aircraft, and recreationists. Other noise sources in the analysis area include automobiles, ATVs, snowmobiles, chainsaws, and recreational shooting. Vehicles use roads in the analysis area for recreational purposes or for access to private lands. Automobile, ATV, and snowmobile noise levels range from 60 to 110 dBA (EPA, 1979) and chainsaws and firearms range from 100 to 175 dBA (Stewart, 2015).
3.8.2.3 Recreation

The analysis area contains a number of recreational opportunities that vary by season on CGNF or private land. Late spring and summer can provide opportunities for hiking, photography, horseback and bicycle riding, wildlife viewing, ATV riding, camping, and picnicking. Fall and winter bring skiing, hunting, snowshoeing, and snowmobiling. At Old Chico there are cabins used for recreational purposes and a resort called Chico Hot Springs. Emigrant Creek Trail is about 0.8 mile from the St. Julian Claim Block at the closest point. There are no developed campgrounds in the analysis area. Emigrant Creek Road provides recreational users the access to the area for these outdoor uses in the area. The qualitative analysis methods used to assess impacts to recreation include consultation with the CGNF and review of CGNF reference materials. Recreation is also discussed in the Transportation, Socioeconomic, Wildlife, and Cumulative Impacts sections.

3.8.3 DIRECT AND SECONDARY IMPACTS

3.8.3.1 No Action Alternative

Under the No Action Alternative, Lucky Minerals would not obtain an exploration license and therefore, could not conduct the exploration activities described in its exploration license application. However, the company would still be allowed to stake claims, map the local geology, and collect surface samples. Road maintenance / grading would not occur and access would be by four-wheel drive, ATV, and by foot. Land uses, noise, and recreation opportunities would remain similar to their existing state.

3.8.3.2 Proposed Action

LAND USE

The total estimated ground disturbance on the St. Julian Claim Block would be approximately 4.8 acres for the drilling activities for both field seasons of 2017 and 2018 (Table 2.1). About 3.48 acres of disturbance may occur for access road upgrades on the St. Julian Claim Block. Drill pads would disturb about 0.52 acre and a laydown yard would be approximately 0.8 acre. There would be no permanent structures built and no disturbance associated with permanent structures for this alternative. Disturbed area would be kept to a minimum size necessary to accommodate the exploration operation.

The existing access road, Emigrant Creek Road and CGNF designated Road 3272, to the St. Julian Claim Block would be cleaned in localized areas to ensure the road is safe; disturbance would be confined to the original width of the road alignment (Dykes, 2016c). The disturbance associated with the existing access road to the St. Julian Claim Block was not included as part of the total land use disturbance as proposed work would be limited to localized areas and done within the existing road prism which is currently disturbed. Based on DEQ’s field reviews and the type of equipment proposed for use, DEQ assumes that the initial mobilization up to the St. Julian Claim Block and demobilization would be done by “walking the equipment” on Emigrant Creek Road. During mobilization, equipment would be unloaded from trailers in a safe and level location at the beginning of Emigrant Creek Road. Equipment then would be driven individually along Emigrant Creek Road to the St. Julian Claim Block. At the conclusion
of exploration activities, the equipment would traverse Emigrant Creek Road individually to be loaded on to trailers. Lucky Minerals may need to obtain a Road Use Permit from the CGNF and/or Park County to use the existing access road.

The laydown yard features would be located at or near the old St. Julian Mill site on the previously disturbed road network within the St. Julian Claim Block. The proposed drilling is to occur on the existing access road or at wider parts, and intersections on the existing road network within the St. Julian Claim Block. All project disturbances would be on private land (patented mineral claims) for the drilling activities. The proposed exploration activities on the St. Julian Claim Block would not disturb any CGNF lands. The types of land use disturbance would be to the existing access road and to previously disturbed areas of private forest land.

There would be no impact from the Proposed Action on the specially designated areas in Table 3.7 or Park County zoning districts. Park County does not have zoning requirements on private land for exploration projects (C. Jones conversation w/ Lawson Moore (Park County Planner), 4/20/16).

All lands disturbed on the St. Julian Claim Block would be required to be reclaimed to the existing state; however, the access roads improvements may enhance drainage and prevent channeling. The laydown yard would not be reclaimed until all exploration activities have concluded for the project.

**NOISE**

There would be a temporary impact from the Proposed Action during exploratory drilling, road maintenance and grading activity, and drill site / pad construction. In addition to the vehicles used to access the site, these activities include both stationary and mobile equipment, including the following:

- D-7 type dozer or equivalent
- G-12-14 type grader or equivalent
- JD-50 or equivalent type track mounted excavator or tractor mounted back-hoe
- LF-70 track mounted diamond drilling machine
- Diesel- or gas-powered water pumps
- Service and operation trucks
- ATV

Generally the noise levels associated with this type of equipment ranges from 60 to 100 dBA at a reference distance of 50 foot from the loudest side of the equipment (Federal Highway Administration, 2016). Decibels are measured using a logarithmic scale, which means decibels cannot be added arithmetically. For example, if two noise sources are each producing 100 dB right next to each other, the combined noise sound level would be 103 dB, as opposed to 200 dB (OHSA, 2013). The LF-70 track mounted diamond drilling rig is a small format drill. Because it is a lightweight exploration rig, it is ideal for drilling in remote locations. Because it is a lightweight drill rig, it is not expected to produce noise at the far range of the noise levels associated with this type of equipment. DEQ assumes that a combined noise level of 100 dBA for the two drill rigs operating at the same time is a conservative estimate, that is, if anything, it
overstates the noise level that is expected to be produced by the two drill rigs operating at the same time.

The noise level would increase significantly in the immediate vicinity of the drill sites. However, Kruger (1981) found that, in general, the noise levels around a drilling rig producing noise levels between were 74 dBA at 200 feet, 64 dBA at 400 feet and at “whisper level” (25 dBA) at about 3/8 of a mile. It is expected that most of the audible sound waves would stay within the confines of the East Fork Emigrant valley. With optimal atmospheric conditions and no other human caused noise, a recreationist may expect to hear operations for a short distance to the west down the main Emigrant Gulch if the recreationist was not within a few hundred feet of the creek. Thus, recreationists within the East Fork of Emigrant valley and a short distance down Emigrant Gulch may hear noise from the drilling operation. The closer the recreationist is to the drill operation, the louder the noise impact would be. Recreationists in close proximity to Emigrant Creek Road and the road designated as FS 3272 would hear noise from the vehicles making approximately four to five round trips per day transporting employees to the St. Julian Claim Block.

The closest inventoried roadless area is the Chico-Peak Inventoried Roadless Area, located approximately 0.3 mile from the St. Julian Claim Block. Recreationists in the portion of the roadless area that is closest to the St. Julian Claim Block may hear noise from the exploration drilling operation, although the noise level should be in the range of 25 dBA (whisper level) or less.

The Absaroka-Beartooth Wilderness Area is located approximately two miles to the south of the St. Julian Claim Block. Under optimal conditions for transmitting sound waves, noise from the normal operations is not expected to reach the wilderness. The St. Julian Claim Block is situated on a north facing slope. All noise generated in this area will generally travel to the north and be contained within the East Fork of Emigrant Gulch. Sound waves from the proposed exploration activity would need to reflect off the south facing slopes across from the activity and continue south to the wilderness. Because of the energy lost in reflecting the sound waves off the opposing hillside, the noise is not expected to reach the wilderness area. Even under some abnormal operating conditions (equipment start up, mechanical malfunctions or dozer ripping of hard material or any other possible scenario) and during optimal environmental conditions, noise is not expected to reach the wilderness given the distance and direction the sound waves would travel and the height of surrounding mountains which would block any noise from reaching the wilderness. Drill pads 21, 22, and 23 on the St. Julian Claim are near the top of the ridge and would allow some noise from drilling operations located on these claims to go further to the south. Noise should still be buffered from the Absaroka-Beartooth Wilderness Area as the intervening ridge to the south has an elevation approximately 800 feet higher than the ridge where the highest elevation drill pads would be located.

Wildlife may be negatively affected by noise associated with the proposed project activities Action and are discussed in more detail in Section 3.4. Drilling operations could tend to drive wildlife from 0.25 to 0.5 mile from the drill sites. (Kruger, 1981). There may also be short-term noise impacts from the Proposed Action to non-motorized recreationists seeking low ambient noise levels near the analysis area.
RECREATION

In most cases, recreational use and access to the public land in the analysis area would continue as it does currently. Emigrant Creek Road provides recreational users access to activities on the public land in the vicinity of the Lucky Minerals proposed project. Short-term impacts during the proposed activities may include increased use of Emigrant Creek Road, increased noise, and restricted access when drill rigs block roads, and increased night lighting adjacent to the St. Julian Claim Block.

Mobilization and demobilization of equipment and “walking the equipment” on Emigrant Creek Road may cause ATV and other type of recreational users to avoid the area during this short period of time. DEQ assumes it will take one day per drill rig and the associated equipment to navigate Emigrant Creek Road during mobilization and demobilization. Under this alternative, flaggers and/or pilot cars would be required when large equipment is being mobilized or demobilized to minimize conflict with recreational users on Emigrant Creek Road.

The operations phase of the exploration of the proposed project would occur on private land and recreational use would continue to take place on public lands. Public motorized and non-motorized access would not be affected since the drilling would take place on private land. The Transportation Section will discuss traffic impacts to the area.

Individuals using the public lands near the St. Julian Claim Block may notice increased noise and night lighting. Since exploration activities would take place in a forested and mountainous area, the visual impacts would be most noticeable to persons who may be recreating within the East Fork of Emigrant Creek drainage, which includes extreme corners of the Chico Peak Roadless Area and the North Absaroka Roadless Area. There are, however, no developed trails within the drainage.

Lucky Minerals would be required to use lights that shield or direct the light down to not impact viewers further from the St. Julian Claim Block. The night lighting may have a short-term impact on users of public lands near the St. Julian Claim Block during the exploration project. The impact would only affect recreationists adjacent to the St. Julian Claim Block and who are currently accustomed to the area’s remoteness. Night lighting is discussed in more detail in Section 3.12 on Visuals.

3.8.3.3 Agency-Modified Alternative

The Agency-Modified Alternative would be the same as Proposed Action.

3.8.3.4 Secondary Impacts

Based on the MEPA model rules definition, secondary impacts are further impacts to the human environment that may be stimulated or induced by, or otherwise result from a direct impact of the action.

The improvements that Lucky Minerals has proposed to make on the access roads to the St. Julian Claim Block include grading in localized areas, clearing of rock and other debris, and sloping of roads to enhance drainage and prevent channeling. The access roads to the St. Julian
Claim Block will not be made wider. Currently, a four-wheel drive high clearance vehicle is required to get to the St. Julian Claim Block. It is anticipated that the same type of vehicle will be required after Lucky Minerals makes the road improvements and completes its exploration activities. Thus, there are not expected to be any significant secondary impacts to land use, recreation, or noise.

### 3.9 SOILS, VEGETATION, AND RECLAMATION

#### 3.9.1 ANALYSIS AREA AND METHODS

The analysis area for soils, vegetation, and wetlands includes the Emigrant Mining District, specifically in the immediate area of the St. Julian Claim Block and the roads that are proposed for access to the exploration area (Figure 3.19). Soil units, topography, and road network within the St. Julian Claim Block are shown on Figure 3.17.

Soils in the vicinity of the St. Julian Claim Block have been mapped by the United States Department of Agriculture, Natural Resources Conservation Service (USDA NRCS, 1996). The field work, map unit designation, and technical quality control for the survey were conducted by the CGNF with work performed during the period 1976 - 1984. Soils maps and profiles of the soil units and associated characteristics were evaluated through a USDA Web Soil Survey (USDA, 2016). The soil report produced through Web Soil Survey is referenced on Figure 3.17 and Table 3.8.

The MNHP database was reviewed to identify and assess the potential impacts to previously inventoried special status plant species and vegetation communities. The Park County Noxious Weed list was also used in the analysis. (Table 3.10 and 3.11)

#### 3.9.2 AFFECTED ENVIRONMENT

##### 3.9.2.1 Soils

The St. Julian Claim Block is characterized as high relief with convex glaciated mountain ridges and narrow valleys along the stream corridor. The St. Julian Claim Block is mountainous and heavily forested upper sub-alpine forest. Elevation ranges from approximately 8,000 ft near creek level to approximately 9,000 ft at the top of the ridge (USGS 1955). Landforms in the analysis area have been influenced by glacial erosion from the steep slopes on the mountain side and deposition of moraines reworked into alluvial terraces along the stream in the valley bottom. Landforms are derived from glacial action including cirques, troughs, and moraines. Soils in the area are formed in colluvium and glacial till deposited on sloped to steeply sloped surfaces of late-Pleistocene or Holocene age.

The soils in the St. Julian Claim Block are underlain by coarse-grained volcanic rock, classified as cryochepts (Figure 3.17 and Table 3.8). Cryochepts are pale colored, young soils, freely draining, and droughty with low organic matter content. The content of angular rock fragments in the subsoil ranges from 35 to 50 percent. Cryochepts are cold region soils and the temperature regime has a mean annual soil temperature at a depth of 20 inches that is higher than 32 degrees F but lower than 46 degrees F. The frost free period is 30-70 days. Due to the
granitic parent materials these soils do not have an accumulation of clay in the subsoil and have moderately acidic pH.

<table>
<thead>
<tr>
<th>Map Soil Unit</th>
<th>Map Unit Name</th>
<th>Landform</th>
<th>Parent Material</th>
<th>Habitat Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>22-1A</td>
<td>Dystic Cryochrepts-Rock Outcrop</td>
<td>Cirques, Troughs</td>
<td>Colluvium Derived From Granite</td>
<td>Subalpine Fir/ Grouse Whortleberry</td>
</tr>
<tr>
<td>35-1C</td>
<td>Typic Cryochrepts, Glacial Drift Substratum</td>
<td>Moraines</td>
<td>Glacial Drift Derived From Granite</td>
<td>Subalpine Fir/ Grouse Whortleberry</td>
</tr>
<tr>
<td>22-1C</td>
<td>Typic Cryochrepts – Cirque Headwalls</td>
<td>Cirques, Troughs</td>
<td>Colluvium Derived From Granite</td>
<td>Subalpine Fir/ Grouse Whortleberry; Subalpine Fir/ Whitebark Pine</td>
</tr>
</tbody>
</table>

Map Unit 22-1A
- Dystic Cryochrepts-Rock outcrop complex, granitic substratum. 15% rock outcrops.
  - Typical profile:
    - A – 0 to 7 inches: very cobbly sandy loam.
    - Bw – 7 to 16 inches: very gravelly sandy loam
    - C – 16 to 60 inches: very cobbly loamy sand

Limitations: Soil unit 22-1A is a poor source of reclamation material due to droughty texture and low organic matter content. Cobble content, sand content, and acidic characteristics limit utility for reclamation materials. Use as topsoil is limited due to rock fragments. Shallow excavations tend to have unstable walls. Limited for road improvements due to steep slopes and large stones.

Map Unit 35-1C
- Typic Cryochrepts – glacial drift substratum derived from granites on steep slopes. Moraines located on lower third of mountain flank.
  - Typical profile:
    - A – 0 to 3 inches: gravelly loam.
    - Bw – 3 to 16 inches: very gravelly sandy loam
    - C – 16 to 60 inches: very cobbly loamy sand

Limitations: Soil unit 35-1C is not rated as a source of reclamation material. Poor source of topsoil due to large rock fragments and low cation exchange capacity. Limited for shallow excavations due to large stones and unstable excavation walls. Soil is poor roadfill source due to cobble content and stones. Very limited for road improvements due to steep slope, large stones, and frost action.

Map Unit 22-1C
- Rock Outcrop – Typic Cryochrepts complex, cirque headwalls. 40% rock outcrops, 40% cryochrepts and similar soils, 20% rubble lands.
  - Typical profile:
    - A – 0 to 3 inches: gravelly loam.
    - Bw – 3 to 16 inches: very gravelly sandy loam
    - C – 16 to 60 inches: very cobbly loamy sand

Limitations: Soil unit 22-1C is not rated as a source of reclamation material, topsoil, or roadfill. Rock outcrops and rubble lands limit shallow excavation and potential location for roads.

3.9.2.2 Vegetation

Primary vegetation in and around the St. Julian Claim Block is characterized as subalpine woodland. It is characterized a high-elevation mosaic of stunted tree clumps, open woodlands, and herb- or dwarf-shrub-dominated openings, occurring above closed forest ecosystems and below alpine communities. It includes open areas with stands of whitebark pine occurring most commonly on south-, east-, and west-facing aspects. Subalpine fir is the co-dominant in these systems and is often the most prevalent tree species. Engelmann spruce is usually associated with subalpine fir and occurs as either a climax co-dominant or as a persistent, long-lived seral species in most upper elevation subalpine fir habitat types. Landforms include ridgetops, mountain slopes, glacial trough walls and moraines, talus slopes, landslides and rockslides, and cirque headwalls and basins.
Elevation ranges from 7,000 ft to 9,000 ft. The climate is typically very cold in winter and dry in summer. Snow accumulation is high in basins, but ridgetops have little snow accumulation because of high winds and sublimation. In this harsh, often wind-swept environment, trees are usually stunted and flagged from damage associated with wind, blowing snow, and ice crystals, especially at the upper elevations. Fire suppression, disease, insects and potentially climate change are changing the structure, distribution and composition of these woodlands.

Subalpine fir / grouse whortleberry is the major habitat type on the St. Julian Claim Block (Pfister et al 1977). The whitebark pine/subalpine fir habitat type is found at the higher elevation portion of the site. These habitat types are found extensively in the highest elevation forests of Montana, east of the continental divide. A cold climate and low timber productivity are associated with these habitat types. Disturbed areas exhibit slow recovery from disturbance with regrowth dominated by the same species found in old-growth stands. Subalpine fir is the indicated climax for this habitat type, but stands are also characterized by whitebark pine, which is a long-lived, seral dominant on drier, higher elevation sites. Additional species found in subalpine fir/grouse whortleberry habitat are listed on Table 3.9.

<table>
<thead>
<tr>
<th>Mountain Heath</th>
<th>Hitchcock’s Woodrush</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Mountain Heather</td>
<td>Alpine Bluegrass</td>
</tr>
<tr>
<td>Alpine Currant</td>
<td>Sandberg’s Bluegrass</td>
</tr>
<tr>
<td>Short Fruited Willow</td>
<td>Alpine Timothy</td>
</tr>
<tr>
<td>Planeleaf Willow</td>
<td>Pinegrass</td>
</tr>
<tr>
<td>Purple Mountain Hairgrass</td>
<td>Parry’s Rush</td>
</tr>
</tbody>
</table>

**Special Status Plants**

The MNHP database was reviewed to assess the potential impacts to previously inventoried special status plant species and vegetation communities. The MNHP data search reported four Montana Species of Concern (SOC) or Potential Species of Concern (PSOC) that have been previously inventoried in Park County in the area around the St. Julian Claim Block. These four species are beautiful fleabane; wedgeleaf saltbush; whitebark pine; and many-ribbed sedge. Whitebark pine is known to occur in the analysis area.

**Beautiful Fleabane:** Two observances of this species have been made in Montana. One observation of this species in Park County was documented in 1989. The location is listed as near the headwaters of a tributary to Davis Creek (Mathews 1989). The observation was approximately 2 miles southeast of the project site in subalpine meadow habitat. Observation was in a forest opening on a gentle north-facing slope at the 7,000 ft elevation. While secure and common throughout its range, the plant is at risk of extirpation in the state.

**Wedgeleaf Saltbush:** This species has been observed in a wetland/riparian area 4 miles northwest of the St. Julian Claim Block. The last documented observation in Park County was in 1897. The general habitat is vernally moist, alkaline soil around ponds
and along streams in the valleys. The species range is British Columbia and Saskatchewan south to Utah and Nevada. Wedgeleaf salt is common and abundant across its range but potentially at risk in the state due to limited range and habitat.

**Whitebark Pine:** Whitebark pine is a common component of subalpine forests and a dominant species of treeline and krummholtz habitats. The species is known to exist in the St. Julian Claim Block which includes historic drilling pads located in upslope and ridgetop locations. Whitebark pine is considered a sensitive species by the Forest Service and the BLM due to severe impacts from past mountain pine beetle outbreaks and by the introduced pathogen, white pine blister rust. Whitebark pine is apparently secure throughout the Rocky Mountain subalpine woodland zone but may be rare, or declining, in parts of its range.

**Many-Ribbed Sedge:** This species was observed in Counts Creek drainage three miles southeast of the St. Julian Claim Block (Mathews, 1989). The observation site was noted as a subalpine meadow 20 years following a clearcut. The location was noted as montane grassland at an elevation of 7,200 ft. The general habitat is grasslands and meadows in the montane and subalpine region. The species range is British Columbia to Montana south to Nevada and Utah. Many-ribbed sedge is globally secure across its range but has limited range in the state.
Figure 3.17
St. Julian Exploration Project, Park County, Montana
Soil Map Units Associated with Lucky Minerals Exploration Proposal
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### Table 3.10
Montana Species of Concern Identified by Montana Natural Heritage Program

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Status* USFWS/State/Forest Service/BLM</th>
<th>Blooming period</th>
<th>Habitat and Elevation</th>
<th>Distribution Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful Fleabane</td>
<td>State: S1S3 (SOC) Global: G5</td>
<td>July-September</td>
<td>Meadows and forest openings in the montane and subalpine zones. 7000 ft elevation</td>
<td>1989 observation in Park County was approximately 2 miles southeast of the project site in subalpine meadow habitat. Observation was in a forest opening on a gentle north-facing slope.</td>
</tr>
<tr>
<td>Wedgeleaf Saltbush</td>
<td>State: S3 Global: G5</td>
<td>August-September</td>
<td>Alkaline soils around ponds and streams in valley bottoms.</td>
<td>This species has been observed in a wetland/riparian area 4 miles northwest of the St. Julian Claim Block. Last documented observation in Park County was 1897.</td>
</tr>
<tr>
<td>Whitebark Pine</td>
<td>USFSW: Candidate USFS: Sensitive BLM: Sensitive State: S3 Global: G3G4</td>
<td>Cones remain closed and on tree until opened or dislodged by birds or squirrels</td>
<td>Subalpine forests. 7000 ft–9000 ft elevation</td>
<td>Common component of subalpine forests. Species is known to exist in the St. Julian Claim Block which includes old drilling pads located near the ridgetop.</td>
</tr>
<tr>
<td>Many-ribbed Sedge</td>
<td>State: S2S3 Global: G5</td>
<td>Flowering and fruiting in July</td>
<td>Grassland/meadows in the montane and subalpine zones 7,200 ft elevation</td>
<td>This species was observed in 1989 3 miles southeast of the St. Julian Claim Block. The site was a 20 year old clearcut located in Counts Creek drainage</td>
</tr>
</tbody>
</table>

*USFWS: Candidate: Those taxa for which sufficient information on biological status and threats exists to propose to list them as threatened or endangered. The USFWS encourages their consideration in environmental planning and partnerships; however, none of the substantive or procedural provisions of the Endangered Species Act apply to candidate species.

*USFWS: Listed threatened: Any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (16 U.S.C. 1532(20)).

*Montana SOC: Montana Species of Concern: native taxa that are at-risk due to declining population trends, threats to their habitats, restricted distribution, and/or other factors. Designation as a Montana Species of Concern or Potential Species of Concern is based on the Montana Status Rank, and is not a statutory or regulatory classification. Rather, these designations provide information that helps resource managers make proactive decisions regarding species conservation and data collection priorities.

*Montana PSOC: Montana Potential Species of Concern: Potential Species of Concern are native taxa for which current, often limited, information suggests potential vulnerability.

*Forest Service Sensitive: Forest Service Manual (2670.22) defines Sensitive Species on Forest Service lands as those for which population viability is a concern as evidenced by a significant downward trend in population or a significant downward trend in habitat capacity. The Regional Forester (Northern Region) designates Sensitive species on Forest Service lands in Montana. These designations were last updated in 2007 and they apply only on Forest Service-administered lands.

*BLM Sensitive: Species are defined by the BLM 6840 Manual as those that normally occur on BLM-administered lands for which BLM has the capability to significantly affect the conservation status of the species through management.

#### 3.9.2.3 Noxious Weeds

Park County has formed a weed management district to manage noxious weeds. It is unlawful to permit noxious weeds to propagate or go to seed on any land in Park County. Park County provides that anyone who enters into a weed management program with the county is considered in compliance with the County Weed Control Act (7-22-2101(5), MCA). County
Weed management plans consider prevention the best method for controlling noxious weeds followed by control. Prevention methods include washing all equipment prior to entry on property where land disturbing activities will take place. Use of noxious weed free seed is required for revegetation. Park County considers chemical control to be the most effective and efficient method for controlling established weeds.

Montana’s County noxious weed list identifies noxious weeds pursuant to the County Weed Control Act.

### Table 3.11
Park County Montana Noxious Weed List

<table>
<thead>
<tr>
<th>Common Name</th>
<th>State Weed Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoary Cress (Whitetop)</td>
<td>2b</td>
</tr>
<tr>
<td>Diffuse Knapweed</td>
<td>2b</td>
</tr>
<tr>
<td>Spotted Knapweed</td>
<td>2b</td>
</tr>
<tr>
<td>Russian Knapweed</td>
<td>2b</td>
</tr>
<tr>
<td>Oxeye-Daisy</td>
<td>2b</td>
</tr>
<tr>
<td>Canada Thistle</td>
<td>2b</td>
</tr>
<tr>
<td>Field Bindweed</td>
<td>2b</td>
</tr>
<tr>
<td>Houndstongue</td>
<td>2b</td>
</tr>
<tr>
<td>Leafy Spurge</td>
<td>2b</td>
</tr>
<tr>
<td>Dyer’s Woad</td>
<td>1b</td>
</tr>
<tr>
<td>Perennial Pepperweed</td>
<td>2a</td>
</tr>
<tr>
<td>Dalmatian Toadflax</td>
<td>2b</td>
</tr>
<tr>
<td>Yellow Toadflax</td>
<td>2b</td>
</tr>
<tr>
<td>Tall Buttercup</td>
<td>2a</td>
</tr>
<tr>
<td>Common Tansy</td>
<td>2b</td>
</tr>
<tr>
<td>Purple Loosestrife</td>
<td>1b</td>
</tr>
<tr>
<td>St. John’s Wort</td>
<td>2b</td>
</tr>
<tr>
<td>Tamarisk</td>
<td>2b</td>
</tr>
<tr>
<td>Orange Hawkweed</td>
<td>2a</td>
</tr>
<tr>
<td>Yellow Starthistle</td>
<td>1a</td>
</tr>
<tr>
<td>Tansy Ragwort</td>
<td>2a</td>
</tr>
<tr>
<td>Rush Skeleton Weed</td>
<td>1b</td>
</tr>
<tr>
<td>Meadow Hawkweed</td>
<td>2a</td>
</tr>
<tr>
<td>Eurasian Watermilfoil</td>
<td>1b</td>
</tr>
<tr>
<td>Yellow Iris</td>
<td>2a</td>
</tr>
<tr>
<td>Sulfur Cinquefoil</td>
<td>2b</td>
</tr>
</tbody>
</table>

1 Definition of State Priorities:

- **Priority 1a**: These weeds are not present in Montana. Management criteria will require eradication if detected; education; and prevention.
- **Priority 1b**: Limited presence in Montana. Management criteria would require eradication or containment where present, and prevention and education elsewhere.
- **Priority 2a**: Common in isolated areas of Montana. Management criteria would require containment and suppression where common; and eradication, prevention, and education where less abundant. Management shall be prioritized by local weed districts.
- **Priority 2b**: Abundant in Montana and widespread in many counties. Management criteria would require containment and suppression where abundant and widespread; and eradication, prevention, and education where less abundant. Management shall be prioritized by local weed districts.
3.9.2.4 **Wetlands and Waters of the US**

The topography of the St. Julian Claim Block is characterized by ridgetops, mountain slopes, glacial trough walls and moraines, talus slopes, landslides and rockslides, and cirque headwalls and basins. There are minimal wetlands in the St. Julian Claim Block consisting of the seeps, springs, streams, and flowing boreholes described in the hydrology section. Streams with an incised channel are Waters of the US. Other large ephemeral tributary drainages in the St. Julian Claim Block would be classified as Non-wetland Waters of the US.

3.9.3 **DIRECT AND SECONDARY IMPACTS**

3.9.3.1 **No Action Alternative**

**SOILS**

Under the No Action Alternative, Lucky Minerals would not obtain an exploration license and therefore, could not conduct the exploration activities described in its exploration license application. However, the company would still be allowed to stake claims, map the local geology, and collect surface samples. Mechanized exploration activities, road maintenance, and grading would not occur; therefore there would be no new soil disturbance. However, previously disturbed soils currently present on the St. Julian Claim Block would remain disturbed. The roads, mine dumps, and historic drill pads on the St. Julian Claim Block would continue to exist. Erosion on the steep road grades would continue. Vegetation would continue to slowly invade the existing road network which would continue to be accessed by recreational ATV and other users. Soil erosion would continue to be limited by the large rocks and high coarse fragment content of the soils. About 2.2 miles of sediment producing road network would continue to exist within the St. Julian Claim Block.

**VEGETATION**

Areas that are disturbed from historic mineral development and land access will continue to be disturbed. Roads created in the past would continue to exist in a barren or partially vegetated state. Whitebark pine would continue to be impacted by pine beetle and/or white pine blister rust with resultant loss of population of this USFS sensitive species. Any vegetation that has colonized the existing road network would not be disturbed.

**NOXIOUS WEEDS**

No activities that would initiate a weed management plan with Park County would take place.

Any noxious weeds that exist on the St. Julian Claim Block would remain. To the extent that weeds are present on the St. Julian Claim Block they would persist.
WETLANDS

If Lucky Minerals did not obtain an exploration license, there is not expected to be impacts to wetlands beyond what is presently occurring in area.

RECLAMATION

Under the No Action Alternative, Lucky Minerals would not obtain an exploration license and therefore, could not conduct the exploration activities described in its exploration license application. Mechanized exploration activities, road maintenance, and grading would not occur; therefore the access roads and existing roads on the patented claim block would not be disturbed. The road network within the St. Julian Claim Block would remain in a partially vegetated and open condition. Natural seedfall and invasion by surrounding forest species would continue to provide seed stock for revegetation for the historic road disturbance. The partially vegetated condition of the road network within the St. Julian Claim Block would remain disturbed due to sporadic use of the road network.

3.9.3.2 Proposed Action

SOILS

The Proposed Action would result in the construction of up to 23 exploration drilling pads on the existing disturbed road prism. Each drill pad would measure approximately 20 ft x 50 feet. Fresh road grading would result in rocks being cleared from the road network. The existing access road would be used to access the drill pad locations. Soils and organic layers would be salvaged to the extent that they exist on the disturbed soil surface. Sumps could likely be excavated larger than the stated 2 ft x 3 ft x 3 ft due to the large stones and unstable excavation walls typical of coarse rocky soils. Disturbed soils would be reclaimed by backfilling disturbances and replacing any salvaged soil, replacing any salvaged organic matter, and placing any cleared vegetation on the disturbed area. Reclamation measures would be concurrent with operations and/or begin immediately upon completion of operations at each site.

Soils would be salvaged from sump excavations and drilling areas and at the end of the exploration program disturbances would be reclaimed utilizing the salvaged soil. If all surface areas on the drill pads, materials laydown area, and the St. Julian Claim Block road network were graded, approximately 4.8 acres of soil would be disturbed. However, as described in the Proposed Action, Lucky Minerals would only grade roads as necessary for access, limiting the disturbance area. Reclamation would minimize impacts to soils, including loss of productivity, erosion, or compaction.

VEGETATION

The soil disturbance under the Proposed Action would be limited to the surface of the existing road network and to the area near the old millsite where a laydown area would be located. Consequently, limited mature vegetation would be disturbed by the Proposed Action. Clearing and grading the road network in localized areas may disturb pioneer species that have attempted to establish in the road surface. The impact to vegetation from road clearing and drill
pad construction would be limited as the road is kept open by recurring traffic from ATV and off-road vehicle traffic. About 2.2 miles of sediment producing road network would continue to exist within the St. Julian Claim Block. Any vegetation that has colonized the existing road network would be removed by road grading activity. Other than localized grading of existing road surfaces, no activities are proposed that would disturb vegetation. Whitebark pine would continue to be impacted by pine beetle and/or white pine blister rust with resultant loss of population of this USFS sensitive species.

Special Status Plants

**Beautiful Fleabane:** The St. Julian Claim Block is composed of north-facing mountain slopes but does not include subalpine meadows. Consequently, suitable habitat for beautiful fleabane may not be present within the St. Julian Claim Block. The project approach would be to occupy previously constructed drill pads on existing road networks. No new areas are proposed for disturbance so the project would have no effect on any populations of beautiful fleabane.

**Wedge-leaf Saltbush:** The St. Julian Claim Block is composed of north-facing mountain slopes but riparian areas with alkaline soils do not exist in the St. Julian Claim Block. Consequently, suitable habitat for wedge-leaf saltbush is not present within the St. Julian Claim Block. The project approach would be to occupy previously constructed drill pads on existing road networks. No new areas are proposed for disturbance so the Project would have no effect on populations of wedge-leaf saltbush.

**Whitebark Pine:** The drilling project proposes to access the site from an existing road network and occupy existing drill pads. The project proposal would not require additional vegetation clearing and soil disturbance. If the project is limited to current disturbed areas then the project is not likely to impact stands of whitebark pine.

**Many-ribbed Sedge:** The St. Julian Claim Block is not subalpine meadow and the Proposed Action is not likely to impact this species.

**NOXIOUS WEEDS**

There is a potential for noxious weeds to be introduced along the access road and on the St. Julian Claim Block due to vehicles used by Lucky Minerals being the seed source. However, Lucky Minerals’ equipment would be required to be washed prior to initial mobilization to the project site. This includes, but is not limited to drill rigs, vehicles used for transportation within the St. Julian Claim Block, and ATVs. Lucky Minerals would be required to notify Park County Weed Board of type and location of noxious weeds on private land if it is required by the weed management program. Additionally, Lucky Minerals would be required to bond for potential treatment of weeds in the event that noxious weeds are noted within the St. Julian Claim Block the following growing season. Lucky Minerals would be required to conduct annual field inspections of drill sites and laydown areas which are used and occupied by Lucky Minerals under this Plan of Operations to monitor for noxious weed infestations for a three-year period. In the event that noxious weeds are noted at the site, Lucky Minerals would be required to properly conduct weed control in conformity with any County requirements. Because Lucky
Minerals would be required to comply with the Park Count Weed Management Plan, impacts from noxious weeds are expected to be minimal.

**WETLANDS**

There are minimal wetlands in the St. Julian Claim Block consisting of the seeps, springs, streams, and flowing boreholes. Potential sediment transport within the incised channels would be addressed with BMP’s developed in a 318/310 Authorization (Table 1.2). Lucky Minerals may also need to obtain other appropriate permits to address unexpected disturbance to streams and wetlands. Any improvements or mitigation measures that are developed would likely lessen the impacts.

**RECLAMATION**

Reclamation of soil and vegetation disturbances in subalpine environment is difficult. Limiting conditions including coarse soil texture, low effective water holding capacity, low cation exchange capacity due to limited organic matter content, short growing season, acidic soils, and periods of environmental stress all contribute to reclamation difficulties. Reclamation actions would be taken that would attempt to mitigate some of these limiting features of the site.

Reclamation measures would be concurrent with operations and/or begin immediately upon completion of operations at each site. Disturbed areas would be required to be kept to the minimum size necessary to accommodate the exploration operation (ARM 17.24.105). If ground-leveling activities are needed or sumps are dug, all suitable on-site organic litter layer and soil material would be salvaged prior to any other site disturbance (such as drilling or leveling), and either stockpiled or used for immediate reclamation (ARM 17.24.105). Drill pad sumps would be backfilled with materials removed from the sump footprint. Felled or cut vegetative material (trees, logs, brush, etc.) would be stockpiled in amounts adequate for reclamation. Replacing soil materials and salvaged organic litter and placing felled vegetation over the disturbed areas would provide a substrate for invasion of forest species onto the drill pad disturbances. Revegetation potential of reclaimed drill pads would be enhanced by steps taken to salvage and replace soil.

While completion of final reclamation as soon as possible is preferable, this may not always be possible due to seasonal weather events. In such an event, interim reclamation would be required for the purposes of erosion control on all exploration disturbance areas (ARM 17.24.105). This may include draining sumps, erosion control measures such as constructing or installing water bars, scarifying compacted surfaces, placement of woody debris, interim revegetation, and erosion control practices.

Exploration drill holes would be required to be plugged at the surface five to 10 feet with cement, except as provided in ARM 17.24.106. Drill hole collar pipe or casing would be removed or cut off below ground level. Upon completion, there would be an effort to pump the remaining drill cuttings down the drill hole before plugging the hole with bentonite and cement. It may not always be possible to completely pump the drill cuttings into the hole, due to rubble or blockages from the sides of the hole. In the event that all of the cuttings cannot be pumped back down the drill hole, there are several options available with respect to the disposal of the cuttings. These options include: burying them in the sump, placing them in
underground adits within the St. Julian Claim Block, or taking them to an approved waste disposal site (Dykes, 2016d). Cuttings would be disposed of in compliance with applicable State regulations (ARM 17.24.107) and in consultation with DEQ.

Excavations would be required to be backfilled with excavated spoil material and topped with salvaged organic material and soil. Compacted surfaces created by exploration activities would be loosened and disturbed areas would be contoured to the original condition to the extent possible by reapplying salvaged material over disturbance areas. This includes reapplication of mineral soil, topped with organic soil material, woody debris, and slash. Upon completion of reclamation, any excess salvaged material (rock, soils, slash, woody debris, etc.) would be scattered in the vicinity. Excess rock or soils would not be placed or scattered in streams or wetlands.

Lucky Minerals would assume responsibility for any necessary reclamation resulting from activities of contracted and/or subcontracted employees. Reclamation requirements, including soil salvage, implementation of best management practices for control erosion, and prescriptive soil treatments, would minimize any potential short and long term impacts from the Proposed Action.

3.9.3.3 Agency-Modified Alternative

The Agency-Modified Alternative would be the same as the Proposed Action with the addition of the following mitigation measures.

DRILLING WASTE DISPOSAL

Instead of retaining the proposed option to dispose of cuttings in underground adits, Lucky Minerals would be required to primarily pump the cuttings back downhole prior to plugging, or when that is not possible, the cuttings in the sumps would be compacted, covered, and revegetated. As stated in 2.4.2.1, historic mining features would be avoided during exploration drilling. This would prevent any attempt to re-open or utilize historic workings that could result in an inadvertent release of historic mine waste or water.

VEGETATION

Lucky Minerals would be required to seed after any road maintenance disturbance to limit invasion by noxious weeds. Lucky Minerals would also be required to seed other disturbances caused by the drilling project, including berms around the water withdrawal pump site, drill sites, and laydown areas to limit invasion by noxious weeds.

Seeding with a mix of alpine timothy, alpine bluegrass, and red clover would promote vegetation establishment to out-compete any weeds that might be introduced to the site. Other disturbances throughout the drilling project, including berms around the water withdrawal pump site, drill sites, and laydown areas would also be required to be seeded to limit invasion by noxious weeds. This mitigation would minimize any impacts caused by noxious weeds.

SURVEYING
In addition to obtaining a permit from the Park County Conservation District for the existing creek crossings, Lucky Minerals would also survey for existing springs, seeps, and other sources of wetlands to avoid any identified potential direct and secondary impacts to wetlands during the drilling program.

3.9.3.4 Secondary Impacts

Based on the MEPA model rules definition, secondary impacts are further impacts to the human environment that may be stimulated or induced by, or otherwise result from a direct impact of the action.

The improvements that Lucky Minerals has proposed to make on the access roads to the St. Julian Claim Block include grading in localized areas, clearing of rock and other debris, and sloping of roads to enhance drainage and prevent channeling. The access roads to the St. Julian Claim Block will not be made wider. Currently, a four-wheel drive high clearance vehicle is required to get to the St. Julian Claim Block. It is anticipated that the same type of vehicle will be required after Lucky Minerals makes the road improvements and completes its exploration activities. Thus, there are not expected to be any significant secondary impacts to soils, vegetation, or reclamation on the St. Julian Claim Block.

3.10 TRANSPORTATION

3.10.1 ANALYSIS AREA AND METHODS

The analysis area for transportation includes the existing roads that are proposed for access to the exploration area between US Highway 89 and the St. Julian Claim Block and the existing road network within the project area (Figure 3.19). These roads include Murphy Road, East River Road, Colin Road, Old Cemetery Road, Chico Road, Emigrant Creek Road and FS Roads 3272 and 3272b. Analysis methods included consultation with Park County for information about traffic counts and maintenance schedule for Emigrant Creek Road (Ed Hillman, 2016). In addition, the following documents were using in the qualitative analysis:

- Gallatin National Forest Plan and associated Vehicle Use Map to review road status in the GNF.
- Park County Active Transportation Plan to review plan status for Emigrant Creek Road.
- US Government Land Office (GLO) records for mineral plats in the Emigrant Creek area to review road status across these mineral plats at the time they were filed with the Department of Interior.
- USGS quadrangle maps for 1955 and 1989 to determine road networks shown on these maps. Recent aerial imagery and measurement tools were utilized to measure the length of the currently existing roads on the St. Julian Claim Block.

DEQ also made to site visits to obtain visual observations of the road conditions as part of this evaluation.
3.10.2 AFFECTED ENVIRONMENT

US Highway 89 is a paved federal highway that parallels the west side of the Yellowstone River between Livingston and Gardner. East River Road (State Highway 540) parallels the east side of the Yellowstone River from Carter Bridge to Point of Rocks. Murphy Road connects Highway 89 to East River Road. Chico Road (County Road 205), Old Cemetery Road (County Road 288) and Conlin Road (County Road 211) are improved roads that provide access from East River Road to Old Chico. From there Emigrant Creek Road (County Road 211E) transitions into FS Road 3272. At the mouth of the East Fork of Emigrant Creek, FS Road 3272 transitions into FS Road 3272b.

Park County approved the Park County Active Transportation Plan February 26, 2016. This planning document identifies community priorities and opportunities for outdoor recreation and active/alternative transportation. The map that accompanies the Plan identifies Murphy Road, Chico Road, Old Cemetery Road, Colin Road, and Emigrant Creek Road as a component of the Active Transportation Plan (Park County, 2016). Park County recognizes Murphy Road as a Class 1 road, which is described as a high traffic or school bus route with regularly scheduled maintenance. Chico Road, Old Cemetery Road, and Colin Road are classified as Class 3 roads, which receive lower traffic volumes and have occasional maintenance. Emigrant Creek Road is identified as a Class 5 road on the lower end (Hillman, 2016). Class 5 roads have low traffic volumes and do not receive regular maintenance (Park County, 2016). A disclaimer on the map states that the information is not to be used for legal purposes.

The Gallatin National Forest Plan for facilities and roads was modified by Plan Amendment 45, GNF Travel Management Plan (Record of Decision 12/10/2006). The Travel Management Plan provides travel area goals, objectives, standards and guidelines. Objectives for the Mill Creek Travel Planning Area include providing “a road and trail system that accommodates traffic consistent with protecting soil and watershed condition.” A sub-objective is to “repair damage to road and trail system and schedule maintenance to attain conditions that are non-erosive.” The Motor Vehicle Use Map, GNF (USDA-FS 2013) specifies a seasonal road closure for Emigrant Creek Road beginning at mile 4.25 to mile 7.46. This closure is in effect from December 1 to June 15. The entire length of the FS Road 3272B is included in this seasonal closure. The ROD for the Forest Travel Management Plan states that the seasonal road closure is to “protect the integrity of the backcountry ski opportunities this area is targeted to provide.” (Gallatin National Forest. 2006)

Measurements of the satellite image road network estimate 2.2 miles of roads and switchbacks currently existing on the 130.9 acres of patented land at the St. Julian Claim Block. The satellite image in Figure 3.18 shows the majority of this disturbance occurring on the Mill, St. Julian and Bullion lode claims.

3.10.3 DIRECT AND SECONDARY IMPACTS

3.10.3.1 No Action Alternative

Under the No Action Alternative, Lucky Minerals would not obtain an exploration license and therefore, could not conduct the exploration activities described in its exploration license application. However, the company would still be allowed to stake claims, map the local
geology, and collect surface samples. Mechanized exploration activities, road maintenance, and grading would not occur; therefore the access roads and existing roads on the patented claim block would not be disturbed.

No road improvements would be constructed to improve access to the proposed drill sites, but the historic road network that extends up Emigrant Creek to the St. Julian Claim Block would continue to provide access to the private lands located at the end of the road. Emigrant Creek Road would continue to provide access for recreationists in accordance with the GNF Travel Plan to private lands and CGNF lands in the Emigrant Creek drainage. ATV and off-road traffic would continue to travel Emigrant Creek Road past private lands that the road passes through.

**Figure 3.18**

Satellite image of St. Julian Claim Block showing existing road network.

3.10.3.2 Proposed Action

In the Proposed Action access to the Emigrant Creek Road would be from the town of Emigrant by way of the Chico Road to the town of Old Chico (See Figure 3.19). Emigrant Creek Road the
transitions to FS Road 3272 near the Emigrant Creek crossing. The proposed access route branches off onto FS Road 3272B, which provides access to the St. Julian Claim Block located on the East Fork of Emigrant Creek.

This access route passes through the Chico Hot Springs Resort. Given the proximity for the road to the Resort, there could be a potential short-term impact during the mobilization and demobilization of the exploration equipment. The Proposed Action includes the use of flagger to reduce safety impacts.

Once the exploration equipment was onsite, Lucky Minerals would add approximately four to five vehicle round trips a day to the existing traffic on the proposed access route. These vehicles (typically pickup trucks) would be used to transport the exploration crews to and from the site. This means that there would conservatively be five vehicle round trips a day added to the existing traffic passing through the Chico Hot Springs Resort daily during the three-month field season. These daily trips may have a minimal, short-term safety impact because the Chico Hot Springs Resort guests park beside the road and frequently walk along it to access the different buildings.

The proposed route continues to Old Chico and onto Emigrant Creek Road. Emigrant Creek Road provides access on the public and private land in the vicinity of the Lucky Minerals proposed project. Short-term impacts during the proposed activities may include increased use of Emigrant Creek Road, increased noise, and restricted access when drill rigs and equipment block roads during mobilization and demobilization.

Emigrant Creek Road would continue to provide access for recreationists in accordance with the Gallatin National Forest (GNF) Travel Plan to private lands and CGNF lands in the Emigrant Creek drainage. ATV and off-road traffic would continue to travel Emigrant Creek Road past private lands that the road passes through.

About 3.48 acres of disturbance may occur for the existing road upgrades on the St. Julian Claim Block. Impacts from road disturbance are also discussed in other resource sections, including: Air Quality, Land Use, Noise, and Recreation, Soils, Vegetation, and Reclamation, Water and Geothermal, Geology and Minerals, and Wildlife.
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Lucky Minerals may have to enter into a road access agreement with Park County and/or the CGNF to address use and maintenance of the access roads. Additionally, Lucky Minerals will need to obtain appropriate stream permits for the potential streambed disturbance and short-term turbidity associated with increased traffic.

3.10.3.3 **Agency-Modified Alternative**

The Agency-Modified Alternative would be similar to the Proposed Action, with the inclusion of three additional mitigation measures.

Lucky Minerals would be required to access the St. Julian Claim Block for mobilization and demobilization of exploration equipment using Murphy Road, Old Cemetery Road, Emigrant Creek Road, and Forest Service Road 3272/3272B. Whenever possible, Lucky Minerals would also use this access route for traffic associated with shift changes, however, other routes may be used for incidental travel, i.e., emergencies and personal travel (See Figure 3.19). This mitigation was added to reduce the potential short-term impacts to the Chico Hot Springs Resort.

Travel speeds on all access roads and within the existing road network of the St. Julian Claim Block would be limited to 25 mph. Due to the rocky terrain of the access road from Old Chico and the St. Julian Claim Block, vehicle speeds are not expected to be excessive. However, Lucky Minerals would be required to limit all vehicles to 25 mph on the all access roads and within the existing road network of the St. Julian Claim Block. Limiting vehicles speeds to 25 mph would further mitigate the potential for wildlife collisions and reduce impacts of fugitive dust. This mitigation was added out of an abundance of caution.

In addition to posting signs, as described in the Proposed Action, Lucky Minerals would be required to monitor access and, if needed, install a gate or other type of road barrier at the boundary of the St. Julian Claim Block to restrict public access to the privately-owned roads on the project area.

3.10.3.4 **Secondary Impacts**

Based on the MEPA model rules definition, secondary impacts are further impacts to the human environment that may be stimulated or induced by, or otherwise result from a direct impact of the action.

The improvements that Lucky Minerals has proposed to make on the access roads to the St. Julian Claim Block include grading in localized areas, clearing of rock and other debris, and sloping of roads to enhance drainage and prevent channeling. The access roads to the St. Julian Claim Block will not be made wider. Currently, a four-wheel drive high clearance vehicle is required to get to the St. Julian Claim Block. It is anticipated that the same type of vehicle will be required after Lucky Minerals makes the road improvements and completes its exploration activities. Thus, there are not expected to be any significant secondary impacts to transportation.
3.11 AIR QUALITY

3.11.1 ANALYSIS AREA AND METHODS

The air quality of a region is primarily controlled by the type, magnitude and distribution of pollutants and may be affected by regional climate. Transport of pollutants from their source areas is affected by topography and meteorology. The analysis area for air quality resources includes the Emigrant Mining District, specifically in the immediate area of the St. Julian Claim Block and the roads proposed for access to the exploration area. Analysis methods included consultation with DEQ’s Air Quality Bureau (AQB) to determine the air quality permit requirements of the proposed action and a qualitative analysis of the emission sources, including stationary equipment, self-propelled vehicles, and warming fires, described in the proposed action. The existing air quality and climatic conditions in the vicinity of the Proposed Action are detailed below. It consists of a discussion of conditions which may affect regional air quality and the existing air quality in the affected area. Site specific air quality monitoring was not conducted as part of this evaluation.

3.11.2 AFFECTED ENVIRONMENT

3.11.2.1 Topography

The St. Julian Claim Block is characterized as high relief with convex glaciated mountain ridges and narrow valleys along the stream corridor. The St. Julian Claim Block is mountainous and heavily forested upper sub-alpine forest. Elevation ranges from approximately 8,000 ft near creek level to approximately 9,000 ft at the top of the ridge (USGS 1955). Landforms in the survey area have been influenced by glacial erosion from the steep slopes on the mountain side and deposition of moraines reworked into alluvial terraces along the stream in the valley bottom. Surrounding the property are treeless, rocky alpine ridgelines, and cirques with short, broad valleys.

3.11.2.2 Climate and Meteorology

The climate of the area typically consists of warm summers and cold winters, with an average annual temperature of 35 °F (1.6 °C). The area receives 25 to 35 inches of precipitation annually, mainly in the form of snow (PRISM Climate Group). Snow accumulation is high in basins, but ridgetops have little snow accumulation because of high winds and sublimation.

3.11.2.3 Existing Air Quality

Existing air quality is good due to lack of emission sources in the area. Additionally, existing air quality has been unimpaired from previous exploration activities in the area. The St. Julian Claim Block is not within a Class I Airshed, nor in an area designated by the United States Environmental Protection Agency (EPA) as not attaining an ambient air quality standard.
3.11.3 DIRECT AND SECONDARY IMPACTS

3.11.3.1 No Action

Under the No Action Alternative, Lucky Minerals would not obtain an exploration license and therefore, could not conduct the exploration activities described in its exploration license application. However, the company would still be allowed to stake claims, map the local geology, and collect surface samples. Mechanized exploration activities, road maintenance, and grading would not occur. There would be no additional impacts to air quality in the study area. Air Quality would remain similar to the existing condition.

3.11.3.2 Proposed Action

In accordance with ARM 17.8.743, the Air Quality Bureau (AQB) at DEQ has determined that the Lucky Minerals project does not require a Montana Air Quality Permit for the proposed action.

(1) A Montana air quality permit is not required under ARM 17.8.743 for the following:
   (b) mobile emitting units, including motor vehicles, trains, aircraft, and other such self-propelled vehicles; and
   (j) drilling rig stationary engines and turbines that do not have the potential to emit more than 100 tons per year of any pollutant regulated under this chapter and that do not operate in any single location for more than 12 months.

The proposed equipment is classified as mobile emitting units which are not regulated by AQB. Some mobile emitting units, such as the 28 HP diesel water pump, could become regulated by AQB as stationary sources of emissions if they operate in the same location for more than 12 months. However, the water pump diesel engine would not require a Montana Air Quality Permit because it does not have the potential to emit more than 25 tons of an airborne pollutant on an annual basis (ARM 17.8.743). The limited emissions from the two drill rigs, crew trucks, and light plant generators, and water pump would be short-term and temporary.

Fugitive dust may increase on the unpaved section of Chico road for short durations in drier conditions, but would be infrequent (See Figure 3.19). After initial mobilization, daily traffic averages would increase by approximately four to five round trips per day. This increase in fugitive dust from traffic would be minimal and temporary. The proposed action includes dust control measures that would be applied as needed throughout the duration of the exploration project. Additional dust control measures on County roads would be addressed by a Park County road maintenance agreement.

Due to the rocky terrain of the access road from Old Chico and the St. Julian Claim Block, vehicle speeds would decrease. This would further minimize the potential impacts of fugitive dust above Old Chico. The proposed dust control measures would be used as needed.

The proposed reclamation of the drill areas and access roads would further reduce potential sources of dust.
3.11.3.3 **Agency-Modified Alternative**

In the Agency-Modified Alternative, Lucky Minerals would be required to access the St. Julian Claim Block for mobilization and demobilization of exploration equipment using Murphy Road, Old Cemetery Road, Emigrant Creek Road, and Forest Service Road 3272/3272B, therefore avoiding Chico Road and Chico Hot Springs. Further, Lucky Minerals would also be required to use this access route for traffic associated with shift changes (See Figure 3.19). The use of this route would reduce or eliminate fugitive dust on Chico Road. However, because there are longer stretches of unpaved road on Old Cemetery Road, there may be a slight increase in the volume of fugitive dust. The proposed dust control measures would minimize potential impacts.

Due to the rocky terrain of the access road from Old Chico and the St. Julian Claim Block, vehicle speeds are not expected to be excessive. However, Lucky Minerals would be required to limit all vehicles to 25 mph on the all access roads and within the existing road network of the St. Julian Claim Block. Limiting vehicles speeds to 25 mph would further mitigate the potential for wildlife collisions and reduce impacts of fugitive dust.

3.11.3.4 **Secondary Impacts**

Based on the MEPA model rules definition, secondary impacts are further impacts to the human environment that may be stimulated or induced by, or otherwise result from a direct impact of the action. No secondary impacts to air quality resources are predicted.

3.12 **VISUALS**

3.12.1 **ANALYSIS AREA AND METHODS**

The analysis area for visual resources for the Proposed Action includes vantage points in the East Fork of Emigrant Creek drainage and other areas in Emigrant Gulch from which the St. Julian Claim Block may be seen. Analysis methods include a review of the Visual Quality Objective (VQO) developed by the GNF applicable to the Emigrant Gulch area, Park County’s zoning on private land (Park County. 2006), field observations including reference images and videos obtained from an unmanned aerial vehicle, and three-dimensional Google Earth imagery.

3.12.2 **AFFECTED ENVIRONMENT**

The St. Julian Claim Block is located on a northeasterly facing ridge in the East Fork of Emigrant Creek drainage. The lower reach of the St. Julian Claim Block is covered with a mature forest canopy of second-growth trees (predominately Douglas fir, Lodge Pole pine and Subalpine fir) up to 100 years old. In the upper reach, the forest canopy is interspersed with naturally occurring talus slopes.

The visual impact from previous mining and mineral exploration activity is readily apparent in the Emigrant Creek Gulch area. Access to the upper elevation portions of the patented mining claims is gained by a historic mine access road, with several spurs, that switchback across the
patented mining claims. While the maturing forest growth has limited its visual impact, the existing access road can be readily seen from views across the East Fork of Emigrant Creek valley as it crosses both the lower and upper reaches of the St. Julian Claim Block.

The GNF has developed Visual Quality Objectives (VQO) for the Emigrant Gulch area. VQOs are the desired level of scenic quality and diversity of natural features based on physical and sociological characteristics of an area. They refer to the degree of acceptable alterations of the characteristic landscape. The VQO for the national forest land surrounding the St. Julian Claim Block is “Modification.” Under this designation, human activity may dominate the characteristic landscape but must, at the same time; utilize naturally established form, line, color and texture. It should appear as a natural occurrence when viewed in middle-ground or background (Grosvenor, 2016). Because it is comprised of patented mining claims, the St. Julian Claim Block is not subject to the VQOs developed by the GNF. Park County does not have any visual zoning requirements on private land in the Lucky Minerals analysis area (Park County Growth Policy, 2006).

### 3.12.3 DIRECT AND SECONDARY IMPACTS

#### 3.12.3.1 No Action Alternative

Under the No Action Alternative, Lucky Minerals would not obtain an exploration license and therefore, could not conduct the exploration activities described in its exploration license application. However, the company would still be allowed to stake claims, map the local geology, and collect surface samples. Mechanized exploration activities, road maintenance, and grading would not occur. The current condition of the visual resources would remain as they are. The historic mine access road that switchbacks across the St. Julian Claim Block would continue to be seen from across the East Fork of Emigrant Creek valley, a limited segment of Emigrant Creek, and partially seen from Emigrant Peak. The visual impacts that would result from Lucky’s active drilling under the Proposed Action would not occur.

#### 3.12.3.2 Proposed Action

Under the Proposed Action, the historic access road that switchbacks across the St. Julian Claim Block would continue to be seen from immediate area vantage points. The visual impact of the historic access road has been lessened over the years by a maturing forest. No mature vegetation would be disturbed by the Proposed Action, although pioneer species that have attempted to establish on the road surface may be disturbed by clearing and grading the road network. A noticeable increase in the visual impact of the historic access road is not expected.

Visual impacts will be increased during active drilling by the presence of two LF-70 track mounted diamond drilling machines and other equipment on the historic access road. The drill rigs and other equipment will appear relatively small when viewed in the context of the mountain landscape. Additionally, the drill rigs and other equipment will be shorter in height than many of the trees growing on the mountainside. Thus, the drill rigs will be partially shielded when stationed on areas of the St. Julian Claim Block that has sufficiently tall vegetation from the viewshed of observers in the immediate vicinity of the St. Julian Claim Block. The visual impact will be greatest when the drill rigs and other equipment are operating
on the historic access road at the upper reaches of the St. Julian Claim Block where the forest cover is less dense.

The visual impacts will be most noticeable to persons who may be recreating within the East Fork of Emigrant Creek drainage, which includes extreme corners of the Chico Peak Roadless Area and the North Absaroka Roadless Area. There are, however, no developed trails within the drainage.

The proposed exploration activity may also be visible to persons who may be recreating along Emigrant Creek. There is a short segment along Emigrant Creek from which a viewer can look up the East Fork of Emigrant Creek drainage. The visual impact is not expected to be significant given the northeast aspect of the slope on which the St. Julian Claim Block is located, the distance between Emigrant Creek and the St. Julian Claim Block, and the intervening forest canopy.

The proposed exploration activity may also be visible from Emigrant Peak. However, the visual impact is not expected to be significant. Because the St. Julian Claim Block is located on a ridge facing to the northeast, only the western portion of the St. Julian Claim Block can be seen from Emigrant Peak while the remainder is hidden as it wraps around a ridge. In addition, Emigrant Peak is 2.5 miles away from the St. Julian Claim Block and a view of the equipment would be partially shielded by the canopy cover on the St. Julian Claim Block. The presence of the drill rigs and other equipment would likely be most noticeable when the equipment was moving.

The proposed exploration activity is not expected to have a significant visual impact to the Absaroka Beartooth Wilderness Area. As previously indicated, the St. Julian Claim Block is located on a ridge with a northeast aspect and with a highest elevation of approximately 8800 feet. The Absaroka Beartooth Wilderness Area is located two miles to the south. In addition, there is an intervening ridge, the highest elevation of which is 9953 feet that should shield most, if not all, views of the St. Julian Claim Block from the closest peak in the Absaroka Beartooth Wilderness Area. The St. Julian Claim Block is not visible from any developed trail within the Absaroka Beartooth Wilderness Area.

The St. Julian Claim Block is not visible from any vantage point on U.S. Highway 89 or in the Arrastra Creek drainage because of distance and intervening geographic features.

Visual impacts will also occur at night, when drilling would require the use of small lights similar to the ones used by highway crews. The areas illuminated by the lights will appear relatively small when viewed in the context of the mountain landscape and will be partially shielded from view by the forest cover. The visibility of the small lights to viewers in the East Fork of Emigrant Creek drainage, along Emigrant Creek, on Emigrant Peak, and within the Absaroka Beartooth Wilderness Area would be similar to the visibility of the drill rigs and other equipment as discussed above.

The visual impacts from Lucky Mineral’s exploration activity would be short term. The visual impacts from the presence of the drill rigs and other equipment would occur during the duration of the two approximately three-month long field seasons. The visual impacts from the use of lights at night would also occur during the periods of active drilling during the two approximately three-month long field seasons. After completion of the proposed exploration
project, there is not expected to by any residual visual impacts. Because the proposed exploration activity uses the historic mine road both for access and location of the drill pads, there is expected to be minimal removal of forest vegetation. The St. Julian Claim Block should appear from immediate area vantage points much the same as it did prior to the exploration project.

3.12.3.3 *Agency-Modified Alternative*

The Agency-Modified Alternative would have similar visual impacts as the Proposed Action except Lucky Minerals is to consider what lighting is necessary and to reduce any unnecessary lighting both temporally and spatially. Nighttime lighting is to be shielded and directed to where it is needed to avoid light spillage, and only be bright enough to maintain crew safety. Thus, the visual impacts from night drilling will be less under the Agency-Modified Alternative than under the Proposed Action.

3.12.3.4 *Secondary Impacts*

Based on the MEPA model rules definition, secondary impacts are further impacts to the human environment that may be stimulated or induced by, or otherwise result from a direct impact of the action. No impacts to air quality resources are predicted.

**3.13 SOCIOECONOMICS**

3.13.1 *ANALYSIS AREA AND METHODS*

DEQ is required to evaluate the socioeconomic impacts resulting from the state action. To be considered, the socioeconomic impacts must be directly related to a change in the physical environment. Changes in the physical environment that would result from DEQ’s approval of Lucy Minerals’ exploration program include changes to the environment due to increased traffic accessing the St. Julian Claim block and the exploration drilling at the St. Julian Claim block. The analysis area for socioeconomic impacts includes the geographic area in which socioeconomic interests may be impacted by the increased traffic due to vehicles accessing the St. Julian Claim Block and the exploration drilling itself. This area includes Chico Hot Springs Resort and Day Spa, Old Chico, and areas that may be impacted by increased traffic on Highway 89, Emigrant Creek Road, and Road 3272. The direct and secondary socioeconomic impacts of the Proposed Action and the alternative are limited to this analysis area. The analysis methods included field reviews by DEQ and public comments submitted during scoping and in response to the Draft EA.

3.13.2 *AFFECTED ENVIRONMENT*

The analysis area is generally rural, consisting of private and public forest lands. Most economic activity consists of limited farming and agriculture and predominately rural lodging and recreation. Chico Hot Springs Resort and Day Spa is the major business in the immediate area on Chico Road. The facility provides for lodging at the main lodge and additional cabins in the near vicinity of the of the developed natural hot spring pools. There are rural residential homes in Old Chico as well as 11 vacation rentals located along Old Cemetery Road. **Figure 19** identifies the roads that will be used to access the St. Julian Claim site and the St. Julian Claim
site in relation to Chico Hot Springs, residences in Old Chico, and vacation rentals along Old Cemetery Road.

3.13.3 DIRECT AND SECONDARY IMPACTS

3.13.3.1 No Action Alternative

Under the No Action Alternative, Lucky Minerals would not obtain an exploration license and therefore, could not conduct the exploration activities described in its exploration license application. Thus, the increased traffic associated with accessing the St. Julian Claim Block and the proposed drilling at the St. Julian Claim Block would not occur. Lucky Minerals would still be allowed to stake claims, map the local geology, and collect surface samples. Road maintenance and grading would not occur and access would be by four-wheel drive, ATV, and by foot. Socioeconomic impacts from these activities would be similar to the existing state.

3.13.3.2 Proposed Action

Access to the St. Julian Claim site would be gained by using Old Cemetery Road or Chico Road, then Emigrant Road, and finally a road that is designated FS 3272. Chico Hot Springs Resort is located along Chico Road and is approximately 5.9 air miles from the St. Julian Claim Block. Old Chico is located at the intersection of Old Cemetery Road and Chico Road. The vacation rentals are located along Emigrant Creek Road near Old Chico and are approximately four air miles from the St. Julian Claim site (See Figure 19).

Lucky Minerals would employ approximately ten employees each season, operating the drill rigs in two shifts from mid-July to mid-October. The employees, using trucks, would make a total of four round trips to the site each day. In addition, a geologist employed by Lucky Minerals would make an additional round trip a day, although the geologist would not go to the St. Julian Claim Block each day the drills are operating. Thus, the access roads would carry no more than five additional round trips of truck traffic per day. These round trips would be spread out over the course of a day, at the beginning and end of each shift.

It is not predicted that the increased traffic and associated noise associated with Lucky Minerals’ employees accessing the St. Julian Claim Block would have any significant socioeconomic impact on Chico Hot Springs Resort, the residences near Old Chico or the vacation rentals along Emigrant Creek Road. The expected four to five round trips per day represent only an additional eight to ten trucks driving past these entities spread throughout the day from the middle of July through the middle of October. Nor is the increased traffic expected to have a socioeconomic impact on a broader scale. In 2016, 73,277, 66,969, 57,131, and 21,439 vehicles were admitted to the North Entrance to Yellowstone Park in July, August, September and October, respectively. Assuming that these figures give a rough approximation as to the traffic load on Highway 89, the increased traffic resulting from the Lucky Minerals exploration project would represent only a fraction of a percent increase of traffic on Highway 89.

Furthermore, it is not predicted that the drilling activity at the St. Julian Claim Block would have a significant socioeconomic impact on Chico Hot Springs Resort, the residences near Old Chico or the vacation rentals along Emigrant Creek Road. Chico Hot Springs Resort is located
approximately 5.9 air miles from the St. Julian Claim site and the residences near old Chico and the vacation rentals along Emigrant Creek Road are approximately 4.9 air miles from the St. Julian Claim Block. Thus, it is not predicted that these facilities will have any visual or noise impacts from the proposed drilling activity.

Traffic and noise impacts are discussed in further detail in Sections 3.8 and 3.10. Impacts to recreational users are discussed in more detail in Section 3.8.

3.13.3.3 Agency-Modified Alternative

The Agency-Modified Alternative would be the same as the Proposed Action Alternative, with the exception that Lucky Minerals would not use Chico Road to access the St. Julian Claim Block, thereby avoiding Chico Hot Springs Resort. Lucky Minerals would be required to access the St. Julian Claim Block using Old Cemetery Road, Emigrant Creek Road, and the road designated Forest Service Road 3272/3272B. However, other routes may be used for incidental travel, i.e., emergencies and personal travel (See Figure 3.19).

Similar to the Proposed Action, there is not expected to be socioeconomic impacts on Chico Hot Springs Resort with the Agency-Modified Alternative. However, avoiding the Chico Hot Springs Resort would help mitigate the potential for resort guests’ interaction with Lucky Minerals crew trucks traveling through the resort.
4 CUMULATIVE IMPACTS

4.1 CUMULATIVE IMPACTS

Cumulative impacts are the collective impacts on the human environment within the borders of Montana of the Proposed Action when considered in conjunction with other past and present actions related to the Proposed Action by location and generic type. Related future actions must also be considered when these actions are under concurrent consideration by any state agency through preimpact statement studies, separate impact statement evaluation, or permit processing procedures.

Three other actions in Park County are under concurrent consideration by DEQ through either separate impact statement evaluations or permit processing procedures. DEQ is conducting an environmental review for a proposed gravel pit (Riverside Gravel Pit) which, if approved, would be located five miles southwest of Emigrant just west of Highway 89. DEQ is also conducting an environmental review for a proposed tire disposal facility (Adkins Tire Landfill) which, if approved, would be located East of Pray off of County Road 540 (East River Road). Finally, DEQ is reviewing an application for another mineral exploration project (Crevice Exploration Project) which, if approved, would be located seven miles east of Gardiner.

The proposed Riverside Gravel Pit, Adkins Tire Landfill and Crevice Exploration Project would be located approximately 11.5, 14 and 20 air miles from Lucky’s proposed mineral exploration project at the St. Julian Claim Block, respectively. Based on the intervening distance, Lucky’s proposed mineral exploration at the St. Julian Claim Block is not expected to result in any cumulative impacts when considered in conjunction with the other three projects located in Park County and currently under DEQ’s review. Moreover, while the Riverside Gravel Pit and Adkins Tire Landfill would have a long-term presence in Park County, Lucky Mineral’s exploration activity at the St. Julian Claim Block would be short-term, lasting for two approximately three-month field seasons. Indeed, it is not known at this time whether any of Lucky Mineral’s exploration activity would be conducted at the same time as the operation of the gravel pit, tire landfill or Crevice’s mineral exploration activity as that depends on the timing of DEQ’s action on the proposed projects.

4.1.1 GEOLOGY AND MINERALS

The Cumulative Impacts Study Area for geology and mineral resources includes the Emigrant Mining District, specifically in the area of the St. Julian Claim Block and the access roads depicted in Figure 3.1 and 3.19, and incorporates past, present, and related future actions under concurrent consideration. DEQ consulted with local, state, federal agencies to inquire about present and future actions under consideration. Currently there are no permitted resource actions or management projects in the project area.

Past impacts associated with historic mining and exploration drilling in the Emigrant Mining District include road disturbance and historic mine waste. The road grading that is part of the Proposed Action and Agency-Modified Alternative would be limited to localized area and would not increase the extent of the road disturbance into previously undisturbed areas. Any historical mine waste that occurs on the surface, which may have the potential to contaminate
soil or water resources, will continue to exist in its current state. As part of the Proposed Action and Agency-Modified Alternative, all of the core samples that are collected would be removed from the site for further analysis, and any of the geologic waste material from drilling (i.e. cuttings) would be pumped back into the drill holes, or buried and compacted in the sumps as part of reclamation. These operational practices would minimize any impacts to geology and mineral resources and would not lead to a significant cumulative impact.

4.1.2 WILDLIFE

The cumulative impacts area includes the analysis area, as well as a broader project region and is defined as the general geographic area up to a four-mile radius of the St. Julian Claim Block and adjacent private land. The cumulative analysis also considers past, present, and related future actions under concurrent consideration. DEQ consulted with local, state, federal agencies to inquire about present and future actions under consideration. Currently there are no permitted resource actions or management projects in the project area.

Past impacts associated with historical mining and exploration drilling in the Emigrant Mining District include road disturbance and historic mine waste and are not expected to result in a cumulative impact on wildlife from the Proposed Action.

Present actions that may have a cumulative impact to wildlife include recreation, transportation, and noise. Stress to wildlife as a result of the Proposed Action added to recreation, traffic, and noise would be minimal. After initial mobilization to the St. Julian Claim Block, the Proposed Action and Agency-Modified Alternative propose adding three vehicles per day to the access roads. The Agency-Modified Alternative added additional mitigation measures to reduce any potential cumulative impacts to wildlife. No long-term residual impacts to wildlife would exist from the proposed action because impacts are expected to be short-term and minimal. At the completion of the project, the affected environment would return to its previous state.

4.1.3 FISH AND AQUATIC INSECTS

The cumulative impacts area includes Emigrant Creek and the East Fork of Emigrant Creek (East Fork). The cumulative analysis also considers past, present, and related future actions under concurrent consideration. DEQ consulted with local, state, federal agencies to inquire about present and future actions under consideration. Currently there are no permitted resource actions or management projects in the project area.

No cumulative impacts have been identified for Fish and Aquatic Resources. Consultation with FWP confirmed that lower Emigrant Creek is greatly impacted by irrigation diversions and is regularly dry before its confluence with the Yellowstone River. A population of Eastern Brook Trout was noted in lower Emigrant Creek near historic dredge waste piles, although this species seems to be more resilient to changes in water quality and quantity, when compared to other fish. The absence of a fish population in the upper reaches of Emigrant Creek and the East Fork and the presence of the physical fish barrier near the Great Western Mine claim limit any additive effect from the Proposed Action or Agency-Modified Alternative.
4.1.4 CULTURAL AND HISTORIC RESOURCES

The cumulative impacts area includes the APE identified in the analysis area. The cumulative analysis also considers past, present, and related future actions under concurrent consideration. DEQ consulted with local, state, federal agencies to inquire about present and future actions under consideration. Currently there are no permitted resource actions or management projects in the project area.

Historic mining features from past mining activities were identified in the APE. There are no other activities in the APE that would have an additive effect on cumulative impacts to Cultural Resources. No significant cumulative impacts have been identified.

4.1.5 WATER AND GEOTHERMAL

The cumulative impacts area includes the hydrologic units identified in the analysis area. The cumulative analysis also considers past, present, and related future actions under concurrent consideration. DEQ consulted with local, state, federal agencies to inquire about present and future actions under consideration. Currently there are no permitted resource actions or management projects in the project area.

Minimal, short-term cumulative impacts to water quality from turbidity could result from additional vehicles crossing the two streams along the access roads. However, the additional 8-10 crossings per day added to the current traffic from landowners and recreationists would not have a long-term cumulative impact as the stream would return to its previous state at the completion of the project.

In the Proposed Action, any pumping of water from the stream for drilling would be sporadic. The stream flow rates measured under baseflow condition in 2015 show that the combined flow from the East Fork drainage is approximately 10% of the flow in Emigrant Creek near Old Chico. This indicates that a small withdrawal in the upper East Fork for drilling water (≤ 50 gpm) would have a very small impact on the volume reaching downstream sites. The drilling field season would be limited to summer months and early fall as well, so the short-term impacts from water withdrawal would not contribute to cumulative impacts on water quantity in the drainage.

Additionally, downstream from the Great Western Mine claim area, the flow in Emigrant Creek more than doubles before it reaches Old Chico, and there were no water quality exceedances measured at the lower site in 2015. This indicates the dominance of the other tributaries and groundwater sources on the hydrology and chemistry of Emigrant Creek as it exits the subwatershed. Additional field data indicate that Emigrant Creek contributes only a small fraction of flow (~1%) and dissolved chemical load (<0.1%) to the Yellowstone River at Emigrant, but the lower reach of Emigrant Creek is often dry and disconnected from the river. Any effects to the larger hydrologic unit from activities in the East Fork drainage would be substantially diminished. Therefore, it is beyond the scope of this analysis to include the range of human activities that are unconnected to the Proposed Action, but which could potentially impact Emigrant Creek in the subwatershed located between Old Chico and the Yellowstone River. These activities could include placer mining and creating dredge waste piles along the
stream, diverting stream flow to irrigation ditches, and impacts from the use of groundwater wells and septic systems in the valley sediments.

Previous geothermal studies have extensively documented the sources and flowpaths of hydrothermal features within and around YNP, and the data verify that there are no direct connections to the Chico Hot Springs system or to the Emigrant Mining District; therefore, no cumulative impacts were identified in the analysis.

4.1.6 LAND USE, NOISE, AND RECREATION

The cumulative impacts area for land use, noise, and recreational resources includes the Emigrant Mining District, specifically in the immediate area of the St. Julian Claim Block and the roads that are proposed for access to the exploration area (Emigrant Creek Road and Road 3272). The cumulative analysis also considers past, present, and related future actions under concurrent consideration. DEQ consulted with local, state, federal agencies to inquire about present and future actions under consideration. Currently there are no permitted resource actions or management projects in the project area. The CGNF is analyzing a potential mineral withdrawal on public lands surrounding the St. Julian Claim Block.

Public land in the area has been and continues to be used for recreation activities including hiking, camping, hunting, and off-road vehicle use. The additional traffic and drilling noise from the Proposed Action added to the current land use in the area would have a minimal short-term impact to recreational experience. Long term cumulative impact to land use, noise, and recreation are not anticipated.

4.1.7 SOILS, VEGETATION, AND RECLAMATION

The cumulative impacts area for soils, vegetation, and wetlands includes the Emigrant Mining District, specifically in the immediate area of the St. Julian Claim Block and the roads that are proposed for access to the exploration area. The cumulative analysis also considers past, present, and related future actions under concurrent consideration. DEQ consulted with local, state, federal agencies to inquire about present and future actions under consideration. Currently there are no permitted resource actions or management projects in the project area.

Past impacts associated with historic mining and exploration drilling in the Emigrant Mining District include road disturbance and historic mine waste. The road grading that is part of the Proposed Action and Agency-Modified Alternative would not increase the extent of the road disturbance into previously undisturbed areas and would be limited to localized areas. As part of the Agency-Modified Alternative, unnecessary surface disturbance would be avoided and seeding those areas that are disturbed would minimize effects to soils, vegetation, and reclamation and would not lead to a significant cumulative impact.

4.1.8 TRANSPORTATION

The cumulative impacts area for transportation includes the Emigrant Mining District, specifically in the immediate area of the St. Julian Claim Block and the roads that are proposed for access to the exploration area. The cumulative analysis also considers past, present, and related future actions under concurrent consideration. DEQ consulted with local, state, federal
agencies to inquire about present and future actions under consideration. Currently there are no permitted resource actions or management projects in the project area.

The additive effect of the four to five daily vehicles used for the proposed exploration activities combined with current traffic numbers may have a minimal short-term impact to traffic safety. However, the Agency-Modified Alternative includes a mitigation to limit Lucky Minerals’ vehicles to 25 MPH. Long-term cumulative impacts to traffic safety are not anticipated because these would be short-term and traffic would return to its previous state at the completion of the project.

4.1.9 **AIR QUALITY**

The cumulative impacts area for Air Quality includes the Emigrant Mining District, specifically in the immediate area of the St. Julian Claim Block and the roads that are proposed for access to the exploration area. The cumulative analysis also considers past, present, and related future actions under concurrent consideration. DEQ consulted with local, state, federal agencies to inquire about present and future actions under consideration. Currently there are no permitted resource actions or management projects in the project area.

No cumulative impacts have been identified for Air Quality as a result of implementation of the Proposed Action or Agency-Modified Alternative in the cumulative impacts area. No other emission sources are located in the identified analysis area that would combine with emissions from drilling, which are exempt under ARM 17.8.743.

4.1.10 **VISUALS**

The cumulative impacts area for Visual Resources includes the analysis area described in the affected environment. The cumulative analysis also considers past, present, and related future actions under concurrent consideration. DEQ consulted with local, state, federal agencies to inquire about present and future actions under consideration. Currently there are no permitted resource actions or management projects in the project area.

Other land use activities or conditions within the analysis area have affected and would continue to affect the visual characteristics of the landscape. Road cuts from historic mining, burned areas (range fires), and beetle-kill pine trees, affect the natural landscape to varying degrees and at varying seasons and duration. These land use activities and natural phenomena are expected to continue to affect visual elements of the landscape into the future. However, Lucky Minerals does not propose any road improvements outside the road prism that would lead to a long-term cumulative impact.
5 REGULATORY RESTRICTIONS

MEPA, as amended, requires state agencies to evaluate any regulatory restrictions they propose on the use of an applicant’s private property (75-1-201 (1)(b)(iv)(D), MCA). Alternatives and mitigation measures are designed to further protect environmental, cultural, visual, and social resources, but they add to the cost of the project. MEPA requires state agencies to evaluate any regulatory restrictions proposed to be imposed on the proponent’s use of private property (75-1-201(1)(b)(iv)(D), MCA). Alternatives and mitigation measures required by Federal or State laws and regulations to meet minimum environmental standards do not need to be evaluated for extra costs to the proponent.

Lucky Minerals would need DEQ approval of their exploration license on the St. Julian Claim Block. DEQ’s selection of an alternative would be designed to make the Project meet minimum environmental standards or would have been proposed and/or agreed to by Lucky Minerals. Thus, the conditions should not constitute a compensable taking of private property.

6 CONSULTATION AND COORDINATION

6.1 PREPARERS

<table>
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<tr>
<th>Name</th>
<th>Department of Environmental Quality</th>
<th>Responsibility</th>
<th>Credentials</th>
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<tr>
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6.2 OTHER AGENCIES CONSULTED

The following federal and state agencies and other entities were consulted during preparation and review of the EA:

- Montana Fish, Wildlife, and Parks
- U.S. Forest Service-Custer Gallatin National Forest
- Montana Natural Heritage Program
- Montana Bureau of Mines and Geology
- Park County
- Montana DEQ Air Quality Bureau

7 NEED FOR FURTHER ANALYSIS AND SIGNIFICANCE OF POTENTIAL IMPACTS

When determining whether the preparation of an environmental impact statement is needed, DEQ is required to consider the significance criteria set forth in ARM 17.4.608, which are as follows:

1. The severity, duration, geographic extent, and frequency of the occurrence of the impact;
2. The probability that the impact will occur if the proposed action occurs; or conversely, reasonable assurance in keeping with the potential severity of an impact that the impact will not occur;
3. Growth-inducing or growth-inhibiting aspects of the impact, including the relationship or contribution of the impact to cumulative impacts;
4. The quantity and quality of each environmental resource or value that would be affected, including the uniqueness and fragility of those resources and values;
5. The importance to the state and to society of each environmental resource or value that would be affected;
6. Any precedent that would be set as a result of an impact of the proposed action that would commit the department to future actions with significant impacts or a decision in principle about such future actions; and
7. Potential conflict with local, state, or federal laws, requirements, or formal plans.

The severity, duration, geographic extent and frequency of the occurrence of the impacts associated with Lucky’s Mineral exploration activities would be limited. Lucky Minerals is seeking authorization to drill up to 46 drill holes from 23 drill pads on its patented mining claims (St. Julian Claim Block). Each drill pad would be approximately 50 feet long and 20 feet
wide and be constructed within the existing road prism. The total surface disturbance is estimated to be 4.8 acres (3.48 acres of disturbance on access roads within the St. Julian Claim Block, 0.8 acres for a laydown facility, and 0.52 acres for the drill pads). Lucky Minerals would conduct the mineral exploration activities over two approximately three-month field seasons, extending from approximately July 15 to October 15 of two consecutive years. Lucky Minerals would be required to reclaim the surface disturbances after completion of the exploration program.

DEQ has not identified any significant impacts to air, or surface and ground water quality (including nearby geothermal resources). It is likely that Lucky Minerals may encounter artesian conditions during drilling. Based on existing holes in the area, the artesian boreholes would likely produce water of less than 5 gpm with no aquatic life exceedances. The water would likely infiltrate back into the rocky ground, but would be managed to prevent discharge to surface water, prior to plugging each borehole. There would be no discernible impact on water quality or quantity in the East Fork of Emigrant Creek drainage. There would be no discernible impact on water quality or quantity in the East Fork of Emigrant Creek drainage. Any local impacts from a flowing borehole would be eliminated as Lucky Minerals would be required to plug all artesian drill holes at depth (bottom to top) prior to the removal of the drill rig.

Important wildlife resources are likely present in the East Fork of Emigrant Creek drainage, including but not limited to Canada lynx, grizzly bear, wolverine, fisher, and elk. Impacts on these resources would be limited. The proposed drilling program is not expected to permanently disturb any habitat used by these species. The drill pads would be located on the existing road on the St. Julian Claim Block, and no new roads accessing the St. Julian Claim Block would be constructed. In addition, the activity associated with the proposed exploration program is limited spatially and temporally. Finally, there is a large amount of undisturbed habitat surrounding the St. Julian Claim Block allowing for avoidance of the area by these and other species.

DEQ recognizes the ecological sensitivity of the area, as evidenced by the existence of surrounding CGNF lands, nearby roadless and wilderness areas, and Yellowstone National Park approximately 15.1 miles south of the St. Julian Claim Block. However, the exploration activities would not cause any surface disturbance in these areas. Moreover, visual and auditory impacts would be limited to CGNF lands adjacent to the St. Julian Claim Block and, potentially, a corner of a nearby roadless area. Visual and auditory impacts are not predicted for roadless areas beyond that closest to the St. Julian Claim Block, for the Absaroka-Beartooth Wilderness Area, or for Yellowstone National Park.

DEQ is also aware of the importance of tourism and recreational opportunities to the Paradise Valley community. However, the small increase in traffic accessing the St. Julian Claim Block (4-5 round trips a day) for two, approximately three-month long, field seasons and the mineral exploration drilling to be performed at the St. Julian Claim Block during the same time period are not predicted to significantly impact these resources.
DEQ has not identified any growth-inducing or growth-inhibiting impacts resulting from the proposed exploration activity, including the relationship or contribution of the impacts to cumulative impacts.

Issuance of the exploration license to Lucky Minerals does not set any precedent that commits DEQ to future actions with significant impacts or a decision in principle about such future actions. If Lucky Minerals submit another exploration license application to conduct additional exploration, or an operating permit application, DEQ is not committed to issuing those authorizations. DEQ would conduct an environmental review for any subsequent authorizations sought by Lucky Minerals and make a permitting decision based on the criteria set forth in the Metal Mine Reclamation Act. Nor does issuance of the exploration license to Lucky Minerals set a precedent for DEQ’s review of other applications for exploration licenses, including the level of environmental review. That decision is made based on a case-specific consideration of the criteria set forth in ARM 17.4.608.

Finally, DEQ does not believe that the mineral exploration proposed by Lucky Minerals conflicts with any local, state, or federal laws, requirements, or formal plans.

Based on a consideration of the criteria set forth in ARM 17.4.608, the exploration activity proposed by Lucky Minerals at the St. Julian Claim Block is not predicted to significantly impact the quality of the human environment. Therefore, preparation of an environmental assessment is the appropriate level of environmental review under MEPA. DEQ identifies the Agency-Modified Alternative as the preferred Alternative.

8 RESPONSE TO COMMENTS

8.1 INTRODUCTION

8.1.1 DEIS Comment Period

The 60-day comment period on the Draft EA started October 12, 2016 and ended December 12, 2016. During that period, DEQ received comments through a website portal, by regular mail, and by electronic mail. This appendix presents a compilation of all comments received and the agency’s responses to those comments.

There were 3,384 individuals, organizations, and agencies comments received on the Draft EA, either through DEQ’s website portal, by regular mail, and by electronic mail. DEQ read and considered each comment. Because large numbers of comments addressed similar topics or themes, DEQ developed general-themed responses to address many of those related comments in one place. Substantive comments are included in a side-by-side response in Part 2. Some general-themed comment responses may refer the reader to the substantive comment response side-by-side for more detail.

There are three parts in Appendix B:
• **Part 1—General-themed Comment Responses** to comments that address topics and themes that were raised by multiple commenters.

• **Part 2—Substantive Comment Responses** provides the scanned images of letters and other comments submitted to DEQ via the comment portal. The agency’s responses are shown beside each comment or on the following pages, with the responses numbered to match the comments.

• **Part 3—Form Letters**, a majority of the comments received were attributed to organized form letter campaigns. One copy of each form letter is presented in its entirety with references to the general-themed responses.

### 8.2 GENERAL-THEMED COMMENT RESPONSES

#### 8.2.1 INTRODUCTION TO GENERAL RESPONSES

Many comments on the Draft EA raised similar issues and concerns. DEQ grouped comments by major topic and provided general responses to those topics. This part of the document presents these responses. If an individual comment is grouped with one (or more) of these major topics, the response to that comment in Part 2 directs the reader to the relevant general response topics in this section.

The General Responses categories, arranged alphabetically for the convenience of the reader, are:

- Bonding
- Historic Mining
- MEPA
  - Further Environmental Analysis/EIS
  - Future Exploration and Mining Actions
  - Cumulative Impacts
  - Level of Public Interest
- Proposed Action and Public Lands
- Mineral Withdrawal
- Regulatory Authority
- Socioeconomics
- Traffic
- Volcanic and Geothermal
- Water Quality
- Water Rights
- Wildlife
8.2.2 BONDING

COMMENT: Several commenters expressed concern that there were discrepancies in the bond calculation, stating, “A DEQ bond calculation in 2015 estimated that reclamation for each bore hole would cost more than $8,000 apiece, and that pad reclamation would cost an additional $3,380. But Lucky Minerals VP Shaun Dykes told the press in late 2016, "The holes will be filled with cement at a cost of about $2,000 each..." ("Vancouver company at the Center of Gold Mining Controversy on Edge of Yellowstone National Park," DeSmog Canada, Nov. 22, 2016.) Commenters noted that this discrepancy was disturbing. DEQ must provide updated reclamation estimates for 2017, and disclose how much bond DEQ is requiring, and how long Montana will hold the bond.”

Additionally, commenters noted that the bonding requirements imposed on mining companies are not adequate. They expressed concern that the American tax payers will be left with the cost of cleanup and reclamation. They asked that the EA be updated to disclose the bonding requirements and the true cost of reclamation following drilling.

RESPONSE: Section 82-4-338, MCA, requires an applicant for an exploration license to submit a bond to DEQ in an amount determined by DEQ. The bond must be conditioned upon the licensee’s compliance with the requirements of the Metal Mine Reclamation Act, the administrative rules and the exploration license. The bond may not be less than the estimated cost to the State to ensure compliance with the Montana Clean Air and Water Quality Acts, the Metal Mine Reclamation Act, the administrative rules adopted under the Metal Mine Reclamation Act, and the exploration license, including the potential cost of DEQ management, operation, and maintenance of the site upon temporary or permanent operator insolvency or abandonment, until full bond liquidation can be effected.

It is not unusual for a bond calculated by DEQ to be more than the cost that would be incurred by the licensee in performing the reclamation. DEQ’s bond calculation is based on the estimated cost of the State in performing the reclamation, not the estimated cost to the licensee. The cost that would be incurred by the licensee is usually less than the cost that would be incurred by DEQ. The licensee is already on site and, thus, does not incur the costs of mobilization and demobilization. Additionally, the licensee is not subject to state procurement laws. DEQ will finalize calculation of the bond after publication of this Final EA and require Lucky Minerals to submit a bond in that amount prior to issuance of the exploration license.

DEQ is not authorized to release a licensee’s reclamation bond until the provisions of the Metal Mine Reclamation Act, the rules adopted under the Metal Mine Reclamation Act, and the exploration license have been fulfilled. Thus, DEQ will release the bond submitted by Lucky Minerals only when DEQ determines that the drill holes have been properly plugged and other disturbances are properly reclaimed. DEQ routinely retains partial bond for a number of years after completion of the drilling program in a sufficient amount to ensure reestablishment of vegetation.
8.2.3 HISTORIC MINING

COMMENT: One set of the form letter comments expressed concerns that the EA justified its finding of no significant impact by noting that there is a history of mining in Emigrant Gulch. Commenters noted that “the impacts of past mining are still seen and felt in the area, but the land is slowly healing. A new mine, especially one like Lucky Minerals envisions, will set that progress back by decades.”

RESPONSE: DEQ is not relying on the historic mining in Emigrant Gulch to justify a finding of no significant impact. DEQ’s application of the significance criteria set forth in ARM 17.4.608 is set forth in Section 7 of the Final EA.

DEQ took into consideration the historic mining in Emigrant Gulch in describing the current environmental conditions that would be affected by the proposed exploration project. For example, Sections 3.7.2.1 and 3.7.2.2 discuss the current stream hydrology and current stream water quality that may be impacted by the proposed exploration project. An accurate description of the current stream hydrology and stream water quality necessary requires an assessment as to whether these environmental conditions have been impacted by previous mining. In addition, DEQ relied on impacts from historic mining to assess the environmental impacts that may be expected from Lucky Minerals’ proposed exploration activity. For example, in Section 3.7.2.3, DEQ used information about groundwater from four flowing boreholes that remain from previous exploration drilling to analyze the potential impacts from the proposed exploration program.

Language in the Final EA has been amended to clarify that DEQ is not relying on historic mining disturbances to determine that Lucky Minerals proposed exploration project will not significantly affect the human environment.

8.2.4 MEPA

COMMENT: Many of the comments received in the public comment period focused on MEPA-related concerns. These concerns have been grouped into four categories: Further Environmental Analysis/EIS, Future Exploration and Mining Activities, Cumulative Impacts, and Level of Public Interest. Below is a description of the concerns received and DEQ’s responses.

Further Environmental Analysis/EIS

COMMENT: The general concern expressed in this category was a need for further environmental analysis. Commenters urged DEQ to prepare a comprehensive Environmental Impact Statement to disclose negative impacts on the wildlife, water quality, recreation and the local economy. Commenters asked DEQ to adopt “the fourth option” set forth in Section 1.5. Section 1.5 states that DEQ has the following four options for decision-making upon completion of the EA:

(1) Deny the application if the proposed operation would violate MMRA, the Clean Air Act, or the Water Quality Act;
(2) Approve the application as submitted;

(3) Approve the application with agency mitigations; or

(4) Determine the need for further environmental analysis to disclose and analyze potentially significant environmental impacts.”

RESPONSE: DEQ has applied the significance criterion set forth in ARM 17.4.608 and has determined that preparation of an EIS is not required. See Section 7 of the EA.

Future Exploration and Mining Activities

COMMENT: A majority of the comments received on the Draft EA were based on the premise that the state action under review was the permitting of a mine. Other commenters felt that the environmental analysis should cover additional exploration activity that Lucky Minerals initially proposed on Forest Service Property.

RESPONSE: Lucky Minerals has not submitted an application for an operating permit to authorize construction and operation of a mine. Therefore, DEQ will not be taking any state action relative to a mine or analyzing the impacts from a mine. The proposed state action is issuance of an exploration license. The Environmental Assessment properly limits its analysis to impacts from the proposed exploration activity.

It is true that Lucky Minerals submitted a proposed plan of operations seeking authorization from the Custer Gallatin National Forest to conduct mineral exploration on Forest Service land. The Forest Service determined that Lucky Mineral’s mineral exploration proposal did not qualify as a categorical exclusion. Lucky Minerals subsequently withdrew its proposed plan of operations, indicating that it would proceed with plans to drill only its private patented mining claims. Lucky Minerals indicated that it would submit a new plan of operations for the Forest Service's review and bear the costs associated with the federal review if that were justified based on the information obtained from drilling on its patented mining claims.

Lucky Minerals submitted an application to DEQ for authorization of mineral exploration activities at the St. Julian Claim Block that is subject to this review. Lucky Minerals attached to its application a map in sufficient detail for DEQ to adequately identify the potential environmental impacts as required by ARM 17.24.103(1)(c).

MEPA requires state agencies to prepare environmental impact statements for state actions that may significantly impact the human environment. Here, the state action is either approval or denial of Lucky Mineral's exploration license application, which seeks authorization to conduct mineral exploration only on Lucky Mineral's patented mining claims. It is not unusual for a mineral developer to apply for authorization for a drilling program and subsequently determine to bear the cost and effort of an expanded exploration programs based on the results initially obtained. In this sense, the initial exploration program has independent utility. Finally, any approval by DEQ of the Lucky Minerals' application for an exploration license would not limit or influence DEQ's action on a subsequent application to amend the exploration license to expand
the drilling program. DEQ would conduct a MEPA review of the amendment application, and have its full authority to either approve or deny the amendment. Of course, in the MEPA review of the amendment application, DEQ would consider the impacts associated with the expanded drilling program added to the impacts associated with the initially approved drilling program in the cumulative impacts analysis.

**Cumulative Impacts**

**COMMENT:** Commenters asked DEQ to consider the cumulative impacts of Lucky Minerals proposed mineral exploration at the St. Julian Claim Block and full-scale mining at the St. Julian Claim Block and Crevice Mountain. Others asked for DEQ to look at the cumulative impacts of the Riverside Gravel Pit, Adkins Tire Landfill, and Crevice Mine Exploration project.

**RESPONSE:** The definition of “cumulative impact” set forth in ARM 17.4.603(7) requires consideration of the proposed action in conjunction with related future actions when those related future actions are under concurrent consideration by any state agency through preimpact statement studies, separate impact statement evaluation, or permit processing procedures. Mining at the St. Julian Claim Block or Crevice Mountain is not undergoing any review by any state agency. Therefore, mining activities at these two sites are not related future actions for purposes of ARM 17.4.603(7).

The proposed Riverside Gravel Pit, Adkins Tire Landfill and Crevice Exploration Project would be located approximately 11.5, 14 and 20 air miles from Lucky Minerals’ proposed mineral exploration project at the St. Julian Claim Block, respectively. Based on the intervening distance, Lucky Minerals’ proposed mineral exploration at the St. Julian Claim Block is not expected to result in any cumulative impacts when considered in conjunction with the other three projects located in Park County and currently under DEQ’s review. Moreover, while the Riverside Gravel Pit and Adkins Tire Landfill would have a long-term presence in Park County, Lucky Mineral’s exploration activity at the St. Julian Claim Block would be short-term, lasting for two 3-month field seasons. Indeed, it is not known at this time whether any of Lucky Mineral’s exploration activity would be conducted at the same time as the operation of the gravel pit, tire landfill, or Crevice’s mineral exploration activity as that depends on the timing of DEQ’s action on the proposed projects.

**Level of Public Interest**

**COMMENT:** Some comments highlighted the overwhelming opposition from the community and area businesses, stating that the opposition and level of public interest alone should be enough to deny the exploration license.

**RESPONSE:** Public participation in the MEPA process is essential to provide input and to ensure the public is informed of the anticipated impacts in of potential state actions. However, MEPA is intended to be procedural in nature. It is not the purpose of MEPA to provide for regulatory authority, beyond authority explicitly provided for in existing statute, to a state agency. DEQ’s decision on Lucky Minerals’ exploration license application will be governed by Section 82-4-332, MCA. That provision requires DEQ to
issue an exploration license to any applicant who pays a fee of $100, agrees to reclaim any surface area damaged by the applicant during exploration operations as may be reasonably required by DEQ, and is not in default of any reclamation obligation under the Metal Mine Reclamation Act.

8.2.5 MINERAL WITHDRAWAL

COMMENT: Some commenters brought to DEQ’s attention the USFS and Department of Interior’s proposal to withdraw 30,000 acres of federal land from mineral development. The proposal would withdrawal mineral rights on these lands for up to 20 years. Commenters asked DEQ to withhold review of the private exploration until Lucky Minerals could explore the public mineral potential pending a decision on the mineral withdrawal decision.

RESPONSE: DEQ has no legal authority to withhold review of Lucky Mineral’s application for an exploration license.

8.2.6 PROPOSED ACTION and PUBLIC LANDS

COMMENT: Comments addressed a concern for the lack of adequate and accurate information in the application. These comments pointed to the inaccuracies in a map included in the exploration license application, asserting that one claim and at least three proposed drill sites were actually located on public lands. Other commenters expressed concern that the Proposed Action was occurring in Yellowstone National Park or on the Custer Gallatin National Forest.

RESPONSE: The St. Julian Fraction was incorrectly identified as a patented claim in the Plan of Operations and the Draft EA. This area was surveyed over a century ago, at the same time the other claims were surveyed and filed, but the St. Julian’s Fraction was never patented. This has been corrected in the Final EA.

The figure provided in the exploration license application (previous Figure 1.4) does not align with actual site topography and road locations when the image is georeferenced to established claim boundaries. When the roads and drill sites are mapped in comparison to the georeferenced claim boundaries, there are three drill sites that are located on CGNF administered land, to the southwest of the Bercry and St. Julian claims (pads #20, 22, 23). Access to those sites and any exploration drilling there would require additional approval from the Forest Service. Alternatively, the drill sites could be relocated to the patented claims or removed from the proposed drilling plan. An updated drill site location map has been provided (Updated Figure 1.4).

8.2.7 REGULATORY AUTHORITY

COMMENT: Commenters questioned the authority of the agency to issue the exploration license, asked DEQ deny the license because it was in the best interest of the citizens of Montana, and requested that the license be denied because the applicant was a foreign company that had a bad reputation with limited financial resources.

RESPONSE: As previously stated, DEQ’s decision on the exploration license application is governed by 82-4-332, MCA. That statute requires DEQ to issue an exploration license to any
applicant who: (a) pays a fee of $100 to the department; (b) agrees to reclaim any surface area damaged by the applicant during exploration operations, as may be reasonably required by the department; (c) is not in default of any other reclamation obligation under this law". DEQ has no authority to deny issuance of an exploration license outside application of 82-4-332, MCA. Thus, DEQ cannot deny issuance of an exploration license based on the applicant being a foreign company, having a bad reputation, or having limited financial resources. DEQ has determined that Lucky Minerals is not in default of any reclamation obligation under the Metal Mine Reclamation Act.

8.2.8 **SOCIOECONOMICS**

**COMMENT:** Commenters expressed concerns that the Draft EA did not analyze socioeconomic impacts. Their concerns were related to DEQ’s decision to not analyze socioeconomic based on the rationale that past exploration projects had not affected the local community. They noted that the last drilling occurred more than 20 years ago and that the local socioeconomics have changed dramatically since 1992.

Others asked DEQ to consider and analyze the impact on the tourism and recreation economies, including impacts to vacation rentals, Chico Hot Springs, and Yellowstone National Park.

**RESPONSE:** DEQ is required to evaluate the environmental impacts, including cumulative and secondary impacts, on the human population in the area to be affected by the proposed action. The term "environmental impact" should be read as including a requirement of a reasonably close causal relationship between a change in the physical environment and the effect at issue. Only socioeconomic impacts that are causally linked to a change in the physical environment need be addressed in an environmental review. Changes in the physical environmental that would result from Lucky Minerals’ proposed exploration activity include changes in the environment due to the exploration drilling at the St. Julian Claim Block and increased traffic accessing the St. Julian Claim Block.

DEQ has revised the EA to include a detailed discussion of the socioeconomic impacts in Section 3.13 of the EA based on public comment and has properly limited its discussion of socioeconomic impacts to those that are directly and closely related to changes in the physical environment that would occur as a result of Lucky Minerals’ proposed exploration activity.

8.2.9 **TRAFFIC**

**COMMENT:** Comments were received about the impacts of increased industrial traffic in Emigrant Gulch and asked that DEQ analyze how gold exploration will affect the public access across both Forest Service and private lands.

**RESPONSE:** Impacts to public access are discussed in the Transportation and Land Use sections for the Final EA (Sections 3.8 and 3.10).

Emigrant Creek Road would continue to provide access for recreationists in accordance with the Gallatin National Forest (GNF) Travel Plan to private lands and CGNF lands in the Emigrant Creek drainage. ATV and off-road traffic would continue to travel Emigrant Creek Road past private lands that the road passes through. Lucky Minerals may have to enter into a
road access agreement with Park County and/or the GNF to address use and maintenance of the access roads.

8.2.10 **VOLCANIC AND GEOTHERMAL**

**COMMENT:** Commenters expressed concern that the Yellowstone Caldera would be disturbed if drilling occurred; triggering an eruption or that drilling would affect the geothermal features in Yellowstone National Park (YNP). Similar comments expressed concern that the geothermal system feeding Chico Hot Springs would be affected by drilling under the Proposed Action.

**RESPONSE:** The concerns that drilling in the St. Julian Claim Block could initiate seismic or volcanic activity within YNP have no scientific basis. The Proposed Action area is located 35 miles from the nearest margin of the Yellowstone caldera and the volcanic units in the Emigrant Mining District are genetically unrelated to, and more than 40 million years older than, the Yellowstone volcanics. This distance is far too great for any discernible impacts from drilling to occur within the caldera, and there is no record of seismic or volcanic activity correlated with any mining activities in the Emigrant Mining District in the last century. There were also no impacts to the seismic and volcanic stability of the Yellowstone thermal system when core drilling took place directly within the YNP caldera and geyser basins in the 1960s.

Multiple USGS investigations identified the recharge sources that are located within YNP and the thermal systems that are responsible for the hot springs in the northern end of YNP. Potential connections between YNP and the Corwin Springs area to the north were thoroughly investigated by the USGS in the 1980s and 1990s (Section 3.7.2.5), and led to the establishment of the Yellowstone Controlled Groundwater Area (CGWA) for the Corwin Springs Known Geothermal Resource Area (KGRA). The Proposed Action area is located outside of both the CGWA and KGRA boundaries (**Figure 3.10**). These previous studies are consistent with more recent data collected by MBMG, which indicate that there is no evidence to support a hydrogeologic or geochemical connection between Emigrant Gulch and the groundwater resources feeding Chico Hot Springs (LaFave, 2016; Section 3.7.2.5). Furthermore, these separate hydrogeologic systems appear to be disconnected from the geothermal resources within the Corwin Springs KGRA, Yellowstone CGWA, and YNP. Consequently, the flow, temperature, and water chemistry at those geothermal sites would not be affected by the Proposed Action.

8.2.11 **WATER QUALITY**

**COMMENT:** One set of the form letter comments asked DEQ to evaluate the impacts to water quality and quantity since exploration would take place near Emigrant Creek, a tributary of the Yellowstone River. They expressed concern that toxins would contaminate the watershed and referenced the Gold King spill on the Animas River in Colorado as an example.

**RESPONSE:** The Proposed Action involves exploration drilling only, and not the development or closure of any tunnels, or re-opening of historic tunnels, which was the cause of the discharge to the Animas River from the abandoned Gold King mine. To preclude such a thing from happening, the Agency-Modified Alternative specifies that historic mining features are to be avoided during drilling operations.
The analysis area for water resources initially focused on the Emigrant Creek subwatershed, which is the hydrologic unit encompassing the Proposed Action area, with additional consideration given to geothermal systems in the region. Based upon public comments received on the Draft EA, additional analysis was conducted in the next subwatershed for lower Emigrant Creek, and its confluence with the Yellowstone River three miles to the south of the town of Emigrant. Due to the scale of influence that was demonstrated through that analysis, the extent of the analysis area was not further expanded to include the Yellowstone River beyond the Emigrant area. Detailed discussion and related field data from MBMG and USGS are provided in Sections 3.7.2. and 3.7.3.2.

In general, the hydrologic and chemical influence from the currently-impacted East Fork on the main stem of Emigrant Creek at Old Chico is not discernible, due to dilution by groundwater and surface water inputs from drainages not connected to the East Fork. Further downstream, the baseflow in Emigrant Creek decreases due to diversion ditches and dredge waste piles, and it accounts for a very small amount (<1%) of the total flow in the Yellowstone River at the confluence. During many times of the year there is no surface connection to the Yellowstone River.

The chemical load from Emigrant Creek has also been measured to be significantly less (<0.1%) than the load in the Yellowstone River. The USGS identified geothermal features in and around Yellowstone National Park as significant sources of nutrients, major ions, and trace elements to the Yellowstone River, particularly arsenic, with concentrations as high as 42 µg/L measured in the river near Corwin Springs (drinking water standard is 10 µg/L). Similar conditions are observed for other parameters like sulfate, chloride, fluoride, sodium, magnesium, and potassium, and trace elements like aluminum, iron, and antimony. The concentrations of these parameters are many times higher in the Yellowstone River than in Emigrant Creek at Old Chico. Combining these field and laboratory measurements with observations that lower Emigrant Creek is seasonally dry and lacks a surface connection to the Yellowstone, the potential impacts to the river from Emigrant Creek’s hydrologic and chemical load are substantially diminished. Even under conditions where there is no water lost from Emigrant Creek, the potential impacts from exploration activities in the upper East Fork drainage would be indiscernible as the total drainage outflow would comprise approximately 0.1% of the flow in the Yellowstone River.

8.2.12 WATER RIGHTS

COMMENT: Commenters expressed concern about the lack of clarity around Lucky Minerals' water rights up the East Fork of Emigrant Gulch in the proposed action. Commenters asked that Lucky Minerals “disclose and provide a record of the exact water rights transferred to them by recording those documents at the Park County Clerk and Recorder.” They also urged DEQ to deny Lucky Minerals’ application until the company produced adequate and accurate information.

RESPONSE: The water right in question has an enforceable priority date of June 12, 1901 and allows for the withdrawal of up to 2.5 cfs from the East Fork of Emigrant Creek for mining related uses (see Section 3.7.3.2). The Proposed Action estimates that a smaller volume of water would be needed for drilling operations (~50 gpm) due to the use of a cyclone fluid recovery
system. The water rights information is publicly available online and is on file with Montana DNRC, the agency that reviews and administers water rights for the state. There is no legal basis authorizing DEQ to require that the water right documents be filed with the Park County Clark and Recorder, or that the company submit modifications to their water right to DNRC.

8.2.13 WILDLIFE

COMMENT: Comments expressed concern to the wildlife in the Paradise Valley if a mine was permitted, citing the recent Snow Geese impacted by the open pit mine in Butte, Montana.

Other commenters express concern for the fish in the Yellowstone River given the fish that died in the river in the summer of 2016. They also noted that “... leaching of sulphuric acid into Emigrant Creek from the ground disturbed by prior mining activities affecting its life sustaining pH value that only recently have fish returned to it.”

RESPONSE: Discussion of existing conditions in the Emigrant Creek subwatershed is provided in Section 3.7.2 and discussion of direct and indirect impacts is provided in Section 3.7.3. Historic mine tailings are not noted within Emigrant Gulch, but large piles of placer dredge waste are located in the valley to the west of Old Chico. The 2016 MBMG baseline report showed that springs along the north side of the East Fork, opposite and downstream from the St. Julian, were likely associated with natural acid rock drainage and the contributions of metals from groundwater to the stream. However, these sites are not associated with historic mining, and the sites identified as existing exploration holes, near the Proposed Action area and the Great Western and Eastern claims, had neutral pH values and no measured water quality standard exceedances. The existing impacts to water quality in the East Fork drainage are not discernible in Emigrant Creek at Old Chico. The potential to impact lower Emigrant Creek and the Yellowstone River is greatly diminished because the East Fork contributes a small portion of flow and chemical load to the subwatershed, and there is regular disconnection between Emigrant Creek and the Yellowstone River.

Contrary to this comment, there is no evidence of fish recently returning to upper Emigrant Creek or the East Fork of Emigrant Creek. Fish surveys conducted in 2013 and 2015 did not retrieve any fish in Emigrant Creek or the East Fork, and it is likely that the physical barriers and degraded stream conditions reported by USFS would limit the up-stream movement of fish away from the lower dredge piles area (see Section 3.5).
8.3 SUBSTANTIVE COMMENT RESPONSES SIDE-BY-SIDE

Comment from: Park County Commission

Response To: Park County Commission

A-1

DEQ understands that jurisdiction over the road that would be used to access the St. Julian Claim Block is disputed. DEQ, however, has no adjudicatory authority. Thus, DEQ has no basis for taking a position as to whether Lucky Minerals needs to obtain any authorization from Park County to use the access road.

A-1-1

DEQ understands that jurisdiction over the road that would be used to access the St. Julian Claim Block is disputed. DEQ, however, has no adjudicatory authority. Thus, DEQ has no basis for taking a position as to whether Lucky Minerals needs to obtain any authorization from Park County to use the access road.

A-1-2

The EA identifies in Sections 3.10.3.2 that Lucky Minerals may have to enter into a road access agreements with Park County and/or the CGNF to address use and maintenance of the access roads. Section 2.3.1 of the EA states, "There may be localized disturbances on Emigrant Creek Road and Forest Service 3272, the proposed access route to the St. Julian Claim Block, to facilitate mobilization of equipment and to improve safety." Additional dust control measures on County roads would be required under Park County's road maintenance agreement (See Section 3.11.3.2).

A-1-3

During mobilization and demobilization activities to the St. Julian Claim Block, Lucky Minerals would be required to use flaggers and/or pilot cars when large equipment is being moved along Emigrant Creek Road to minimize conflict with recreational users.

A-1-3

DEQ is required to evaluate the environmental impacts, including cumulative and secondary impacts, on the human population in the area to be affected by the proposed action. The term "environmental impact" should be read as including a requirement of a reasonably close causal relationship between a change in the physical
Further, given the importance of intact and unimpaired wildlands to Park County’s economy, DEQ should evaluate the effects of the proposed project, as well as reasonably foreseeable future projects, on the composition, diversity, and resilience of the local economy, including effects to public finances. The Commission also encourages DEQ to review and address the many public comments concerning the potential impacts to the local economy; effects to the scenic and historic significance of the area; and impacts to the natural environment, wildlife, and wildlife habitat. As the county governing body, the Commission understands that its role in these areas is limited, but encourages DEQ to address these and other resident concerns as part of its review.

Sincerely,

Clint Tinsley
Commissioner

Marty Malone
Commissioner

Steve Caldwell
Commissioner

environment and the effect at issue. Only socioeconomic impacts that are causally linked to a change in the physical environment need be addressed in an environmental review. Changes in the physical environmental that would result from Lucky Minerals’ proposed exploration activity include changes in the environment due to the exploration drilling at the St. Julian Claim Block and increased traffic accessing the St. Julian Claim block. DEQ has revised its discussion of socioeconomics in Section 3.13 based on public comment and has properly limited its discussion of socioeconomic impacts to those that are directly and closely related to changes in the physical environment that occur as a result of Lucky Minerals’ proposed exploration activity.

The proposed project would have limited impacts to County infrastructure in the vicinity of the project area. A dozer, a grader, an excavator and the two drill rigs will cross the infrastructure on two occasions; during mobilization and demobilization for the project. This equipment is listed in Section 2.32 of the EA and would be subject to any applicable load limits for use of the infrastructure. During the drilling season, four to five round trips of four-wheel drive pickup traffic would use the infrastructure to transport workers to the site. This level of increased traffic should not materially increase County expenditures in maintaining the county road and associated infrastructure.

A-1-4
Related future actions must be considered when these actions are under concurrent consideration by any state agency through pre-impact statement studies, separate impact statement evaluation, or permit processing procedures. DEQ has revised its discussion of socioeconomics in Section 3.13 based on public comment and has properly limited its discussion of socioeconomic impacts to those that are directly and closely related to changes in the physical environment that occur as a result of Lucky Minerals’ proposed exploration activity. Also see response to comments related to Future Exploration and Mining and Socioeconomics. See sections 3.4 and 3.12 for discussion of wildlife and aesthetics.
The proposed water drafting area is shown in the Plan of Operations submitted by Lucky Minerals and in the updated Figure 1.4. This area is accessible from the private road that crosses the Bullion and Mill Lode claims. Exact locations for laying the hose have not been submitted in the Plan of Operations, but such a map seems unreasonable and unpredictable in practice, because the hoses would likely be moved on a regular basis between the different active drill sites. The hoses would span from the water drafting area on the East Fork, up to drill pad locations on the existing switchback road that are located within private claims. The road may be the easiest path to follow, or in other instances it may be laid across the ground between switchbacks, but the latter option poses more obstacles and difficulties for hose placement and may not be the preferred approach.

Figure 1.4 has been updated.

The language has been revised in the Final EA.

The 2011 Iron Cap placer project has been added to the timeline.

The language has been updated.

Table 1.1 has been updated.

Figure 1.4 has been updated.
A-2.8

Road access in the proposal is limited to Emigrant Creek Road, and the roads denominated FS Road 3272 and 3272B. No other road access is included in this proposal. Project does not propose to access FS Road 3269 or 3269A. The switchback route on the west side will not be used.

A-2.9

Thank you for your comment. The document has been updated.

A-2.10

Lucky Minerals states that there may be localized disturbances on access roads necessary to facilitate mobilization of equipment. Lucky Minerals acknowledges that hand picking may be required in some areas. Lucky Minerals is not authorized to dispose of material derived from road clearing into Emigrant Creek.

A-2.11

DEQ has estimated the acreage of 3.48 acres of disturbance on the St. Julian Claim Block for the road access disturbance. Lucky Minerals exploration activities are proposed only on private lands on the St. Julian Claim Block. It will be the responsibility of Lucky Minerals to verify exploration is occurring on private lands.

A-2.12

Please see Section 2.3.5 for the description of water use for the project. These locations would be located in existing disturbed areas. Since these locations would be in existing disturbed areas it was not included in Table 2.1 as this table is describing new disturbances resulting from the project.

A-2.13

Lucky Minerals describes action as taking place on existing road prisms located on existing roads located on private property consisting of the St. Julian Claim Block.
Lucky Minerals has not described any overland routes, nor has it requested authorization to travel over land or construct new roads. Locations of proposed actions are described as existing road prisms.

Section 2.3.5 states, "Lucky Minerals proposes to obtain water for drilling either from existing artesian boreholes or from the East Fork of Emigrant Creek, utilizing the existing water right that is attached to the St. Julian Mine patented claims. The artesian boreholes are located on CGNF administered land and Lucky Minerals would need to obtain permission prior to using that water supply." Figure 1.4 has been updated to include the proposed water withdrawal site from the East Fork of Emigrant Creek.

As mentioned in Section 2.3.5, the use of artesian drill holes located on National Forest Service lands would require additional permission from the Forest Service. The flow rates measured from these holes (≤ 5 gpm) are unlikely to provide sufficient water for drilling operations. The Agency-Modified Alternative has been updated to reflect these conditions.

See response to Comment A-2-16.

Lucky Minerals will be required to wash all vehicles prior to mobilizing to the project site under the Proposed Action.

Interim seeding of the berms associated with the water drafting site has been added to the Agency-Modified Alternative.
all disturbances.

A-2-21
See response to Comment A-2-22.

A-2-22
DEQ understands that jurisdiction over the road that would be used to access the St. Julian Claim Block is disputed. DEQ, however, has no adjudicatory authority. Thus, DEQ has no basis for taking a position as to whether Lucky Minerals needs to obtain a USFS Road Use Permit from the Forest Service.

A-2-23
DEQ does not have legal authority to require Lucky Minerals to provide legal documentation of road jurisdiction to the Forest Service. See response to Comment A-2-22.

A-2-24
See response to Comment A-2-16

A-2-25
Thank you for your comment.

A-2-26
See response to Comment A-2-16

A-2-27
Thank you for your comment. The document has been updated.

A-2-28
Figure 3.16 and Table 3.7 have been updated in the Final EA.

A-2-29
A review of historic maps showing shaft, adit, and tunnel locations (GLO 1903 and 1910; Stotelmeyer, 1983) indicates that nearly all the historic mine features are located near the eastern boundary of the Mill Lode claim and Josephine claim, the eastern boundary of the St.
Julian Fraction, and the southern end of the St. Julian Lode claim. Based on the drill site locations provided in the Proposed Action application (Updated Figure 1.4), the proposed drill pads are located to the west and north from, and do not overlap, any of the historic workings. Recommendations have been added for noting any voids that are encountered during drilling, and assessing the potential for any water releases and the necessity for abandoning and plugging the hole. DEQ does not recommend additional probing for workings outside of the proposed drilling locations.

A-2-30
See Response to Comment A-2-11. The EA does detail in Sections 3.8.3.2 and 3.10.3.2, the existing road up to the St. Julian Claim Block and the potential need for permit from the CGNF and/or Park County on the use of the existing access road.

A-2-31
Artesian boreholes are addressed in Response A-2-16, road permits are addressed in A-2-30. Lucky Minerals has a responsibility to obtain any required permits from the Forest Service or to ensure the location of the drillholes are on its private property. DEQ does not have authority to require Lucky Minerals to conduct a land survey.

A-2-32
Agency has removed redtop from approved seed mix.

A-2-33
Thank you for your comment. The document has been updated.

A-2-34
St. Julian Fraction has been removed from Table 1.1.

A-2-35
Thank you for providing this information. The discussion of the ATV/motorcycle trail has been removed from the EA.
Comment Noted. Figure 3.19 is meant to depict to the reader what existing roads are in the vicinity of the project and not ownership of access roads.

A-2-37
See response to Comments A-2-22 and A-2-23.

A-2-38
Thank you for your comment. The document has been updated.

A-2-39
Thank you for your comment.
Thank you for your comment. Please see Section 3.4 in the EA for discussion on Wildlife.

Comment noted. Also see general-themed response to comments related to Future Exploration and Mining Actions.
Aside from the additional mitigations, comments and corrections offered below, the EA is thorough and lays out, in clear detail, the potential impacts of the alternatives. If the Agency Modified Alternative is adopted with the following additional mitigations suggested by FWP, the impacts of this project to wildlife would likely be temporary and of short duration. Wildlife would be displaced while the project is active and there could be impacts to survival and reproduction from that displacement; however, FWP's concerns for long-term impacts on wildlife populations and wildlife habitat would be alleviated due to the short duration of the proposed project.

FWP is aware of public concern that identification of minerals during the exploration phase could lead to a longer-term and larger scale mining effort with greater impacts on fish, wildlife, and habitat. FWP would have additional concerns if a larger effort is proposed in the future, but the comments on this EA are directed solely to the project as it is currently proposed.

Specific comments, corrections, and recommendations FWP has regarding the project include:

**Comments:**

- There is cause for concern over permanent changes to wildlife habitat that would result from the proposed road improvements, included in both the Proposed Action and Agency Modified Alternative. This impact is acknowledged in 3.4.4.4, "Indirect impacts". The road improvements will facilitate access for motorized use in an area that presently is very remote and rarely disturbed. This will result in a potentially significantly increased level of disturbance and fragmentation of the habitat with higher traffic volume, higher traffic speeds, and increased human presence. The road improvements would represent a permanent change to the landscape, with long-term implications for habitat suitability and productivity of the area for wildlife. This is of greatest concern for those species that are most sensitive to human activity, such as wolverine, lynx, grizzly bears, and ungulates including elk, mule deer and moose that use this habitat for calving/fawning or migration.

- Although the EA discusses impacts to elk as an indicator species representative of other ungulates based on USFS guidelines for forest management, there are biological and social concerns with other ungulates in relation to this project as well. Specifically, the project area provides important habitat for mule deer and moose. Elk-based criteria are used for USFS forest management, but for the purposes of an EA, these species have different habitat associations, forage needs and sensitivities than elk. While it may be appropriate to use elk as an indicator species for forest management, it may not be appropriate to disregard the differences among forest dwelling species in terms of potential impacts of this proposed project. For example, though the elk population in this area has been within or above population objectives in recent years, mule deer and moose populations have declined, and hunting opportunity has been reduced to address these

Vehicles would access the St. Julian Claim Block using the existing roads between East River Road and the St. Julian Mine Claim Block. The Proposed Action does not include any new road construction. The approximate four-mile length of Emigrant Creek Road from Old Chico to the St. Julian Claim Block would be cleared of rock and debris within its original configuration, some of which would include hand picking. The road would not be widened. Emigrant Creek Road may be graded in localized areas in order to keep it serviceable for the type of vehicles that would be involved in the project. The clearing and localized improvements to Emigrant Creek Road, however, will not materially change its character of an unimproved forest road. The clearing and localized grading should not facilitate traffic on Emigrant Creek Roads at appreciably higher speeds than the current traffic.

The public currently has access to the base of the St. Julian Claim Block
declines. Impacts to mule deer have implications for mountain lion populations in the area, and impacts to calving/fawning areas have implications for black and grizzly bears that may rely on neonates as a spring food source. Omitting any acknowledgement or discussion of these species may raise concerns with the public that impacts to wildlife have not been thoroughly considered.

- In Section 3.4.4.2, on page 62 the EA states that the proposed action would not influence elk calving areas, but then goes on to say that elk would likely calve away from the project area to avoid the disturbance. This seems to be a contradiction. Data on fawning/calving habitat indicate that the project area is likely used for calving/fawning, and drilling/human activity in the area during June would likely result in ungulates avoiding the area for calving/fawning, with potential impacts from neonates being displaced.

- In Section 3.4.4.2, page 57-58 the EA states: “Localized improvements to existing roads may facilitate higher travel speeds than allowed by the unmaintained current conditions; however the potential for collisions with wildlife would be minimal.” Research on this subject is clear that higher travel speeds result in increased wildlife collisions, especially in areas of high wildlife activity. The above statement does not seem to be supported by data. This statement is repeated in a number of sections throughout the document. Additionally, traffic volume is very likely to increase with the road improvements, which will also contribute to increased risk of wildlife collisions.

- There is a lot of emphasis on bald eagles in the Draft EA. Equal or more focus should be placed on golden eagles. Bald eagles are more likely to nest in the lower level riparian/river corridors while the proposed site for the mining activity is more conducive for golden eagles to nest.

- In addition to the Food Storage Regulations on the Custer/Gallatin National Forest, the exploratory mining company should also be aware that bear attractants on private land are addressed by the Montana Code Annotated 87-3-130: Taking of wildlife to protect persons or livestock.

  (2) A person may not provide supplemental feed attractants to game animals by:
  (a) purposely or knowingly attracting bears with supplemental feed attractants;
  (b) after having received a previous warning, negligently failing to properly store supplemental feed attractants and allowing bears access to the supplemental feed attractants; or
  (c) purposely or knowingly providing supplemental feed attractants in a manner that results in an artificial concentration of game animals that may potentially contribute to the transmission of disease or that constitutes a threat to public safety.

via Emigrant Creek Road and recreationists presently access the area to pursue recreational activities. The improvements to Emigrant Creek Road discussed above would not lead to access to higher elevations and more remote habitat, or additional fragmentation of wildlife habitat. Currently, a four-wheel drive high clearance vehicle is required to get to the St. Julian Claim Block. It is anticipated that the same type of vehicle will be required after Lucky Minerals makes the road improvements and completes its exploration activities.

Given the low number of round trips to be made each day and the speed at which a vehicle can travel on Emigrant Creek Road, vehicular collisions with wildlife should only have a minimal increase over the existing state of the road.

A-3-6
Existing conditions and impacts for the action alternatives to mule deer and moose have been added to the Final EA.

A-3-7
The Final EA has been modified to correct this contradiction.

A-3-8
See response to Comment A-3-5.

A-3-9
Golden eagles are discussed in the EA under the heading "Birds". Known golden eagle nesting activity is also discussed.

A-3-10
The 87-3-130, MCA, language regarding bear attractants on private land has been added to the Final EA.
Neither of the action alternatives includes maintenance of the access roads after two approximately three-month field seasons. While reclamation of the roads to the St. Julian Claim Block is not part of either action alternative, Lucky Minerals may need to obtain a Road Use Permit from the CGNF and/or Park County that includes such conditions. Adapting the project to be completed without improving the roads would likely not be practicable.

The Agency-Modified Alternative includes conducting pre-construction surveys to identify sensitive wildlife habitat. Lucky Minerals does not anticipate the drilling season to start until July 15th. Starting the field season in mid-July would avoid the calving and fawning season.

The sinuosity, width, and steepness of FS 3272 naturally limit travel speed. Although vehicular collisions with wildlife have the potential to minimally increase as a result of the localized improvements proposed by Lucky Minerals in the Proposed Action; out of an abundance of care, a speed limit of 25 mph was added to the Agency-Modified Alternative to mitigate the slightly increased potential for collisions.

The Agency-Modified Alternative includes pre-construction surveys for nesting birds and other sensitive wildlife and the maintenance of buffers if nests are found. DEQ has added the specific language that buffers shall be developed as directed by USFWS guidelines.
Lucky Minerals does not propose to access the St. Julian Claim Block until July 15th, therefore, temporal (February-June) buffers for any bird nests (including raptors) would not be necessary. However, if a raptor nest is built or discovered within the St. Julian Claim Block, Lucky Minerals would consult with FWP to determine avoidance or mitigation measures. Any spatial buffers required through consultation with local FWP biologists would be in accordance with the Montana Bald Eagle Guidelines (2010).

Project design features to minimize and shield lighting are already included in the Agency-Modified Alternative. Blasting is not proposed for the project.

A-3-13
If the proposed exploration project leads to the future development of mine plans, then the subsequent proposal would be reviewed by DEQ and the larger-scale disturbance and potential impacts would be addressed at that time. DEQ's review of any subsequent application for an operating permit by Lucky Minerals would require additional MEPA analysis.

The EA refers to the 318 Authorization obtained through DEQ for any disturbances associated with work along stream beds or banks and the temporary turbidity associated with vehicular stream crossings. However, a "Joint Application Form" would be used for that permit, which is also used to apply for conservation district 310 permits, and other permits through Montana DNRC and FWP (http://dnrc.mt.gov/licenses-and-permits/stream-permitting). This information has been added to Table 1.2.

The drill pad BMPs would be installed at each drill site and adjoining access road. From the drill site location map provided by Lucky Minerals Inc. (Figure 1.4), the only location which is located within 100 feet of the East Fork of Emigrant Creek is Pad #1. Based on the company's proposed 100 feet buffer, this site will need to be relocated.
between these units so the area is likely used by elk from both of these EMU’s to some degree. The Absaroka EMU description is included here:

“This 2,420-square-mile EMU is located on the north and west flanks of the Beartooth and Absaroka Mountains and includes the north portion of the Absaroka-Beartooth Wilderness. The area is a mixture of public (68%) and private (32%) lands. Much of the EMU (62%) falls within the boundaries of the Custer and Gallatin National Forests; however, the majority of the 341 square miles of elk winter range occurs on small parcels of privately owned land used for cattle grazing and hay production. About 77% of the EMU is elk habitat.”

- **3.4.1.1 Key issues, page 33**
  The entire project boundary is key habitat for wolverines - not mentioned under key issues.

- **Section 3.4.3.3**
  Suggested edits to paragraph 1 page 38: …………..Although the St. Julian Claim Block is generally within reach of nearby wolf packs and dispersing wolves, there has not been a documented pack overlapping with this specific area for over five years. While wolves tend to use more moderately sloped terrain, and likely would not select such a steep area, there is a wolf pack that has been documented to use territory within 3 straight-line miles of the claim.

FWP appreciates the opportunity to comment on this proposal. If you have any questions or need further consultation with FWP for project planning and implementation, please contact our local area wildlife biologists. FWP looks forward to working with you on this and future projects.

Sincerely,

Sam B. Sheppard

Sam B. Sheppard
Region 3 Supervisor
1400 South 19th Ave
Bozeman, MT 59718
Phone 406-994-4042

or removed from the drilling plan.

See general-themed response to comments related to Water Rights.

The sumps would be used for the disposal of dry to damp drill cuttings, but no fluids would be stored in the pits. The sumps would be lined and when drilling is completed, the salvaged native soil would be used to cover the compacted sumps, which should allow for sufficient revegetation and preclude leakage. The use of a cyclone recovery system and the placement of bottom liners in sumps would preclude allowing drilling fluids to percolate into the ground. From the drill site location map provided by Lucky Minerals (Figure 1.4), the only location which is located within 100 feet of the East Fork of Emigrant Creek is Pad #1. Based on the company’s commitment, any site within that distance will need to be relocated or removed from the drilling plan.

Lucky Minerals would be required to plug any artesian boreholes in accordance with ARM 17.24.106 (Section 3.7.3.3).

Anecdotal evidence of Eastern Brook Trout and Rocky Mountain Sculpin populations was discussed with FWP (Opitz Pers. Comm. 3/2/17). A fish survey was conducted by FWP in 2005, in lower Emigrant Creek near the dredge waste piles west of Old Chico. Two reaches were surveyed, one above and one below a nearby irrigation diversion. Details within the survey tables indicate that only Eastern Brook Trout were identified. More discussion of the 2005 data has been added to Section 3.5. Fish surveys conducted in 2013 and 2015 did not retrieve any fish in Emigrant Creek or the East Fork of Emigrant Creek (Section 3.5). It is likely that the physical barriers and degraded stream conditions reported by USFS limit the up-stream movement of fish away from the lower dredge piles area. Although the upstream water quality at Old Chico met all aquatic life standards (Section 3.7.2), any changes to water quality as a direct result of exploration drilling in the upper East Fork drainage would be detected through adjacent monitoring, as discussed in the Agency-Modified Alternative.
Lucky Minerals would be required to obtain a General Permit for Storm Water Discharges Associated with Construction Activity.

A-3-14
A description of the Absaroka Elk Management Unit has been added to the Final EA.

A-3-15
Wolverines were added to the Final EA under Key Issues.

A-3-16
The suggested edits are included in the Final EA.

A-3-17
Thank you for your comment.

Comment from: Tony Quirini

Tony Quirini

No, in opposition. It will degrade water quality and it has already closed public access to emigrant's southern boundary. There is a gate with no trespassing signs. At the least allow public access through their property to access emigrant peak and the boulder road.

Response To: Tony Quirini

P-3-1
Discussion of existing conditions in the Emigrant Creek subwatershed is provided in Section 3.7.2 and discussion of direct and indirect impacts is provided in Section 3.7.3. The access road to the Proposed Action area has not been closed, nor does that road lead to Emigrant Peak or the Boulder Road. The closure referenced in this comment is an unrelated civil matter that would need to be addressed with a different private land owner.

P-3-2
DEQ believes the Commenter is making a reference to a portion of access roads not located on the St. Julian Claim Block and is located on Emigrant Creek Road at Sections 25, 36 T6S R8E. These signs and access road barriers were not placed there by Lucky Minerals or DEQ.
Comment from: Brett Svetlik

Brett Svetlik

As a prior resident of Paradise Valley and the Emigrant Gully area, I am extremely concerned with the possibility of continued mining development in the Emigrant area. As a recreation guide, artist, community member and avid outdoorsman, I feel new mining developments have no greater benefit than what already exists in the natural landscape. In short, the negatives will overwhelm the positives. My strongest argument concerns the area’s water supply. In the last decade, due to irrigation, increased population and a steady drought, most creeks within the valley are pumped dry before they even have a chance to reach the Yellowstone. How about after mineral exploration leads to an operating mine? Where will the water come from? Where will it be stored, how will it be cleaned, or removed? Looking at the most recent fish die off due to increased water temps, lower water levels and increased pressure, how will another development like this one outweigh the impacts? A couple of jobs? Capital for a select few? Let’s rethink this proposal and find a better way to manage the only earth we have with more people in mind. There are a lot of industries already in place and booming due to Montana’s outdoor heritage and beautiful open spaces. Permitting “exploitation” will just lead to more development and a higher risk. What’s the lifetime of the mine? What’s the lifetime of our planet with us on it?

Response To: Brett Svetlik

P-5-1
See general-themed response to comments related to Future Exploration and Mining Actions.

P-5-2
Discussion of existing conditions in the Emigrant Creek subwatershed, the seasonal water loss to irrigation, and the connection to the Yellowstone River is provided in Section 3.7.2, and discussion of direct and secondary impacts is provided in Section 3.7.3.

P-5-3
See general-themed response to comments related to Future Exploration and Mining Actions.

P-5-4
The water right associated with the Proposed Action and the methods for storing and using water during exploration are discussed in Section 3.7.3.2. Discussion of existing conditions in the Emigrant Creek subwatershed is provided in Section 3.7.2 and discussion of direct and secondary impacts is provided in Section 3.7.3.

P-5-5
See general-themed response to comments related to Socioeconomics.

P-5-6
Thank you for your comment.

P-5-7
See general-themed response to comments related to Future Exploration and Mining Actions.

P-5-8
Thank you for your comment.

Comment from: Terry Stinchcombe

Terry Stinchcombe
As I have read that Lucky Minerals has been granted approval for exploratory drilling on Emigrant I can’t help but wonder what is meant by “minimal environmental impact”. There will obviously be an impact but does minimal mean polluted waters but minimally so. Polluted air but minimally so. Disturbance to wildlife and again minimally so. Whether or not minimal or hazardous, it’s all a negative environmental impact. What if these exploratory wells adversely affect the hot springs at Chico, “oops, sorry didn’t see that coming”. What if Lucky Minerals finds gold or whatever other minerals in abundance. They won’t go away so what then? I’ll answer my own question, major environmental impact. Goodbye tourism and the dollars that go with it. Goodbye quality of life for local residents, goodbye wildlife. I’m curious of the mandate that the DEQ operates under. Nothing that a gold mine or any mine does has anything todo with environmental quality, period.

Response To: Terry Stinchcombe

P-11

P-11-1
One of the intents of MEPA is to adequately review state actions in order to ensure that the public is informed of the anticipated impacts of potential actions. However, MEPA is procedural in nature and helps facilitate the ability of state agencies to make better decisions. MEPA does not provide regulatory authority, beyond authority explicitly provided for in existing statute, in this case the Metal Mines Reclamation Act, to a state agency. Also see general-themed response to comments related to Future Exploration and Mining Actions.

P-11-2
DEQ is charged with administering the Metal Mine Reclamation Act, under which Lucky Minerals has applied for an exploration license.
Comment from: Todd Mott

Emigrant Gulch is a wild place. It needs to stay a wild place. Drilling test holes in this place for gold is not going to keep it a wild place. There are so many issues that are at hand in this situation. It would be nearly impossible to address all of them here. I ski and hike in this area. Access/egress are a huge issue. There is a very narrow road through a rock slide that one has to navigate to get to this area. That alone makes this a hard place to get to. As a wild land fireman one of our main issues on fires is being able to get in or out. How has this issue been addressed? If the forest is truly a multi-user land, then how is this access/egress issue going to be dealt with for the public and our access? This area is one of many very unique streams feeding the Yellowstone River, the longest un-dammed river in N. America. You know this. How is allowing mining in this area going to help preserve this stream, its flow, its fish, and the Yellowstone river? My suspicion is that it won't be preserved at all but ruined, and not restorable. How is this serving the greater good of my home, my friends homes, their business or the animals that call this place home? Don't we have enough gold mines on the planet to satisfy the need for gold? Why ruin one the last great places for an out of country special interest to reap millions while creating a negative effect to the local people? Have you seen what happened on the Animas River in Colorado? This was and is still an environmental disaster. Why would the DEQ even consider allowing mining in such a pristine area, when the potential is so devastating. If your agency is really going to live up to its name, Dept. of Environmental Quality, then what are you going to do about the quality of water, the quality of life for the locals, the quality of habitat, the quality of silence, the quality of wildness, that will most certainly be affected at the least and totally destroyed at the most? Are you as an agency going to restore these things once they have been over run and ruined by Lucky Minerals? Once they start drilling there is no going back, and once this place is ruined it is ruined for a few but for all. How will you answer to this devastation? How will you repair it? My thoughts are that you won't, no one will and no one can. It will be forever changed. And for what? For gold. For greed. For a foreign company that couldn't even get the state and county right on the original application. Do you think they care about how their operation is going to affect the community and the environment at large? I don't think they will, as exemplified in their original application. At the end of the day we can't eat gold and when the water is ruined we can use that either. Leave this place alone and set aside for people. Buy the mining claims, gift them to the people and be done with this hoax. We don't need it. Sincerely, Todd C. Mott

Response To: Todd Mott

P-19

P-19-1
Thank you for your comment.

P-19-2
Section 2.3.2 of the Final EA discusses fire safety measures Lucky Minerals has proposed to implement as part of the project. Access into this area is currently only through Emigrant Creek Road for all users. Lucky Minerals would comply with CGNF and Park regulations regarding fire rules and/or closures.

P-19-3
Discussion of existing conditions in the Emigrant Creek subwatershed is provided in Section 3.7.2 and discussion of direct and secondary impacts is provided in Section 3.7.3. The fish surveys that were conducted on Emigrant Creek and the East Fork of Emigrant Creek in 2005, 2013, and 2015 are discussed in Section 3.5.

P-19-4
Thank you for your comment.

P-19-5
See general-themed response to comments related to Future Exploration and Mining Actions.

P-19-6
See general-themed response to comments related to Bonding.

P-19-7
See general-themed response to comments related to Bonding.
I looked at photographs and map spots of the area and would suggest that you not proceed unless a cap mandate for tailings areas are produced and full road recontouring funding is in place before proceeding. We know this will not be a "safe" operation. The respect of the land and the state resources must then rely on mitigation and restoration. Set aside restoration funds to cap and sequester the tailings fields and conduct full road and mine recontouring and restoration following their abandonment. Alternatively, if the operations proceed beyond the decadal mark, institute ongoing restoration benchmarks to be completed during operations. Allow the fund for such ends to grow as the project grows. We need to stop inheriting the tax and toxic waste burdens of these operations without proper compensation. Make sure the hydrologic function is restored. Use the logging roads of the Clearwater NF as an example to follow. Provide scientifically founded examples of projects that have both been conducted without significant environmental and economic loss and have been restored to full ecologic function and composition following mine abandonment. Make sure those tailings are capped to avoid watershed entrainment. Call it protecting the fisheries if you have to but know its better for everyone in this state - for generations to come. Examine the latest hydrologic relationships before proceeding. Gravel-bed river floodplains are the ecological nexus of glaciated mountain landscapes by F. RICHARD HAUER, HARVEY LOCKE, VICTORIA J. DREITZ, MARK HEBBLEWHITE, WINSOR H. LOWE, CLINT C. MUEHLFELD, CARA R. NELSON, MICHAEL F. PROCTOR, STEWART B. BOOD. SCIENCE ADVANCES24 JUN 2016 : E1600026

Thank you for your comment.

The proposed drill sites would utilize existing roads and the overall operation would limit new surface disturbance, which is a different scenario than the creation of logging roads and sediment mitigation in the Clearwater NF. The proposed use of water is described in Section 3.7.3.2. These exploration activities would occur for short-term, seasonal periods and are not likely to change the behavioral characteristics of the watershed or its ability to sustain favorable conditions of water flow (i.e. hydrologic function). The minor influence the upper East Fork has on the greater Emigrant Creek watershed is discussed in Section 3.7.2. There would be little deviation from the existing environmental conditions, and the proposed drill site reclamation is required to follow the applicable regulations.
Examples of mine abandonment are inequivalent comparisons, because the Proposed Action is not for a mine operation. There are many on-going exploration projects across Montana in various stages of activity, and completed projects must meet the applicable criteria before receiving reclamation bond release and cessation of their license. A few examples of successful reclamation observed in 2016 include projects in Marsh Creek, Henderson Creek, and Copper Cliff.

The Proposed Action is for a drilling exploration project. Tailings are typically a by-product from ore separation in a mill facility, and would not be generated under the current plan. At the scale of the Proposed Action, only drill cuttings from exploration would be produced and would be stored in sumps during drilling. The possible methods for cuttings disposal and reclamation are discussed in Section 3.3.3.

Comment from: Suzanne Goodman

Suzanne Goodman

In the past week Interior Secretary Jewl announced the two year moratorium placed on federal lands in Paradise Valley, noting the proximity to a national treasure, Yellowstone National Park (YNP) and citing the desire to preserve the unusual features of the area. The fact that Lucky Minerals owns some mining claims in the area on private land, does not remove the element of the fragility or proximity of these lands. A recent article in our local paper describes a new study beginning in YNP, using new technology to map underground water pathways that contribute to the thermal features of YNP. The article scientists were quoted as saying this study delves into uncharted territory. We do not yet know what underground water pathways contribute to the unique features of YNP. The possible impact of mining exploration in the Paradise Valley area on these pathways should be addressed in the final EA. Most specifically, what effect will the exploration proposed by Lucky Mineral Mining have on underground water features affecting the park. At least let YNP complete its study before permitting any mining activity in Paradise Valley so that decisions may be based on scientists understandings and findings. At stake is an irreplaceable environment.

Response To: Suzanne Goodman

P-33-1
Thank you for your comment.

P-33-2
The new study conducted in Yellowstone National Park (YNP) was an aerial electromagnetic survey performed by helicopter. The study was initiated to gain more insight about the potential hydrogeologic connections between thermal features within YNP. Locations inside the most recent caldera (Figure 3.14) were the focus of the project, including Upper and Lower Geyser Basins, Mud Volcano, and the north end of Yellowstone Lake. Outside of the caldera, the 16-mile corridor between Norris and Mammoth was also surveyed, but no information was gathered beyond the northern boundary of YNP, which excludes Corwin Springs, Chico Springs, and Emigrant Gulch (near Proposed Action).

Recent discussion with the USGS clarified that the aerial survey was
completed in December, 2016 and the raw data were not available until February, 2017 (USGS, 2017). Prior to the release of any conclusive documents, the data processing and interpretation phases of the project could take months to years to complete, and there would be no mention of the Proposed Action area. Potential connections between YNP and the Corwin Springs area to the north of YNP were thoroughly investigated by the USGS in the 1980s and 1990s (Section 3.7.2.5), and led to the establishment of the Controlled Groundwater Area (CGWA) for the Known Geothermal Resource Area (KGRA). More recent investigations by MBMG indicate that there is no evidence to support a hydrogeologic or geochemical connection between Chico Springs or Emigrant Gulch, and neither of those systems seems to be connected to the Corwin Springs KGRA (Sections 3.7.2.3 and 3.7.2.5).
Comment from: Jeannette Blank

Jeannette Blank

Hello,

Please find below my comments on the Draft EA prepared by DEQ for the proposed Lucky Minerals exploration work in Emigrant Gulch in Park County, Montana.

PURPOSE & NEED

I have several comments and questions regarding the Purpose and Need evaluation of the proposed Lucky Minerals activities in Emigrant Gulch. As a result of the recent 2 year mineral withdrawal proposal announcement by the Interior, Lucky Minerals' exploration project has been changed significantly. The project has gone from exploring mineral potential on 2500 acres of public acres, 47 acres of private property to just 47 acres of private acres. The scope of the exploration work has also been reduced from 56 exploratory wells to just 23 wells. Based on this, my comments and questions are:

- **Purpose of the project**
  - The existing EA does not evaluate the potential impacts associated with the revised scale, scope and overall mining plan and therefore this EA should be rewritten.
  - If Lucky Minerals can only mine on private lands, is this truly an economically viable project? If not, then is there a valid purpose and need for the exploratory work?

- **Scope of the project**
  - The scope of Lucky Minerals' proposed project and mining plan of development is no longer accurate given the current public minerals restrictions. Lucky Minerals should be required to resubmit a proposed scope and a proposed intent.

- **Existing EA**
  - The existing EA does not evaluate the potential impacts associated with the revised scale, scope and overall mining plan and therefore this EA should be rewritten.
  - If Lucky Minerals can only mine on private lands, is this truly an economically viable project? If not, then is there a valid purpose and need for the exploratory work?

WATER QUALITY MONITORING & RECLAMATION

- **Monitoring Plan**
  - The existing monitoring plan proposed by Lucky Minerals is not adequate. The 2016 Bureau of Mines and Geology Emigrant Creek baseline report shows that the existing exploration wells in the area leach metals like aluminum and cadmium into the creek causing exceedences in WQ standards for fish and other aquatic life. Lucky Minerals proposed monitoring plan will not adequately monitor their potential impacts and contributing load to the creek. Is Lucky Minerals' prevention, monitoring, and mitigation plan for potential leaching and other water quality impacts truly adequate? Has DEQ vetted their past performance or their mining locations to ensure that we are not just getting lip service from a company with a poor track record? Does DEQ have confidence that Lucky Minerals will indeed ensure our publically owned water resources are not degraded in the short-term or long-term by their activities?

- **Reclamation Bond Release**
  - The Reclamation Bond Release criteria described in the Plan of Development are inadequate and appears to only focus on surface reclamation. It provide no detail regarding surface or groundwater monitoring at the end of the project during the proposed 5 year

Response To: Jeannette Blank

P-39-1

Please see Sections 1.1 and 1.2 of the EA.

P-39-2

See general-themed response to comments related to Future Exploration and Mining Actions.

P-39-3

See general-themed response to comments related to Future Exploration and Mining Actions and Regulatory Authority.

P-39-4

See response to Comments A-2-22 and O-3-5.

P-39-5

The 2016 MBMG baseline report showed that springs along the north side of the East Fork of Emigrant Creek, opposite and downstream from the St. Julian, were likely associated with natural acid rock drainage and the contributions of metals to the stream. However, the sites identified as existing exploration holes, near the Proposed Action area and the Great Western and Eastern claims, had neutral pH values and no measured water quality standard exceedances.

P-39-6

Water quality monitoring is not included in the Proposed Action. The Agency-Modified Alternative has been revised to include water quality monitoring in the East Fork of Emigrant Creek during operations adjacent to the St. Julian Claim Block (Section 3.7.3). Lucky Minerals will be required to plug all exploration drill holes pursuant to ARM 17.24.106. That administrative rule requires all exploratory drill holes to be plugged at the surface five to ten feet with
cement. ARM 17.24.106 requires drill holes to be plugged from the bottom of the hole to within five to ten feet of the surface with bentonite and with cement from the top of the bentonite to the surface if the drill hole 1) intercepts two aquifers; 2) intercepts one aquifer and an existing or beneficial use exists; 3) intercepts one or more artesian aquifers; or 4) has the potential for downward water loss from an aquifer. DEQ has not determined there is a need for water quality monitoring after completion of the proposed drilling program. Therefore, DEQ is not requiring the bond to cover water monitoring after completion of the drilling program. Pursuant to ARM 17.24.128, DEQ will conduct inspections of the site once a year following completion of the drilling program to assess reclamation success.

Section 2.3 of the EA has been updated to specify the main drilling season during the two years. Lucky Minerals expects the main drilling season to be July 15 to October 15 each year and may be curtailed on those two dates mentioned above due to snow levels in the project area. Lucky Minerals has not proposed plowing snow to open or keep the roads open to get to the project site. (Shaun Dykes email to Jen Lane, Apr. 26, 2016)

The BMPs would be most effective when installed at the drill sites and access road, rather than in the areas between the drill sites and stream. Potential sediment transport within the incised channels should be addressed with BMPs developed in a separate 318 Authorization. From the drill site location map provided by Lucky Minerals Inc. (Figure 1.4), the only location which is located within 100 ft of the East Fork of Emigrant Creek is Pad #1. Based on the company’s commitment, this site will need to be relocated or removed from the drilling plan.

See response to comment P-39-10 on toxicity of drilling muds and fluids.
The proposed drilling fluids would consist of water and a non-toxic product which consists of organic polymer compounds, commonly made with esters, ethers, or olefin isomers. These biodegradable products have been approved by EPA for a variety of drilling applications on land and offshore, and have been used since the early 1990s. Compared to traditional water- or oil-based fluids, the synthetic polymers provide high drilling efficiency, while exhibiting low toxicity and degradation to environmentally benign products (Burke and Veil, 1995). Bentonite clay slurry is often used in conjunction with synthetic polymers, and one advantage to using clay is that the fluid only absorbs a short distance into the borehole wall before being sealed off (referred to as filter cake layer), providing borehole stability and preventing significant fluid loss into the formation. Synthetic fluids can be easily recirculated from the hole and reused, while also eliminating the potential contamination from using diesel- or petroleum-based fluids. Along with the proposed cyclone recovery system, the use of synthetic fluids would reduce the drilling water demand and potential impacts to surface water, and remove the potential for seepage into shallow groundwater by not storing fluids in sumps. The synthetic fluids would not be directly disposed of in the drill holes, which would be potentially backfilled with cuttings prior to being sealed with grout and cement.
Public concern about this project is SIGNIFICANT. This cannot be understated or ignored. Public concern and scrutiny has not diminished just because the current exploratory work has been significantly reduced in scale and scope because the ultimate intent to mine our Yellowstone headwaters has not changed. There were over 8,000 public comments during the last public comment period (6,250 received by DEQ) and DEQ will likely receive another 2,000 comments during this public comment period. That is 10,000 comments so far on just the exploratory work. My hope is that DEQ sees that the current 23-hole project on 47 acres of land is not viable project and throws it out or places it on hold until a time when the public minerals are available and can make the exploratory work a valid effort. If for some reason the evaluation of the 23-hole/47-acre project moves forward, the magnitude of public concern alone validates the need for a full EIS on this project, let alone the numerous technical and environmental questions that need additional consideration. People have too many unanswered questions, and Montana taxpayers have been left holding the bill to reclaim abandoned and poorly managed mines for far too long. We need proof that this project is worth the potential impacts and we need proof that Lucky Minerals is not going to leave us with an expensive mess that hurts our local economy and natural resources for their short-term gains.

Thank you for your time and effort in considering my comments.

Sincerely,

Jeannette Blank
418 S 9th St
Livingston, MT
406-223-5955

- Public concern about this project is SIGNIFICANT. This cannot be understated or ignored. Public concern and scrutiny has not diminished just because the current exploratory work has been significantly reduced in scale and scope because the ultimate intent to mine our Yellowstone headwaters has not changed. There were over 8,000 public comments during the last public comment period (6,250 received by DEQ) and DEQ will likely receive another 2,000 comments during this public comment period. That is 10,000 comments so far on just the exploratory work. My hope is that DEQ sees that the current 23-hole project on 47 acres of land is not viable project and throws it out or places it on hold until a time when the public minerals are available and can make the exploratory work a valid effort. If for some reason the evaluation of the 23-hole/47-acre project moves forward, the magnitude of public concern alone validates the need for a full EIS on this project, let alone the numerous technical and environmental questions that need additional consideration. People have too many unanswered questions, and Montana taxpayers have been left holding the bill to reclaim abandoned and poorly managed mines for far too long. We need proof that this project is worth the potential impacts and we need proof that Lucky Minerals is not going to leave us with an expensive mess that hurts our local economy and natural resources for their short-term gains.

Thank you for your time and effort in considering my comments.

Sincerely,

Jeannette Blank
418 S 9th St
Livingston, MT
406-223-5955
Comment from: Jeff Nash

I live 6 miles west of Emigrant peak. I thought I moved far enough away from this type of activity. I'm guessing you plan on flying your machinery in. There are no bridges or roadways with that kind of capacity.

Response To: Jeff Nash

Transportation analysis is included in Section 3.10. The use of helicopter supported exploration drilling is not proposed for this project. Lucky Minerals will be responsible for maintaining legal loads on bridges and roadways. If Lucky Minerals were to transport equipment that exceeds legal dimensions they would need to obtain a permit from the Montana Department of Transportation.
Comment from: Michael Hudson

Michael Hudson

The Department of Environmental Quality (DEQ) should adopt the 4th option as presented in Section 1.5 of the Draft EA. An objective review of the potential environmental impacts associated with the development of the Lucky Minerals mine should cause the DEQ to seriously question the proposal. Additional environmental analysis is essential, and any potential environmental impacts identified by the analysis should be subject to public disclosure and properly analyzed. As a former Montana resident, and recent tourist to Montana and Paradise Valley, I greatly appreciate the natural resources of the Yellowstone valley. The recent fish kill of 2016 in the Yellowstone River was caused by environmental conditions which promoted a parasite-related proliferative kidney disease outbreak. This demonstrates the river's sensitivity to environmental impacts and the need to vigilantly maintain water quality and prevent pollutants such as those commonly caused by mining activities. An objective review of the Lucky Minerals mining proposal would find that it puts the Yellowstone River and its ecologically rich resources at risk.

Response To: Michael Hudson

P-154

P-154-1
See general-themed response to comments related to Further Environmental Analysis.

P-154-2
See general-themed response to comments related to Future Exploration and Mining Actions and Further Environmental Analysis.

P-154-3
Comment noted.

P-154-4
The Proposed Action is for a drilling exploration project and not a mining operation. Discussion of existing conditions in the Emigrant Creek subwatershed is provided in Section 3.7.2 and discussion of direct and secondary impacts is provided in Section 3.7.3. The Agency-Modified Alternative has been updated to include regular water quality monitoring in the East Fork of Emigrant Creek and contingency sampling. Also see general-themed response to comments related to Wildlife.
From a review of database records, the Montana Bureau of Mines and Geology sampled the Murray/Swanson private well on 10/31/2016 as part of the groundwater characterization of Park and Sweet Grass counties. Although water-dating samples were not collected (like tritium), stable oxygen and hydrogen isotope data collected from the Murray/Swanson well indicate that the groundwater is sourced from meteoric water (precipitation) with little effect from evaporation. It seems likely that the glacial till aquifer on the valley margin is recharged on the scale of decades rather than centuries. However, as discussed in the MBMG’s 2016 baseline report, there is no evidence for a deep permeability pathway connecting the volcanics and crystalline bedrock in the Proposed Action area and the valley-filling sediments below. At a distance of 5 miles from the Proposed Action area, direct impacts to the Murray/Swanson well from core drilling or changes to the East Fork of Emigrant Creek seem very unlikely.

The well log indicates that the Murray/Swanson well is drilled to a depth of 340 feet in heterogeneous glacial till and screened at the bottom, beneath multiple zones of "heavy claybound" material. This would indicate that potential recharge from surface water would not be rapid, and any changes to water quality in Emigrant Creek would not immediately impact the lower aquifer. Likely a result of the subsurface residence time, the TDS and major ion concentrations recently measured in the Murray/Swanson well are approximately twice as high as those measured in Emigrant Creek at Old Chico, so potential influences from nearby surface water may not be discernible.

The water samples collected from Emigrant Creek at Old Chico did not exceed any aquatic life or human health standards, which are much more restrictive than the irrigation water guidelines established by the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). The East Fork of Emigrant Creek above
the confluence with Emigrant Creek had the highest in-stream metal concentrations sampled by MBMG, indicating impacts from an area of natural acid rock drainage. However, those concentrations were still well below the NRCS irrigation guidelines. With the East Fork contributing approximately 10% of the flow in Emigrant Creek at Old Chico, it seems very unlikely that potential changes in the upper tributary would impact the lower reach to a point where it would be unsuitable for irrigation purposes.

See general-themed response to comments related to Water Quality.

Discussion of existing conditions in the Emigrant Creek subwatershed, the seasonal water loss to irrigation, and the connection to the Yellowstone River is provided in Section 3.7.2, and discussion of direct and secondary impacts is provided in Section 3.7.3.

DEQ has revised the EA to include a detailed discussion of the socioeconomic impacts in Section 3.13 of the EA. Also see general-themed response to comments related to Socioeconomics.

Thank you for your comment.

The economics of Paradise Valley and the Livingston area have been studied and published. Non-resident spending in Park County amounts to $196 million dollars a year, creates 2,700 jobs, and the Paradise Valley corridor to Yellowstone National Park has been touted as one of the great attractions of a visit to Yellowstone National Park.

Why would anyone living in this area or visiting the area want to jeopardize the existing renewable gold mine, that is the pristine Paradise Valley today, that currently provides such a bounty to the area while at the same time keeping the bucolic nature of the area intact?

Businesses are relocating to the rural areas of Montana like Livingston because of the natural environment and life style that the current pristine environment provides. Mining in the Absaroka and Gallatin Mountains in the vicinity of the Paradise Valley, Gardiner Basin, and areas
bordering Yellowstone National Park is not good for the environment, the economy or the well being of a renewable resource that currently exists.

Any mining effort should be held to the highest standard of scrutiny. A full Environmental Impact Statement is called for. The EIS should address the economic and social impacts of any mining operations in the subject area.

The profits of any mining operations will leave the United States. Wages earned by any miners would be short lived compared to the “Renewable” wages that the current economy provides. It would be very short sighted to allow a temporary mining operation to cripple the future benefits of the current economic system.

“Yellowstone is more valuable than GOLD.”

Very truly yours,

Peter Murray, on Emigrant Creek, Old Chico

- Economic data from Dr. Larry Swanson, Univ of MT.
Comment from: Daniel Thums

Daniel Thums

These comments concern Lucky Minerals proposal for gold exploration in Emigrant Gulch. A full Environmental Impact Statement is necessary to assess the exploration plan. It is unrealistic to believe the mining company claims of minimal impact in this area. The company has no ties with or concern for the local area. Simply accessing the drill sites will have significant impact. The deep test holes have unknowable risk to local water supply including a potential economic disaster to Chico Hot Springs.

This is a potentially disastrous situation for the local community and all efforts should be made to fact find and guarantee that no harm will be done to the local economy and landscape. This should be done with a full EIS.

Don Thums

Response To: Daniel Thums

P-179

P-179-1
See general-themed response to comments related to Further Environmental Analysis.

P-179-2
Discussion of existing conditions in the Emigrant Creek subwatershed is provided in Section 3.7.2 and discussion of direct and secondary impacts is provided in Section 3.7.3. Recent investigations by MBMG suggest that there is not a direct hydrogeologic or geochemical connection between water in the Emigrant Creek subwatershed and the system feeding Chico Hot Springs, as discussed in subsections 3.7.2.3 and 3.7.2.5.

P-179-3
See general-themed response to comments related to Further Environmental Analysis.

Comment from: Phoenix Peavy

Phoenix Peavy

There are a few concerns here one of my main concerns is the contamination of our ground water. The acids used in refining and breaking the ore free cannot be contained and therefore is a serious risk to our pristine aquifer, not to mention the run off into the beautiful Yellowstone river, which may very well affect a huge part of our way of life around here. The Yellowstone river is our blood line, if it becomes contaminated it will ruin our summertime sports and the tourist income we gain every summer, that keeps this area alive.

Response To: Phoenix Peavy

P-196

P-196-1
The Proposed Action is for a drilling exploration project and not a mining operation. There will be no "acids used in refining and breaking the ore free," because no ore will be mined or processed under this proposal. Discussion of existing conditions in the Emigrant Creek subwatershed is provided in Section 3.7.2 and discussion of direct and secondary impacts is provided in Section 3.7.3.
Comment from: Dawn Hirschfelt

Dawn Hirschfelt

Yellowstone is US Forest Service public land and cannot be mined!

Please consider the impacts of increased industrial traffic in Emigrant Gulch, and analyze how gold exploration will affect our public access across both US Forest Service and private lands.

You must evaluate the impacts to water quality and quantity since exploration will take place near Emigrant Creek, a tributary of the Yellowstone River. Don't risk the clean water that fuels Park County and the Paradise Valley.

P-208

Response To: Dawn Hirschfelt

P-208-1

See description of the Proposed Action. Lucky Minerals proposes to conduct exploratory drilling on private patented mining claims on the St. Julian Claim Block in Emigrant Gulch. Also see general-themed response to comments related to Future Exploration and Mining Actions and Public Lands.

P-208-2

Transportation analysis is included in Section 3.10.

P-208-3

See general-themed response to comments related to Water Quality.

Comment from: Karen Krieger

Karen Krieger

We need to mine resources for our economy. What we don't need is to diminish our National Parks, especially the first National Park in the world. It is critical that strong regulations be imposed on any mine proposed in the Greater Yellowstone Ecosystem. Water quality must not be affected, drilling must not alter the geothermal systems of the area. The strongest regulations must be imposed on the Lucky Minerals request for drilling.

P-211

Response To: Karen Krieger

P-211-1

Thank you for your comment.
Comment from: Sarah Muller

sarah muller

Please do not allow this company to drill on their private leases that they have already leased.
I live at the base of Emigrant Gulch and own a vacation rental business that would be totally ruined if this is allowed to happen.
I already deal with an high impact of traffic going up the gulch to recreate and adding big trucks and mining equipment would be devastating..., and not just for myself but for the entire area.

Thanks!
Sarah Muller

Comment from: Scott/Katie Bischke/Gibson

Scott/Katie Bischke/Gibson

Please deny Lucky Minerals' request for a Categorical Exclusion under NEPA for their proposed mineral exploration in the Mill Creek area of Custer Gallatin National Forest. Here's why:
(1) The Forest Service must evaluate the cumulative, connected and reasonably foreseeable actions associated with the proposed activity.
(2) The Forest Service should conduct an Environmental Assessment (EA) because extraordinary circumstances exist that preclude categorical exclusion. We are right next to Yellowstone National Park, in a crown jewel part of Montana's, to the country's, wild country.
(3) The Plan of Operations lacks sufficient information to evaluate the proposal. And why would it if your goal, as seems to be Lucky Minerals', is simply to hold the area hostage to make money off its stock rising, then receding. Sigh.
(4) There are huge threats to (a) endangered species, (b) water quality, (c) wilderness character, (d) recreation, (e) public access. WHO benefits from this proposed project?!
(5) It is unclear if Native American cultural sites have been investigated and will be protected.
(6) The reclamation bond is inadequate. Lucky Minerals is a penny stock Canadian firm with assets in 2014 of $935,000 CA. They have no record of management or production. Do not risk our incredible Montana mountains and all they mean to the people, critters, and spirit of our state to what is clearly a speculative project. These people lack of financial resources to conduct the full scope of proposed exploration activities on private and public lands, which the company themselves estimates at over $2 million.

Response To: Sarah Muller

P-215

The EA sections 2.3 and 3.10 describe the type of traffic and the potential impacts of traffic from the proposed project.

Response To: Scott/Katie Bischke/Gibson

P-226

This environmental assessment (EA) analyzes the impacts of the Lucky Minerals exploration license application for activities on private patented mining claims. The Montana Department of Environmental Quality is the regulatory authority responsible for approving or denying exploration license. The applicant has not requested a Categorical Exclusion for the state action. The statute requiring the environmental assessment is the Montana Environmental Policy Act (MEPA), not NEPA.

DEQ has determined Lucky Minerals' application has sufficient information to analyze the impacts from the proposed project.

See Sections 3.4.4, 3.7.3, 3.8.3, and 3.10.3 for a description of the direct and secondary impacts for each resource.

This property is on private lands, so there is no regulation by which the agency can require archaeological inventory. The Metal Mine Reclamation Act provides for no such protections. Under MEPA, we
can only assess impacts on known sites. If the property was State land, then the Montana Antiquities Act would apply. If the property was on Federal land, then Section 106 of NHPA would apply.

P-226-5
See general-themed response to comments related to Bonding.

Response To: Donna Onstott

P-230
See general-themed response to comments related to Further Environmental Analysis and Future Exploration and Mining Actions.

P-230-1
See general-themed response to comments related to Water Rights and Proposed Action and Public Lands.

P-230-2
See general-themed response to comments related to Bonding.

P-230-3
Please see Section 3.10 of the EA which discloses the impacts of transportation in the vicinity of the proposed project. The use of helicopter supported exploration drilling is not proposed for this project.

P-230-4
DEQ has revised the EA to include a detailed discussion of the socioeconomic impacts in Section 3.13 of the EA. Also see general-themed response to comments related to Socioeconomics.

P-230-5
Thank you for your comment.

P-230-6
See general-themed response to comments related to Future Exploration and Mining Actions.
Comment from: Adrienne Pollard

Response To: Adrienne Pollard

P-233

See general-themed response to comments related to Water Quality.

P-233-1

Lucky Minerals is proposing the drilling of 46 drill holes at 23 drill pads on its privately-owned, patented mining claims. Its patented mining claims are not located on the western flank of Emigrant Peak. Lucky Minerals is not proposing the construction of any new access roads that would further fragment wildlife habitat.

P-233-2

DEQ has revised the EA to include a detailed discussion of the socioeconomic impacts in Section 3.13 of the EA. Also see general-themed response to comments related to Socioeconomics.

P-233-3

Also see general-themed response to comments related to Future Exploration and Mining Actions.

P-233-4

Thank you for your comment.
Comment from: Catherine Logan

http://luckyminerals.mdeq.commentinput.com/
Dec. 11, 2016

Jen Lane
Department of Environmental Quality
P.O. Box 200991
Helena, MT 59620-0991

RE: My public comment on DEQ's Draft EA of Lucky Minerals

Dear Ms. Lane,

After reviewing MT DEQ's Draft EA of Lucky Minerals exploration proposal I strongly urge you to reconsider its conclusion. Due to Lucky Minerals' unacceptable misinformation on their maps, projected project costs, etc., and the shortcomings of the department's analysis (EA), which does not adequately address any and all potentially significant impacts, I think it's imperative that the DEQ conducts an Environmental Impact Statement (EIS) - adopting the 4th option presented in Sec. 1.5 of the Draft EA. Especially given the sensitive geologic nature of the Emigrant Gulch area, where even exploratory bore holes could impact the quality and quantity of our entire aquifer.

Both Greater Yellowstone Coalition (GYC) & Park County Environmental Council (PCEC) have pointed out in this round of public comments that Lucky Minerals (LM) needs to pay attention to the fundamental details by submitting a complete survey and recorded documents and producing accurate GIS maps. This is absolutely necessary to verify LM claims on private property as well as their project's pads and drill hole locations in relationship to our adjacent public lands, so a thorough analysis can be conducted and properly evaluated.

As a member of both GYC & PCEC knowing and trusting the quality of work they do I ask that you please consider as part of my public comment their detailed comment points relating to the mapping, GIS, socioeconomic problems along with the misconception that an exploratory permit analysis should not consider LM long term plans for a large mining operation that would exponentially multiply the potentially significant environmental & societal impacts.

PCEC:

- The proposed action is supposed to be on private lands, yet Lucky's map shows one claim and at least three proposed drill sites that appear to be on public lands.
- The proposed action shows a lack of clarity around Lucky's water rights up Emigrant Gulch. Lucky needs to disclose and provide a record of the exact water rights transferred to them by recording those documents at the Park County Clerk and Recorder.
- Despite overwhelming opposition from the community and hundreds of businesses, the Canadian mining company Lucky Minerals has not given up its plans to dig for gold up

Response To: Catherine Logan

P-234

Thank you for your comment. See general-themed response to comments related to Further Environmental Analysis.

P-234-1

See general-themed response to comments related to Water Quality.

P-234-2

See general-themed response to comments related to Proposed Action and Public Lands.

P-234-3

Thank you for your comment. See general-themed response to comments related to Further Environmental Analysis.

P-234-4

See general-themed responses.

P-234-5
Figure 1.4 has been updated to show the St. Julian Fraction as unpatented. Also see general-themed response to comments related to Proposed Action and Public Lands.
At least three proposed drill pads on public land, two or three proposed drill pads on the very border of public lands and numerous access roads on public land. A federally monumented survey and accurate GIS map must be completed. An updated Plan of Operations must be submitted to Custer Gallatin National Forest and permitted before any exploration license can be granted for the current Plan of Operations.

Inaccurate Map - The map on Page 7 of the DEQ Draft EA is fundamentally flawed. The original for this map was produced by Geologic Systems Ltd and was included as Plate 4 of the original Plan of Operations submitted on April 7, 2015. This original map did not indicate the separate loe and mill claim boundaries nor did it properly indicate the St. Julian Friction. Although the shape of the road prisms appears to be quite accurate, their location relative to the property boundaries is simply not correct.

The Map on Page 7 of the October 13, 2016 Draft EA is clearly modified from the original map on Plate 4 of the Plan of Operations submitted by Lucky Minerals on April 7, 2015. The Oct 2016 map clearly shows the direction and legend annotations removed and the claim boundaries (in green) and names added along with a new legend. The more recent map deliberately highlights a portion of the St. Julian Fr (sic) as patented. There is no attribution for the source of this added information found on the October 13, 2016 Draft EA map.

Recommendations: The mining industry is currently being held to a much higher standard of precision and specificity, on a world-wide basis. Lucky Minerals’ lack of attention to detail on something as fundamental as the primary map and the land ownership of the proposed drill sites is unacceptable. Until adequate information is produced, the DEQ must accept the No Action Alternative or at a minimum, deny the application and request from Lucky Minerals proof of right to surface occupancy, adequate surveys, maps and drill pad locations.

Sincerely,
Catherine P. Logan
POB 482
Emmigrant, MT 59027
catherineplogan@gmail.com
submitted to Custer Gallatin National Forest and permitted before any exploration license can be granted for the current Plan of Operations.

Figure 1: Proposed drill pads, stream crossings, and public roads within the Lucky Minerals Plan of Operations. St. Julian Claim Block is outlined.

Inaccurate Map

The map on Page 7 of the DEQ Draft EA is fundamentally flawed. The original for this map was produced by Geologic Systems Ltd and was included as Plate 4 of the original Plan of Operations submitted on April 7, 2015. This original map did not indicate the separate lode and mill claim boundaries nor did it properly indicate the St. Julian Fraction. Although the shape of the road plans appears to be quite accurate, their location relative to the property boundaries is simply not correct.

The map on Page 7 of the October 13, 2016 Draft EA is clearly modified from the original map on Plate 4 of the Plan of Operations submitted by Lucky Minerals on April 7, 2015. The Oct 2016 map clearly shows the direction and legend annotations removed and the claim boundaries (in green) and names added along with a new legend. The more recent map deliberately highlights a portion of the St. Julian Fr (sic) as patented. There is no attribution for the source of this added information found on the October 13, 2016 Draft EA map.

Recommendations:

The mining industry is currently being held to a much higher standard of precision and specificity, on a worldwide basis. Lucky Minerals' lack of attention to detail on something as fundamental as the primary map and the land ownership of the proposed drill area is unacceptable. Until adequate information is produced, the DEQ must accept the No Action Alternative or at a minimum, deny the application and request from Lucky Minerals proof of right to surface occupancy, adequate surveys, maps and drill pad locations.
See Section 3.4.4.2 for a discussion on sensory disturbance to local wildlife as the result of heavy equipment / vehicle use, road grading / maintenance, pad development, core drilling, and associated human activity would primarily be auditory but disturbances may also include olfactory (i.e., smell) as well as visual (i.e., light) and tactile (i.e., vibration) disturbances. The Agency-Modified Alternative has mitigation measures to address wildlife disturbances. See Section 2.4.4 for a description of wildlife awareness and avoidance mitigations.
Thank you for your comment. Potential impacts to elk are addressed in the EA. Also see Comment A-3-5 for response to improved access.

Please see response to Comment O-2-30.

Potential impacts to grizzly bears are addressed in the EA and the Agency-Modified Alternative has provisions to minimize human/bear interactions. Also see response to Comments A-3-5, O-10-36 and O-10-37.

A discussion of the potential impacts to Canada lynx is included in Section 3.4 Wildlife of the EA.

A discussion of the potential impacts to wolverines is included in Section 3.4 Wildlife of the EA.

Thank you for your comment. The Agency-Modified Alternative includes a measure for pre-construction wildlife and bird surveys and mitigation and avoidance measures should sensitive wildlife, including bird nests be found. This alternative also includes provisions to follow state and federal guidelines regarding appropriate temporal and spatial buffers for bird nests, and for consultation with local biologists.

Analysis of wetlands and waters of the US is included in Section 3.9.2.4. Wildlife is addressed in Section 3.4.
Comment noted. Impacts to species protected by the Endangered Species Act and the Migratory Bird Treaty Act are addressed in the EA. As stated by the commenter, if there were to be a federal permit there could be consultation requirements with FWS.

Analysis of wetlands and waters of the US is included in Section 3.9.2.4.

Table 1.2 provides a listing of County, State and Federal Agencies and their respective permit / authorizing responsibilities. Lucky Minerals would be required to obtain any permits required by County, State or Federal Agencies.

DEQ is required to, has, and will consult with SHPO. This property is on private lands, so there is no regulation by which the agency can require archaeological inventory. The Metal Mine Reclamation Act provides for no such protections. Under MEPA, we can only assess impacts on known sites. If the property was State land, then the Montana Antiquities Act would apply. If the property was on Federal land, then Section 106 of NHPA would apply. There is no requirement for DEQ to consult directly with tribes. However, DEQ welcomes comment and discussion from any interested tribes or tribal members.

The Agency-Modified Alternative includes provisions for pre-
construction wildlife surveys and subsequent measures to avoid and minimize impacts to wildlife. Consultation with Montana Department of Fish, Wildlife and Parks biologists is also included.
These impacts appear to be small but when viewed from a habitat effectiveness and suitability perspective they are much larger. Many wildlife species are sensitive to human use and presence, reduced habitat suitability or effectiveness is expected well beyond actual disturbance areas. Big game animals (e.g., big horn sheep), grizzly bear, lions and other rare species have been shown to use habitats near human disturbances (noise, industrial activities, housing) with less frequency. Even though overall disturbance is only 4.8 acres, actual project impacts would extend to over 1,000 acres with a conservative 0.5 mile area of reduced habitat suitability. Not including the disturbance impacts of additional traffic on the irrigated Gulch Road.
Comment from: Robert McWilliams

Robert McWilliams

I own and operate Granny's Gourmet Donuts in Bozeman. We used to only get a few tourists each summer, but glowing reviews on the internet has led hundreds of tourists to visit us. This turns a slow period when university students are gone into a profitable time. These tourists aren't coming to Yellowstone to see a big ugly gold mine. They can go to Butte to see such wonders.

Why should we jeopardize the vital, already viable businesses in the local area for an extraordinary risky mining operation? Especially when all of the profits will flow out of state to non-Montana citizens? The small number of jobs required for the mine pale in comparison with the number of jobs already in place in the Paradise Valley and local area. I urge you to reject this mining operation.

Response To: Robert McWilliams

P-255

P-255-1

See general-themed response to comments related to Future Exploration and Mining Actions.
Comment from: Mary Swanson

Mary Swanson

Dear Ms. Lane:

I am submitting my comments, due by 12/12/2016, on the Draft Environmental Assessment analyzing potential impacts from mineral exploration proposed by Lucky Minerals. DEQ should adopt the 4th option under Section 1.5 of your Draft EA and require a full EIS analysis.

One of the first points that caught my attention in your EA was the assumption that "socioeconomic factors" in this part of Paradise Valley have not changed in the past 20 years. My husband and I are one of 6 private residences that did not exist in 1990 and, in fact, we purchased our 20 acre property on Bullion Bench, just south of Old Chico and including a stretch of Emigrant Creek, in 2008, building our home here in 2010. In our small subdivision, one neighbor has already built and lives in her home year round, as do we. Two other parcel owners plan to build in the near future. Our covenants make it clear that this land is to remain wildlife friendly with very limited use of the land. The clean water of the creek was another draw for us as was the rough road up Emigrant Gulch where we often hike and enjoy the beauty and solitude. And that is why we purchased this property, that is where the value of it lies for us. And it was Yellowstone that drew us to this valley in the first place. No way would we have looked twice at this area had there been a full-scale gold mine operation practically out our back door. Our property value counts too!

The demographics of this valley are changing too. Tourist dollars already make up the largest portion of the economy and that segment is continuing to grow. Moreover, it is a sustainable economy and a conservative economy, unlike the relatively short term jobs and environmental damage brought in by a gold mine. Businesses are also relocating to this rural area because of their technological capacity to do so and because the lifestyle that can be enjoyed in such an unpolluted natural environment is an absolute magnet. DEQ needs to consider impacts to current socioeconomic, per MT law.

We are also very concerned about keeping water in Emigrant Creek, in the Yellowstone River and in our aquifers unpolluted. The MT Bureau of Mines tested our water a few weeks ago. They are establishing a baseline in the area. Our water is clean and pure at this moment, but we did learn that it is only tens, rather than hundreds, of years old as we had been told when we purchased. So the chance of our sole water supply being affected by Lucky Minerals activity is an immediate concern for us, let alone for the agricultural and tourist businesses that are also totally dependent upon clean waters.

Lucky Minerals is not planning to stop operation once they drill a few exploratory holes. Their plan, set out in their own documents, is for a large-scale, open-pit gold mine and we all know what that means - there are plenty of examples in the West and even in MT. Your approach to looking ONLY at small-scale exploration is neither an honest approach to weighing consequences nor a wise use of taxpayer funding for your time and effort.

The area may have been mined in the past, but it is healing now. All of those operations

Response To: Mary Swanson

P-259-1

Thank you for your comment. See general-themed response to comments related to Further Environmental Analysis.

P-259-2

DEQ has revised the EA to include a detailed discussion of the socioeconomic impacts in Section 3.13 of the EA. Also see general-themed response to comments related to Socioeconomics and to Future Exploration and Mining Actions.

P-259-3

DEQ has revised the EA to include a detailed discussion of the socioeconomic impacts in Section 3.13 of the EA. Also see general-themed response to comments related to Socioeconomics.

P-259-4

Please see response to Comment P-176-1.

P-259-5

See general-themed response to comments related to Future Exploration and Mining Actions.

P-259-6

See general-themed response to comments related to Historic Mining and Future Exploration and Mining Actions.
were orders of magnitude smaller than what Lucky has in mind. Prior mining is no excuse to allow more in that area now.

We have done a lot of reading and research on gold mining in the past two years and one thing we have learned is that, almost without exception, the bonding requirements imposed on mining companies are never adequate when an accident or an act of God occurs. There are always loopholes and when the company goes under, the taxpayer pays, but the damage done can almost never be undone. In your EA, bonding money specifics are not specified. DEQ must disclose how much bond is required and for how long the bond must be held by the state. And those requirements must always cover YOUR CURRENT estimates of what reclamation will cost, not Lucky’s.

Finally, I need to comment on the plan for weed control. My husband and I and our one neighbor on our 80 acre subdivision have taken seriously our obligation to control weeds on these parcels. Over the past 5 years, we have made headway on this project; however, we observed how little is done on many private lands surrounding us. Upon inquiry to the PC Weed Board, we were told that there is no funding for much of anything except spot spraying along some roadways each year. Forget enforcement! Your plan to allow Lucky to do an annual evaluation and treatment for only 3 years is hardly a plan. Who will monitor and how will a requirement for effective results be enforced? The mining activity will be far up in the wild country, one place where invasive weeds should never be allowed a chance to get a footing – but keeping that from happening will require far more than 3 treatments. We can vouch for that! DEQ needs to considerably beef up requirements for weed control.

The potential consequences of Lucky’s intended long-term plan are enormous. The tradeoff of some jobs for some time and profits that will no doubt leave the US weighed against the inevitable damage to the environment, including putting a clean water supply at risk, requires a full EI be called for at this critical point.

Sincerely,
Mary Swanson

Also see general-themed response to comments related to Future Exploration and Mining Actions and Bonding.

DEQ would include an estimated cost to conduct weed control as a component of the reclamation bond Lucky Minerals would be required to submit prior to issuance of any exploration license. DEQ would not release this component of the reclamation bond until vegetation is established and weeds are controlled. Generally, three years is the minimum amount of time that DEQ would retain bond for weed control. DEQ would retain the bond for a longer period if needed to establish weed control. DEQ employees would inspect the site to monitor the progress of reclamation. Pursuant to Section 82-4-338(5), DEQ is not authorized to release bond until the public has been provided an opportunity for hearing and a hearing has been held if requested.

See general-themed response to comments related to Future Exploration and Mining Actions.
Dear Ms. Lane:
I am submitting my comments, due by 12/12/2016, on the Draft Environmental Assessment analyzing potential impacts from mineral exploration proposed by Lucky Minerals.

DEQ should adopt the 4th option under Section 1.5 of your Draft EA and require a full EIS analysis.

One of the first points that caught my attention in your EA was the assumption that “socioeconomic factors” in this part of Paradise Valley have not changed in the past 20 years. My husband and I are one of 6 private residences that did not exist in 1996 and, in fact, we purchased our 20 acre property on Bullion Bench, just south of Old Chico and including a stretch of Emigrant Creek, in 2008, building our home here in 2010. In our small subdivision, one neighbor has already built and lives in her home year round, as do we. Two other parcel owners plan to build in the near future. Our covenants make it clear that this land is to remain wildlife friendly with very limited use of the land. The clear water of the creek was another draw for us as was the rough road up Emigrant Gulch where we often hike and enjoy the beauty and solitude. And that is why we purchased this property, that is where the value of it lies for us.

And it was Yellowstone that drew us to this valley in the first place. No way would we have looked twice at this area had there been a full scale gold mine operation practically out our back door. Our property value counts too!

The demographics of this valley are changing too. Tourist dollars already make up the largest portion of the economy and that segment is continuing to grow. Moreover, it is a sustainable economy and a conservative economy, unlike the relatively short term jobs and environmental damage brought in by a gold mine. Businesses are also relocating to this rural area because of their technological capacity to do so and because the lifestyle that can be enjoyed in such an unspoiled natural environment is an absolute magnet. DEQ needs to consider impacts to current socioeconomics, per MT law.

We are also very concerned about keeping water in Emigrant Creek, in the Yellowstone River and in our aquifers unsoiled. The MT Bureau of Mines tested our water a few weeks ago. They are establishing a baseline in the area. Our water is clean and pure at this moment, but we did learn that it is only tens, rather than hundreds, of years old as we had been told when we purchased. So the chance of our sole water supply being affected by Lucky Minerals activity is an immediate concern for us, let alone for the agricultural and tourist businesses that are also totally dependent upon clean waters.

Lucky Minerals is not planning to stop operation once they drill a few exploratory holes. Their plan, set out in their own documents, is for a large-scale, open-pit gold mine and we all know what that means – there are plenty of examples in the West and even in MT. Your approach to looking ONLY at small-scale exploration is neither an honest approach to weighing consequences nor a wise use of taxpayer funding for your time and effort.

The area may have been mined in the past, but it is healing now. All of those operations were orders of magnitude smaller than what Lucky has in mind. Prior mining is no excuse to allow more in that area now.

We have done a lot of reading and research on gold mining in the past two years and one thing we have learned is that, almost without exception, the bonding requirements imposed on mining companies are never adequate when an accident or an act of God occurs. There are always loopholes and when the company goes under, the taxpayer pays, but the damage done can almost never be undone. In your EA, bonding money specifics are not specified. DEQ must disclose how much bond is required and for how
The bond must be held by the state. And those requirements must amply cover YOUR CURRENT estimates of what reclamation will cost, not Lucky’s.

Finally, I need to comment on the plan for weed control. My husband and I and our one neighbor on our 80 acre subdivision have taken seriously our obligation to control weeds on these parcels. Over the past 5 years we have made headway on this project, however, we observed how little is done on many private lands surrounding us. Upon inquiry to the PC Weed Board, we were told that there is no funding for much of anything except spot spraying along some roadways each year. Forget enforcement! Your plan to allow Lucky to do an annual evaluation and treatment for only 3 years is hardly a plan. Who will monitor and how will a requirement for effective results be enforced? The mining activity will be far up in the wild country, one place where invasive weeds should never be allowed a chance to get a footing – but keeping that from happening will require far more than 3 treatments. We can vouch for that!! DEQ needs to considerably beef up requirements for weed control.

The potential consequences of Lucky’s intended long term plan are enormous. The tradeoff of some jobs for some time and profits that will no doubt leave the US weighed against the inevitable damage to the environment, including putting a clean water supply at risk, requires a full EIS be called for at this critical point.

Sincerely,
Mary Swanson
I strongly urge the Department of Environmental Quality (DEQ) to adopt the 4th option as presented in Section 1.5 of the Draft EA – determining the need for further environmental analysis, so that any and all potentially significant environmental impacts are disclosed to the public and properly and fully analyzed. Lucky Minerals’ operational plan to explore for gold in Emigrant Gulch is full of flaws and oversights that put our land, water, and the local economy at risk.

* The proposed action is supposed to be on private lands, yet Lucky’s map shows one claim and at least three proposed drill sites that appear to be on public lands. Lucky needs to complete a survey and produce an accurate GIS map. This lack of attention to detail on something as fundamental as the primary map is unacceptable.

* The proposed action shows a lack of clarity around Lucky’s water rights up Emigrant Gulch. Lucky needs to disclose and provide a record of the exact water rights transferred to them by recording those documents at the Park County Clerk and Recorder.

* In section 3.3.3.2 of the EA it’s stated “the drill fluid would be recirculated at the surface and the cuttings would be separated using cyclone technology, so no fluids would be stored in the sumps.” There is a contradictory statement in section 2.3.8 of the EA which states “non-toxic lubricants in sumps would be allowed to percolate into the ground prior to backfilling.” This contradiction makes it difficult to determine Lucky Minerals’ intention regarding storing fluids and must be clarified.

* Per the EA section 3.3.3.2, “Lucky Minerals’ estimates 160 cu/ft of rock to be removed per drill hole x 2 drill holes per pad.” The sump size proposed by Lucky Minerals at each drill pad would be 18 cu ft. The sump is not sized adequately to accommodate the estimated rock to be removed from each drill hole. Lucky can’t determine if all the drill cuttings can be pumped back in the drill holes. The DEQ should insist that Lucky propose sumps that are adequately sized in the event the drill cuttings can’t be pumped back down the drill holes. DEQ must deny Lucky Minerals’ application until the company can produce adequate and accurate information.

There is also a significant need for DEQ’s further analysis in the following areas:

* Socioeconomic impacts: The Draft states that past exploration in this area didn’t affect local socioeconomic, therefore there’s no need to analyze impacts of the current proposal. I disagree. The last drilling occurred here between 1991-1993 – more than 20 years ago. The local socioeconomic have changed dramatically since 1992. For example, today the Old Chico area hosts nine vacation rental businesses and six private residences that did not exist in the 1990s. DEQ needs to consider impacts to current not previous socioeconomics, as required by Montana law.

* Bonding: The Draft says bonding is required, but doesn’t discuss specifics of how much money the state requires. Further how can a bond amount even be determined since Lucky per the EA has not clarified that water source. Which they state could be artisanal wells or the east fork or Emigrant Creek. Each requiring different reclamation.

A DEQ bond calculation in 2015 estimated that reclamation for each bore hole would cost more than $8,000 apiece, and that pad reclamation would cost an additional $3,380. But...
Kimiko Barrett

As a Ph.D. Researcher and Policy Analyst living in Livingston, and for the previous 10 years in the town of Clyde Park in northern Park County, I am strongly opposed to the proposed mine by Lucky Minerals. The present EA does not adequately address the socioeconomic and ecological impacts of the proposed project and an EIS is necessitated.

Should this mine proceed, the socioeconomic consequences to local communities, and the county at large, would be irreversible and significant. The proposed location of the mine is based at the headwaters of the Upper Yellowstone Basin, abutting public lands and within the Greater Yellowstone Ecosystem. The mine would detract from the scenic amenities that are so instrumental in drawing people to this area and boosting local economies. Park County's economic growth is based on service-related industries, such as tourism, recreation, and retail, all which would be adversely affected by the operation of this mine. In addition, further research is needed beyond the EA, including more stringent water monitoring of the quality and quantity of water impacted by the mine. Again, the current EA does not effectively address these significant concerns and an EIS is needed, at a minimum.

Response To: Kimiko Barrett

P-276

P-276-1
Thank you for your comment.

P-276-2
See general-themed response to comments related to Future Exploration and Mining Actions.

P-276-3
The Proposed Action is for a drilling exploration project and not a mining operation. Discussion of existing conditions in the Emigrant Creek subwatershed is provided in Section 3.7.2 and discussion of direct and secondary impacts is provided in Section 3.7.3. The Agency-Modified Alternative has been updated to include regular water quality monitoring in the East Fork of Emigrant Creek and contingency sampling during operations.

P-276-4
Thank you for your comment. Also see response to comments related to Further Environmental Analysis.
Comment from: Larry Swanson

DATE: December 12, 2016
TO: Montana Department of Environmental Quality
Attention: Jen Lane
FROM: Larry Swanson, 124 Applehouse Ln., Missoula, MT 59802
RE: Comments for Lucky Minerals Draft Environmental Assessment, Park County, Montana

These comments are offered in regards to the Lucky Minerals Draft EA prepared by the Montana Department of Environmental Quality (MDEQ). They are largely drawn from a recent study I prepared under contract with the Greater Yellowstone Coalition on the economy of the Park County area.

I am a Ph.D. economist and have authored hundreds of economic studies and profiles for areas a sub-regions across Montana, the larger Rocky Mountain West region, and other areas and region of the U.S. My Ph.D. in economics is from the University of Nebraska (1980) and includes specialities in urban and regional economies, public resource economics, and community and regional planning. I worked for nearly ten years as a private consulting economist prior to joining the University of Montana's Bureau of Business Research as its Director of Economic Analysis in 1988. I was promoted to UM's O'Connor Center for the Rocky Mountain West in 1994 and named its Senior Fellow in Regional Economy. I became Director of the O'Connor Center in 2008 where I continue as Director and as the Scott Endowed Senior Fellow in Regional Economy.

My work primarily involves detailed research on the state and larger region economies; work that has been supported by major foundations, federal and state agencies, other universities, other public and private organizations, businesses, and individuals. I have done many studies and research reports in support of economic development plans and strategies across the region. The economic study of Park County was produced privately by me outside of my time with the university with funding by area businesses and property owners in the Park County area and through contracting with the Greater Yellowstone Coalition who facilitated the study. The Citations for the study is:

*Key Trends, Dependencies, Strengths and Vulnerabilities in Park County, Montana, and its Area Economy*, by Dr. Larry Swanson, Ph.D. Economist, prepared for the Greater Yellowstone Coalition, Bozeman, MT, April 2016

The study is not meant to examine in detail potential impacts associated with any future large-scale mining of the kind that could eventuate from the mineral exploratory work being proposed by Lucky Minerals, Inc. However, the study provides important context for viewing and understanding what may be at stake or at risk should such exploration work occur leading to or even threatening to lead to future large-scale mining in this area.

Because so much of this area's economy is buttressed and supported by high quality area amenities and the visitors and new residents these attract and retain, along with the money they spend and the homes that they buy or build in the area — even the suggestion that there is a growing chance of visible, large-scale mining in the area can result in negative economic impact. For example, property values in areas like this, buoyed by nearby high-quality area amenities an
DEQ has revised the EA to include a detailed discussion of the socioeconomic impacts resulting from Lucky Minerals proposed mineral exploration. See Section 3.13 of the EA. Also see general-themed response to comments related to Socioeconomics.
Adding to the specter of the proposed exploration work is the plan to use night lighting in the project work areas. The EA notes that access to the proposed exploration area is via an existing road network, but adds: "[T]he access roads and the existing road network on the privately patented claims would be improved through grading in localized areas, in order to keep them serviceable for the type of vehicles described in the proposed action. All roads would be cleared of loose rock and other debris, but they would not be made wider. (p. 31 of EA)"

"Lucky Minerals would access the St. Julian Claim Block for mobilization and demobilization of exploration equipment using Murphy Road, Old Cemetery Road, Emigrant Creek Road, and Forest Service Road 3272/3272B." (p. 22)

"There may be localized disturbances on Emigrant Creek Road and Forest Service Road 3272, the proposed access route to the St. Julian Claim Block, to facilitate mobilization of equipment and to improve safety." (p. 17) The photo below, from the EA, clearly shows how visible this road system is with its many switchbacks across this highly eroded slope. And it will only become more visible with the removal of vegetation and grading called for in the proposal.

The EA notes: "Access roads and the existing road network within the St. Julian Claim Block would be maintained through grading as necessary, in order to keep them serviceable for the type of vehicles that would be involved with the Proposed Action. However, the roads would not be made wider. All roads would be cleared of rock and other debris within their original

P-279-2
See Section 3.12 for discussion on visuals and aesthetics in the project area.
configuration, some of which may require hand-picking to ensure safety and minimize
disturbances. P. 17

The EA points out that vegetation has encroached into or nearby this road system in many areas,
but the roads remain highly visible (as can be seen in Figure 2.2). So, as vegetation nearby and in
the roadway is removed to better accommodate trucks and traffic associated with the planned
exploration, this road system is likely to become even more visible from greater distances than
before. The scope of the project, even with the small number of workers involved, will become
increasingly visible. It will not go unnoticed and will become a growing preoccupation and
concern of area businesses, landowners, and visitors contemplating what it may mean for the
future.

At the same time, the greater potential for negatively impacting the area economy of Park County
would result if large-scale mining subsequently came to be as a result of the planned exploration.
This also must be given some consideration, even though it is clear that the EA is framed around
an assessment only of the proposed exploration work. Assessments or planning studies must be
forward-looking. They need to consider what is possible or likely to happen in the future as a
result of a particular activity such as this exploration work. As the EA repeatedly notes regarding
the evaluation of “cumulative impacts” of the proposed activity: “The cumulative analysis also
considers past, present, and related future actions under concurrent consideration” [noted several
times in section 4.1 of the EA with underlining added].

One possible “related future action” of the proposed activity is that large-scale mining would in
fact be pursued at the site as a result of the exploration. To not consider this eventuality at all as is
now the case with this EA results in incomplete, overly truncated, and narrowly framed

P-279.3
See Section 3.12 for discussion on visuals and aesthetics in the project area.

P-279.4
Comment noted. See Section 3.12 for discussion on visuals and aesthetics in the project area.

P-279.5
See response to Comment O-10-8 and general-themed responses related to Future Exploration and Mining and Cumulative Impacts.
Thank you for your comment. See general-themed response to comments related to Future Exploration and Mining Actions.
"Economists with the U.S. Department of Agriculture’s Economic Research Service (ERS) have developed measures of the extent of area employment in an array of creative occupations. There are 3,141 counties and county equivalents in the U.S., and 2,091 of those are non-metro counties like Park. In the ERS measure of area creative occupation employment, Park ranked 120th among all 2,091 non-metro counties or in the top six percent of those counties. ERS studies further show that many non-metropolitan counties that tend to be high in these measures of creative employment also are ones ranked very high in terms of area amenities and area recreation resources and attributes.

"ERS studies indicate that counties having three attributes tend to rank high in terms of population and employment growth and overall rural development potential and these are: 1) a relatively high proportion of people employed in "creative" occupations, 2) a seemingly strong setting for entrepreneurial initiative, and 3) relatively high ranked area amenities and recreational resources. These three attributes are referred to by economists as the "trifecta" for positive rural development and all appear to be core strengths of the Park County area economy."

While in the past it has been difficult to quantify or accurately take into account how area environmental amenities help shape and support area economic growth and development, the work by economists at the Economic Research Service of the U.S. Department of Agriculture is making this increasingly clear. And these connections simply can no longer be ignored, particularly in these types of Environmental Assessments where major mining activity in areas where this is economically incompatible is being contemplated or proposed.

The Park County economic study further finds: "The chief threat to area quality of life and economic well-being would be any future activities that negatively impact, both substantively and perceptually and on a large scale, area amenities and environmental attributes that have become the foundation of the area's economic vitality. Large-scale, highly visible, and environmentally disruptive activities, such as certain mining and heavy manufacturing activities, may pose the greatest threats. While these activities do bring jobs, employment earnings, and income to an area, these benefits are sometimes short-term or transitory while their negative impacts are deep, continuing sometimes in perpetuity, and causing long-term economic impairment. (pp. 3-2, study report, underlining added)"

Montana has a long history with large-scale hard rock mining and while this industry has provided many jobs over the years, these jobs have tended to come and go. The same cannot be said for the environmental and natural resource degradation resulting from many of these operations. I was fortunate to participate in a two-year study several years ago that examined natural resource and environmental clean-up and restoration activity in Montana. The study report is entitled: "Cultural Resource and Environmental Restoration in Montana." It was produced in 2012 for the Montana AFL-CIO with funding by the U.S. Department of Labor. A copy of the full report is available from the O'Connor Center for the Rocky Mountain West at the University of Montana.

Included in the study were 27 case studies on sites where major clean-up had been done or attempted in the state. "A diversity of sites, reflecting the range of restoration work being done in Montana, including: forest sites with activities such as stewardship projects aimed at forestland restoration and repair; riparian sites with waterway area restoration and repair; areas impacted by heavy industry and industrial processes including federal Brownfield contamination sites; areas impacted by present and past mining activity; and sites affected by oil and petroleum

See response to Comment O-10-8 and general-themed responses related to Future Exploration and Mining and Socioeconomics.

See response to Comment O-10-8 and response to comments related to Future Exploration and Mining Actions and Cumulative Impacts.
contamination. Restoration work at the sites ranged from several hundred thousand dollars to hundreds of millions of dollars and the 27 projects combined had expenditures totaling $353 million.” (p. 9, O’Connor Center 2012 Restoration Study)

As part of the study a general review was done of the extent of damaged and degraded resources in Montana resulting from past and current activities. Citing information on the MDEQ website at that time, the report notes: “The Montana Department of Environmental Quality administers the federal Brownfields program aimed at identifying and eventually cleaning up sites with significant contamination of hazardous materials and substances. It has been able to fund about 25 assessments of these kinds of sites in Montana, but admits that there are probably hundreds of potential Brownfield contamination sites across Montana where significant contamination is known or suspected.”

“Under its Abandoned Mine Reclamation program MDEQ has completed reclamation work at 408 coal mines and 38 hard-rock mines, but more than 1,500 abandoned mine sites have been identified and assessed under the program, occurring in 16 counties. MDEQ notes that the majority of Montana’s fifty-six counties have had abandoned mine problems associated with former coal or non-coal mines or abandoned gravel pits.”

“Up to 294 sites across Montana were given some consideration for possible cleanup under federal and state Superfund programs. Superfund sites are ones where contamination is particularly widespread and large scale. 209 of these remain under consideration, with six listed as maximum priority sites, 53 as high priority sites, and 74 as medium priorities. Only four of the sites are now listed as requiring “no further action” and only 32 are under “active management” (MDEQ “Site Response Section Statistics Report,” January, 2011).

While this information was compiled in 2012 and comes from a 2011 report by MDEQ, there is little doubt that the status of cleanup and restoration in Montana involving sites like these largely continues today, mainly because the funding necessary to take on the tasks involved in assessing, cleaning up, and attempting to restore more of these sites is so costly. Funding simply has not been adequate and this gross inadequacy is likely to continue in the foreseeable future.

Because of this, the state and its communities have to be much more deliberative in their consideration of large-scale mining operations in the future like many current and past ones which have left behind so much environmental degradation that has yet to be addressed. The monetary gains from most of the past mines were temporary. However, their negative impacts on affected environments and resources are continuing as long as they remain unabated.

Because of this, great care and consideration must be given in evaluating every step taken toward large-scale mining operations, particularly in places and areas where many of these types of operations are simply incompatible with area environments and emerging economies. This is essentially what we have with the Lucky Minerals proposal for Park County. And this can be readily seen in other findings from the Park County economic study, as cited below and excerpted from pages 51 through 55 of the report.

*Population Growth* Park County has had a growing population for a very long time, although this growth slowed in the last decade. Much of the county’s population growth has been from positive net migration, or more people moving to the area than the number moving away. [...]

DEQ has revised the EA to include a detailed discussion of the socioeconomic impacts resulting from Lucky Minerals proposed mineral exploration. See Section 3.13 of the EA. Also see general-themed response to comments related to Socioeconomics.
property type accounted for only 17.7 percent of the tax base. In Wheatland it accounted for only 6.2 percent.

These residential properties accounted for 53.8 percent of Park County taxable property values as compared to 40.9 percent statewide and 15.4 percent and 4.1 percent in Sweet Grass and Wheatland Counties, respectively. Neither of these other nearby counties is as well-positioned as Park with its gateway to Yellowstone National Park and abundance of highly visible and highly valued amenities that get reflected in Park County’s large number of seasonal and recreation homes and their values, serving to greatly add to the property tax base of the county. Neither of the other nearby counties have the high levels of visitation by non-resident travelers to Montana and by anglers for the areas highly valued streams and waterways that Park County has. So it must be concluded that the very tax base of Park County is highly sensitive to residential property values and the growing incidence of part-times buying and building homes in the county. The economic study further found:

"Personal Income Growth" The personal income base of the county has been growing at a good pace for a long time and although this slowed in recent years during the recession, recovery more recently has pushed personal income in Park County to an all-time high of $645 million in 2014, measured in inflation-adjusted dollars.

"Per Capita Income Growth" Personal income on a per capita basis in the county has grown steadily over time, adjusted for inflation, and reached an all-time peak in 2014 of $40,614. This compares with state-wide per capita income of $39,903. The poverty rate in Park County also is lower than state-wide – 12.3 percent versus 15.2 percent. So, economic well-being of county residents exceeds that of the state as a whole using those often-used measures.

"Labor Income or Earnings" Labor earnings are declining as a share of overall personal income in the county and this should continue as the population ages and more residents reach retirement age. Income from non-labor sources will rise more rapidly and older persons living in the county receiving Social Security, medical program payments, and income from savings and investments, will account for a growing share of area income.

"Imported" Labor Earnings The desirability of living in Park County affects how much labor income is "imported" to the county by residents who work at jobs outside of Park County. Park is a significant net importer of these workplace labor earnings because many residents who work outside of the county choose to live in Park County. Those net additions to labor income accounted for about ten percent of all county labor earnings in 1990, but in 2014 this had grown to over 25 percent. This growth is a reflection of the desirability of living in Park County, even for residents who work at jobs outside of the county.

"Yellowstone ‘Gateway’" Highway 89 is one of the primary ‘gateways’ to and from the park. The Yellowstone River flows into Park County from the park, running alongside Highway 89 through the “Paradise Valley” area in the southern portion of the county. This valley is aptly named, framed by impressive mountain ranges and scenic landscapes and vistas, including views of Emigrant Peak, that are very appealing to visitors and area travelers.

"Park Visitation" Visitations to Yellowstone National Park was a record level in 2015 with 4.1 million visitors. Average daily traffic (ADT) in July last year also reached a record level at 3,585 vehicles a day. This is an 18 percent increase in traffic over ten-years earlier. This
increase represents hundreds of additional vehicles a day moving through the area each summer.

"Visitor Spending Regionally" When traveling to and from Yellowstone National Park and across Montana, visitors spend an estimated at $3.6 to $5.8 billion annually on fuel, lodging, food, supplies, and other largely traded goods and services. The Institute for Tourism and Recreation Research at the University of Montana estimates spending by non-resident travelers in the 5-county region of Gallatin, Sweet Grass, Stillwater, Carbon, and Park at $970 million annually. This and the economic activity it generates support an estimated 13,520 jobs in the region.

"Visitor Spending in Park County" Spending by non-resident travelers in Park County alone is estimated at $196 million, or about 20 percent of the 5-county total. Only five counties in Montana are estimated to have more non-resident traveler spending than Park and, on a per capita basis, no major tourism county in Montana has more in non-resident spending that Park, supporting an estimated 2,700 jobs, or about 25 percent of all county jobs." (underlining added)

"Public Forestlands" Park County is about 2,800 square miles in size and over 1,500 square miles of this total contains some type of federal forest lands. Over half are federally protected "wilderness" areas. These largely natural areas and open lands create a rich and healthy environment for wildlife and help sustain high quality streams and other waters. These natural amenities bring large numbers of anglers, hunters, and other recreationists to the Park County area each year, adding further to those who pass through the area primarily in visiting Yellowstone Park.

"Anglers and Hunters" The Montana Fish, Wildlife and Parks (MFWP) estimates that resident and non-resident hunters and anglers spend about $1.26 billion each year in the state. These dollars are spent disproportionately in areas where hunting and fishing are best and Park County is one of these areas. The Upper Yellowstone basin or drainage, largely contained within Park, Sweet Grass, and Stillwater Counties, runs the full length of the Paradise Valley, and is the single busiest drainage in all of Montana for sport fishing activity. MFWP estimates the basin accommodates over 70 percent of all sport fishing in the state, 374,000 "angling days" in total with three-fifths of this in the summer months. About 64 percent of this is by residents of Montana with the rest by non-residents." (underlining added)

"Area Hunting" MFWP compiles data on hunting activity across Montana by sub-area and district. Hunter-days for elk hunting in districts largely within Park County total 20 to 25 thousand a year. Area deer hunting add another 15,000 or more hunter days to this. There also is significant goat, sheep, and moose hunting in the area.

"Angler/Hunter Spending" The combined fishing and hunting activity in the area is considerable, as is area spending by anglers and hunters while on trips to the area. Altogether, stream and lake anglers spend an estimated $70 million a year during their fishing trips to the Upper Yellowstone. Hunters spend another $5 to $6 million during their hunting trips in Park County area hunting districts. These dollars flow to area gas stations, car rental businesses, lodging and camping facilities, food stores and restaurants, guide services, and other businesses in the area. This spending represents about $4,000 to $5,000 in additional spending for each resident of the county." (underlining added)
"Seasonality in Area Employment" Park County employment is greatly affected by area patterns in visitation and traveler activity. County employment reaches highs each year in mid-summer and lows ordinarily in February with swings in employment of over one thousand jobs or about 13 percent. Over time, peak summer employment levels are rising, with the total number of employed reaching a high in 2015 of 8,556 workers.

"Area Self-employment" The county has an unusually high level of proprietor or self-employment. Self-employed individuals, both on farms and ranches and in a wide range of non-farm businesses, account for almost 40 percent of all jobs in the county as compared to 27 percent state-wide. This is an indication of a high level of area entrepreneurial "energy" as well as the area's small businesses. Proprietors are persons who work for themselves and tend to be much more "rootless" or flexible in terms of where they can choose to live and work. The higher percentage of proprietorships in Park County is partly because these persons want to live in the area and this is a function of the quality of life and area amenities.

"Areas of Concentrated Employment" Of all the sectors of the economy, accommodations and food services which includes all lodging and eating businesses has the highest employment in the county. This is not surprising given the area's high levels of visitation. Retail trade more broadly is the second largest employer. [...] In the post-recession period up until the present, the biggest job growth has been in accommodations and food services, again reflecting this dependency on spending by travelers and visitors. Five of the seven areas of greatest job growth more recently are somewhere in traded goods and services including accommodations and food, arts and recreation services, retail trade more generally, and wholesale trade.

"Travel and Tourism Boosted Trade" These dominant sectors in trade have grown in labor earnings from a little over $30 million in 1985 to over $60 million today and labor earnings paid to those employed in accommodations and food service reached an all-time high of $35 million in 2014. These trade sectors are heavily impacted by travel, tourism, and area recreation activity and account for over 22 percent of all labor income in the county - a relatively high percentage that reflects the area's dependence on those activities.

"Construction" The construction sector ranks fourth in the county in labor earnings at $22.4 million. This is down considerably from a high in 2006 of $35 million. This sector stabilized in 2010 and has begun to grow once again with the larger share of area residential construction tied to part-time residents of the county, drawn to the area by quality of life and area amenities." (underlining added)

"Area Agriculture" Park County has 564 farms and ranches, 93 of which are greater than 2,000 acres in size. Contained within these are 774,000 acres of land, both owned and leased, about 45 percent of the entire county land area. A full 608,000 acres are in some type of pasture, further adding to the expansiveness and allure of the area's landscapes and environmental quality. Gross receipts from livestock sales total over $30 million a year. Crop receipts add another $15 million, with those gross receipts spread across a range of categories including livestock purchases, feed costs, fuel, and hired labor; the latter estimated at over $10 million annually.
DEQ has revised the EA to include a detailed discussion of the socioeconomic impacts resulting from Lucky Minerals proposed mineral exploration. See Section 3.13 of the EA. Also see general-themed response to comments related to Socioeconomics.

"Chief Area Economic Strengths" Park County’s economic strengths are derived from a stable and growing population, added to by a growing number of part-time residents who own homes in the area. Combining with this is a large and growing number of visitors to the area, for fishing and hunting and traveling to Yellowstone Park and other area attractions. These combine to grow and sustain the area economy, expanding area trade beyond levels sustainable only by residents of the county and adding to area construction. The heart-beat of the Park County economy closely reflects the flow of visitors to the area and the growing presence of retirees and part-time residents.

"Chief Area Economic Threat" The chief threat to area quality of life and economic well-being would be any activities that could significantly negatively impact area amenities, environmental attributes, and quality of life because these are the things that distinguish the area and have contributed so heavily to area economic health and vitality. Any highly visible and environmentally disruptive activity, like large-scale mining or large-scale industry, activity, that can impact the area both substantially in terms of air, water, and land quality, and perceptually, reducing the area’s image as a high-quality place to live and visit, would have the greatest potential to cause long-term area economic impairment." (underlining added)

In evaluating the potential impact of mineral exploration like that proposed by Lucky Minerals, Inc., it is important to fully consider with foresight how this and potential mining activity in the future it makes more possible will and can impact an area economy like that of Park County. The current EA gives this little consideration. Therefore the evaluation lacks context and foresight and is incomplete. The EA is simply too narrowly framed to make for a more complete decision making document that is cognizant of the area’s economic context. It is this context that has led to so much fear and opposition by area businesses to this proposal, even at this early stage.

Many Montanans have seen firsthand how mining can impact an area’s environment and have also seen cleanup and restoration of major sites go unattended or performed inadequately. In our 2012 study of natural resource and environmental restoration in Montana, we became a bit dismayed at just how much work remains to cleanup and attempt restoration at many mining sites around the state. We concluded: "In a state that prides itself on not only the quality of its natural surroundings and environmental amenities but also their quality, these conditions where degradation and contamination are often allowed to persist and expand are unacceptable. In the past many contamination sites and areas of land degradation have gone almost unnoticed and unattended, sometimes because of the sheer abundance of the state’s natural resources and the remoteness of their locations. Early testing for contamination at many sites has been sometimes too limited and confined to fully expose the problems."

"Damage and contamination persists also because the costs of restoration are high, so high that true restoration – returning damage environments to near pre-existing conditions – is seldom if ever achieved even when attempted.

"Damage persists because government programs and the funding they may bring to these problems are often inadequate to the sheer magnitude of the tasks involved.

"Damage persists because the private incentives for cleanup and restoration usually pale in relation to the monetary incentives leading to the exploitation and damage of resources and associated environments.

P-279-10

See general-themed response to comments related to Future Exploration and Mining Actions.
Comment from: Kathleen Hurley

Kathleen Hurley

While the EA clearly defines the Purpose for the proposed action, it is deficient in explaining the Need for the proposed action in a site that has potential to cause significant impacts to other receptors, human and ecological. Without a clear definition of the “need”, the basis for proceeding with an EA is weak.

The number of drill pads proposed is 23 with 2 borings at each site. Given the preponderance of other drill pads in the adjacent areas, what is the justification for this number of drill pads? Can these be reduced and reviewed as a potential alternative to the proposed action?

The volume of water required for drilling of each borehole is not adequately characterized thus presenting challenges in determining the potential impact on hydrological resources in the region. These hydrological resources are critical for the ecological function of these systems as well as for provision of ecosystem services for the surrounding communities.

Response To: Kathleen Hurley

See response to Comment O-10-21.

See response to Comment O-10-23.

The water that would be needed for drilling is discussed in Section 3.7.3.2. Although it is not possible to report the total volume needed for each individual hole, an estimate is provided for the maximum flow needed for drilling while using a cyclone recovery system (<50 gpm). This is significantly less than the volume which is permitted for withdrawal from the East Fork of Emigrant Creek, through the water right (2.5 cfs or 1,122 gpm). See general-themed response to comments related to Water Quality.
DEQ is aware the proposed mineral exploration project is opposed by local stakeholders. DEQ, however, is required to process Lucky Minerals application for an exploration license and to either issue or not issue the exploration license as provided in Section 82-4-332, MCA.

See general-themed response to comments related to Future Exploration and Mining Actions and Regulatory Authority.

Thank you for your comment. Where applicable, "would" has been replaced by "would be required to" in the Final EA.

DEQ does not have the resources to conduct frequent on-site inspections as requested by the commenter. DEQ has two full-time employees to conduct inspections at all mining activities being conducted under Small Miner Exclusion Statements and exploration activity being conducted under exploration licenses. DEQ intends on inspecting Lucky Minerals exploration activity once during each three-month long drilling season.

See response to Comment A-3-13. Montana does not have a law which requires reporting for a spill of any size, but a policy was developed by DEQ to address spill reporting and to ensure environmental protection by assisting in the implementation of the Comprehensive Environmental Cleanup and Responsibility Act (75-10-701, et seq., MCA); Hazardous Waste Act (75-10-401, et seq., MCA); Solid Waste Management Act (75-10-201, et seq., MCA); Underground Storage Tank Act (75-11-501, et seq., MCA); and the Water Quality Act.
(75-5-101, et seq., MCA. As clarified in the policy, spills greater than 25 gallons of any petroleum product must be reported. However, the threshold of ten barrels (420 gallons) that is cited in Lucky Mineral's plan for other substances is not consistent with the policy. This has been clarified in the Final EA.

P-282-6
See Section 3.4.4 for the impacts from night lighting. Also, see Section 2.5.2.

P-282-7
See Section 3.8.3.2 for noise impacts from the proposed action.

P-282-8
Thank you for your comment.

Comment from: Neva La Fawn Kleinsasser

P-284

Neva La Fawn Kleinsasser

Gold Exploration at Eminent Gulch is too risky for the environment. More impact studies need to be done in regards to water quality and economic impact to existing recreational and tourist businesses and attractions and landowners.

Response To: Neva La Fawn Kleinsasser

P-284-1
DEQ has revised the EA to include a detailed discussion of the socioeconomic impacts resulting from Lucky Minerals proposed mineral exploration in Section 3.13 of the EA. Also see Section 3.7 for the analysis of water quality.
December 12, 2016

Tom Livers, Director
Montana Department of Environmental Quality
1520 E. 6th Avenue
P.O. Box 200901
Helena, MT 59620

Re: Proposed Exploration Activities of Lucky Minerals Inc. within the Emigrant Mining District

On behalf of the National Parks Conservation Association (NPCCA), I appreciate the opportunity to submit comments specific to the Draft Environmental Assessment of Lucky Minerals (Montana), Inc. Lucky Minerals Project, Park County, MT, Exploration License Application #0079 (EA) for the proposed exploration activities of Lucky Minerals Inc. (Lucky Minerals) in the St. Julian mine claim block (St. Julian Claim Block) in the Emigrant Mining District.

Since 1919, NPCA has been the leading voice of the American people in protecting and enhancing our National Park System, working together with our over 1 million members and supporters, including more than six thousand in Montana, to preserve our nation’s natural, historical, and cultural heritage for present and future generations. NPCA has a long history of advocating for the protection of national parks and park resources, both inside national parks and on adjacent lands. We are particularly interested in the proposed project and its potential impacts on Yellowstone National Park (YELL) and park resources.

Lucky Minerals Project
The Montana Department of Environmental Quality (MDEQ) is evaluating the potential environmental impacts of an exploration license application from Lucky Minerals within nine patented mining claims on the privately-owned St. Julian Claim Block, approximately twelve miles southeast of Emigrant, MT and thirty miles north of YELL. In order to assess the presence of base and precious metals (gold, copper, silver, and molybdenum mineral deposits), the exploration license application includes exploratory drilling of an estimated forty-six drill holes between 1,000 and 2,000 ft. The exploration project and related activities would continue for...
Thank you for your comment. DEQ will apply the criteria set forth in ARM 17.4.608 to determine the need to prepare an EIS.

The proposed Riverside Gravel Pit, Adkins Tire Landfill and Creviced Exploration Project would be located approximately 11.5, 14 and 20 air miles from Lucky's proposed mineral exploration project at the St. Julian Claim Block, respectively. Based on the intervening distance, Lucky's proposed mineral exploration at the St. Julian Claim Block is not expected to result in any cumulative impacts when considered in conjunction with the other three projects located in Park County and currently under DEQ's review. Moreover, while the Riverside Gravel Pit and Adkiss Tire Landfill would have a long-term presence in Park County, Lucky Mineral's exploration activity at the St. Julian Claim Block would be short-term, lasting for two 3 month drilling seasons. Indeed, it is not known at this time whether any of Lucky Mineral's exploration activity would be conducted at the same time as the operation of the gravel pit, tire landfill or Creviced's mineral exploration activity as that depends on the timing of DEQ's action on the proposed projects.

The cumulative impacts area for land use, noise, and recreational resources includes the Emigrant Mining District, specifically in the immediate area of the St. Julian Claim Block and the roads that are proposed for access to the exploration area (Emigrant Creek Road and Road 3272). The proposed Riverside Gravel Pit, Adkins Tire Landfill and Creviced Exploration Project would be located approximately 11.5, 14 and 20 air miles from Lucky's proposed
Situated within the Yellowstone River watershed, each project's activities will have some impact on the Yellowstone River. MDQP must consider the potential for water contamination from each project and how the individual contributions of each may collectively impact the water quality and ecological health of the Yellowstone River. Public concern for the river has increased in recent months, particularly after a large mountain wildfire die-off that forced Montana Fish, Wildlife, and Parks (FWP) to close the river to all water-based recreation on August 19th, 2016. This action had significant economic consequences for the outdoor recreation and fishing industry in the Paradise Valley. Given the sensitivity and importance of the river, MDQP should more closely and thoroughly investigate the potential cumulative water pollution impacts of all four projects to fully ensure that appropriate mitigation and prevention measures are in place to safeguard the Yellowstone River and its tributaries.

Within the draft EA, MDQP did not consider the potential future impacts of the potential development of a large mine at either the St. Julian Claim Block or the Crevice Exploration site. Currently, both projects are in the exploratory phase, but it is reasonable to assume that should either discover large mineral deposits, Crevice and/or Lucky Minerals will pursue the development of large-scale mines. This intent has been indicated by both companies through public statements and investor materials. According to Lucky Minerals, the proposed project is only the first phase of “an aggressive exploration project.” Later stages of this project include plans to construct new roads and drill at additional locations on both private and public lands. The development of a large mine at either location would have much larger impacts on wildlife habitat availability and security, water use and contamination, traffic levels, and scenic and recreational disturbance. MDQP should consider the impact of a fully developed mine at both the St. Julian Claim Block and Crevice Exploration site when examining the cumulative impacts of the proposed projects in the Paradise Valley.

**National Park Service as a Cooperating Agency**

The proposed project is within close proximity to YELL and will affect habitat that is used by species that move between YELL and the St. Julian Claim Block, including grizzly bears and lynx which are both listed as threatened species under the Endangered Species Act (ESA). The proposed project also has the potential to affect air quality, water quality, and scenic and recreational values in areas adjacent to and within close proximity to YELL. The National Park Service submitted comments on Lucky Minerals’, previously proposed Emmitt Project Plan of Operations on March 26th, 2015, citing several concerns about the project’s potential impact on park resources including adverse impacts on the recreational experience of park visitors, the potential for drilling to negatively impact geothermal resources in the park (particularly mineral exploration project at the St. Julian Claim Block, respectively. Based on the intervening distance, Lucky’s proposed mineral exploration at the St. Julian Claim Block is not expected to result in any cumulative impacts when considered in conjunction with the other three projects located in Park County and currently under DEQ’s review. Moreover, while the Riverside Gravel Pit and Adkins Tire Landfill would have a long-term presence in Park County, Lucky Mineral’s exploration activity at the St. Julian Claim Block would be short-term, lasting for two 3 month drilling seasons. Indeed, it is not known at this time whether any of Lucky Mineral’s exploration activity would be conducted at the same time as the operation of the gravel pit, tire landfill, or Crevice’s mineral exploration activity as that depends on the timing of DEQ’s action on the proposed projects.

O-2-4

See general-themed response to comments related to Water Quality and Cumulative Impacts.

O-2-5

MEPA requires state agencies to consider “cumulative impacts” when taking state action on proposed projects. See general-themed response to comments related to Future Exploration and Mining Actions.

O-2-6

Yellowstone National Park is 15 miles away and is not expected to be directly impacted by Lucky Minerals’ limited exploration plan. The NPS participated in scoping and were included the stakeholders mailing list. Those on the list received monthly updates throughout the MEPA process. DEQ did not receive any comments on the Draft EA from the NPS.
The level of analysis conducted for the Lucky Minerals EA is consistent with standard practices under MEPA and the MMRA for exploration of minerals. The Proposed Action is limited spatially and temporally. It is typical for analyses to include resource agency consultation and a literature search. The Agency-Modified Alternative provides for pre-construction wildlife surveys and mitigation measures should sensitive resources be found.

DEQ used the best available data, including the MNHP database, to conduct the wildlife analysis. MNHP data is based on observations of wildlife reported over time. In addition to the field observations collected in the MNHP, DEQ used established habitat mapping from the Montana Department of Fish, Wildlife and Parks (FWP) to verify and establish habitat for wildlife. Plus, DEQ has consulted with FWP and the local Forest Service office on wildlife habitat in the vicinity of the proposed project to supplement the MNHP database. DEQ has completed several field reviews of the project as well. DEQ's analysis of wildlife in the EA does not solely rely upon the MNHP database but this tool was an additional item used in the analysis.

DEQ believes a 4-mile radius is an adequate analysis area. The Agency-Modified Alternative provides for avoidance and mitigation measures for wildlife using the St. Julian Claim Block while exploration is planned. For wildlife species with large home ranges (e.g. lynx, wolverine, grizzly bear) who may occasionally occupy the area, the ample habitat surrounding the Claim Block allows individuals to avoid the Block. As acknowledged in the EA, some individuals may be subject to disturbance and short term loss of habitat. The environmental consequences described in the EA would not likely change were the analysis area larger.
The analysis only included a radius around the St. Julian Claim. There was no mention of any radius for the road corridor along Emigrant Creek. Increased traffic levels and road improvements are likely to displace wildlife and discourage movement. Typically, there is a 500-meter zone of influence around roads, and carnivores are particularly sensitive to displacement from increased traffic levels within this zone.\(^5\) NPCA recommends that MDEQ expands its area of analysis to include at least 500 meters on either side of the roads that Lucky Minerals plans to improve.

### Long-Term Impacts on Wildlife

Given the level of road improvements proposed by Lucky Minerals, NPCA is concerned about the potential for wildlife in the area to be impacted beyond the lifespan of the two-year exploration project. According to the EA, “The road improvements described in the Proposed Action have the potential to increase recreation access in the area which may contribute to future stress on wildlife.” Currently, Emigrant Creek Road and Forest Service Road 3272/3272B are classified as maintenance level 2, which indicates that the road is only suitable for high clearance vehicles, not passenger cars.\(^6\) Forest Service roads with a maintenance level of 1 or 2 are often closed to the public. Closed roads typically have a lower impact on sensitive wildlife species, such as grizzly bears, lynx, and wolves. Improvements to these roads are likely to convert these roads from closed to open roads, leading to an increase in passenger vehicle traffic. Open roads significantly decrease habitat security for many wildlife species, primarily because of increased traffic and more frequent human presence in the area. Forest Service Road 3272/3272B is currently impassable, due to large boulders on the road bed and several potholes on one-lane, dirt road. The proposed road improvements will likely increase access for hikers, hunters, ATVs, snowmobiles, and motorcycles, all of which will displace sensitive wildlife species to various degrees.

While the EA acknowledges the potential for increased human access and recreation in the area, it concludes that the potential long-term impacts to wildlife would be minimal and that wildlife populations will return to normal after the project. Increased human presence in the area, though, has the potential to continuously displace sensitive wildlife, particularly grizzly bears, lynx, wolves, elk, and both bald and golden eagles. It is also likely that human-wildlife conflicts will increase as a result of increased human presence, which would disproportionately impact grizzly bears. Human-caused mortality, including hunter self-defense, poaching, and agency removal of bears involved in conflicts, is the principal cause of grizzly bear mortality in the Greater Yellowstone Ecosystem.\(^7\) The conclusion that wildlife populations will return to normal  base 10

The wildlife analysis in the EA (Section 3.4) includes a discussion of potential impacts to wildlife from the access road corridor. Specifically including a 500-meter zone of influence would not change the analysis in the EA.

### O-2-11

As stated in the EA, the FS specifies a seasonal road closure for Emigrant Creek Road beginning at mile 4.25 to mile 7.46. This closure is in effect from December 1 to June 15. The entire length of the East Fork of Emigrant Creek Road (accessed by CGNF Road 3272B) is included in this seasonal closure. Emigrant Creek Road would continue to provide access for recreationists in accordance with the Gallatin National Forest Travel Plan. The Proposed Action does not change FS road closure. The potential effects on wildlife from improved accessibility are discussed in Section 3.4 of the EA.

### O-2-12

See response to Comment O-2-11.

### O-2-13

After the two 3-month exploration seasons, road maintenance by Lucky Minerals would not continue. FS road closures would not be affected by the Proposed Action. Whether or not human presence will increase in the long term as a result of the Proposed Action is speculative. The potential effects of increased human use in the area is addressed in the EA.
is unsubstantiated and contradictory to earlier statements in the EA. After improvements to these rural roads are made, they will likely continue to provide easy access to the area well beyond the two years of Lucky Minerals’ exploration plans.

The EA also states that “Localized improvement to existing roads may facilitate higher travel speeds than allowed by the maintained current conditions; however, the potential for collisions with wildlife would be minimal.” This conclusion is also unsubstantiated. The only mitigation strategy to reduce wildlife-vehicle collisions is to impose a speed limit of 25 MPH, but posted speed reductions have not been effective at reducing wildlife-vehicle collisions. Given the St. Julian Claim Block’s proximity to the Absaroka-Beartooth Wilderness, Inventory Roadless Areas, and YELL, the site and the roads leading to it are likely utilized by various species. With road improvements, these roads are likely to receive more traffic at higher speeds than what wildlife are currently accustomed to, which could negatively impact these species.

Insufficient Mitigation Plan for Several Wildlife Species
The presence of multiple federally protected and Forest Service sensitive species requires Lucky Minerals to appropriately mitigate any potential negative impacts its exploration will have on wildlife. Protecting wildlife habitat in this area is of increasing importance due to climate change. Unfortunately, the EA does not have adequate mitigation plans for several species, including grizzly bears, lynx, wolverines, elk, eagles, bats, and Western toads.

The proposed project lies within occupied grizzly bear habitat and is adjacent to the Primary Conservation Area for grizzly bears in the Greater Yellowstone Ecosystem population. NPCC is concerned that the proposed project could pose a risk of grizzly bear displacement, habitat loss, and mortality. The EA discusses the potential habituation of grizzly bears due to increased human activity and continual presence of Lucky Minerals employees in the area. Humans often bring attractants with them, such as food, trash, and other items that attract grizzly bears to the area. While MDEQ has recommended the use of a food storage order, bear-proof containers for trash and other attractants, and a no-pens policy, the potential for habituation is still high. Continuous human presence in occupied grizzly bear habitat may still habituate grizzlies as they become more accustomed to humans in the area. Habituation may be even more likely if trash, food, or other attractants are accidentally left out or disposed of incorrectly. Bears that are habituated to human presence often come into conflict with humans, and many are killed as a result of these conflicts. NPCC recommends that the MDEQ and Lucky Minerals formally consult with the U.S. Fish and Wildlife Service (FWS) concerning the proposed project’s potential impact on grizzly bears. Given the nature, location, and scope of the proposed project, NPCC believes that formal consultation with the FWS will be required to assess impacts to threatened grizzly bears.

DEQ and Lucky Minerals are not required to formally consult under the Endangered Species Act, Section 7. Only Federal agencies are required to consult with USFWS under the ESA for federal actions. This proposed project is not currently undergoing any federal actions that would require this consultation.

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The Proposed Action is for two 3-month exploration seasons. Therefore impacts such as displacement of wildlife would be temporary.

Thank you for your comment.

DEQ took into account the current level of human activity already occurring within the area of proposed project in Emigrant Creek and the limited duration of the proposed exploration project to conclude there would be no long-term displacement of lynx. Lucky Mineral's employees will not "continuously occupy the area" but will be onsite for two three-month drill seasons. In regard to increased access, see response to Comment A-3-5.

Under the Agency Modified Alternative, Lucky Minerals would be required to seed after any road maintenance disturbance to limit invasion by noxious weeds. Lucky Minerals would also be required to seed other disturbances caused by the drilling project, including berms around the water withdrawal pump site, drill sites, and laydown areas to limit invasion by noxious weeds.

The FWS consultation is noted, but is not required as this current proposal does not involve Federal actions. Also see response to Comment O-2-17.

See response to Comment O-2-18 regarding permanent disturbance.

The only outfitters authorized by the Custer Gallatin National Forest in the area are in the Six Mile drainage to the south of the St. Julian Claim Block and front country horse rides near Chico Resort. There are no outfitters currently authorized to conduct activities in the Emigrant drainage. (Grosvenor, 2017b)
The Agency-Modified Alternative in the Final EA has been modified to include language about consultation with FWP and consistency with FWS buffers for any eagle nests found on the St. Julian Claim Block during pre-construction surveys. The language now reads:

"Lucky Minerals would be required to conduct pre-exploration surveys prior to each field season to identify potential areas of western toad habitat, bat habitat, and nesting birds in areas of new disturbance on drill pads and laydown area. If any of these habitats are found near the drilling areas Lucky Minerals will consult Montana Fish, Wildlife, and Parks (FWP) to determine avoidance or mitigation measures.

To avoid disturbing nesting eagles, other raptors, owls, or songbirds, Lucky Minerals would maintain natural forested (or vegetative) buffers around nest trees. The buffer areas would be consistent with USFWS guidelines and would serve to minimize visual and auditory impacts associated with human activities near nest sites.

If a raptor nest is built or discovered within the St. Julian Claim Block, Lucky Minerals would consult with FWP to determine avoidance or mitigation measures. Any spatial buffers required through consultation with local FWP biologists would be in accordance with the Montana Bald Eagle Guidelines (2010)."

See response to Comment O-2-24

O-2-25

See response to Comment O-2-24

O-2-26

See response to Comment O-2-24

O-2-27

The EA must first confirm the presence or absence of eagle nests in the area. Second, it must define the size of these buffers and provide evidence that they are likely to minimize both visual and auditory disturbances to levels that would not lead to nest abandonment. NPCA recommends that MDEQ and Lucky Minerals formally consult with FWS to develop appropriate buffers for this project.

With regards to bats, the EA only recommends mitigating the impacts of lights, but it does not have any plans for noise. There are three species of bats that are Forest Service sensitive species that are likely to be in the area: long-eared myotis, long-legged myotis, and Townsend's big-eared bat. Foraging bats tend to avoid areas with substantial noise, primarily because anthropogenic noise disrupts their ability to find and capture prey. Given the level of noise anticipated with exploration, which will continue during the night, it is likely that sensitive bat species will avoid the area.

Finally, the EA has no mitigation measures planned for Western toads. According to FWP, the use of chemicals should be avoided within a 100-meter buffer of Western toad breeding sites. The EA does not include this recommendation in its mitigation efforts, which is concerning given that Lucky Minerals will be using chemicals to control invasive species. Other chemicals will be present at the site, such as spent drilling fluids and contaminated water used in exploratory drill holes. Additionally, no field work has been conducted to assess the presence or absence of Western toad breeding sites in the area.

NPCA recommends that MDEQ require Lucky Minerals to develop more robust and appropriate mitigation plans for the above species. Additionally, MDEQ and Lucky Minerals should consult with FWP to develop appropriate buffers for this project.

11 See Schaub et al., 2009.

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Language was added in the Final EA to acknowledge potential for bats to avoid the area during exploration activities due to noise.

Language has been added to the Final EA to include consultation with FWP should western toad habitat be found during pre-construction surveys.

Comment noted. Also see response to Comment O-2-17.

The Agency-Modified Alternative includes surveys and measures to avoid and minimize impacts to the bird and amphibian species. See Section 2.4.6.2. Some of the species the Commenter has identified do not likely inhabit the project area, such as trumpeter swan and northern leopard frog. If bighorn sheep are in the project area, the impact will be short-term as the Proposed Action would only occur for a three-month period each year. There is sufficient habitat for peregrine falcon, black-backed woodpecker, harlequin duck, and bighorn sheep in the surrounding area.

See response to Comment A-3-13 and O-10-53.

See response to Comment P-39-10.

See responses to comments P-39-10, P-282-5, and O-10-55.

Lucky Minerals does not propose to widen the access roads. Table 1.2 provides a listing of County, State and Federal Agencies and their
because Emigrant Creek flows into the Yellowstone River, MDEQ must consider how impacts to the creek from this road work may affect the Yellowstone River.

Despite all of these potentially significant water quality impacts, the EA does not specify what monitoring will be required at the project site to ensure that exploration does not degrade local water quality. To enable meaningful analysis of whether short-term and long-term water quality impacts may be detected and effectively remedied, MDEQ should describe monitoring requirements in detail.

**Impacts to the Absaroka-Beartooth Wilderness**

The EA does not discuss any potential impacts this project will have on wilderness. This project is only three miles from the Absaroka-Beartooth Wilderness, an area that is valued for its wildlife habitat, quiet recreation opportunities, and remoteness from development. Given the level of noise and light pollution that will be associated with this exploration, it is likely that this exploration project will degrade wilderness characteristics in portions of the Absaroka-Beartooth Wilderness. Without any field visits to the area, MDEQ cannot conclude that noise and lights from this project will not impact the Wilderness. MDEQ should ensure that disturbances from motorized vehicles, lights, and heavy machinery do not impact the pristine character of the Absaroka-Beartooth Wilderness.

**Conclusion**

This region is visited on an annual basis by millions of national and international visitors who come for the abundant wildlife, world class fishing, scenic vistas, and to relax at Chico Hot Springs after a day hiking in the park. Located just north of YELL, this area plays a vital role in the health of the wildlife and waters of our nation’s first national park. The proposed exploration license application threatens to impact multiple watersheds, iconic wildlife, and other world renowned resources on the northern edge of YELL. MDEQ should fully assess Lucky Minerals’ exploration project with a full EIS analysis.

We hope that you will consider the information that we have provided and analyze the concerns we raised in an EIS. We appreciate the opportunity to provide input during this comment period.

Best Regards,

Stephanie Adams

Yellowstone Program Manager,
Yellowstone Field Office
Bozeman, MT

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respective permit / authorizing responsibilities. In Section 2.3.1 Lucky Minerals commits to obtaining any permits required by County, State or Federal Agencies. These commitments could include Park County road maintenance agreement and FS road access permit. DEQ exploration license does not authorize placement of road fill into streams or authorize bank alteration to Emigrant Creek.

O-2-36
See response to Comment P-39-6.

O-2-37
The Final EA has been updated to include a discussion of potential impacts to the Absaroka-Beartooth Wilderness in Sections 3.8 and 3.12.
CC:
Steve Bullock, Governor of Montana
Tim Baker, Office of Montana Governor Steve Bullock
Mary Erickson, Forest Supervisor, Custer Gallatin National Forest
Jeff Hagney, Director, Montana Fish Wildlife & Parks
Sam Sheppard, Regional Supervisor, FWP Region 3
Dan Wnek, Superintendent, Yellowstone National Park

Citations


Yellowstone Field Office
321 East Main Street, Suite 314 | Bozeman, Montana | P: 406.224.8861 | npca.org
We are writing the Department of Environmental Quality to give public comment on a Draft Environmental Assessment (Draft EA) analyzing potential environmental impacts from mineral exploration activity proposed by Lucky Minerals. The proposed mineral exploration project would be located on private patented mining claims known as the St. Julian Claim Block in the Absaroka Mountains approximately 12 miles southeast of Emigrant.

The International Federation of Fly Fishers (IFFF) was established in 1965 to be an organized voice of fly fishers. We are a non-profit membership-based organization with approximately 13,000 members worldwide with headquarters in Livingston, Montana. Our mission is to conserve, restore and educate through fly fishing. We complete our mission through various activities, including monitoring actions that will adversely impact our fisheries and their habitats in all parts of the world.

The Department of Environmental Quality (DEQ) should adopt the 4th option as presented in Section 1.5 of the Draft EA – determining the need for further environmental analysis, with an Environmental Impact Statement (EIS), so that any and all potentially significant environmental impacts are disclosed to the public and properly analyzed.

The proposed action is supposed to be on private lands, yet Lucky’s map shows one claim and at least three proposed drill sites that appear to be on public lands. Lucky needs to complete a survey and produce an accurate GIS map. This lack of attention to detail on something as fundamental as the primary map is unacceptable.

The proposed action shows a lack of clarity around Lucky’s water rights up Emigrant Gulch. Lucky needs to disclose and provide a record of the exact water rights transferred to them by recording those documents at the Park County Clerk and Recorder.

Despite overwhelming opposition from the community and hundreds of businesses, the Canadian mining company Lucky Minerals has not given up its plans to dig for gold up Emigrant

Thank you for your comment.

Thank you for your comment.
Gulch, just north of Yellowstone and above Chico Hot Springs.

Lucky Minerals has made it clear that they plan to create a large-scale, potentially open pit gold mine. Yet the Draft EA that DEQ recently released only examines direct and indirect effects associated with proposed exploration and does not evaluate potential cumulative effects mining that is fully planned by Lucky Minerals on Emigrant Peak.

Without evaluating Lucky Minerals' full mining plan, we, nor the State, can effectively evaluate the direct, indirect and cumulative potential adverse effects of the full plan of operation. The proposed gold mine would likely result in permanent scars and threaten wildlife, plants and water resources of this world-famous landscape not only in the short term, but for generations to come.

The Draft EA states that past exploration in this area didn't affect local socioeconomics; therefore, there's no need to analyze impacts of the current proposal. This is not a supportable statement. The last drilling occurred in this area between 1991-1993—more than 20 years ago. The local socioeconomics have changed dramatically since 1993. For example, today the Old Chico area hosts nine vacation rental businesses and six private residences that did not exist in the 1990s. DEQ needs to consider impacts to current socioeconomics, as required by Montana law, and this needs to be done through preparation of an EIS.

Montana's Draft EA recognizes that Lucky Minerals' proposal could potentially have dangerous impacts on the pristine waters and intact wildlife that are vital to our local businesses and economy.

However, the State ultimately concluded that there would be no significant impacts from Lucky Minerals' operation. This is based on assumptions about the wildlife that do and don't live there, the value of cultural and historic artifacts in the area, and the potential impacts a spill may have on surrounding creeks that feed into the Yellowstone.

The Draft EA notes that the area has been mined in the past, using that fact as a rationalization to allow more mining in the area with no assessment of potential for cumulative impacts. Emigrant Gulch does have a history of mining, and the impact of those mines are still seen and felt in the area today, but the land is healing. To open up the gulch to more mining will set this restoration back, and the mine that is Lucky's ultimate goal has the potential to have a much larger adverse impact than any previous operations.

The Draft says bonding is required, but doesn't discuss specifics of how much money the state requires. A DEQ bond calculation in 2015 estimated that reclamation for each bore hole would cost more than $8,000 apiece, and that total reclamation would cost an additional $3,340. But Lucky Minerals' VP Shain Dykes told the press in late 2016, "The holes will be filled with cement at a cost of about $2,000 each." (Vancouver company at centre of gold mining controversy on edge of Yellowstone National Park, DeSmog Canada, Nov. 22, 2016) This discrepancy is disturbing. DEQ must provide updated reclamation estimates for 2017, and disclose how much bond DEQ is requiring, and how long Montana will hold the bond.

We conclude our comments by respectfully requesting that the DEQ prepare an EIS for the full mining operation that Lucky Minerals proposes. It is the opinion of the IFFP that it is only through preparation of an EIS that the direct, indirect and cumulative potential adverse environmental, social

O-3-6

See general-themed response to comments related to Future Exploration and Mining Actions.

O-3-7

DEQ has revised the EA to include a detailed discussion of the socioeconomic impacts in Section 3.13 of the EA. Also see general-themed response to comments related to Socioeconomics.

O-3-8

Impacts from the three alternatives are described in the Direct and Secondary Impacts subsection by resource. No "dangerous" impacts have been identified as a result of any of these alternatives.

O-3-9

Thank you for your comment.

O-3-10

DEQ is not using the fact that mining has previously occurred in the area as justification to allow Future Exploration and Mining with no assessment of cumulative impacts. DEQ takes into account the historic mining and exploration activities that have occurred in the area in describing the existing environment. By so doing, DEQ is taking into account the cumulative impact of Lucky's proposed mineral exploration with past actions.

O-3-11

See general-themed response to comments related to Bonding.

O-3-12

See general-themed response to comments related to Future Exploration and Mining Action.
and economic impacts to the area can be properly assessed as a result of the planning mining operation.
Thank you very much for this opportunity to provide these public comments.

Sincerely,

[Signature]
President/CEO

cc: U.S. Fish and Wildlife Service
    Montana Fish, Wildlife & Parks
    Park County Environmental Council
    Greater Yellowstone Coalition
    National Park Conservation Association
    American Fly Fishing Trade Association
    Theodore Roosevelt Conservation Partnership
Comment from: Winter Wildlands Alliance

Thank you for your comment.

This comment is focused on the impacts from mining. If an application to construct and operate a mine under an operating permit were applied for DEQ would analyze and disclose those impacts in an environmental review document. Lucky Minerals has not submitted an application for an operating permit to authorize construction and operation of a mine. The proposed action is only for an exploration license. The Environmental Assessment discloses the impacts of activities associated with exploration. DEQ will not be taking any state action relative to a mine or analyzing the impacts of a mine. Please see Sections 3.8 and 3.10 of the EA that describes the potential impacts to recreation and transportation from the exploration project.

Please see the Transportation analysis in Section 3.10. The use of helicopter supported exploration drilling is not proposed for this project. The proposed drilling is approximately two miles from these climbing locations identified in the comment. This type of recreation would have the same type of impact to other recreationist in the vicinity of the proposed project that have been disclosed in Sections 3.8 and 4.1.6 of the EA.

See general-themed response to comments related to Further Environmental Analysis/EIS and Proposed Action/Public Lands.

See general-themed response to comments related to Water Rights.

See general-themed response to comments related to Future Exploration and Mining Actions.

DEQ has revised the EA to include a detailed discussion of the socioeconomic impacts in Section 3.13 of the EA. Also see general-themed response to comments related to Socioeconomics.
Montana’s assessment recognizes that Lucky Minerals’ proposal could potentially have dangerous impacts on the water and wildlife that our states’ recreation economy is based upon. However, the State ultimately concluded that there would be no significant impacts from Lucky Minerals’ operation. This is based on assumptions about the wildlife that do and don’t live there, the value of cultural and historic artifacts in the area, and the potential impacts a spill may have on surrounding creeks that feed into the Yellowstone.

The EA often notes that the area has been mined in the past, using it as an excuse to allow more mining in the area. Emigrant Gulch does have a history of mining, and the impact of those mines are still seen and felt in the area today, but the area is recovering. To open up the gulch to more mining will set this restoration back, and the mine that is Lucky’s ultimate goal has the potential to make a much larger impact than any previous operations.

Bonding
The Draft says bonding is required, but doesn’t discuss specifics of how much money the state requires. We have seen the A DEQ bond calculation in 2015 estimated that reclamation for each bore hole would cost more than $6,000 apiece, and that pad reclamation would cost an additional $3,380. But Lucky Minerals VP Shawn Dykes told the press in late 2016, “The holes will be filled with cement at a cost of about $2,000 each...” (“Vancouver company at the center of gold mining controversy on edge of Yellowstone National Park,” DeSmog Canada, Nov. 22, 2016.) This discrepancy is disturbing, DEQ must provide updated reclamation estimates for 2017, and disclose how much bond DEQ is requiring, and how long Montana will hold the bond.

Bonding issues have plagued recovery and reclamation efforts at hardrock mining sites across Montana.

Thank you for considering these comments.

Sincerely,

Hillary Bison
Recreation Planning and Policy Manager
Thank you for your comment.

Thank you for your comment.

In the event DEQ issues an exploration license, DEQ will calculate the estimated costs to the state in performing the reclamation using equipment and labor costs current at the time the bond is calculated. DEQ will hold the bond until it determines Lucky Minerals has implemented the required reclamation. DEQ cannot give a definite
In Section 7, Need for Further Analysis and Significance of Potential Impacts: “DEQ had determined that the environmental impacts resulting from Lucky Minerals’ proposed exploration project will not be significant. DEQ identifies the Agency Modified Alternative as the Preferred Alternative.”

O-5-3
(cont.)

Vor, Section 1.5 (page 9) states: “The options that the DEQ has for decision-making as to whether or not the proposed operation is justifiable under the Environmental Quality Act or the Water Quality Act or the Clean Air Act include (1) deciding whether the proposed operation would violate a law, (2) approving the application as submitted, (3) approving the application with agency mitigations, or (4) determining the need for further environmental analysis to disclose and analyze potentially significant environmental impacts.”

O-5-4
See response to comments related to Proposed Action and Public Lands.

O-5-5
See response to comment O-10-18. Also see general-themed response to comments related to Proposed Action and Public Lands.

The period of time the bond will be held because the length of time it will take to perform the reclamation and establish the required vegetation is not known.

O-5-5
See response to comments related to Proposed Action and Public Lands.

1 Refer to attached photograph of DEQ “Lucky File” (page 8) taken December 19, 2015 in the DEQ Hard Rock room.
Proposed Drill Pad #15 (at approximately 45.25345 N, -110.64790 W, elevation 8,492 feet), is at least 70 feet from the property boundary and on federal public land of the St. Julian Fraction lode claim. Considering the lack of any public record showing conveyance of the St. Julian Fraction into private ownership, Lucky Minerals must supply the documents proving a right to surface occupancy on this land.

One or two additional proposed drill sites (Pads #14 and Pad #18) are close enough to the property boundary to raise concern and thus require an adequate survey and mitigation measures in place to eliminate any impacts to public lands.

The DEQ has acknowledged that the actual drill pad locations are “somewhat fluid as they are basically going to be in wide swaths and switch backs in the roads.” Similarly, Section 2.6.4 (Page 19) declares, “The locations of the proposed drill sites are conceptual and may change as new information is acquired. Additional holes may be required on a specific area or direction.”

Due to the proximity and potential impact to public lands, this ambiguity is unacceptable and should be remedied. Lucky Minerals must produce a complete survey of all boundaries in question, along with exact locations for any proposed drill pad that may impact public lands surface or subsurface minerals. Clear surveys on the ground showing public land and exact location of the proposed drill pads must be in place before any exploration license can be granted.

Proposed Drill Pad #20 (45.25292 N, -110.65109 W, 8,628 feet) is claimed to be on the Barcy patented lode claim. This is on public land to the west with approximately 450 feet of access road also on public land. Refer to Figure 1.

Proposed Drill Pad #22 (45.26125 N, -110.80067 W, 8,071 feet) is claimed to be on the St. Julian patented lode claim. This is on public land to the west with approximately 100 feet of access road also on public land. Refer to Figure 1.

Proposed Drill Pad #23 is close enough to the property boundary to raise concern and need an adequate survey and mitigation measures in place to eliminate any impacts to public lands. Additional setbacks on the St. Julian road network clearly enter public lands approximately 1,178 feet total.

Recommendations:

Due to the proximity and direct intersection with federal public lands and uncertainty over legitimate surface occupancy of some claims, Lucky Minerals should provide proof of any land use agreements by recording them with the Park County Clerk & Recorder office.

There are at least three proposed drill pads are on public land, two or three proposed drill pads on the very border of public lands, and numerous access roads on public land. A federal monumented survey and accurate GIS map must be completed. An updated Plan of Operations must be submitted to Custer Gallatin National Forest and permitted before any exploration license can be granted for the current Plan of Operations.
The map on Page 7 of the DEQ Draft EIA is fundamentally flawed. The original for this map was produced by Geologic Systems Ltd and was included as Plate 4 of the original Plan of Operations submitted on April 7, 2016. This original map did not indicate the separate lode and mill claim boundaries, nor did it properly indicate the St. Julian Fraction. Although the shape of the road parcels appears to be quite accurate, their location relative to the property boundaries is simply not correct.

At numerous times throughout the review process, the DEQ has made notes questioning the surface ownership of the St. Julian Fraction.

In addition, maps presented by Peter Werner and Alex Scienskidz, of the Custer Gallatin National Forest, during a field trip to Emigrant on October 23, 2015 clearly indicate the known boundaries of the St. Julian claim block and the location of proposed drill pads, including #15, #20 and #22 clearly shown on federal public land (Figure 2).

See response to comments related to Proposed Action and Public Lands.
Access to the St. Julian claim is via FS Road 3272 to the East Fork of Emigrant Creek where the route is designated 3272B. FS Road 3272B travels up the East Fork of Emigrant Creek on the north side of the creek to a point just north of the Copper King Lode (MS 9015) where the access crosses East Fork Emigrant Creek to the south side of East Fork Emigrant Creek. Access to St. Julian claim block is via this route.

Table 1.2 provides a listing of County, State and Federal Agencies and their respective permit / authorizing responsibilities. In Section 2.3.1
Lucky Minerals commits to obtaining any permits required by County, State or Federal Agencies.

Emigrant Creek Trail 65 extends up the main fork of Emigrant Creek. Lucky Minerals does not propose to access areas up the main fork of Emigrant Creek beyond the confluence with East Fork Emigrant Creek.

USFS has indicated that ATV trail has not been constructed due to litigation from private property owners.

Sections 3.8 (Land Use, Noise and Recreation) and 3.12 (Visuals) have been revised to discuss the impacts of the proposed exploration project on inventoried Roadless areas and the Absaroka Beartooth Wilderness Area.
Several early drafts of this Draft Environmental Analysis indicated there were up to 21 issues raised that would be addressed. While we recognize that combining some issues is to be expected and encouraged for efficiency and clarity, we are concerned that some issues may have not been given adequate consideration or dismissed altogether and the failure to examine them would violate MEPA.

a) Wilderness and Inventoried Roadless Areas

According to notes in the internal drafts of the DEQ, issues raised around impacts to the Absaroka-Beartooth Wilderness and Inventoried Roadless Areas were to be combined with the “Land Use, Recreation and Noise” Scoping Issue.

Table from: LuckyMinerals_EA_3rd_Draft_2018.doc; 8/22/21 08

<table>
<thead>
<tr>
<th>Wilderness and Roadless Area</th>
<th>Impacts to the roadless and wilderness areas from mineral exploration will be analyzed and disclosed in the Land Use, Noise, and Recreation Section. (See Section 3.8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a concern that mineral exploration (including helicopter flights, road construction, and installation of existing roads) may impair qualities of the North Absaroka IRA by diminishing the natural integrity, remoteness, and solitude of the IRA.</td>
<td></td>
</tr>
<tr>
<td>There is a concern that project traffic will negatively affect the recreation experience (solitude, peace, and tranquility) provided by the Absaroka Beartooth Wilderness and North Absaroka IRA, as well as negatively impact wildlife that use these areas.</td>
<td></td>
</tr>
</tbody>
</table>

Yet in the final DEQ Draft EA (Section 3.8), there is no mention what-so-ever of Wilderness nor Inventoried Roadless Areas (IRA). The Absaroka Beartooth Wilderness lies some 2.2 miles south of the St. Juliana Claim block. There are Category 1B IRA lands less than one-mile south of Pad Site F23 (top of the St. Juliana Claim block) and less than 500 meters to the north of Pad Site F1 and the main laydown area at the old St. Juliana Millsite. A Category 1C IRA lies 2.6 miles to the southeast (Figure 2).
The Chico Peak and North Absaroka Inventoried Roadless Areas have been added to Table 3.7.

Thank you for your comment. See Response O-5-11.

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In Table 1.7 of the DEQ Draft EA there is no mention of Inventoried Roadless Areas as a "special area identified in scoping." Comments submitted by GYC included 688 words specific to IRAAs.

For convenience they are repeated here:

In addition to being adjacent to the Absaroka-Beartooth Wilderness, part of the current exploration proposed by Lucky Minerals is in the inventoried North Absaroka Roadless Area (IRA), posing potential adverse impacts that require consideration in an EIA of EIS. 36 C.F.R. § 220.6(b)(5)(iv) (requiring consideration of congressionally designated wilderness in evaluating extraordinary circumstances precipitating reliance on categorical exclusions).

These lands are specifically identified as pristine and unspoiled and provide the public with many benefits including clean water, outdoor recreation and critical wildlife habitat. The west side of the Gulch, including much of Emigrant Peak, is part of the IRA. Please refer to the attached map. With mining exploration expanding to this section of the gulch for the first time since 1993, it is critical to fully analyze and understand the current conditions and potential impacts to this sensitive and unique landscape.

Lucky Minerals is proposing three drill pads on the OVI-Alien area to be accessed via helicopter only. These sites are very close to, if not within, the IRA and it appears a number of drill sites on the Emigrant Peak (west) side are within the IRA (see attached map).

The Lucky Minerals proposal is the first major mining exploration in Emigrant Gulch since the implementation of the 2001 Roadless Rule. Thus, it is doubtful the impacts of mining...
Lucky Minerals' has not proposed any disturbances on the North Absaroka Roadless Areas. Secondary impacts to the Wilderness and Inventoried Roadless Areas are discussed in Section 3.8.3.2 of the EA. Also see general-themed response to comments related to MEPA.
### b) Socio-Economic Impacts

Socio-Economic impacts were originally scheduled for analysis in early drafts of this Draft Environmental Analysis.

Table From: LuckyMinerals_EA_2nd_Draft_2016.doc, 7/7/2016

<table>
<thead>
<tr>
<th>Socioeconomics</th>
<th>There is a concern that the Lucky Minerals proposal will harm the local economy (jobs, recreation and tourism, hunting &amp; guiding, fishing, agriculture, property values).</th>
<th>There is a concern that the Lucky Minerals proposal may impact Paradise Valley communities, disrupting the lives and livelihoods of the community and impacting sense of place.</th>
<th>Social and economic impacts of mineral exploration will be analyzed and disclosed. (See Section 3.9)</th>
</tr>
</thead>
</table>

Yet by the August 22nd draft they had been moved to the “Considered but Dismissed” category. The rationale in the DEQ Draft EA states: (Page 14-15):

As described in Section 2.3.4, the proposed exploration activity would only result in a maximum of ten people in a 24-hour period on site, with the project life of two limited field seasons. The *Emigrant Creek area has had past exploration projects that are similar in potential impacts to the proposed project and these past exploration activities did not cause identifiable socioeconomic impacts to the area.* (emphasis ours) The narrow area of Park County that would be utilized for this project may not notice the negligible impacts of ten temporary workers for a short duration. Since the exploration project would be in short duration with limited amounts of temporary jobs and have no measurable impacts on the analysis area the socioeconomic effects of the proposed exploration were not considered in detail.

The history of exploration in Emigrant Gulch is well-known and summarized in Section 1.3 of the DEQ Draft EA. The last time any drilling occurred in the area was 1991-1993 (page 3). Using exploration activities from the early 1990s as the justification there would be “no measurable impacts” in 2016 does not meet the requirements of analysis under NEPA.

As described in more detail elsewhere in these comments, GYC and our members maintain considerable doubt and concern over the Lucky Minerals transportation plans and the impacts this proposal will have on the surrounding communities. Using analyses from the early 1990s does not justify diminishing the socioeconomic impacts. Using ambiguous estimations of the activity and the impacts on local communities, citizens and businesses does not justify dismissing the socioeconomic impacts.

The following vacation rental businesses did not exist in Old Chico in 1992:

- Counts Cabin
- Creek Cabin
- Gulch Cabin
- Placer Cabin
- Mine Gulch Cabin

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**O-5-14**

DEQ has revised the EA to include a detailed discussion of the socioeconomic impacts in Section 3.13 of the EA. Also see general-themed response to comments related to Socioeconomics.
Section 3.4.4.2 has been modified to indicate that approximately 4.8 acres of new ground disturbance will result from road maintenance on the St. Julian Claim Block (3.48 acres), the drill pad sites (0.52 acres), and the laydown areas (0.8 acres). The total disturbance of the proposed project is approximately 4.8 acres. Section 2.3.1 of the Final EA describes the proposed project may have localized disturbances on Emigrant Creek Road and Forest Service Road 3272 to facilitate mobilization of equipment and to improve safety.

Lucky Minerals has proposed to locate the laydown area on private patented land at the old mill site on the St. Julian Claim Block. During several field reviews, DEQ has observed the old mill site is relatively flat and will only require minimal disturbance for a laydown area. The size of the laydown yard is what Lucky Minerals has proposed for this project. Lucky Minerals has proposed only to disturb private lands on the St. Julian Claim Block. The Orschel Placer No 58 is not proposed to
accommodate the laydown and other storage needs. Our concern is that there will be for split over occupancy onto public lands and roads and or additional land disturbance not properly accounted for.

Lucky Minerals must disclose any additional land use agreements with owner(s) of the Orschel Placer No 58 that might be used for the current project. The Orschel is owned by a principal in the St. Julian Claim Block and is implied to be under option to Lucky Minerals since March 2015.11 To properly comment on the current proposal in front of the DEQ, the public must be able to analyze any additional properties that might be utilized for laydown areas or staging. Due to its location above the main fork of Emigrant Creek, any use of the Orschel Placer may have considerable impacts to other recreational users and landowners in the gulch, as well as potential impacts to Emigrant Creek and nearby historic structures (17-callies) protected under National Register of Historic Places (NRHP).

The preferred Agency Modified Alternative states in Section 2.4.2.1 that:

“Contaminant of flow from artesian boreholes would prevent any potential discharge of water or wastewater, prior to pluggying and abandoning the drill holes in accordance with ARM 17.24.106 (page 22).”

There is no information provided in the Lucky Minerals, Inc. Plan of Operations on how they plan to contain unexpected artesian water. There should be pre-existing facilities and plans to contain unexpected artesian water. This may require actions that are not accounted for in the overall land disturbance estimations. This is particularly concerning with the drill pads near the East Fork and on federal public lands.

Recommendations:

Lucky Minerals consistently underestimates and downplays the land disturbance required for drill pads, possible artesian containment, laydown areas and road maintenance. Lucky Minerals must provide precise and specific details regarding all land disturbances so the public and DEQ can properly analyze all possible disturbances and potential impacts.

Lucky Minerals must disclose any other lands in Emigrant Gulch or Paradise Valley in addition to the St. Julian Claim Block that might be used for this action. Under Section 1.5 of the Draft EA the DEQ must consider “the need for further environmental analysis to disclose and analyze potentially significant environmental impacts.”

b) Road Access & Maintenance

The preferred Agency Modified alternative identifies that the mobilization and demobilization of exploration equipment must avoid Chico Hot and Use Murphy Road to reach Emigrant Creek Road, all roads administered by Park County. The option of using “other routes” (ie, Chico Road and Costin Road) for incidental travel, including shift changes, should not be allowed and strictly enforced in the interest of public safety around the popular Chico Hot Springs and Resort.

The Emigrant Creek Road is an unmaintained Park County Road. Where the county road ends and the Forest Service Road 3272 begins has been debated and questioned by local landowners, Park County and the US Forest Service. GYC does not question the prescriptive rights of the public, Forest Service, landowners and property licensed operators to use the Emigrant Creek Road and

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Page 17
exploration license would only authorize the road improvements proposed by Lucky Minerals. The widening of the access road or disposal of material into the creek would be a violation of the exploration license.

Lucky Minerals is required to obtain any permits required by County, State or Federal agencies, including 318 or 124 permits. Table 1.2 provides a listing of County, State and Federal agencies and their respective permitting/authorization authorities.
Figure 7: Emigrant Creek Facing the Emigrant Gulch Road. Drawn unknown. Courtesy Scott Quix.

The preferred Agency-Moderated Alternative presented in Section 3.3.3.3 of the DEC Draft EA expresses a concern for geologic materials that might be exposed by grading and maintenance and recommends Lucky Minerals identify and map the areas of localized disturbance that would be expected.

The Agency-Moderated Alternative does not address threats to public health and safety on the road now and into the future and the potential for debris ending up in the creek. The Lucky Minerals, Inc. NE 13-161 and original Plan of Operations consciously downplay and significantly underestimate the current condition, width and reliability of the road.

Figure 8: Areas of significant road instability threatening Emigrant Creek.
Additionally, there is considerable undermining of the road from historic placer mining operations throughout the gulch, particularly on the Mary Agnes and Frady Placer. The Pittsburgh Placer has experienced numerous collapses along the Emigrant Road along with concern over the stability of potential undermining higher in the valley where traditionally the use has been more limited. Road activity from exploration in the 1990s does not prove the undermining is safe today for increased industrialization.

The proposed action further states that Forest Service Roads 3272 and 3272B will be used. This so-called FS Road 3272B requires an additional stream crossing that is not accounted for in the analysis of impacts to the stream and potential State of Montana 318 or 124 permits required.

**Recommendations:**

- A proper analysis of the impacts to public health and safety of increased industrial traffic in Emigrant Gulch, surrounding resorts and subdivisions, and particularly in Old Chico, must be completed under NEPA. Additional restrictions on which county roads are available for use except only in emergency situations are required.

- An independent third-party engineering analysis of road cuts, undermining, and needed road maintenance must be performed. If a license is granted, Lucky Minerals, Inc. must be required to alert the public with reasonable notice prior to performing any maintenance to the Emigrant Creek Road to allow the public to review potential impacts to Emigrant Creek.

- Specifics about the use of roads near the St. Julian Claim Block and stream crossings of the East Fork of Emigrant Creek must be addressed by Lucky Minerals, Inc. and the potential impacts analyzed.

a) Drill Site/Pad Construction

The proposed action, as recommended by DEQ, indicates drill pads will be located a minimum of 100 feet away from all perennial streams and 50 feet away from other natural wetland areas. Proposed Drill Pad #1 (approximately 45.255640N, -110.635937W) is easily within 50 feet of the perennial East Fork of Emigrant Creek.

Proposed Pads #2 (odd mill site) and #3 (road junction) appear to be approximately 100 feet from the East Fork but are directly above a steep slope leading into the creek. DEQ added that Murphy Road, Old Cemetery Road, Emigrant Creek Road, and the road designated Forest Service Road 3272/3272B for mobilization/demobilization and shift changes; other routes may be used for incidental travel (emergencies and personal travel). DEQ does not have the authority to regulate traffic on public roads.

DEQ does not have regulatory authority to require an independent third-party engineering analysis related to the use of existing public roads. Nor does DEQ have regulatory authority to require Lucky Minerals to give public notice prior to performing maintenance on Emigrant Creek Road.

**Recommendations:**

- The exact location of Drill Pads #1, #2, and #3 and their proximity to the East Fork of Emigrant Creek needs to be properly surveyed and disclosed in addition to more in-depth analysis of the gradient, soils, sub-surface composition and existing vegetation separating the creek from the drill pads. These locations may require removal from the exploration plan due to their proximity to the East Fork.

O-5-21

Under the action alternatives, Lucky Minerals will be required to use flaggers and/or pilot cars when large equipment is being mobilized and demobilized from the area. Lucky Minerals will also be required to use flaggers with portable radios to monitor and control traffic along Emigrant Creek Road during road cleaning.

With the consent of Lucky Minerals, DEQ has included in the Agency-Modified Alternative a requirement that Lucky Minerals use Murphy Road, Old Cemetery Road, Emigrant Creek Road, and the road designated Forest Service Road 3272/3272B for mobilization/demobilization and shift changes; other routes may be used for incidental travel (emergencies and personal travel). DEQ does not have the authority to regulate traffic on public roads.

O-5-22

DEQ does not have regulatory authority to require an independent third-party engineering analysis related to the use of existing public roads. Nor does DEQ have regulatory authority to require Lucky Minerals to give public notice prior to performing maintenance on Emigrant Creek Road.

O-5-23

In Sections 2.3.1 and 2.3.2 of the EA describes the details on the use of
DEQ must request full disclosure of ALL products AND volumes used in the drilling program and all sumps must be lined and contained to eliminate the chance of lubricants and other materials discharging into the creek and to eliminate future acid drainage.

d) Drill cuttings

The disposal of waste drill cuttings is discussed in several sections of the EA. In Section 4.1.1 it is noted that (page 146):

"... any of the geologic waste materials from drilling (i.e., cuttings) would be pumped back into the drill holes, or buried and compacted in the sumps as part of reclamation."

Requiring that all drill cuttings be disposed down-hole or in lined pits should be a mandatory part of the permit. Recent research indicates drill waste from mineralized areas can lead to acid mine contamination.10 Lining the waste pits with an impervious liner should also be required. The impact load in some areas can be very high, and unlined pits allow maximum seepage into groundwater. Pits lined with an impermeable liner will at least minimize the amount of seepage to groundwater. Considering the high amount of natural AMD in the East Fork of Emigrant Creek, the disposal of drill cuttings in the manner proposed may lead to an increase in AMD and needs to be fully analyzed.

It should also be noted that Lucky Minerals originally proposed to line the waste pits and use a cyclone system to dewater the drill cuttings before placing them in a pit.10 As noted in the DEQ Draft EA

"... the cyclone system reduces the drilling water demand and potential impacts to surface water, and reduces the potential for seepage to shallow groundwater from fluid bearing sumps." (page 111)

Recommendations:

- The use of a cyclone system should be required. The use of cyclone technology will speed the time it takes for the cuttings to dry in the sumps by removing and recycling the drilling fluids from the cuttings produced during the drilling process. This will allow the cuttings in the sumps to dry faster allowing them to be backfilled and reclaimed to match the pre-site conditions sooner.

- No drill cuttings should be allowed to remain on the surface nor inside existing adits where they are exposed to air and water. All drill cuttings will either be returned down-hole, or placed in pits lined with an impermeable liner and covered with native materials and properly protected from interactions with water including meteoric precipitation.

e) Financial Assurance

It is noted in the 2016 Draft DEQ EA (page 11):

"Lucky Minerals proposes to drill up to 46 drill holes from 22 drill pads (2/pad) over two field sections."

Lucky Minerals notes in the April 2015 Plan of Operations (page 12) that:

- The access road up to the St. Julian Claim Block. DEQ's EA analyzes the impacts to the stream crossing in Sections 3.5.3.2, 3.7.2.2, and 3.7.3.2.

O-5-24

See response to Comment A-3-13

O-5-25

See response to Comment O-12-4

O-5-26

This component is already included in the Proposed Action and the Agency-Modified Alternative. See response to Comment O-12-4.

O-5-27

See response to Comment O-12-4

O-5-28

Section 82-4-338, MCA, requires an application for an exploration license to submit a bond to DEQ in an amount determined by DEQ and conditioned upon compliance with the requirements of the Metal Mine Reclamation Act, the administrative rules and the exploration license. The bond may not be less than the estimated cost to the state to ensure compliance. It is not unusual for a bond calculated by DEQ to be significantly more than the cost that would be incurred by the licensee because the licensee is already on site and is not subject to state procurement laws. DEQ will calculate the bond after issuance of the Final EA, assuming an exploration license is issued, when any applicable mitigation measures are known and the costs of implementing can be calculated. DEQ will release the bond only when it determines that the reclamation has been achieved. DEQ routinely
retains bond for a number of years in a sufficient amount to ensure establishment of vegetation.

See response to Comment O-10-53.

Section 82-4-338(1)(a), MCA, provides that an applicant for an exploration license may submit a surety bond, a cash deposit, an assignment of a certificate of deposit, an irrevocable letter of credit, or other surety acceptable to DEQ. As a policy, DEQ does not accept self-bonding or corporate guarantees. The requirements for surety bonds, certificates of deposit and letters of credit are set forth in ARM 17.24.144 through 166. DEQ will not accept a bond unless it satisfies the applicable requirements.

See response to Comment O-5-4.
f) Water Rights

The information provided on water rights is insufficient to allow DEQ or the public to evaluate the potential adverse impacts of Lucky Minerals' proposed water use.

Under Section 2.3.5 of the DEQ Draft EA,

“Lucky Minerals proposes to obtain water for drilling either from existing artesian boreholes or from the East Fork of Emigrant Creek, utilizing the existing water right that is attached to the St. Julian Mine patented claims.”

Location and Use of Water Right

The General Abstract for Water Right Claim 43B 103500-007 (June 12, 1901, enforceable priority date) indicates 1250 cfs, "limited to the volume of water historically used for mining purposes, from Emigrant Creek, East Fork South Fork (sic)." This water right is between April 14 and October 31 for surface water diverted by ditches in the NW SE Sec 5, Township 15S, Range 9E.

This water right agreement is clear.

"This use may consume some water, but until that amount is quantified, it is presumed that the use is non-conservative."

It is important to note that the map for the State Water Right Query system indicates a different source, location and place of use for Water Right Claim 43B 103500-007 than the General Abstract. The diversion site is mapped as a groundwater diversion taken from a point at approximately 45.25419N, -116.64663W. This appears to correspond with an identified seep (GWIC #205001) with an estimated flow of 5 gpm according to Leftow 2016.

According to the State Water Right Query mapping, this source is to be used in an upper portion of the St. Julian's claim block including the St. Julian lode, Bottle lode and parts of the Josephine lode. The General Abstract Statement of Claim identifies the place of use as the "NW Sec 5, Township 15SE Range 9E." This location is consistent with Place of Use indicated on the Water Right Query system map but excludes parts of all the Copper King Lode, Beryl Lode, Bullion Lode, Mill Lode, Josephine Lode and Helen claims. In other words, in proposed drill pads #1 through #13, #16, #20, #22 lie outside of the indicated Place of Use identified on the Water Right Query System Map.

A change of use permit is required whenever there is a "change in the place of diversion, the place of use, the purpose of use, or the place of storage." MCA 85-2-132(9).

MCA 85-2-302(4)(b) states:

If an application is for a permit to appropriate water with a point of diversion, conveyance, or place of use on national forest system lands, the application is not correct and complete under this section until the applicant has submitted proof of any written special use authorization required by federal law to occupy, use, or traverse national forest system lands for the purpose of diversion, impoundment, storage, transportation, withdrawal, use, or distribution of water under the permit.

The referenced map from the State Water Right Query system was discussed with DNRC (Pers. Comm. 3/3/17). The point of diversion can only be mapped to the center of the most accurate legal description that is provided, i.e. limited to the center of the NWSE Sec 5, T7S, R9E. In this situation, that point is not located on a stream, even though the General Abstract and the database entry clearly describe the point of diversion as surface water (denoted by "S") from the East Fork of Emigrant Creek. The point shown on the online map also appears to be a square (denoting groundwater), but when the object is selected with the cursor, a circular outline is shown instead (denoting surface water). There is no connection between the diversion point that is mapped online and the St. Julian seep sampled by MBMG (GWIC #285001), which are estimated to be 450 feet apart. Determinations should be made from the General Abstract and the database and not the map feature. The DNRC would determine the need to change the Point of Use for the water right in question, and would administer the change of use permit, as indicated in Table 1.2.

As shown in Plate 6 of Lucky Mineral's Plan of Operations, the access to the East Fork diversion is located to the east of the old mill area. However, this location is also accessible through private land across the Bullion and Mill Lode claims ("Mill Site" road on GYC Figure 1) and does not necessitate the use of the "East Fork" road shown in GYC's Figure 1.
Although the water right allows for the diversion of 2.5 cfs, only 50 gpm would be needed for the proposed drilling operations, and that withdrawal would not be continuous due to the use of a cyclone recovery system (Section 3.7.3.2). The 2015 Priority Date Index for Enforcement Area 43B was discussed with DNRC (Pers. Comm. 2017). The St. Julian water right (6/12/1901) does not appear on the index list because it is located outside the boundaries of the enforcement area, which was established as part of a district court order. The East Fork and other upper tributaries of Emigrant Creek were excluded when the 43B area was created, and enforcement would not occur unless there was a notable change complaint filed by downstream users. Any further issues related to the water right would be addressed by Montana DNRC, as indicated in Table 1.2.

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Page 19

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Note: The diagram and figure text are not transcribed due to the nature of the content.
According to the April 10, 2015 Priority Date Index for Emigrant Creek Enforcement Area, the following senior water rights appear downstream from the St. Julian:

- Water Right 43B 194361-00 owned by Alvin L. Pierce with an enforceable priority date of April 22, 1882 for a total of 2.0 cfs for the Morgan Ditch #1, Pioneer-Lefroy Ditch, and Coelum Ditch.
- Water Right 43B 194413-00 owned by the Yellowstone Spring Ranch, LLC with an enforceable priority date of Oct 1, 1893 and owns part of the diversion for Morgan Ditch #1.
- Water Right 43B 194426-00 owned by Evelyn F. Barnes with an enforceable priority date of Oct 10, 1893 for an additional 8.75 cfs for the Morgan Ditch #1.
- Water Right 43B 122379-00 owned by Ruth M. Coe with an enforceable priority date of Aug 13, 1894 for 1.25 cfs.

The Water Right 43B 192590-00 dated June 12, 1901 does not appear on the 2015 Priority Date Index for Emigrant Creek Enforcement Area.

Additional Water Rights Owned by St. Julian Group

There is a Water Right 43B 194462-00 owned by Keough, Brown & Keough, Inc dated April 11, 1892 for 2.0 cfs diverted at the Orschel Placer in N3S1W1E of Section 6 in Township 7, Range 9E.

Despite being the oldest water right in Emigrant Creek Enforcement Area 43B, the point of use is very clearly the Orschel Placer (and to the west) and not the St. Julian Claim Block.

Keough, Brown & Keough, Inc are listed as part owners of the St. Julian Claim Block. The joint ownership of the Orschel and the St. Julian Claim Block combined with the Lucky Minerals, Inc. claim of having an option to purchase agreement of nine patented claims requires further disclosure and clarity to which water right they intend to use.

Recommendations:

Due to uncertainty over the water rights and to help protect the public from unwarranted use of water, Lucky Minerals must disclose and provide a record of the water rights transferred to them by recording those documents at the Park County Clerk and Recorder. Lucky Minerals must provide detailed information on how and exactly where they intend to access the diversion site(s) and the current state of the headgate at the diversion site, if any.

To enable a thorough and accurate evaluation of the water rights, DEQ should require Lucky Minerals to apply for a change of use, which will require it to document the historical use of the water, access across forest system lands, and the lack of adverse effects to other rights holders.

Access to the East Fork diversion site is in question and no additional consultation with the Custer Gallatin National Forest is required to determine the use and impacts to one or more historic roads on public land between the crossing of the East Fork at approximately 45.25778N, 111.69358W and the Bottler Lode claim.

The attached water right has a priority date of June 12, 1991. Core drilling as it is practiced in the 21st century was not a historic use in 1991 when the St. Julian Mine closed. In order to determine how much of the “maximum 2.5 cfs” is currently allowed under this water right, Lucky Minerals must quantify the amount of water to be used in core drilling that will be “consumed” and how much will be discharged back into the East Fork or allowed to “percolate” into the ground. A majority of the drill pads are hundreds of feet in elevation

As noted in the comment, the Orschel Placer is located 1.5 miles to the west of the St. Julian Claim block, and the associated water right is for a diversion of 2.0 cfs from Emigrant Creek (4/11/1882). Despite the overlap in ownership by Keough, Brown & Keough, this is a separate water right for an unconnected property. There is no discussion of the Orschel Placer water right in the Plan of Operations submitted by Lucky Minerals, and there is no indication that it would be needed or utilized in support of the St. Julian exploration project.

See general-themed response to comments related to water rights and consumptive use, and any change to the water right, would be conducted by Montana DNRC, as indicated in Table 1.2.
above the creek and the likelihood of any non-consumptive use being discharged back into the creek needs to be analyzed.

To fully understand the water rights for Emigrant Creek and to protect the rights of those downstream, the differences between the state 2015 Priority Date Index for Emigrant Creek, the Water Right Query system mapping and the General Abstract attached to the water right 43B 153550-00 should be reconciled so the public can properly ascertain the appropriate use of the water rights.

g) Existing Artesian Water Use

Under Section 2.3.5, "Lucky Minisam proposes to obtain water for drilling either from existing artesian boreholes or from the East Fork of Emigrant Creek, utilizing the existing water right that is attached to the St. Julian Mine patented claims." The artesian wells in question have been identified by the state as found on public lands along the so-called FS Road 3273B west of the St. Julian claim block. These are marked on Figures 3.7 and 3.8 of the Draft EA. There are no known private water rights assigned to these wells. Any collection or land disturbance of the area around the bore holes requires consultation with the Custer Gallatin National Forest under the National Environmental Policy Act (NEPA).

Recommendations:

Permits including water rights, and land disturbance to use any artesian water found on public lands need to be obtained before any exploration license can be granted.

h) Wildlife

CYCC recognizes the importance of potential impacts to wildlife and comments the DEQ for their in-depth analysis in the Draft EA. Identified wildlife concerns that stand out are:

- "The St. Julian Claim Block has substantial marten, bobcat, black bear, mountain lion, and grizzly bear populations." (Section 3.4.3.3, page 48)
- "Three federally listed wildlife species (bald eagle, Canada lynx, grizzly bear) with a moderate to high probability occurrence in the project area" (page 39)
- "A bobcat likely is present in the St. Julian Claim Block." (page 49)
- "The St. Julian Claim Block lies within fully occupied grizzly bear habitat. The Primary Conservation Area is approximately one mile to the west." (page 42)
- "Two golden eagle nest sites have been documented near the St. Julian Claim Block in the headwaters of Passage and Arista Creek" (page 80)
- Section 3.4.3.3 (page 42) mentions, "On March 11, 2016, the USFWS proposed removing the Greater Yellowstone Ecosystem (GYE) population of grizzly bears from the federal list of endangered and threatened wildlife."

The grizzly bear delisting process currently has no bearing on the analysis of this project and the potential impacts. Any conservation strategies and regulations currently in place through the Endangered Species Act must be maintained.

On June 10, 2016 Linnaza Schroeder, MEPA Coordinator for the Montana Fish Wildlife and Parks (MT FWP) recommended, "We didn't notice any mention of fishers in the draft, it would be appropriate to include them under the Project Area Existing Environment section alongside of lynx (first paragraph), as...

O-5-38 (cont.)
O-5-39

See response to Comments O-5-32 and O-5-33.

O-5-40

See response to Comment A-2-16.

O-5-41

Thank you for your comment.

O-5-42

The EA has been updated in response to this comment. The Final EA has removed language about the grizzly bear delisting process. Table 3.2 and Section 3.4.3.3 of the EA has been updated to include the fisher.
More information on peregrine falcons and golden eagles was added to the Final EA. The Montana Natural Heritage Program has no record of a peregrine falcon eyrie within 5 miles of the St. Julian Claim Block. The Agency-Modified Alternative calls for pre-construction bird nesting surveys and consultation with FWP regarding protective measures should a nest be found.

The Agency-Modified Alternative has been changed in the Final EA and now states:

"Lucky Minerals would be required to conduct pre-exploration surveys prior to each field season to identify potential areas of western toad habitat, bat habitat, and nesting birds in areas of new disturbance on drill pads and laydown area. If any of these habitats are found near the drilling areas, Lucky Minerals will consult Montana Fish, Wildlife, and Parks (FWP) to determine avoidance or mitigation measures. To avoid disturbing nesting eagles, other raptors, owls, or songbirds, Lucky Minerals would maintain natural forested (or vegetative) buffers around nest trees. The buffer areas would be consistent with..."
USFWS guidelines and would serve to minimize visual and auditory impacts associated with human activities near nest sites. If a raptor nest is built or discovered within the St. Julian Claim Block, Lucky Minerals would consult with FWP to determine avoidance or mitigation measures. Any spatial buffers required through consultation with local FWP biologists would be in accordance with the Montana Bald Eagle Guidelines (2010).

O-5-45
As indicated in the Environmental Assessment, in order to reduce or eliminate potential for wildfire, Lucky Minerals would be required to adhere to current and imposed fire restrictions that are enacted by the Forest Supervisor and Park County. Additionally, Lucky Minerals would be required to ensure that all vehicles are equipped with a functional spark arrester and baffled muffler, and are equipped with an axe, bucket, shovel, and fire extinguisher. All support or crew transport vehicles would be parked in an area in which the natural vegetation does not directly contact the catalytic converter of the vehicle. Lucky Minerals would also be required to comply with Forest Service regulations regarding fire rules and/or closures. All pumps/generators and other combustion engines would be placed away from combustibles and be equipped with functional spark arrestors and fire suppression kits. DEQ does not have the authority to prohibit Lucky Minerals’ use of warming fires.

O-5-46
See responses to O-5-32 through O-5-34, P-280-3, and general-themed response to comments related to water rights. The water diversion site and the expected operation of the pump is described in the Proposed Action in Sections 2.3.5 and 3.7.3.2. This would include providing containment and clean up kits for the pump and stored fuel, and the pump would be located within a lined berm on existing disturbed ground away from the stream bank. This approach would not involve the movement of native geologic material or historic tailings and is intended to decrease the likelihood for impacting water quality. Minor disturbance may be associated with the stream intake, but the 318, 310, and/or 124 permits would address the bank and stream work, as
described in Table 1.2. The expected water usage for drilling is well below the volume allowed under the water right associated with the St. Julian, and water usage is further described in Section 3.7.3.2 and in the other cited responses. The Agency-Modified Alternative has also been updated to include regular monitoring and contingency sampling in the East Fork of Emigrant Creek, above and below the proposed drilling area.

O-5-47
The disposal and burial of drill cuttings and the reclamation of boreholes and new land disturbance are designed to minimize watershed impairment, as discussed in Sections 2.3 and 3.9. Current vehicle activity at the stream crossings does not contribute to acid rock drainage, and the Proposed Action would likely increase vehicle traffic by 8 to 10 crossings per day. The disturbances associated with work along stream beds or banks and the temporary turbidity associated with the stream crossings would be addressed in the Authorization obtained through DEQ. However, a "Joint Application Form" would be used for that permit, which is also used to apply for conservation district 310 permits, and other permits through Montana DNRC and FWP. (http://dnrc.mt.gov/licenses-and-permits/stream-permitting). This information has been added to Table 1.2.

O-5-48
See response to Comments P-39-6 and O-12-4.

O-5-49
See response to Comment P-39-6.

O-5-50
See response to Comment P-39-6.

O-5-51
DEQ will include the estimated costs of revegetation and weed control as a component of the reclamation bond that Lucky Minerals will be required to submit prior to conducting any activity, assuming an exploration license is approved. DEQ will retain bonding for
Revegetation and weed control until appropriate vegetation is established --- a period that generally is at least three years.

The impacts resulting from the washing of equipment prior to mobilization is too attenuated from DEQ's action on Lucky Minerals' exploration license application to be included in the EA.

O-5-52
Thank you for your comment.

O-5-53
See response to Comment O-5-51.

O-5-54
DEQ does not have the authority to require Lucky Minerals to comply with federal standard for noxious weed management. If Lucky Minerals is required to obtain a road use permit in order to access the St. Julian Claim Block with the vehicles and equipment associated with its proposed mineral exploration activity, the Forest Service could impose the federal weed control standards. County Weed Control Act 7-22-2101, et seq, MCA places responsibility for weed control on the county weed board. Applicant will file a weed control plan with the Park County Weed Control Board. DEQ does not have authority to require Lucky Minerals to develop a weed management plan that satisfies county or federal weed control standards and that is effective for a period of ten years.

DEQ will bond for weed control. Bond is not for a specific number of years but rather for achieving a weed free condition comparable to adjacent non-impacted lands. If the entity that controls the road access that Lucky Minerals will use to get to the St. Julian Claim Block could require additional requirements as part of their road use agreement or permit.

O-5-55
Thank you for your comment.

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“Lucky Minerals proposes to wash all equipment listed in Section 2.3.2 prior to mobilization. Lucky Minerals would be held for potential treatment of weeds in the event that noxious weeds are noted within the St. Julian Claim Block the following season.”

Although drill holes and drill pads can be reclaimed relatively soon after the drilling operation is over, revegetation takes years at a minimum. DEQ should request a comprehensive plan where any washing might take place in order to analyze potential impacts to surrounding neighbors.

Road systems are major pathways for the spread of invasive plants. Lucky Minerals has a duty not only to monitor and mitigate the spread of invasive plants, but also to prevent their spread when possible throughout the operation area, including all access roads. There will be considerable use and disturbance of roads on public lands and roads, including private lands not involved in the current project.

The proposed action indicates two shifts per day of ten workers. This represents a considerable amount of traffic and potential to spread noxious weeds throughout the operating season. Vehicles used for this activity should also be washed daily prior to entering Emigrant Gulch.

With the St. Julian Block being surrounded by Forest Service lands and the proximity to designated Wilderness and Inventoried Roadless Areas, Lucky Minerals should be held to the Federal standards for noxious weed management.

Recommendations:

- A fully bonded weed management plan must be developed in consultation with Park County and Custer Gallatin National Forest and needs to be in place for ten years following the end of exploration activities.

VI. SEGREGATION OF MINERALS ON PUBLIC LANDS

On November 21, 2015 Secretary of Interior Sally Jewell announced the acceptance of an application and petition for Mineral Withdrawal on 33,375 acres of federal public lands in the Yellowstone-Glendive region of Park County, Montana. This application was published in the Federal Register on November 22, 2015.20

For a period until November 22, 2018, subject to valid existing rights, the National Forest System lands described in this notice will be segregated from and withdrawn from leasing, unless the withdrawal is in any manner cancelled or annulled by the order of the President or the withdrawal is approved prior to that date. The notice will be processed in accordance with the regulations set forth in 43 CFR part 2300.

This notice includes approximately 16,784 acres in Emigrant Gulch including all of the public land surrounding the St. Julian Claim Block. Most, if not all of this land has been leased by Lucky Minerals as unpatented mining claims under 1612 General Mining Law.21

Holders of mining claims and sites located within lands later withdrawn from mineral entry must prove their right to continue to occupy and use the land for mining purposes. The owner must demonstrate that they contain a discovery of a valuable mineral deposit and/or are used and occupied property under the General Mining Law, on or before the date of segregation. 43 C.F.R. § 3000.105(b).

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Lucky Minerals is proposing to conduct mineral exploration on its patented mining claims. Lucky Minerals' patented mining claims are not subject to the proposed federal mineral withdrawal.

O-5-56

Lucky Minerals is proposing to conduct mineral exploration on its patented mining claims. Lucky Minerals' patented mining claims are not subject to the proposed federal mineral withdrawal.

O-5-57

Lucky Minerals is proposing to conduct mineral exploration on its patented mining claims. Lucky Minerals' patented mining claims are not subject to the federal mineral withdrawal. Therefore, Lucky Minerals is not required to establish valid existing rights.

O-5-58

See response to Comment 0-5-57.
proposed operations concludes that a mining claim is invalid, or if there is a pending contest proceeding for the mining claim.

(1) BLM may—

(i) approve an annual report for the proposed mining claim proposing operations

(ii) approve a plan of operations for the proposed mining claim proposing operations

that are limited to taking samples to confirm or corroborate mineral exposures that

are physically disclosed and existing on the mining claim before the segregation or

withdrawal date, whichever is earlier; and

(iii) approve a plan of operations for the operator to perform the minimum

necessary annual assessment work under § 3851.1 of this title, or

(2) A person may only conduct exploration under a notice that is limited to taking

samples to confirm or corroborate mineral exposures that are physically disclosed

and existing on the mining claim before the segregation or withdrawal date,

whichever is earlier.

Referring to Figure 1 of these comments and the map on page 7 of the DEQ Draft EA, there are six

to ten (6-10) proposed drill pads either on public land or very near public land. Lucky clearly states

that drilling from any of their pads will be,

“Drill holes would be either vertical or angled holes designed to test investigate the subsurface

geology. Most of these drill holes are planned to be angled.” (page 19-20).

This raises the question of the Proposed Action intersecting minerals that lie underneath public

lands that are subject to the segregation effects of a withdrawal notice.

Recommendations:

Mining claims or sites whose discovery or use or occupation cannot be demonstrated on the
data for withdrawal or the date of mineral examination have no Valid Existing Rights and

are subject to the segregative effects of the November 22, 2016 withdrawal notice.

Prior to any exploration license being granted, Lucky Minerals must consult with the Bureau

of Land Management (BLM) to establish Valid Existing Rights to minerals under public land,

including those that may be accessed via angled drilling from private land.

VII. COOPERATING AGENCIES

Throughout the Draft EA there are numerous references to information or cooperation required with

both Park County and the US Forest Service. On page 17, the Draft EA states,

“the company commits to obtaining any permits required by the County, State or Federal

agencies.”

Under Section 1.5 “Authorizing Action” of the Draft EA, Lucky Minerals and DEQ need to supply

completed plans or documentation for the following consultations prior to granting any exploration

license:

Cooperation with Park County

- Plans for “proper disposal of contaminated debris” (Section 2.3.2, page 18)

- Coordination with “Park County Weed Board” (Section 2.3.6, page 20) for control and

  reclamation of noxious weeds

- Analysis of impacts to the public health and safety due to increased impacts on the

  Emigrant Creek Road and businesses in and around Old Chico

O-5-58

(cont.)

O-5-59

See response to Comment 0-5-57.

O-5-60

See response to Comment 0-5-57.

O-5-61

Table 1.2 is included in the Environmental Assessment to satisfy ARM 17.4.609(3)(c). That provision requires an environmental

assessment to include a listing of any state, local, or federal agencies that have overlapping or additional jurisdiction or environmental

review responsibility for the proposed action and the permits, licenses, and other authorizations required. The jurisdiction of some

agencies is not known with certainty. For example, DEQ

understands there is a dispute as to the entity that has jurisdiction over a portion of the road that Lucky Minerals will use to access the

site. Therefore, DEQ has also included in the list agencies that may have overlapping additional jurisdiction. DEQ has modified the text

of Section 1.5 to reflect this clarification. While MEPA requires a

listing of other agencies that may have overlapping jurisdiction,

MEPA does not require documentation that a project proponent has

obtained the additional permits, licenses or authorizations prior to
making a decision on the proposed action as this commenter suggests. DEQ has also revised the Environmental Assessment to remove reference to "cooperation" or "coordination." MEPA's cooperation provision is found in ARM 17.4.626 and entitled "Interagency Cooperation," applies to preparation of an environmental impact statement.

DEQ will use the criteria set forth in ARM 17.4.608 to determine whether preparation of an EIS is necessary. The contents of an exploration license application is governed by ARM 17.24.103(1)(c). An exploration plan of operations must state the type of exploration techniques that would be employed in disturbing the land and include a reclamation plan in sufficient detail to allow the department to determine whether the specific reclamation and performance requirements of ARM 17.24.104 through 107 would be satisfied. DEQ's review of Lucky Minerals exploration license application for compliance with the Metal Mine Reclamation Act is not the proper vehicle for enforcement of local, other State, and federal laws.

DEQ does not have authority to declare Lucky Minerals' application deficient because it does not contain sufficient information to determine whether Lucky Minerals will be in compliance with laws regarding surface occupancy. In the context of operating permit, the Metal Mine Reclamation Act specifically states that DEQ is not required to verify an applicant's mineral ownership or right to mine. Nor is the application deficient under the Metal Mine Reclamation Act because it does not contain sufficient information to determine
whether Lucky Minerals would be in compliance with respect to impacts of public land under NEPA, the federal mineral withdrawal, and water rights administered by the DNRC. Nor does DEQ have the authority to deem Lucky Minerals' application deficient until Lucky Minerals obtains third-party road engineering analysis or conducts a monumented land survey of its patented mining claims. The other areas identified by the commenter are sufficiently addressed in the EA.

O-5-63
Thank you for your comment.
Attached Documents:
- DCO Lovely File – PDF of photograph taken in Hard Rock Room at State office, December '16, 11:16 a.m.
- Gallatin National Forest Travel Management Plan EIS, Pages II-142-144, Oct 2006

Additional References
DCO, 2015, SMES Exploration Field Inspection Report, Department of Environmental Quality, Robert Crotham, June 30, 2015.
Comment from: Park County Environmental Council

Response To: Park County Environmental Council

O-8

DEQ will apply the criteria set forth in ARM 17.4.608 to determine the need to prepare an EIS. Also see general-themed response to comments related to Further Environmental Analysis.

O-8-1

See response to O-8-1.

O-8-2

See general-themed response to comments related to Proposed Action and Public Lands.

O-8-3

See general-themed response to comments related to Water Rights.

O-8-4

See Response to Comment O-10-18. Should Lucky Minerals submit an application for a mine, DEQ's review of the application would likely include the preparation of an environmental impact statement.

O-8-5

DEQ has revised the EA to include a detailed discussion of the socioeconomic impacts in Section 3.13 of the EA. Also see general-themed response to comments related to Socioeconomics.

O-8-6

Thank you for your comment.
O-8.8
See response to Comment O-3-10.

O-8.9
See general-themed response to comments related to Bonding.

Jesse A. Logan
Box 452
Ennis, MT 59727
Dear Ms. Lane,

We appreciate your time and consideration on this important matter. First, I would like to thank you for the work that you do for the State of Montana.

I am writing on behalf of the Park County Environmental Council (PCEC), a local grassroots environmental group with over 500 members. PCEC urges the Department of Environmental Quality (DEQ) to adopt the 4th option as presented in Section 1.5 of the Draft Environmental Assessment (Draft) – determining the need for further environmental analysis, with an Environmental Impact Statement (EIS), so that any and all potentially significant environmental impacts are disclosed to the public and properly analyzed. Emigrant Peak is an area of extraordinary environmental, social, and economic value. Lucky Minerals’ exploration plans have the potential to significantly and negatively impact the environment.

Emigrant Peak is part of one of the most ecologically diverse areas in the region and sits at the doorstep to Yellowstone National Park, the Yellowstone River, and the Absaroka-Beartooth Wilderness. It is an invaluable resource for this community and deserving of the utmost care and consideration.

Emigrant Peak, Emigrant Gulch, and the surrounding wildlands are important habitat for grizzly bears, Canada lynx, grey wolves, elk, and other wildlife. Its watersheds drain into the Yellowstone River, a Blue Ribbon Trout Stream that provides prime habitat to cutthroat, rainbow, and brown trout, birds of prey and songbirds alike, and to a multitude of macroinvertebrate aquatic species; additionally it provides for many area jobs and serves as a locus for water-based recreation. Farmers and ranchers in the Paradise Valley depend on the river’s clean water to irrigate their crops. Chico Hot Springs depends on the underground geothermal reservoirs deep beneath Emigrant.

DEQ will apply the criteria set forth in ARM 17.4.608 to determine the need to prepare an EIS.
Altogether, the economic and social health of our community depends inextricably on the
environmental health of this area.

PCEC has been working to protect and preserve Park County’s vast natural resources since
1999. We are the only countywide environmental group focusing exclusively on issues affecting
Park County. PCEC works with people to preserve and restore the county’s wilder rivers, diverse
wildlife, landscapes, outstanding natural beauty, people and way of life.

Initially formed by a small group of community members concerned about resource
extraction on public lands, PCEC has grown to over numerous issues related to the Yellowstone
River and its tributaries, public and private land management and community engagement and
values. Our three program areas are Yellowstone Headwaters, Wild Backyard, and Sustainable
Communities. Lucky Minerals’ proposal to drill exploratory test holes in and around Emigrant
Gulch impacts all three of those program areas. Emigrant Peak sits in the heart of our Wild
Backyard, any water impacts would degrade the Yellowstone Headwaters, and our Sustainable
Communities and our members’ way of life depend on the pristine natural resources that Emigrant
Peak provides.

Our members live in and around the Custer Gallatin National Forest. Many of our members
regularly visit Emigrant Peak to recreate, to view wildlife, to hunt, to fish and to find solitude.
Emigrant Peak provides quiet recreation, tremendous hiking, skiing, climbing opportunities, and
much more. To our members, Emigrant Peak is more than an extraordinary environmental resource—it is part
of the pristine ecosystem that provides jobs, clean water, clean air, and a thriving tourist economy.
Emigrant Peak represents the heart of our community.

EMIGRANT PEAK AND THE PARADISE VALLEY

Lucky Minerals proposes mineral exploration on the flanks of Emigrant Peak in the heart of
the Paradise Valley in one of the most socially, economically, and environmentally valuable areas of
the Custer Gallatin National Forest, just 20 miles north of Yellowstone National Park. Emigrant
Peak is the most well-known and prominent peak visible to residents and visitors of the Paradise
Valley sitting at almost 11,000 feet. Emigrant Peak above the Absaroka Beartooth Wilderness
and provides a buffer for wildlife and nongenius to Yellowstone National Park. The geothermal
resources in this area are vast. The water resources under Emigrant Peak and Emigrant Gulch are
connected to Yellowstone National Park and are inextricably linked to the Greater Yellowstone
Ecosystem. Drilling on Emigrant peak could have detrimental impacts on these water resources, aquifer, the Yellowstone River that are the lifeblood of Paradise Valley and the surrounding ecosystem.

Emigrant Peak and the Emigrant Gulch are important places for people throughout the
country. But they are also local treasures. Emigrant Peak is one of the most popular year-round
recreation destinations in Montana, including for hiking in the summer, hunting in the fall, rock
climbing and backcountry skiing in the winter. This is a place where local recreationists can take
See general-themed response to comments related to Further Environmental Analysis and Cumulative Impacts.

DEQ will apply the criteria set forth in ARM 17.4.608 to determine the need to prepare an EIS.
review of this project based on the potential significant and extraordinary environmental impacts of exploratory drilling in Erogant Gulch.

ACCURACY AND SCOPE OF LUCKY MINERALS PROPOSED EXPLORATION

Lucky Minerals plan submitted to the DEQ only represents one portion of a much larger exploratory drilling proposal in Erogant Gulch over the course of several years. Lucky Minerals, in their 43-101 Technical Report, The Erogant Mining District Project, South Central Montana (March 2015) (Technical Report) states that Lucky Minerals is planning additional drilling on both private and U.S. Forest Service land as part of, in the company's words, "an aggressive exploration program in the near future." Technical Report at 7. The Technical Report available on Lucky Minerals' website makes plain that while the initial exploration will proceed beyond the exploration project presented to DEQ as, "an application (Plan of Operation) will be made for road access construction and additional drilling locations that would be covered by an Environmental Assessment."[1] Id. at 74.

Lucky Minerals’ submission of a plan of operations for only a portion of its exploration activities is prohibited by MEPA. The company has made it very clear to the public and the potential investors of its intentions to engage in a multi-phased mineral exploration project. Lucky Minerals has offered no indication that it would be impossible to describe or forecast the full extent of its exploration activities. Indeed, the company's Technical Report indicates that future phases of the project are well understood. Even if exact drilling locations or depths are yet to be determined, the plan of operations must describe future exploration. In the event that such plans change, the company may amend or supplement its application at a future date. What Lucky Minerals may not do, and the DEQ must not allow under its regulations, is pretend that future phases of exploration will not occur, or allow the project to be drawn out in multiple small phases when the entirety of the project has already been publicly available at the outset.

The circumstances here are similar to those addressed in Blue Ocean Props. Inc. v. Withhuis, 754 F. Supp. 1450 (D. Haw. 1991). In that case, the court examined four phases of a geothermal energy development project. Phases 1-3 involved exploration and verifying the potential geothermal resource before construction of a geothermal energy plant in Phase 4. As with Lucky Minerals' initial mineral exploration plans here, in Blue Ocean Props. Inc. v. Withhuis, "the early phases were to be carried out primarily with public funds to remove the uncertainty and risk, and thereby encourage private investors to undertake the ultimate Project development." Id. at 1453. The court in that case found that the exploration and verification activities had no "independent utility" because they would be "irrational" absent imminent construction of a geothermal power plant (Phase IV)." Id. at 1459. Therefore, the agency was required to consider the impacts of these connected actions in a single EIS. Id. Likewise here, it is irrational for the DEQ to consider only a portion of planned exploration.

See response to Comment O-10-18.

O-9-5

See response to Comment O-10-18.

O-9-6

In Blue Ocean, the United States District Court for the District of Hawaii determined that the first three phases of the four phase Hawaii Geothermal Project did not have independent utility. On that basis, the court determined that all four phases of the project must be considered in the same environmental impact statement under the "connected actions" provision of 40 CFR § 1508.25(a)(iii).

Unlike in Blue Hawaii, Lucky Minerals' proposed mineral exploration program has utility independent from the actual construction and operation of a mine, which is only speculative at this point in time. It is not unusual for an entity to obtain an exploration license, conduct the authorized mineral exploration, and then decide not to seek authorization for construction and operation of a mine because no viable mineral resource has been identified. Thus, Lucky Minerals' exploration for a viable mineral deposit is not irrational absent imminent construction and operation of the mine.
activities. To satisfy NEPA, the agency must examine the full extent of Lucky Minerals' exploration plans in a single EIS.

Not only must the DEQ analyze the entire scope of foreseen exploration activities on private and National Forest Lands, the agency must examine the cumulative impacts of exploration activities within patented mining claims. Because Lucky Minerals has improperly constrained the scope of its plan of operations to exclude foreseen minerals exploration, the action described in the Draft is likewise constrained.

Lucky Minerals has only provided one map of their proposed drill pad locations. This map, at 1:5, is an inadequate reference and resource for the proposed actions. It is missing basic map elements like north arrow, scale, projection and coordinate system. Accurate analysis of this map, both printed or in a GIS is impossible without that information.

Additionally, the proposed action is supposed to be on private lands yet Lucky's map shows four proposed drill sites that appear to be on public lands - Pad #7, Pad #13, Pad #16 and Pad #20. Lucky needs to complete a proper survey, provide a list of the drill pad locations with GPS coordinates (latitude and longitude), as well as provide an accurate GIS compatible map. This lack of attention to detail on something as fundamental as the primary map and accurate exploitation locations demonstrates a lack of planning and/or a deliberate obfuscation on the part of Lucky Minerals.

DEQ requires exploration permit applicants to “submit an exploration plan of operations and a map or sketch in sufficient detail to locate the area to be explored as well as the actual proposed disturbances, and to allow the department to adequately determine whether significant environmental problems would be encountered.” Admin. R. Mont. § 17.24-109(3)(g). Lucky Minerals has failed to do this in both the full scope for its planned explorations and with the map submitted.

WILDLIFE AND THREATENED AND ENDANGERED SPECIES

The Absaroka Mountains are home to bighorn sheep, elk, deer, moose, marmots, pikas, coyotes, black bears, wolves, and wolverines. Because the proposed mineral exploration project threatens significant adverse impacts to federally listed species. The grizzly bear (Ursus arctos horribilis) and the Canada lynx (Lynx canadensis) (lynx), which live in the region around Emigrant Peak, are both listed as threatened species under the federal Endangered Species Act 50 C.F.R. § 17.114(a). The Draft indicates scant consideration of potential harm to members of these listed species. However, potentially significant adverse effects to both grizzly bears and lynx from the proposed mineral exploration require the DEQ to prepare an EIS.

Emigrant Gulch and its surrounding wildlands is occupied and active habitat for grizzly bears—a threatened species under the Endangered Species Act—bordering the Primary Conservation Area. It is documented habitat for Canada lynx, also a threatened species under the Endangered Species Act.

O-9-7
See response to Comment O-10-18.

O-9-8
See response to comment O-10-18. Also see general-themed response to comments related to Proposed Action and Public Lands.

O-9-9
See response to Comments O-10-36, O-10-37, and O-10-38.

O-9-10
See response to Comment O-10-36.
An analysis of the potential impacts to grizzlies bears are set forth in Section 3.4 - Wildlife. See also the response to Comment O-10-36.
Thank you for your comment.

See response to Comments P-233-2 and O-10-38. Also see general-themed response to comments related to Future Exploration and Mining Actions.

Thank you for your comment.

A discussion of the potential impacts to Canada lynx is included in Section 3.4 Wildlife of the EA.

See response to Comment O-5-10.
community of life are untrammeled by man, where man himself is a visitor who does not remain.” 16 U.S.C. § 1131(c). Another thing, a wilderness area “has outstanding opportunities for solitude or a primitive and unconfined type of recreation.” Id. § 1131(c)(2). Perhaps no area embodies this definition as fully as the Absaroka-Beartooth Wilderness. The wilderness area encompasses 434,648 acres in the heart of the Greater Yellowstone Ecosystem, adjoining Yellowstone National Park on the park’s northern edge, and contains some of the most wild and remote country in the lower-48 states.

The Draft makes little to no mention of wilderness areas; however, figure 3.16 of the Draft situates the drill area north of the Absaroka-Beartooth Wilderness boundary. Emigrant Exploration Project, Park County, Montana: Proposed Area of Drilling (Jan. 2015), available at http://www.flsurvey.gov/project/Zproject/47891. Noise and disturbance from increased motorized vehicle use, as well as lights used for night drilling, are fundamentally inconsistent with wilderness character of adjacent wilderness and require consideration under MEPA. Greater Yellowstone Coal. v. U.S. Forest Serv., 12 F. Supp. 3d 1228, 1278-79 (D. Idaho 2014), appeal dismissed (Sept. 8, 2014) (stating that NEPA required Forest Service to examine the “sight and sound impacts” within recommended wilderness area of motorized vehicles occurring half-mile outside of recommended wilderness boundary); Greater Yellowstone Coal. v. Timbarch, No. CV-06-04-BLV, 2006 WL 3386751, at *3 (D. Idaho Nov. 21, 2006) (recognizing that helicopter flights may be inconsistent with solitude and opportunities for primitive recreation); see also Lyon v. Waldron Livestock Ass’n, Inc. v. Koshk, 516 F. Supp. 2d 982, 988-90 (D. Mont. 2007) (stating that “the agency’s duty to preserve the wilderness area is wholly independent of the source or location of that activity” and “may apply to agency activity that occurs outside of the boundaries of the wilderness area”).

O-9-18
See response to Comment O-5-10.

O-9-19
This property is on private lands, so there is no regulation by which the agency can require cultural resource inventory. The Metal Mine Reclamation Act provides for no such protections. Under MEPA, we can only assess impacts on known sites. If the property was State land, then the Montana Antiquities Act would apply. If the property was on Federal land, then Section 106 of NHPA would apply.
IMPACTS TO WATER RESOURCES FROM MINERAL EXPLORATION ARE SIGNIFICANT

The proposed mineral exploration and future drilling are likely to have significant environmental consequences for surface and groundwater quality, requiring study in an EIS. Emissary Gulch sits in the middle of a naturally and intentionally significant geothermal resource. The extent to which this resource could potentially be impacted by exploratory drilling is unknown. Previous drilling at the U.S. Geological Survey (USGS) well has been controversial due to its proximity to Yellowstone National Park. The DEQ must consider these significant environmental impacts through an EIS.

The Yellowstone River provides a high-quality water source for the Yellowstone National Park (YNP) and the Corwin Springs area to the north of YNP were thoroughly investigated by the USGS in the 1980s and 1990s (Section 3.7.2.5), and led to the establishment of the Controlled Groundwater Area (CGWA) for the Known Geothermal Resource Area (KGRA). The Proposed Action exploration area is located outside of both the CGWA and KGRA (Figure 3.10). The St. Julian Claim Block is 35 miles away from the northern rim of the YNP caldera, and cannot be considered as sitting "in the middle" of a geothermal resource. Recent investigations by MBMG concluded there is no evidence to support a potential connection to the Corwin Springs KGRA or features in Yellowstone National Park (Sections 3.7.2.3 and 3.7.2.5).

1. Water Rights

The proposed action shows a lack of clarity around the water rights associated with the mining claim on Emissary Gulch. Lucky Minerals needs to disclose and provide a record of the exact water rights transferred to them by recording those documents at the Park County Clerk and Recorder. Furthermore, DEQ statements about the associated water rights are misleading. DEQ must require that Lucky Minerals identify all water rights issues with the Montana Department of Natural Resources (DNRC) prior to any determination by DEQ.

DEQ states, at 110, that: "Water for drilling would be pumped from either the existing artesian boreholes or from the East Fork of Emigrant Creek, utilizing the water right that is attached to the St. Julian Mine claim. This water right allows for the withdrawal of 1,123 gpm (25.5 cfs)". An initial investigation of existing water rights in the St. Julian exploration area with the DNRC Water Right Query System (https://waterrightsonline.mt.gov/Default.aspx) found one existing water right attached to the St. Julian patented mining claims. It is important to note that this water right has a stated place of use in the Southeast of the Southwest quarter section of Section 5, Township 7 South, Range 9 East. Based on the map provided by Lucky Minerals this place of use only covers the drill pads located in the southern half of the St. Julian block. This discrepancy needs to be addressed in more detail by Lucky Minerals and the DNRC. Historic use of this water right will also need to be resolved with the DNRC prior to use - primarily to determine the allowable volume of consumptive use, which may not necessarily be the same as the volume listed on the abstract and in the Draft.

O-9-20
The comment does not provide a reference to the "previous drilling," but it is presumably referring to the CUT well drilled near Corwin Springs in 1986. Potential connections between Yellowstone National Park (YNP) and the Corwin Springs area to the north of YNP were thoroughly investigated by the USGS in the 1980s and 1990s (Section 3.7.2.5), and led to the establishment of the Controlled Groundwater Area (CGWA) for the Known Geothermal Resource Area (KGRA). The Proposed Action exploration area is located outside of both the CGWA and KGRA (Figure 3.10). The St. Julian Claim Block is 35 miles away from the northern rim of the YNP caldera, and cannot be considered as sitting "in the middle" of a geothermal resource. Recent investigations by MBMG concluded there is no evidence to support a hydrogeologic or geochemical connection between Chico Hot Springs or Emigrant Gulch (LaFave, 2016), and neither of those systems seem to be connected to the Corwin Springs KGRA or features in Yellowstone National Park (Sections 3.7.2.3 and 3.7.2.5).

O-9-21
See response to Comment P-19-3 and general-themed response to comments on Water Quality and Wildlife. Note that the Proposed Action does not include any drill locations on Emigrant Peak.

O-9-22
See general-themed response to comments related to Water Rights.

O-9-23
See general-themed response to comments related to Water Rights. Also see response to comments O-5-32 and A-2-16.
Additionally, the statement at 110, “Water for drilling would be pumped from ... existing artesian boresholes” and earlier in the Draft, at 20, “The artesian boresholes are located on CGNF administered land and Lucky Minerals would need to obtain permission prior to using that water supply,” brings up additional questions that will need to be addressed with DNRC. Our inquiry did not turn up any water rights related to groundwater use. If Lucky Minerals intends to pump groundwater from an existing borehole/well they will need to secure the appropriate rights to do so from DNRC and the U.S. Forest Service prior to any exploration activity.

DEQ should not allow any activity related to exploration until Lucky Minerals has secured and clarified the necessary water rights needed for their exploration operations. From all appearances within the Draft, Lucky Minerals has demonstrated a clear lack of understanding of the basics of Montana Water Law, further demonstrating evidence of their lack of due diligence and disregard of the State's rules and regulations.

2. Ground Water

Between 1973 and 1992, explorations have resulted in 83 test holes for a total of 42,237 feet. This averages just over 508 feet per hole. A lone drill site on Emigrant Peak from 1963 was widely known to have struck an artesian well that has continued to flow over 50 years later. Local landowners in Emigrant Gulch claim “almost every historic drill site up there is leaking water.”

With a combined 46 drill holes from 23 drill sites, Lucky Minerals is proposing an average depth of 1,000 feet, though some holes may be up to 2,000 feet. This represents a significant increase over historic drilling with unknown impacts to groundwater. With a long legacy of mining activity and unknown levels of acid mine drainage and other groundwater impacts, a current baseline on all existing drill sites need to be fully analyzed before any new drill sites are approved in Emigrant Gulch. The addition of 46 or more boreholes with the real potential of artesian activity could seriously impact surface water quality, which in turn has the potential to impact downstream users, fisheries and the Yellowstone River.

DEQ must require that Lucky Minerals disclose the overall number of boreholes proposed (not just a single pad site) and the totality of the company's planned exploration, to provide an understanding of the full scope of Lucky Minerals' intentions in a Plan of Operations made available for public scrutiny and comment prior to granting any permits.

3. Surface Water

As mentioned in the previous section the total number of bore holes being proposed by Lucky Minerals is unknown, the current action accounts for 46 holes. This number alone represents a potential for significant impact on the surface water resource of not only the East Fork of Emigrant Creek, but Emigrant Creek and the Yellowstone River as well.

In the No Action Alternative of the Draft, at 108, DEQ notes that “recent water quality data indicate that Emigrant Creek exceeds the acute and/or chronic aquatic life standards for metals in three of the four sampled locations (above and below the East Fork confluence, above the

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O-9-24
See general-themed response to comments related to Water Rights and Comment O-5-32.

O-9-25
The requested information regarding groundwater and acid rock drainage is discussed in the MBMG baseline report (LaFave, 2016). Further discussion of existing conditions in the Emigrant Creek subwatershed, the seasonal water loss to irrigation, and the connection to the Yellowstone River is provided in Section 3.7.2, and discussion of direct and secondary impacts is provided in Section 3.7.3. The requirements for plugging boreholes and artesian boreholes in Montana are clearly described (ARM 17.24.105, 17.24.106, 36.21.671) and included in Section 3.7.3.2.

O-9-26
See response to Comment O-9-27.

O-9-27
The total number of boreholes being proposed by Lucky Minerals is 46, as indicated throughout the EA. Discussion of existing conditions in the Emigrant Creek subwatershed, the seasonal water loss to irrigation, and the connection to the Yellowstone River is provided in Section 3.7.2, and discussion of direct and secondary impacts is provided in Section 3.7.3.

O-9-28
See response to Comments O-10-52 and O-10-53.
Great Western Mine) ... water resources are impacted there by the oxidation and weathering of alteration minerals that occur in the volcanics. This is all within the area of the proposed action, indicating that even without drilling, water quality is impacted from existing conditions and historic activity. Adding 46 new groundwater and surface water input sources, with the potential to impact water quality negatively, needs to be addressed further, since the Draft, at 111, states “it is likely that Lucky Minerals would also encounter attenuated conditions during drilling.” That statement is immediately followed by the assertion that the proposed boreholes will “produce water with chemistry and flow similar to the Duril Corporation boreholes and the seeps below the St. Julian Mine.” There is no way to guarantee this postdrilling scenario and DEQ needs to ensure that Lucky Minerals have proven safeguards in place to prevent additional impacts to the water quality as well as sufficient bonding to cover any and all associated monitoring and remediation costs, as stated at 111.

“The reclamation bonding must also be adequate to ensure a reasonable plugging at each site (ARM 17.34.106).”

DEQ must require a weekly water quality monitoring program, at a minimum, to monitor the surface waters of Emigrant Creek and its tributaries throughout the duration any exploration or mining-related activity. Additionally, continued water quality monitoring must be required after completion of any exploration or mining-related activity. The cumulative effects of from any exploration activity may not be present upon completion.

**Socioeconomic Impacts**

The Draft states that past exploration in this area didn’t affect local socioeconomics, therefore there’s no need to analyze impacts of the current proposal. We disagree. The last drilling occurred here between 1991-1995 — more than 30 years ago. The local economy has changed dramatically since 1992. For example, today the Old Chico area hosts mining lease operators and private residences that did not exist in the 1990’s. DEQ needs to consider the socioeconomic impacts on the local businesses and community, as required by Montana law.

Chico Hot Springs Resort sits at the base of Emigrant Gulch. It has one hot water source and one cold water source, both springing from Emigrant Gulch, fed by thermal water rising from deep fractures in the earth. Without this water resource, Chico Hot Springs goes out of business. This historic business has served as the heart of the Paradise Valley since 1890 and draws people from around the world, as well as locals. This is where people meet friends, get married, dance to local bands, and treat themselves to lunch. Chico Hot Springs is a highlight for tourists on their Yellowstone area vacations. Writers, artists, and celebrities have found their inspiration here. Chico has provided long-term employment and economic benefits to the community for more than a hundred years, longer than any mining operation. A mine threatens the very nature and integrity of this truly historic place.

Chico Hot Springs also serves as an important meeting place for professionals and businesses. Chico hosts conferences of state and national significance year round. Chico donates

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O-9-29

See response to Comment P-39-6. Similar water quality monitoring could be conducted during the post-drilling monitoring period, prior to any bond release inspection. The monitoring period would only be extended if impacts are observed within the initial period, and the background information from active working periods would be a useful comparison. Monitoring would take place in the East Fork adjacent to the St. Julian Claim Block, upstream and downstream from the Proposed Action sites, while also acknowledging that the stream water quality rapidly degrades approximately 0.5 mile downstream from that site, due to current natural conditions.

O-9-30

DEQ has revised the EA to include a detailed discussion of the socioeconomic impacts in Section 3.13 of the EA. Also see general-themed response to comments related to Socioeconomics.

O-9-31

The sources of the Chico Hot and Cold Springs are discussed in detail in Section 3.7.2.5, but neither spring emanates from Emigrant Gulch. Recent investigations by MBMG concluded there is no evidence to support a hydrogeologic or geochemical connection between Chico Hot Springs or Emigrant Gulch (LaFave, 2016), and neither of those systems seem to be connected to the Corwin Springs KGRA or features in Yellowstone National Park (Sections 3.7.2.3 and 3.7.2.5).

O-9-32

See general-themed response to comments related to Future Exploration and Mining Actions.

O-9-33

As required by 82-4-332(3), MCA, Lucky Minerals will be required to a reclamation and revegetation bond in a form and amount as
business to our valley and to our community, and therefore, any impact to Chico Hot Springs would have far-reaching consequences in the Paradise Valley. People visit Chico and then they visit local businesses, hire fly-fishing guides and eat in local restaurants. Chico itself employs nearly 180 families in the Paradise Valley. When you consider the tourist dollars that Chico brings to the rest of the community, you realize that any impact to Chico Hot Springs could have far-reaching economic impacts. No amount of gold is worth that economic loss to our community.

**BONDING AND RECLAMATION**

It does not appear as though Lucky Minerals has the sufficient capital to secure a bond for this project. Before allowing any type of mineral exploration in Emigrant Gulch, the DEQ must require that Lucky Minerals furnish a sufficient guarantee for complete restoration work of any project they receive authorization for.

The Draft says bonding is required. But doesn’t discuss specifics of how much money the state requires. A DEQ bond calculation in 2015, estimated that reclamation for each bore hole would cost more than $50,000 apiece, and that pad reclamation would cost an additional $3,380. But Lucky Minerals VP Shawn Dykes told the press in late 2016, “The holes will be filled with cement at a cost of about $2,000 each.” (“Vancouver company at the centre of gold mining controversy on edge of Yellowstone National Park,” DeSmog Canada, Nov. 22, 2016.)

DEQ must provide updated reclamation estimates for 2017, and disclose how much bond DEQ is requiring, and how long Montana will hold the bond.

**CONCLUSION**

PCBC recommends that the Department of Environmental Quality adopt the 4th option as presented in Section 1.5 of the Draft Environmental Assessment—determining the need for further environmental analysis with an Environmental Impact Statement so that any and all potentially significant environmental impacts are disclosed to the public and properly analyzed. Emigrant Peak is an area of extraordinary environmental, social, and economic value. Lucky Minerals’ exploration plans have the potential to significantly and negatively impact the environment.
Comment from: EarthJustice

Response To: EarthJustice

O-10-1
See general-themed response to comments related to MEPA and Further Environmental Analysis/EIS.

O-10-2
See response to Comment O-10-18. Lucky Minerals has submitted to DEQ an application seeking state authorization for an exploration drilling program on its patented mining claims. Lucky Minerals has not submitted to DEQ an application for an operating permit.

O-10-3
DEQ’s application of the significance criteria set forth in ARM 17.4.608 is set forth in Section 7 of this Final EA.

O-10-4
See general-themed response to comments related to Further Environmental Analysis.

O-10-5
Thank you for your comment.
Thank you for your comment.

Thank you for your comment.

See response to Comment O-10-18. Lucky Minerals has submitted to DEQ an application seeking state authorization for an exploration drilling program on its patented mining claims. Lucky Minerals has not submitted to DEQ an application for an operating permit for a mining operation. Thus, the scope of the EA is properly limited to the direct, secondary and cumulative impacts resulting from the proposed exploration program.

See response to Comment O-10-29.
meetings in Park County have drawn in hundreds of local residents, revealing substantial opposition to any proposal for exploration drilling or full-scale gold mining on Emigrant Peak and surrounding areas. The Department and the U.S. Forest Service received more than 6,000 scoping comments on the Department’s proposal, highlighting, among other points, the economic harm the Emigrant community will suffer if the project goes forward.

Reflecting this opposition to gold mining on Emigrant Peak, on November 21, 2016, the U.S. Forest Service and Department of Interior announced a proposal to withdraw 30,000 acres of land in Paradise Valley—including National Forest System lands adjacent to Lucky’s proposed project—from mineral development. See Notice of Application for Withdrawal and Notification of Public Meeting, 81 Fed. Reg. 83,867, 83,867 (Nov. 22, 2016). The proposal had the immediate effect of preventing mining activity, subject to valid existing rights, for two years. Id. If finalized, the withdrawal will prevent mining activity on these lands for up to 20 years. Id. The withdrawal is intended “to protect and preserve the scenic integrity, important wildlife corridors, and high quality recreation values of the Emigrant Creek area located in the Custer Gallatin National Forest, Park County, Montana.” Id. Those same values are threatened by the mineral project Lucky intends to conduct on its private claims, which is not precluded by the public lands withdrawal.

For these reasons, and to comply with its obligations under MEPA as detailed below, the Department must identify and disclose all environmental impacts in an EIS before taking any action concerning the proposed mineral exploration on Emigrant Peak.

II. MEPA REQUIRES THE DEPARTMENT TO DISCLOSE ALL THE ENVIRONMENTAL IMPACTS OF LUCKY’S EXPLORATION PROJECT

The Montana Environmental Policy Act ("MEPA") requires Montana agencies to “take a ‘hard look’ at the environmental impacts of a given project or proposal.” Montana Wildlife Fed’n v. Mont., 854 P.2d 877, 889; see also MCA § 75-1-201(1)(b)(iv). The agency must consider, among other things, feasible alternatives to the proposed action, MCA § 75-1-201(1)(b)(iv)(C); the direct, indirect, and cumulative environmental impacts of the action, MCA § 75-1-208(4); Admin. R. Mont. 17.4.607(3)(e) (requiring an evaluation of “impacts, including cumulative and secondary impacts, on the physical environment”); and “the economic advantages and disadvantages of the proposal,” MCA § 75-1-201(1)(b)(iv)(H). “The agency must examine the relevant data and articulate a satisfactory explanation for its action, including a rational connection between the facts found and the choice made.” Montana Wildlife Fed’n v. Mont., Dep’t of Environ. Quality, 2008 MT 487, ¶ 34, 347 Mont. 197, 211, 197 P.3d 482, 492.

MEPA environmental analyses come in two main varieties: detailed environmental impact statements ("EISs") and shorter, more cursory environmental assessments ("EAs"). The Department must prepare an EIS if the proposed action will "significantly affect[] the quality of the human environment." Admin. R. Mont. 17.4.607(1). The Department may, however, prepare a less-exhaustive environmental assessment if it is not clear, without further evaluation, whether the project will require an EIS; or where the otherwise significant impacts of the project can be mitigated "below the level of significance." Id., 17.4.607(3)(b), 607(4).

Thank you for your comment.

See general-themed response to comments related to MEPA and Further Environmental Analysis.

Thank you for your comment.

Thank you for your comment.
In determining whether the impacts of a proposed action will be significant, the Department must consider:

(a) the severity, duration, geographic extent, and frequency of occurrence of the impact;

(b) the probability that the impact will occur if the proposed action occurs; or conversely, reasonable assurance that the impact will not occur;

(c) growth-inducing or growth-inhibiting aspects of the impact, including the relationship or contribution of the impact to cumulative impacts;

(d) the quantity and quality of each environmental resource or value that would be affected, including the uniqueness and fragility of those resources or values;

(e) the importance to the state and to society of each environmental resource or value that would be affected;

(f) any precedent that would be set as a result of an impact of the proposed action that would commit the department to future actions with significant impacts or a decision in principle about such further actions; and

(g) potential conflict with local, state, or federal laws, regulations, or formal plans.

Admin. R. Mont. 17.4.608(1).

As set forth below, the EA does not meet these legal standards.

III. THE DEPARTMENT SHOULD REQUIRE LUCKY TO SUBMIT A NEW APPLICATION THAT COMPLETELY AND ACCURATELY DESCRIBES DRILLING LOCATIONS, WATER AVAILABILITY, AND THE SCOPE OF PLANNED EXPLORATION.

At the outset, it appears that Lucky has not provided complete and accurate information to allow the Department to appropriately evaluate the environmental impacts of planned exploration activities, particularly with respect to drilling locations, water availability, and the scope of Lucky's planned exploration activities. Accordingly, granting Lucky an exploration permit may have impacts beyond those described in the EA. The Department should require Lucky to resubmit a plan of operations that corrects these deficiencies to enable the Department to fulfill its environmental review obligations under MEPA.

First, the Department must verify that Lucky's planned exploration is limited to privately owned lands and minerals. As described in further detail in the comments separately filed by the Greater Yellowstone Coalition, a number of Lucky's proposed drill pads appear to be on the Custer Gallatin National Forest or very near the forest boundary. Not only is mining impermissible on such lands without authorization from the U.S. Forest Service— which Lucky
See general-themed response to comments related to Water Rights

As Commenter is aware, Lucky Minerals submitted a proposed plan of operations to the Gallatin National Forest for approval. The Forest Service subsequently determined that Lucky Minerals’ proposal did not qualify as a categorical exclusion. Lucky Minerals subsequently withdrew its proposed plan of operations, indicating that it would proceed with plans to drill only its private patented mining claims. Lucky Minerals indicated that it would submit a new plan of operations for the Forest Service’s review and bear the costs associated with the federal review if that were justified based on the information obtained from drilling on its patented mining claims. Lucky then submitted the application to DEQ the exploration license application pertaining to the St. Julian Claim block that is subject to this review. Lucky Minerals attached to its application a map in sufficient detail for DEQ to adequately identify the potential environmental impacts as required by ARM 17.24.103(1)(c).

MEPA requires state agencies to prepare environmental impact statements for state actions that may significantly impact the human environment. Here, the state action is either approval or denial of Lucky Minerals’ exploration license application, which seeks authorization to conduct mineral exploration only on Lucky Minerals’ patented mining claims. It is not unusual for a mineral developer to apply for authorization for a drilling program and subsequently determine to bear the cost and effort of an expanded exploration programs based on the results initially obtained. In this sense, the initial exploration program has independent utility. Finally, any approval by DEQ of the Lucky Minerals’ application for an exploration license would not limit or influence
DEQ's action on a subsequent application to amend the exploration license to expand the drilling program. DEQ would conduct a MEPA review of the amendment application, and have its full authority to either approve or deny the amendment. Of course, in the MEPA review of the amendment application, DEQ would consider the impacts associated with the expanded drilling program added to the impacts associated with the initially approved drilling program in the cumulative effects analysis.

O-10-19
See response to Comment O-10-18.

O-10-20
There is no basis for the Commenter's concern that this Environmental Assessment may provide the last opportunity for DEQ to consider the impacts of additional exploration activities that Lucky Minerals may propose in the future. On approval by DEQ, an applicant is issued an exploration license renewable annually by filing an annual report on a form provided by DEQ and payment of the renewal fee of $25. Thus, if DEQ issues an exploration license to Lucky Minerals for the two year exploration project, Lucky Minerals will be required to renew the exploration license in the second year by filing the required annual report and fee. The scope of the approved exploration project, however, is governed by the issued exploration license and is not enlarged by the fact that there is a requirement that the applicant renew the exploration license annually. In other words, if DEQ approves an exploration license authorizing Lucky Minerals to drill 46 drill holes over a two year period, Lucky Minerals could not enlarge the scope of the approved drilling program by submitting an annual report and renewal fee for a third or subsequent year. An enlargement of the exploration program beyond that originally approved by DEQ would require an amendment to the exploration license, which would entail additional environmental review under MEPA.

O-10-21
DEQ has clarified in the Final EA that DEQ's purpose and need in conducting the environmental review is to act upon Lucky Minerals' proposal to conduct mineral exploration at the St. Julian Claim Block in compliance with the Metal Mine Reclamation Act. When an agency is asked to approve a specific plan, the agency must take into account the needs and goals of the parties involved in the application or proposal. The commenter is incorrect in stating that DEQ considered only three alternatives during the environmental review. DEQ considered in detail the three alternatives identified by the
Commenter. DEQ, however, considered two additional alternatives --- one requiring Lucky Minerals to complete all exploration drilling in one season and the other that would prohibit drilling at nighttime. These alternatives were not considered in detail for the reasons given in Section 2.5. DEQ has revised this section based on comments received.

O-10-22
See response to Comment O-10-21.

O-10-23
When an agency is asked to approve a specific plan, the agency must take into account the needs and goals of the parties involved in the application or proposal. With regard to the number of proposed drill locations, DEQ has no basis to second-guess Lucky Minerals need to conduct drilling at all of the proposed locations.

O-10-24
See response to Comment O-10-20. DEQ has revised its discussion of alternatives considered but dismissed without detailed analysis in response to comments received.

O-10-25
The socioeconomic impacts resulting from Lucky Minerals proposed exploration program is set forth in Section 3.13. The impacts on sensitive species are set forth in Section 3.4. DEQ's consideration of an alternative requiring the exploration program to be completed in one three-month season and dismissal of that alternative without detailed analysis is set forth in Section 2.5.1.

O-10-26
DEQ's reason for considering but dismissing without detailed analysis an alternative that would eliminate night drilling is set forth in Section 2.5.2.

O-10-27
DEQ analyzed a reasonable range of alternatives in its environmental review of Lucky Minerals' proposed exploration activity.

O-10-28
The impacts to wildlife are addressed in Section 3.4, the impacts to wilderness values are address in Section 3.8, the impacts to water quality are
addressed in Section 3.7, and socioeconomic impacts are discussed in Section 3.13. The impacts associated with wildfire risk are discussed in response to Comment O-10-60.

O-10-29

The degree to which the effects on the quality of the human environment are likely to be "highly controversial" is one factor that must be considered by federal agencies in determining the necessity to prepare an environmental impact statement under NEPA. 40 C.F.R. 1508.27. The list of factors that state agencies must consider in determining the need to prepare an environmental impact statement under MEPA does not include a parallel provision. Moreover, even in the federal context, the term "controversial" refers to cases where a substantial dispute exists as to the size, nature or effect of the federal action rather than to the existence of opposition to a use. Also see general-themed response to comments related to Further Environmental Analysis.

O-10-30

See responses to Comment O-10-20. The environmental assessment discloses the severity of impacts on wildlife in Section 3.4. The EA acknowledges the uniqueness of the wildlife resources that may be impacted, indicating that the bald eagle is a bird of conservation concern and Canada lynx and grizzly bear are listed as threatened under the Endangered Species Act; that wolverine, Canada lynx, and grizzly bear are state-listed species of concern, and that the grizzly bear, bald eagle, elk, goshawk and pine marten are Gallatin National Forest Management indicator species.

O-10-31

DEQ has revised the EA language to state "The activity and noise associated with road construction, maintenance, and drilling rigs may cause displacement and disturbance" and "...the Proposed Action increases the potential for human / bear conflicts to occur, possibly leading to injury, harm, direct, or indirect mortality of grizzly bears." Id. at 59. But the EA does not fully grapple with the severity and duration of those impacts, or the possible inconsistency of these impacts with the 2016 Grizzly Bear Conservation Strategy. See Admin. R. Mont. 17.4.60R(1) (Department must consider “severity” and “duration” of impacts, as well as “potential conflict with local, state, or federal laws, requirements, or formal plans”).

Although the EA asserts that disturbances to grizzlies in Emigrant Gulch will be limited to the two-year duration of the project, some impacts to grizzlies will be long-lasting. Improvements to the Emigrant Gulch road, for example, will permit increased access by hikers, hunters, ATVs, and motorcycles, exacerbating the risk of bear-human conflicts well into the future. Further, because an exploration license is renewable, approval of the license would permit exploration—and the consequent impacts of exploration—to continue indefinitely. The EA does not address these enduring impacts.

O-10-32

Impacts from increased human conflicts and motorized intrusion are also more severe than the EA suggests. Human-caused mortality—including hunter self-defense, poaching, and...
The management objective is to maintain existing resource management and recreational uses, to allow agencies to respond to demonstrated problems with appropriate management actions, and to provide for bears to use lands that are not managed solely for bears but in which their needs are considered along with other uses. This language has been added to the Final EA.

O-10-32
Please see response to comments A-3-5.

O-10-33
Please see Sections 3.4 and 3.10 for the limited amount of impacts from the Project's traffic to wildlife during the two 3-month exploration seasons.

O-10-34
The Project has proposed to use only existing access roads and will not increase fragmentation by constructing new access roads for the Project.
See response to Comment O-10-18. Also see general-themed response to comments related to Future Exploration and Mining Actions.

There were as few as 136 grizzly bears in the Greater Yellowstone Ecosystem when they were listed in 1975. Today, grizzly bears thrive with a conservative population of more than 700 grizzlies. The populations stability from 2002-2014 and other population trends indicate that the Greater Yellowstone Ecosystem is at or near its carrying capacity for grizzly bears. The Greater Yellowstone Ecosystem Grizzly Bear Conservation Strategy represents a paradigm shift from managing for recovery to one of conservation. Its goal is to manage for approximately 674 bears. If and when a final delisting rule has been published and management of the Yellowstone grizzly bear has become the responsibility of Idaho, Montana and Wyoming and the tribes, these states and tribes would then determine if and when hunting would begin. U.S. Fish and Wildlife Service, Questions and Answers, Greater Yellowstone Ecosystem Grizzly Bear Population Proposed Delisting Rule.

As noted in the EA, while Lucky Minerals' patented mining claims are within suitable grizzly bear habitat, the patented mining claims do not lie within the Primary Conservalional Area identified in the Grizzly Bear Conservation Strategy. The Primary Conservation Area is envisioned to be a secure area for grizzly bears, with population and habitat conditions maintained to ensure a recovered population is maintained for the foreseeable future and to allow the bears to expand outside the Primary Conservation Area. The patented mining claims lie within Grizzly Suitable Habitat. Under the Greater Yellowstone Grizzly Bear Conservation Strategy, the objective outside the Primary Conservation Area is to maintain existing resources management and recreational uses and to allow agencies to respond to demonstrated problems with appropriate management actions. The key to successful management of grizzly bears outside the Primary Conservation Area lies in bears utilizing lands that are not managed solely for bears but in which their needs are
As discussed in the EA, the impacts to grizzly bears are not predicted to be significant, even without these mitigation measures. The mitigation measures were added out of an abundance of caution.

The Final EA language states activity "may" cause disturbance. As with grizzly bear, Canada lynx have large home ranges. The activity associated with the Proposed Action is limited spatially and temporally and there is a large amount of undisturbed habitat surrounding the Proposed Action area, allowing for avoidance of the area by lynx. Duration of impacts would likely be limited to periods of active exploration and limited road maintenance on the St. Julian Claim Block.

See response to Comment A-3-5.

See general-themed response to comments related to Future Exploration and Mining Actions and response to Comment O-10-20.

Comment noted. As with grizzly bear and Canada lynx, wolverines have large home ranges. The activity associated with the Proposed Action is limited spatially and temporally and there is a large amount of undisturbed habitat surrounding the Proposed Action area, allowing for avoidance of the area by wolverine.
For example, in the Canadian Rockies, wolverines were more likely to occur in more topographically rugged terrain and areas where industrial activity and habitat alteration were low. Wolverine occurrence was negatively related to seismic-line density and was positively related to landscape ruggedness. This sensitivity of wolverines to anthropogenic activities appears to be pronounced in females, especially during the natal denning period—an important consideration for species like the wolverine that have a low reproductive rate. Human infrastructure, including roads, may affect wolverine populations through direct mortality (e.g., road kill and more direct access for poachers and trappers). Such anthropogenic mortality is typically additive—that is, in addition to background levels of natural mortality—and can lead to population declines. Further, habitat fragmentation can alter ecological processes, indirectly affecting distribution and population viability. Fragmentation can isolate infrastructure, recreation, extractive industries. See Section 3.4.4 for the impacts to wolverines.

See Nicole Akiess Hein, Complex Effects of Human-Impacted Landscapes on the Spatial Patterns of Mammalian Carnivores, MSc Thesis, Univ. of Victoria, Ch. 2, at 3, 39, 43-45 (2015), attached as Exhibit 20; J.T. Fisher et al., Wolverines (Gulo gulo luteus) on the Rocky Mountain Slopes: Natural Heterogeneity and Landscape Alteration as Predictors of Distribution, 91 Can. J. Zool. 706, 707, 710-11, 712 (2013), attached as Exhibit 21; Robert M. Inman et al., Developing Priorities for Metapopulation Conservation at the Landscape Scale: Wolverines in the Western United States, 166 Biological Conservation 276, 284 (2013), attached as Exhibit 22; Carlos Carroll et al., Carnivores as Focal Species for Conservation Planning in the Rocky Mountain Region, 11 Ecological Applications 961, 973, 975 (2001), attached as Exhibit 23; John Krebs et al., Multiscale Habitat Use by Wolverines in British Columbia, Canada, 71 J. Wildlife Mgmt. 2180, 2181 (2007), attached as Exhibit 24; Roel May et al., Impact of Infrastructure on Habitat Selection of Wolverines Gulo gulo, 12 Wildlife Biology 283, 288-92 (2006), attached as Exhibit 25.

Fisher et al., at 710-41; See also id. at 711 (noting that wolverine densities in undeveloped areas were two to three times higher than in developed areas); id. at 712 (explaining their finding that “the probability of wolverine occurrence decreases across a gradient of increasing anthropogenic landscape development.”)

See Krebs et al., at 2181, 2189; May et al., at 291; Fisher et al., at 712 (“Habitat alteration and accompanying human activity may degrade habitat quality and depress naturally late-onset reproduction, low reproductive rates, juvenile survival, and population growth rates.”)

See Krebs et al., at 2189-90; May et al. at 292. See also Jens Persson et al., Human Caused Mortality in the Endangered Scandinavian Wolverine Population, 142 Biological Conservation 325, 328, 330 (2009), attached as Exhibit 26 (noting that in Scandinavia, “[p]oaching was the single most important cause of mortality for adult wolverines” and that “the wolverine with a low average annual reproduction may be susceptible to variation in adult survival caused by human induced mortality, with poaching as a significant part”).

Fisher et al. at 712.

Id.
wolverine home ranges, depressing the species' already low reproductive rate and leading to local extirpation. 30

In the Greater Yellowstone Ecosystem, an area that includes the proposed mineral exploration on and near Emigrant Peak, wolverines are located primarily on National Forest lands. 31 They occur at a very low density in this ecosystem as compared to other wolverine populations. 32 Nonetheless, "because it has some of the largest and most contiguous patches of wolverine habitat in the conterminous United States, the Yellowstone ecosystem is likely to play an increasingly important role in the population dynamics and persistence of wolverine populations as the regional-scale coverage of snow declines." 33

As the EA acknowledges, wolverines are likely to be found in the project area. EA at 51 ("The St. Julian Claim Block is within the home range distance for wolverines that have been documented in the area."). From 2005-2009, researchers conducted wolverine studies in the area encompassing the proposed mineral exploration. 34 The study area covered 13,000 square kilometers in the eastern portion of Yellowstone National Park and adjoining portions of the Bridger-Teton, Gallatin, and Shoshone National Forests, including largely roadless areas in the Absaroka-Beartooth and North Absaroka Wilderness areas. 35

The results of the study demonstrate the importance of the Emigrant Peak area of the Absaroka Mountains to wolverines in the Greater Yellowstone Ecosystem. Over the entire study area, scientists live-trapped just four individuals. Three of these wolverines were captured and resided in the Absaroka Range north of Yellowstone National Park. 36 Wolverine tracks were not observed in the interior of Yellowstone National Park, 37 nor were resident wolverines detected in

30 See Murphy et al. (2011a), at 38; Hein, Ch. 2, at 44.
31 See Inman et al. (2012), at 782 (noting that in the Madison and Teton mountain ranges, "eighty-six percent of wolverine locations occurred on lands administered by the United States Forest Service, 12% on National Park Service lands, and 28% occurred on all other ownerships. Thirty-six percent of all wolverine locations occurred in designated wilderness.").
32 See id. at 787 ("our estimate of 3.5 wolverines/1,000 km² is at the low end of reported values for North America.").
33 Kerry Murphy et al., Wolverines in Greater Yellowstone, 19 Yellowstone Science 17, 23 (2011b), attached as Exhibit 27.
34 See generally Murphy et al. (2011a).
35 Id. at 3.
36 Id. at 18.
37 The Wildlife Conservation Society has documented resident wolverines with home ranges that extended into the park along its northwestern and southwestern boundaries. Murphy et al. (2011a), at 35-36.
The Proposed Action evaluated in the EA does not include a long term increase in human activity. As the comment indicates, wolverines occupy large home ranges. The activity associated with the Proposed Action is limited spatially and temporally and there is a large amount of undisturbed habitat surrounding the Proposed Action area, allowing for avoidance of the area by wolverine.
Neither of the action alternatives includes maintenance of the access roads after the two 3-month exploration seasons. While reclamation of these roads is not part of either action alternative, road conditions would naturally return to pre-project conditions. There would not be a genetic threat to wolverines as a result of the short term improved access included in the Proposed Action as the temporal duration is far too short.

The Final EA includes language about the proposed listing of wolverine as threatened under the Endangered Species Act. Because the species is not listed, a discussion in the EA about potential conflicts in the event of a listing, would be speculative and beyond the scope of MEPA.

Comment noted. Impacts to wolverines were examined in the EA, please see Section 3.4. Also see general-themed response to comments related to Further Environmental Analysis.
While the Prokopenko thesis was not referenced in the EA, the EA identifies the same potential impacts as listed in this comment. Please see Sections 3.4 and 3.10 analyzing traffic impacts from the project and limited amount of road access improvements that will occur to Emigrant Creek Road.

See response to Comment O-5-10.

Sections 3.8 (Land Use, Noise and Recreation) and 3.12 (Visuals) have been revised to discuss the impacts of the proposed exploration project on inventoried Roadless areas and the Absaroka Beartooth Wilderness Area. DEQ disagrees with the Commenters statement that the equipment will be transported on a primitive road through a roadless area. Equipment will be mobilized to the site using the Emigrant Creek Road and roads that are designated FS 3272 and 327B. By definition, the equipment is not being mobilized through a roadless area because mobilization is using roads that currently exist on the landscape. The Chico Peak and North Absaroka Inventoried Roadless Areas are located 0.3 and 0.8 miles from the St. Julian Claim Block, respectively (See Figure 3.16). In regard to "the next phase" of Lucky Minerals' planned operation, see general-themed response to comments related to Future Exploration and Mining Actions.
machines, and diesel- or gas-powered water pumps at each drill site. All of this equipment will be transported on a primitive road through the roadless area, which will necessarily upgrade and alter the impact of existing primitive roads on the landscape. Additionally, three vehicle roundtrips per day are anticipated to support around-the-clock drilling in two 10-hour shifts.

Further, the next phase of Lucky’s planned exploration, which Lucky does not describe in its Plan of Operations, includes “road access construction” and additional drilling locations, potentially within the roadless area.

Noise and disturbance from increased motorized vehicle use, as well as lights used for night drilling, are fundamentally inconsistent with the pristine character of adjacent wilderness and roadless areas and should be considered under NEPA. See Greater Yellowstone Coal. v. U.S. Forest Serv., 12 F. Supp. 3d 1268, 1278-79 (D. Idaho 2014), appeal dismissed (Sept. 6, 2014) (stating that NEPA required Forest Service to examine the “sight and sound impacts” within recommended wilderness area of motorized vehicles occurring half mile outside of recommended wilderness boundary); see also Idaho Wolf League of Am., Inc. v. Kimbell, 516 F. Supp. 2d 982, 988-90 (D. Idaho 2007) (stating that “the agency’s duty to preserve the wilderness area is wholly independent of the source or location of that activity” and “may apply to agency activity that occurs outside of the boundaries of the wilderness area”). The EA should address these impacts.

C. The Emigrant Project May Have Significant Impacts on Water Quality.

The EA does not adequately address impacts to water quality. As the EA discloses, the available data about groundwater quality in the project area indicate that mineral exploration in Emigrant Gulch could release acidic water containing high concentrations of metals and other pollutants into the Emigrant Creek system. Groundwater in the area has a low pH and carries elevated concentrations of sulfate, dissolved solids, iron and manganese. EA at 95. Concentrations of aluminum, cadmium, copper, lead, and zinc in groundwater samples from some locations exceed acute and chronic aquatic life standards. Id. Groundwater surveys also suggest Lucky is likely to encounter “artesian conditions” during drilling—that is, sources of groundwater under sufficient pressure to produce flow to the surface. Id. at 111.

The EA denies that groundwater flow will impact surface water, however, stating without evidence that discharges from boreholes will “likely infiltrate back into the rocky ground.” EA at 111. Although the Department recommends that “Lucky Minerals should develop a mitigation plan for containing flow from artesian boreholes, if those conditions are encountered during drilling,” the Department does not give any indication what such a mitigation plan would involve, or how effective it would be. Id. at 112. The EA also states that plugging boreholes will

See response to Comment O-5-10.

As discussed in Section 3.7.2, the groundwater with pH < 3 and elevated metal concentrations was observed 0.5 mile to the west of the Proposed Action area, on the opposite slope, across the East Fork of Emigrant Creek. The naturally-occurring ferricretes noted in the stream adjacent to this area demonstrate the effect on surface water quality. Closer to the proposed exploration area, pH values are more neutral and water quality standards are not exceeded. Seeps and flowing boreholes that are located on slopes within or adjacent to the Proposed Action area have measured flows ≤ 5 gpm.

Pursuant to ARM 17.24.105(7) and ARM 17.24.106(2)(c) and (4), Lucky Minerals will be required to plug artesian drill holes at depth (top to bottom) prior to removing the drill rig. Lucky Minerals will be required to submit bond to ensure artesian holes are plug because the drilling will take place in an area of known artesian well potential.
Under Section 82-4-332(3), MCA, an applicant is required to file with DEQ a reclamation and revegetation bond in a form and amount as determined by DEQ under Section 82-4-338, MCA. Section 82-4-338, MCA, provides in relevant part that the applicant may file with DEQ a cash deposit, an assignment of a certificate of deposit, an irrevocable letter of credit, or other surety acceptable to the department. The bond may not be less than the estimated cost to the state to ensure compliance with Title 75, chapters 2 and 5, the Metal Mine Reclamation Act, the administrative rules adopted under the Metal Mine Reclamation Act, and the exploration license. Surety bonds, certificates of deposit and letters of credit must satisfy the requirements set forth in ARM 17.24.144, 145, and 146, respectively. DEQ may not release a bond until the provisions of the Metal Mine Reclamation Act, the rules adopted under the Metal Mine Reclamation Act and the exploration license have been fulfilled.

See response to P-39-10. As stated in the EA, the drilling fluids are not just water, but a combination of water and non-toxic biodegradable products used to increase the viscosity of the water to get the desired performance for drilling, depending on the downhole conditions. The proposed drilling fluids are classified as synthetic based drilling muds, because the polymer component is often made from synthetic organic compounds like esters, ethers, or olefin isomers. Details regarding the proposed products in the Plan of Operations have been added to Section 3.7.3.2.

As explained in Section 3.7.2, the groundwater samples collected within the proposed drilling area show pH values between 5.90-6.18 and low metal concentrations, so there is little suggestion that drilling fluids would carry contamination sourced directly from groundwater. The drilling fluids themselves have a high buffering or neutralization capacity due to the properties of the ingredients and the inclusion of additional alkaline chemicals in drilling products (e.g. caustic soda or lime) to maintain the...
optimal pH for drilling efficiency, often pH > 8. An alkaline drilling fluid would diminish the potential acidifying effect from groundwater and may immobilize metals. An inadvertent release of drilling fluid to the surface is not directly comparable to a fuel or water release. The drilling fluids would likely act as a thin mud or paste with decreased fluidity, and would likely be contained within the drill pad area by the stormwater and sediment controls. Maintaining the proposed buffer of 100 feet away from the East Fork of Emigrant Creek will decrease the probability for direct surface water discharge, but regular monitoring and contingency sampling within the creek have also been added to the Agency-Modified Alternative.

Similar to its purpose in downhole conditions, the bentonite slurry would wet the ground surface but it would be less likely than water to fully absorb into the ground (e.g. filter cake layer). Even though spill kits related to fuel and petroleum products are included in the Proposed Action, the Agency-Modified Alternative now specifies that additional spill kit materials for drill fluid containment should be readily available on-site for any inadvertent release. This equipment may include, but is not limited to, straw wattles and staking, absorbent pads, silt fence, plastic sheeting, shovels or hand tools, and buckets. As the clay-rich material dries, it could be scooped or shoveled into a sump with the cuttings. The drilling fluid components are non-toxic and biodegradable and pose little environmental risk, and any cuttings contained in the slurry would be returned to the suitable disposal location.

See response to Comment A-3-13. This approach would be comparable to observations from Pebble Prospect sites, where "sump overburden samples had neutral pH and no elevated analytes, indicating that the lack of vegetative growth was not due to soil chemistry" (Zamzow and Chambers, 2016).

The potential for turbidity and suspended solid loads would be minimized by the use of BMPs in the required permits associated with stream-crossings that Lucky Minerals will need to obtain (see Joint Application Form, Table 1.2). Also see response to Comment O-10-32.

See response to Comment P-39-6.
See general-themed response to comments related to Water Quality.

O-10-60
It is not anticipated that Lucky Minerals would use warming fires during the summer months when fire danger is at its highest. Lucky Minerals stated that warming fires would “be used in the fall and cooler months when cold nights occur” and would be in self-contained 55 gallon drums. Lucky Minerals also noted that it would adhere to all burn restrictions in the area (Dykes, 2017a).

O-10-61
DEQ is required to evaluate the environmental impacts, including cumulative and secondary impacts, on the human population in the area to be affected by the proposed action. The term "environmental impact" should be read as including a requirement of a reasonably close causal relationship between a change in the physical environment and the effect at issue. Only socioeconomic impacts that are causally linked to a change in the physical environment need be addressed in an environmental review. Changes in the physical environmental that would result from Lucky Minerals proposed exploration activity include changes in the environment due to the exploration drilling at the St. Julian Claim block and increased traffic accessing the St. Julian Claim block.

DEQ has revised its discussion of socioeconomics based on public comment and has properly limited its discussion of socioeconomic impacts to those that are directly and closely related to changes in the physical environment that would occur as a result of Lucky Minerals' proposed exploration activity. The Commenter has not asserted any close casual connection between a physical change in the environment resulting from the proposed exploration activity to asserted impacts to access to wildlife, wild places and world-class fishing. Likewise, the Commenter has not asserted any close casual connection between a physical change in the environment resulting from the proposed exploration activity to asserted impacts on tourists and recreationists visiting the Paradise Valley on Yellowstone Park.

O-10-62
DEQ agrees with the Commenter that an increase in traffic is a change in the physical environment that would occur as a result of Lucky Minerals' proposed exploration license. The socioeconomic impacts resulting from that physical change are addressed in Section 3.13.
DEQ agrees with the Commenter that increases in traffic and noise are changes in the physical environment that would occur as a result of Lucky Minerals’ proposed exploration license. The socioeconomic impacts resulting from that physical change are addressed in Section 3.13.

See response to Comments O-10-62 and 63.

Thank you for your comment.

The impact from Lucky Minerals’ proposed exploration activity on recreationists is set forth in Section 3.8 (Land Use, Noise, and Recreation) and Section 3.12 (Visuals). Lucky Minerals would conduct the exploration activity during a three month field season extending from approximately July 15 to August 15. Thus it is not expected to impact recreational skiers. People avoiding the area based on an expectation that their recreational experience will be diminished is not an impact that is closely related to a change in the physical environment and, therefore, need not be discussed in the environmental review. Socioeconomic impacts are discussed in Section 3.13.

The socioeconomic impacts that are expected to occur as a result of the proposed exploration activity are discussed in Section 3.13.
VI. CONCLUSION

Lucky Minerals’ plan for aggressive mineral exploration on and near Emigrant Peak is unprecedented in intensity and threatens significant environmental harms. The importance of the resources at stake to the Greater Yellowstone ecosystem, its human and wildlife inhabitants, and visitors from across the world demand no less than the highest level of scrutiny for the potentially destructive mineral exploration under consideration. The Department must prepare an EIS.

Sincerely,

Jenny Harbine

DEQ disagrees with the commenter’s characterization of Lucky Minerals’ proposed exploration program as “threatening significant environmental harm” and being “potentially destructive.” DEQ’s application of the significance criteria set forth in ARM 17.4.608 is included in Section 7 of the EA.
EXHIBIT LIST

Exhibit 2. J. Post, *There's a place for mines, and it's not on Emigrant Peak, Livingston Enterprise* (July 14, 2015)
Exhibit 3. Letter from Shawn Dykes to Yellowstone Ranger District (undated)


Exhibit 22. Robert M. Innan et al., *Developing Priorities for Metapopulation Conservation at the Landscape Scale: Wolverines in the Western United States*, 166 Biological Conservation 276, 284 (2013)

Exhibit 23. Carlos Carroll et al., *Carnivores as Focal Species for Conservation Planning in the Rocky Mountain Region*, 11 Ecological Applications 961, 973, 975 (2001)


Exhibit 27. Kerry Murphy et al., *Wolverines in Greater Yellowstone, 19 Yellowstone Science 17* (2011b)

Exhibit 28. Absaroka-Beartooth Wolverine Project Newsletter (Spring 2007)


Exhibit 34. Yellowstone National Park, *Changes in Yellowstone Climate* [https://www.nps.gov/yell/learn/nature/clinchangeretinfo.htm](https://www.nps.gov/yell/learn/nature/clinchangeretinfo.htm)

Exhibit 36. Summary of Concerns raised in Scoping Comments (undated)


Exhibit 40. Brett French, Drilling in Paradise: Proposed drilling near Emigrant Peak, Chico raises opposition (Mar. 24, 2016)
On February 17, 2015, Lucky Minerals (Montana), Inc. submitted an application for mineral exploration on its privately-owned patented St. Julian Mine Claim Block, a claim block surrounded by Custer Gallatin National Forest (CGNF) on the western edge of the Absaroka Mountains in Park County, Montana. A draft environmental assessment (EA) was prepared by Montana Department of Environmental Quality (MDEQ) to address the analysis of possible environmental consequences. This draft EA presents an analysis of those environmental consequences for three exploration alternatives: the No Action Alternative, the Proposed Action, and the Agency-Modified Alternative, which is an additional suggestion of mitigation measures developed by MDEQ. We should state that the Agency-Modified Alternative is the Preferred Alternative, yet as stated in the draft EA, those suggestions or modifications are not required by Lucky Minerals to implement. We want to thank MDEQ for the opportunity to comment on this analysis. We appreciate this opportunity to comment.

Comments contained below represent those of the Gallatin Wildlife Association (GWA), a non-profit volunteer wildlife conservation organization (1976-2012; non-profit 501(c)(3) corporation), representing hunters and anglers in Southwest Montana and elsewhere. GWA works to promote the restoration, maintenance and perpetuation of native fish, wildlife and their habitat. Our mission is simply to protect habitat and conserve all native fish and wildlife. GWA supports sustainable management of fish and wildlife populations through fair chase public hunting and fishing opportunities that will ensure these traditions are passed on for future generations to enjoy.

Project Description:

O-11-1
Lucky Minerals has agreed to incorporate the mitigations described in Alternative 3 into the exploration license. (See 75-201(4)(b), MCA, "Nothing in this subsection (4) prevents a project sponsor and an agency from mutually developing measures that may, at the request of a project sponsor, be incorporated into a permit or other authority to act.")

O-11-2
Thank you for your comment.
To restate the project as listed in the draft EA, the St. Julian Claim Block consists of nine patented mining claims located in the Emigrant Mining District approximately 12 miles southeast of Emigrant and 22 miles northeast of Gardiner, Montana. According to the summation given:

"Lucky Minerals proposes to drill up to 46 drill holes from 23 drill pads (2/3 pad) over two field seasons. The total project disturbance area, including access roads, laydown areas, and drill pads within the St. Julian Claim Block, would be approximately 4.8 acres. In order to keep disturbance to a minimum, all drill holes and associated stumps would be located within the previously disturbed prism of existing roads. The stumps would be used for collection and disposal of wet drill cuttings. Lucky Minerals would use two drills running two ten-hour shifts per day. Lucky Minerals estimates that a maximum of 4 drill sites would be in use at any one time. Results from this preliminary phase of the project would be used to model the subsurface geology and associated mineralization, if any."

"...The project area would be accessed by the county maintained Emigrant Creek Road and then by Forest Service designated Road 3272. Access to the Emigrant Creek Road is from the town of Emigrant by way of the Chico Road. The number of trips to the project following the initial delivery of the drilling equipment would be approximately two, two-way trips per day. There may be localized disturbances on Emigrant Creek Road and Forest Service Road 3272, the proposed access route to the St. Julian Claim Block, to facilitate mobilization of equipment and to improve safety. Although Lucky Minerals does not anticipate conducting any work or improvements to any of the stream crossings, the company commits to obtaining any permits required by County, State, or Federal agencies."

**Stating the Obvious:**

Even though this draft EA is an analysis on the project at hand, a project covering only 4.8 acres of private land, let's be clear. If Lucky Minerals Inc., receives the results they are hoping to find from exploratory operations, the damage done would and could be far greater on the natural landscape than what is to be unleashed on just these 4.8 acres. This is an issue not mentioned within the scope of this draft EA. The comments below are centered on the facts listed within the draft EA and on that project area alone. But please note that our concern will be magnified many times over if and when Lucky Minerals, Inc. decides to proceed ahead with full scale operations.

Even though this draft EA is concerned with exploratory operations on private land, the impact will not remain on private land. Wildlife does not know and understand arbitrary boundaries such as private and public. And the wildlife within the project area is owned by the American Public. This is our natural heritage. The same argument could be said about public access, water quality of streams and groundwater resources, and the unintentional spillover effect on public lands bordering private lands. Directly or indirectly, any accidents and/or unattended consequences will have harm on public lands.

**O-11-3**

Thank you for your comment.

**O-11-4**

See general-themed response to comments related to Future Exploration and Mining Actions and Cumulative Impacts.

**O-11-5**

An impact analysis was completed for the resources associated with the scoping issues studied in detail. Each resource identifies an analysis area for direct, secondary, and cumulative impacts. These areas extend beyond the private claim block. Therefore, both private and public lands have been analyzed.
A thorough analysis by DEQ should be undertaken to understand the impacts of water quality and quantity. This would include understanding the surface water and groundwater relationship of Emigrant Creek and its aquifer as it is a tributary of the Yellowstone River.

Wilderness Areas and Proposed Wild and Scenic River Designations:

To ignore the discussion of potential wilderness or the discussion of proposed future designation of Yellowstone River as a Wild and Scenic River is a mistake. The draft EA states the following: “Future land designations are speculative and beyond the scope of this analysis. This issue will not be analyzed.” If exploratory actions would result in harm to nearby resources, the harm could preclude positive steps from being taken in setting aside these lands and waters as stated above. So to dismiss the discussion as presumptuous or not necessary is an opportunity lost. In discussion with Forest Service officials, there is no current known prospect to designate current inventoried roadless areas in the vicinity of the project area as wilderness study areas. However, the Custer Gallatin National Forest is undergoing a comprehensive Forest Management Plan. The future of current roadless areas in the vicinity of the St. Julian Claim Block and the current Absaroka-Beartooth Roadless Area remain in question. Inclusion of these lands into the current Absaroka-Beartooth Wilderness Area will remain a possibility.

Currently the project area is only three miles from the nearest boundary of the Absaroka-Beartooth Wilderness Area. If exploratory action results in the desire to pursue active mining operations, wildlife and their habitat would be greatly impacted in the Absaroka-Beartooth Wilderness Area. Not to mention that sight and noise pollution could also have a significant impact on the wilderness experience.

Wildlife and Endangered Species:

Our natural heritage is succumbing to immense environmental pressure not only here but around the world. The Gallatin Wildlife Association tries to address these concerns over wildlife and their corresponding habitat in southwestern Montana. This draft EA raises concerns over three species which have been or currently are on the endangered species list as permitted under the Endangered Species Act of 1973: the bald eagle, Canadian Lynx and the grizzly bear. The draft EA states the proposed project area is located in known habitat for each of these species.

We would like to comment on two of those endangered species and include two additional species of concern - threatened species and indicator species.

Canadian Lynx: The United States Fish and Wildlife Service (USFWS) has designated critical habitat in portions of the Custer Gallatin National Forest for the Canadian Lynx in 2014. The draft EA states that the Emigrant Gulch Road corridor and St. Julian Claim Block lie within the boundaries of designated lynx critical habitat. While the draft EA makes the statement that there is no documented evidence of Canadian Lynx in the St. Julian

Thank you for your comment.

Thank you for your comment.
Potential impacts to grizzly bears are addressed in the EA and the Agency-Modified Alternative has provisions to minimize human/bear interactions. Also see response to Comments O-10-36 and O-10-37.

Thank you for your comment.
O-11-11 (cont.)

O-11-12
Thank you for your comment.

O-11-13
Comment noted. Also see general-themed response to comments related to Future Exploration and Mining Actions.

O-11-14
Thank you for your comment.
and grizzly bear, the indirect effect of continued road deterioration would limit vehicle access to higher elevation areas beyond the St. Julian Mine property, reducing human incursions into wildlife habitat."

For this reason it is the belief of the Gallatin Wildlife Association that the "No Action Alternative" should be the preferred action taken. There doesn't seem to be any disagreement that the St. Julian Mine Claim Block is in the heart of many sensitive and threatened species of wildlife. The risk is too great to take and too heart-breaking to hear if this proposed action would result in the degradation of the future of southwest Montana's natural heritage. We thank you for this opportunity to comment.

Sincerely,

Glenn Hackett
Volunteer President, Gallatin Wildlife Association
Thank you for your comment.

See general-themed response to comments related to Bonding.
3.7.3.3. Agency-Modified Alternative

Lucky Minerals suggests that: “Surface and ground water monitoring should not be an issue during the core drilling phase of this operation. All drill fluid additives pumped down hole are regulated and meet all state and Federal safety and environmental standards.” (Lucky Minerals, 2015, p.8)

DEQ notes that “... the wellbore that will be drilled will penetrate the aquifer covered by the surficial geologic units...” (DEQ, 2016, p. 110)

These wells are located in areas where sulfide mineralization is expected. Water that is resident in fractures in these zones will have been exposed to this mineralization, and is likely to have some level of dissolved metals. In addition, the drill cuttings will contain sulfide minerals that will now be finely ground, and exposed to oxygen and water as they are flushed to the surface. Drill fluid that escapes the pad, a common occurrence at drill sites, could contain contamination that is independent of the drill additives that are used.

DEQ has sampled the East Fork at the base of the St. Julian Mine area, at up-gradient and down-gradient sites (GWIC 2855007 and 2855009, DEQ, 2016, p. 83). So there is relatively recent background data that can be used to ensure drilling activities, including vehicle activity in the streams, is not unduly degrading background water quality.

In the Proposed Alternative it is assumed there will be no surface water quality impacts, and DEQ has not addressed water quality sampling in the Agency-Modified Alternative. It is inappropriate that some water quality monitoring be required, since there are several different contaminant vectors that might lead to surface water contaminations (e.g., drilling fluids spilled at the drill pad, vehicles crossing through the stream, failure of silt drift fences or stream wickets, etc.). Simple pH and specific conductance monitoring would provide a trigger to alert DEQ that more detailed information might be needed. The only time-consuming part of pH and SC monitoring is calibrating the meter, and it is not unreasonable to add that sampling surface water quality at two locations be done weekly.

Recommendations: DEQ should require weekly monitoring for pH and specific conductance at sites GWIC 2855007 and 2855009. If the pH at the lower site is 6.5 or more, or the SC at the lower site is 1000 nS/cm or more, then a full suite of metals and cations should be sampled at both sites.

4.1.1. Geology and Minerals

The disposal of waste drill cuttings is discussed in several sections of the EA. In this section it is noted that:

“... each of the geologic waste material from drilling (i.e. cuttings) would be pumped back into the drill hole, or buried and compacted at the surface as part of reclamation.” (DEQ, 2016, p. 146)

Requiring that all drill cuttings be disposed downhole or in a lined pit should be a mandatory part of the permit. As previously mentioned, drill waste from mineralized areas can lead to acidic metal contamination. (Gannaway and Chambers, 2016). Lining the waste pits with an impermeable liner should also be required. The metals in some cuttings can be very high, and unlined pits allow maximum seepage into groundwater. Pits lined with an impermeable liner will at least minimize the amount of seepage to groundwater.

O-12.4

Drill cuttings would not be allowed to remain on the surface. The sumps would be lined and when drilling is completed, the salvaged native soil would be used to cover the compacted sumps, which should allow for sufficient revegetation and preclude leakage. The use of a cyclone recovery system and the placement of bottom liners in sumps would preclude allowing drilling fluids to percolate into the ground. In addition, the Agency-Modified Alternative has been updated to restrict the disposal of cuttings in historic mine workings, the cuttings would be pumped back downhole prior to plugging, or covered, compacted, and revegetated.
It should also be noted that Lucky Minerals has proposed to line the waste pits and use a cyclone system to dewater the drill cuttings before placing them in a pit. (Lucky Minerals, 2015, p.4)

The use of a cyclone system is strongly recommended. As noted in the EA: "...the cyclone system reduces the drilling water demand and potential impacts to surface water, and reduces the potential for seepage into shallow groundwater from fluid-bearing sumps." (DEQ, 2016, p. 111)

Recommendation: No drill cuttings should be allowed to remain on the surface. All drill cuttings will either be returned downhole, or placed in pits lined with an impermeable liner, and covered with native materials.

Thank you for the opportunity to comment on this EA.

David M. Chambers, Ph.D., P. Geop.

References
8.4 FORM LETTERS RECEIVED

The following form letters were received during the public comment period.
Dear Department of Environmental Quality,

Lucky Minerals’ plan to explore for gold in Emigrant Gulch is full of flaws and oversights. I strongly urge you to consider further environmental analysis, so that any and all potentially significant environmental impacts are disclosed to the public and properly analyzed.

Today’s mining industry is held to much higher standards than it was even 50 years ago. We cannot allow sloppy inaccuracies to put our land, water, and economy at risk.

I am deeply concerned about how our public lands will be affected by gold exploration. Lucky Minerals’ proposal simply does not have enough details or even basic information, and their primary map isn’t accurate. This is unacceptable. DEQ must deny their application until Lucky Minerals can produce adequate and accurate information.

I ask you to consider the impacts of increased industrial traffic in Emigrant Gulch, and to analyze how gold exploration will affect our public access across both US Forest Service and private lands. Please also consider the socioeconomic impacts gold exploration will have on the vibrant and resilient tourism and recreation economy of Park County.

Finally, I ask you to evaluate the impacts to water quality and quantity since exploration will take place near Emigrant Creek, a tributary of the Yellowstone River. We cannot risk the clean water that fuels Park County and the Paradise Valley.
Greater Yellowstone Coalition Campaign Letter

Nov 16, 2016

Jen Lane
P.O. Box 200901
Helena, MT 59601

Subject: Tell Montana: Don't mine Yellowstone!

Dear Jen Lane,

Lucky Minerals' plan to explore for gold in Emigrant Gulch is full of flaws and oversights. I strongly urge the Department of Environmental Quality (DBQ) to consider further environmental analysis, so that any and all potentially significant environmental impacts are disclosed to the public and properly analyzed.

Today's mining industry is held to much higher standards than it was even 50 years ago. We cannot allow sloppy inaccuracy to put our land, water and economy at risk.

I am deeply concerned about how our public lands will be affected by gold exploration. Lucky Minerals' proposal simply doesn't have enough details or even basic information, and their primary map isn't accurate. This is unacceptable. DBQ must deny their application until Lucky Minerals can produce adequate and accurate information.

I ask the DBQ to consider the impacts of increased industrial traffic in Emigrant Gulch, and to analyze how gold exploration will affect our public access across both US Forest Service and private lands. DBQ must also consider the socioeconomic impacts gold exploration will have on the vibrant and resilient tourism and recreation economy of Park County.

Finally, I ask DBQ to evaluate the impacts to water quality and quantity since exploration will take place near Emigrant Creek, a tributary of the Yellowstone River. We cannot risk the clean water that fuels Park County and the Paradise Valley.
Dec 8, 2016

Jen Lane
P.O. Box 206901
Helena, MT 59601

Subject: Tell Montana TODAY: Don't mine Yellowstone!

Dear Jen Lane,

I strongly urge the Department of Environmental Quality (DEQ) to adopt the 4th option as presented in Section 1.5 of the Draft EA, determining the need for further environmental analysis, so that any and all potentially significant environmental impacts are disclosed to the public and properly analyzed.

Lucky Minerals' plan to explore for gold in Emigrant Gulch is full of flaws and oversights that put our land, water, and the local economy at risk.

* The proposed action is supposed to be on private lands, yet Lucky's map shows one claim and at least three proposed drill sites that appear to be on public lands. Lucky needs to complete a survey and produce an accurate GIS map. This lack of attention to detail on something as fundamental as the primary map is unacceptable.

* The proposed action shows a lack of clarity around Lucky's water rights up Emigrant Gulch. Lucky needs to disclose and provide a record of the exact water rights transferred to them by recording those documents at the Park County Clerk and Recorder.

DEQ must deny Lucky Minerals' application until the company can produce adequate and accurate information.

There is also a significant need for DEQ's further analysis in the following areas:

* Socioeconomic impacts: The Draft states that past exploration in this area didn't affect local socioeconomics, therefore there's no need to analyze impacts of the current proposal. I disagree. The last drilling occurred here between 1991-1993 - more than 20 years ago. The local socioeconomics have changed dramatically since 1992. For example, today the Old Chico area hosts nine vacation rental businesses and six private residences that did not exist in the 1990s. DEQ needs to consider impacts to current socioeconomics, as required by Montana law.

* Bonding: The Draft says bonding is required, but doesn't discuss specifics of how much money the state requires. A DEQ bond calculation in 2015 estimated that reclamation for each bore hole would cost more than $8,000 apiece, and that pad reclamation would cost an additional $3,380. But Lucky Minerals VP Shaun Dykes told the press in late 2016, "The holes will be filled with cement at a cost of about $2,000 each." (Vancouver company at the centre of gold mining controversy on edge of Yellowstone National Park, DeSmog Canada, Nov. 22, 2016.) This discrepancy is disturbing. DEQ must provide updated reclamation estimates for 2017, and disclose how much bond DEQ is requiring, and how long Montana will hold the bond.

I ask the DEQ to consider the impacts of increased industrial traffic in Emigrant Gulch, and to analyze how gold exploration will affect our public access across both US Forest Service and private lands. Finally,

I ask DEQ to evaluate the impacts to water quality and quantity since exploration will take place near Emigrant Creek, a tributary of the Yellowstone River. We cannot risk the clean water that fuels Park County and the Paradise Valley.
Sierra Club Form Letter

Jen Lane, DEQ, MEPA Coordinator
Montana Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Conduct a more complete assessment of the proposed Emigrant Mine, Exploration License Application #00795

Dear Coordinator Lane,

Lucky Minerals has made it clear that they want to create a large scale mine and explore for other minerals in addition to gold. Their proposal opens the door for development of a large-scale mine and puts the Yellowstone River and Montana’s outdoor heritage at risk.

The DEQ analysis only examined a small fraction of the company’s expansive mine plans. The flawed analysis does not offer a complete picture, so neither DEQ nor the public can truly assess the impacts and long and short-term consequences of mining in this world-famous landscape.

The Paradise Valley is a world-renowned gateway to Yellowstone and home to grizzly bears and wolverines. A gold mine would put these and other imperiled species at even greater risk, and seriously threaten the local tourism-dependent economy.
8.4.3 General Form Letter

General Form Letter

I strongly urge the Department of Environmental Quality (DEQ) to adopt the 4th option as presented in Section 1.5 of the Draft EA – determining the need for further environmental analysis, so that any and all potentially significant environmental impacts are disclosed to the public and properly analyzed.

Lucky Minerals’ plan to explore for gold in Emigrant Gulch is full of flaws and oversights that put the area’s land, water, and local economy at risk.

The proposed action is supposed to be on private lands, yet Lucky’s map shows one claim and at least three proposed drill sites that appear to be on public lands. Lucky needs to complete a survey and produce an accurate GIS map. This lack of attention to detail on something as fundamental as the primary map is unacceptable.

The proposed action shows a lack of clarity around Lucky’s water rights up Emigrant Gulch. Lucky needs to disclose and provide a record of the exact water rights transferred to them by recording those documents at the Park County Clerk and Recorder.

DEQ must deny Lucky Minerals’ application until the company can produce adequate and accurate information.

There is also a significant need for DEQ’s further analysis in the following areas:

Socioeconomic impacts: The Draft states that past exploration in this area didn’t affect local socioeconomics, therefore there’s no need to analyze impacts of the current proposal. I disagree. The last drilling occurred here between 1991-1993 – more than 20 years ago. The local socioeconomics have changed dramatically since 1992. For example, today the Old Chico area hosts nine vacation rental businesses and six private residences that did not exist in the 1990s. DEQ needs to consider impacts to current socioeconomics, as required by Montana law.

Bonding: The Draft says bonding is required, but doesn’t discuss specifics of how much money the state requires. A DEQ bond calculation in 2015 estimated that reclamation for each bore hole would cost more than $8,000 apiece, and that pad reclamation would cost an additional $3,380. But Lucky Minerals VP Shawn Dykes told the press in late 2016, “The holes will be filled with cement at a cost of about $2,000 each...” (“Vancouver company at the centre of gold mining controversy on edge of Yellowstone National Park,” DeSmog Canada, Nov. 22, 2016.)

This discrepancy is disturbing. DEQ must provide updated reclamation estimates for 2017, and disclose how much bond DEQ is requiring, and how long Montana will hold the bond. I ask the DEQ to consider the impacts of increased industrial traffic in Emigrant Gulch, and to analyze how gold exploration will affect our access to the US Forest Service and private lands.

Finally, I ask DEQ to evaluate the impacts to water quality and quantity since exploration will take place near Emigrant Creek, a tributary of the Yellowstone River. We cannot risk the clean water that fuels Park County and the Paradise Valley.
December 12, 2016

Montana DEQ  
P.O. Box 200901  
Helena, MT 59620-0901

Re: Lucky Minerals Draft EA

Thank you for the opportunity to comment on the Lucky Minerals Draft EA. I am writing on behalf of Earthworks, a non-profit organization dedicated to protecting communities and the environment from the adverse effects of mineral development.

I urge the Department of Environmental Quality (DEQ) to adopt the 4th option as presented in Section 1.5 of the Draft EA determining the need for further environmental analysis, so that any and all potentially significant environmental impacts are disclosed to the public and properly analyzed.

Lucky Minerals' plan to explore for gold in Emigrant Gulch is full of flaws and oversights that put our land, water, and the local economy at risk.

- The proposed action is supposed to be on private lands, yet Lucky's map shows one claim and at least three proposed drill sites that appear to be on public lands. Lucky needs to complete a survey and produce an accurate GIS map. This lack of attention to detail on something as fundamental as the primary map is unacceptable.
- The proposed action shows a lack of clarity around Lucky's water rights up Emigrant Gulch. Lucky needs to disclose and provide a record of the exact water rights transferred to them by recording those documents at the Park County Clerk and Recorder.

DEQ must deny Lucky Minerals' application until the company can produce adequate and accurate information.

There is also a significant need for DEQ's further analysis in the following areas:

- Socioeconomic impacts: The Draft states that past exploration in this area didn't affect local socioeconomics, therefore there's no need to analyze impacts of the current proposal. I disagree. The last drilling occurred here between 1991-1993 -- more than 20 years ago. The local socioeconomics have changed dramatically since 1992. For example, today the Old Chico area
hosts nine vacation rental businesses and six private residences that did not exist in the 1990s. DEQ needs to consider impacts to current socioeconomics, as required by Montana law.

* Bonding: The Draft says bonding is required, but doesn't discuss specifics of how much money the state requires. This discrepancy is disturbing. DEQ must provide updated reclamation estimates for 2017, and disclose how much bond DEQ is requiring, and how long Montana will hold the bond.

I ask the DEQ to consider the impacts of increased industrial traffic in Emigrant Gulch, and to analyze how gold exploration will affect public access across both US Forest Service and private lands. Finally,

I ask DEQ to evaluate the impacts to water quality and quantity since exploration will take place near Emigrant Creek, a tributary of the Yellowstone River. We cannot risk the clean water that fuels Park County and the Paradise Valley.

Sincerely,

Bonnie Gestring
EARTHWORKS
140 South 4th St. West
Missoula, MT 59801
406-549-7361
bgestring@earthworksaction.org
9 GLOSSARY

Acid Rock Drainage (ARD)- a rock weathering process which produces an outflow of water with low pH and elevated concentrations of sulfates and some metals. Although a host of chemical processes can contribute to ARD, the oxidation of pyrite (i.e. reaction with oxygen and water) is the greatest contributor. This process occurs naturally within some environments, but can be exacerbated by large scale ground disturbances.

Alluvium- loose, unconsolidated soil or sediments which have been eroded, reshaped, and deposited in a non-marine setting. Particle size can range from silt and clay up to sand and gravel.

Andesite- an extrusive igneous (volcanic) rock, with a generally intermediate composition that falls between basalt and dacite. Silicon dioxide (SiO₂) content is typically between 52 and 63%.

Aphanitic- description given to igneous rocks that are so fine-grained that the component mineral crystals are not detectable by the unaided eye.

Argillic alteration- hydrothermal alteration of rock which introduces clay minerals (e.g. kaolinite, smectite and illite). The process generally occurs through interaction with moderately acidic, low temperature groundwater and can occur under atmospheric conditions. Advanced argillic alteration occurs under even more acidic conditions and higher temperatures.

Autobreccia- a clastic volcanic rock that is formed when thick, nearly solid lava breaks up into blocks and these blocks are then reincorporated into the lava flow and mixed in with the remaining liquid magma. The resulting breccia is uniform in rock type and chemical composition.

Basalt- a fine-grained extrusive igneous (volcanic) rock, which is classified as having a mafic composition. This indicates the rock has higher magnesium and iron content, but a lower silicon dioxide (SiO₂) content, typically between 45 and 52%.

Breccia- a rock composed of broken fragments of minerals or rock cemented together by a fine-grained matrix that can be similar to, or different from, the composition of the fragments.

Caldera- a large volcanic crater, typically one formed by a major eruption leading to the collapse of the mouth of the volcano.

Chalcocite- a copper-sulfide ore mineral (Cu₂S), which is opaque and has a dark-gray to black color.

Chalcopyrite- a copper-iron-sulfide ore mineral (CuFeS₂), which is opaque and has a brassy to golden-yellow color.

Cirque- a half-open steep-sided hollow at the head of a valley or on a mountainside, formed by glacial erosion.

Covellite- a relatively uncommon copper-sulfide mineral (CuS), which has an indigo blue color. It is often found in association with, or as a coating on, other sulfide minerals.
Crepuscular- animals are those that are active primarily during twilight (i.e., the period immediately after dawn and that immediately before dusk).

Cryochrept- A cold-climate soil lacking in development at both the surface and sub-surface levels.

Dacite- an extrusive igneous (volcanic) rock, which is classified as having an intermediate-felsic composition, in between andesite and rhyolite. This indicates the rock has a typical silicon dioxide (SiO2) content between 63 and 69%.

Diamond Core Hole Drilling- a drilling technique that produces a solid core of rock that is extracted from depth for examination on the surface. The drill bit itself is a cylindrical metallic ring that contains industrial diamonds in the matrix, which aids in the strength and hardness of the bit. As drilling progresses downward, a cylindrical rock core forms in the interior of the drill pipe for later extraction.

Dissolved Oxygen- a common field parameter measurement which quantifies the concentration of molecular oxygen (O2) dissolved in water.

Drusy Quartz- a coating of fine quartz crystals that forms on a rock void or fracture surface.

Electrofishing- a common scientific survey method which uses direct current electricity to catch fish, using a submerged cathode and anode. This affects the movement of the fish so that they swim towards the anode where they can be caught to determine population, density, and species composition.

Eocene- a major division of the geologic timescale, that is the second epoch of the Paleogene Period. The Eocene Epoch lasted from 56 to 33.9 million years ago.

Epiclast- rock clasts and minerals released by ordinary weathering processes from pre-existing consolidated rocks. Volcanic epiclasts are clasts of volcanic composition derived from erosion of volcanoes or ancient volcanic terrains

Ferricrete- a hard, erosion-resistant layer of sediments which has been cemented into a crust by iron oxides, typically derived from the oxidation of percolating solutions of iron salts.

Galena- an abundant lead sulfide mineral (PbS), which has a gray to silvery color.

Gangue- the commercially worthless material that surrounds, or is closely mixed with, a wanted mineral in an ore deposit.

Granite- an intrusive igneous (plutonic) rock, which is classified as having a felsic composition. This indicates the rock has a higher silicon dioxide (SiO2) content, typically greater than 69%.

Granodiorite- an intrusive igneous (plutonic) rock, which is classified as having an intermediate-felsic composition, between diorite and granite in composition. This indicates the rock typically has a silicon dioxide (SiO2) content between 63 and 69%.

Half-Graben- a geological structure bounded by a fault along one side of its boundaries, unlike a full graben where a depressed block of land is bordered by parallel faults.
**Hydrologic Unit Code** - a sequence of numbers or letters which classify and categorize bound hydrological features like rivers, lakes, or drainage basins.

**Hydrostatic Pressure** - the pressure that is exerted by a fluid at equilibrium at a given point within the fluid, due to the force of gravity. Hydrostatic pressure increases in proportion to depth measured from the surface because of the increasing weight of fluid exerting downward force from above.

**Hydrothermal Breccias** - a clastic rock that is formed at shallow crustal levels, when seismic or volcanic activity causes a void to open along a fault deep underground. The void typically fills with expanding hot water or steam, which then causes rock to destabilize and collapse into the void. As the cycle continues, the mixture of collapsed rock may consolidate and form a breccia.

**Induced Polarization Geophysical Surveys** - a geophysical imaging technique used to identify the electrical chargeability of subsurface materials.

**Krummholtz** - stunted windblown trees growing near the tree line on mountains.

**Laramide Orogeny** - a period of mountain building in western North America, which started in the Late Cretaceous, 70 to 80 million years ago, and ended 35 to 55 million years ago. This orogeny occurred in a series of pulses, with quiescent phases intervening.

**Mantle Plume** - a mechanism proposed to explain volcanically active regions that are not associated with tectonic plate boundaries. These plumes or “hotspots” are posited to exist where hot rock nucleates at the core-mantle boundary and rises through the Earth’s mantle, intruding into the crustal layer.

**Mesic** - an environment or habitat containing a moderate amount of moisture.

**Mesozoic** - a major division of the geologic timescale, that is the second era within the Phanerozoic eon (between the Paleozoic and Cenozoic). The Mesozoic Era lasted from 252 to 65 million years ago, and is commonly associated with the age of dinosaurs and abundant conifers.

**Meteoric Water** - water derived from any form of precipitation, and the water bodies which originate secondarily from precipitation (e.g. rivers, lakes, icemelts).

**Microsite** - a small part of an ecosystem that differs markedly from its immediate surroundings.

**Molybdenite** - a relatively common molybdenum-sulfide ore mineral (MoS₂), which has a black to silvery-gray color. Molybdenite is also very soft (Mohs scale hardness= 1-1.5), and may be superficially mistaken for graphite due to similar physical properties.

**Paleozoic** - a major division of the geologic timescale, the earliest and longest era within the Phanerozoic eon (followed by the Mesozoic and Cenozoic). The Paleozoic Era lasted from 541 to 252 million years ago, and the early part of the era is commonly associated with the relatively sudden appearance of invertebrate animals and development of macroscopic plant life.

**Permil (or per mille)** - a sign used to denote “parts per thousand,” which looks like a percent sign with an extra zero in the divisor (%).
**pH-** a numeric and logarithmic scale used to specify the acidity or basicity of a solution, generally reported between 0 and 14. In general terms, it is approximately the negative logarithm of the molar concentration (mol/L) of hydrogen ions.

**Physiographic Province-** a geographic region with a characteristic geomorphology, and often with a specific subsurface rock type or structural elements.

**Pliocene-** a major division of the geologic timescale, that is the second epoch of the Neogene Period. The Pliocene Epoch lasted from 5.3 to 2.6 million years ago.

**Porphyry-** a textural term for an igneous rock consisting of large-grained crystals dispersed in a fine-grained matrix or groundmass. The term is also used to describe a type of mineral deposit called a “copper porphyry,” which forms primarily when fluids are driven off from a cooling, intrusive magma body.

**Potentiometric Surface-** a hydrologic concept which is an imaginary surface that defines the level to which water in a confined aquifer would rise, were it allowed to equilibrate under atmospheric conditions. This concept is often depicted as a contoured map showing groundwater elevation.

**Precambrian-** a major division of the geologic timescale, that is the largest span of time in Earth’s history before the current Phanerozoic Eon. It spanned from the formation of Earth about 4.6 billion years ago, to the beginning of the Cambrian Period (within the Paleozoic Era) about 542 million years ago.

**Quartz Monzonite-** an intrusive igneous (plutonic) rock, which is classified as having a felsic composition. This indicates the rock has a higher silicon dioxide (SiO₂) content, typically greater than 69%. It is often confused with granite due to its similar color and mineral content, but quartz monzonite contains only 5-20% quartz, while granite contains >20%.

**Quartz-Sericite-Pyrite alteration-** also known as phyllic alteration, this is a hydrothermal alteration zone that occurs in permeable rock that has been affected by circulation of hydrothermal fluids. The original mineral suite (often containing orthoclase feldspar, biotite, and various silicates) may be altered to sericite, quartz, and pyrite, but the texture and mineral geometry may be preserved.

**Reduction Potential (Redox)-** a measure of the tendency of a chemical species to acquire electrons and thereby be reduced. This measurement is often applied to aqueous solutions, where it is a measure of the tendency of the solution to either gain or lose electrons when it is subject to change by introduction of a new species.

**Reverse Circulation Drilling-** a drilling method in which a pneumatic reciprocating piston (or “hammer”) is used to crush rock and advance the drill hole. The cuttings are lifted up by air, and sometimes water, through an inner tube in the drill pipe.

**Rheology-** is the study of the flow of matter, primarily in a liquid state, but also as solids under conditions in which they respond with plastic flow rather than deforming elastically in response to an applied force.

**Rhyodacite-** an extrusive igneous (volcanic) rock, which is classified as having an intermediate composition, between rhyolite and dacite.

**Rhyolite-** an extrusive igneous (volcanic) rock, which is classified as having a felsic composition. This indicates the rock has a higher silicon dioxide (SiO₂) content, typically greater than 69%.
Seral- is an intermediate stage found in ecological succession in an ecosystem advancing towards its climax community.

Sericite- a fine-grained mica, similar to muscovite or illite. Sericite is a common alteration mineral of orthoclase or plagioclase feldspars in areas that have been subjected to hydrothermal alteration.

Siliceous- a description of rocks that have silica (SiO₂) as a principal constituent.

Silicified- a description of rocks that have been converted into or impregnated with silica (SiO₂).

Specific Conductivity (SC)- the measure of a solution’s ability to conduct an electrical current.

Sphalerite- a common zinc sulfide mineral that may contain variable amounts of iron ((Zn,Fe)S). Sphalerite is the chief ore of zinc, and its color can vary from brown to yellow, or gray to gray-black.

Stable Isotopes- atoms whose nuclei contain the same number of protons but a different number of neutrons. Unlike radioactive isotopes which decay over time and thus change atomic weight, stable isotopes do not degrade. There are often multiple stable isotopes that exist for each light-weight element, so isotopic analysis relies on measuring the ratios of particular isotopes within a sample.

Stockwork- a complex system of structurally controlled or randomly oriented veins.

Sulfate- a very common, polyatomic ion with the empirical formula SO₄²⁻.

Sulfides- an inorganic anion of sulfur with the chemical formula S⁻². In aqueous solutions, sulfides readily bond with transition metal cations. Many important metal ore minerals are sulfides.

Talus- a slope or deposit formed by an accumulation of broken rock debris, as at the base of a cliff. Also known as “scree.”

Terrestrial- an animal that lives on land as opposed to living in water, or sometimes an animal that lives on or near the ground, as opposed to arboreal life (in trees).

Tertiary- the former term for the geologic period from 65 to 2.6 million years ago, between the extinction event at the end of the Cretaceous Period and the beginning of the Quaternary glaciation. Although no longer recognized as a formal unit by the International Commission on Stratigraphy, the term is still widely used.

Tuffs- a relatively soft rock, formed by volcanic ash that is ejected during an eruption. Following ejection and deposition, the ash may be consolidated into a solid rock. Also known as “tufa.”
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APPENDIX A

Water Quality Tables
<table>
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<tr>
<th>GWIC ID</th>
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NR = No Reading/No Data; J = above detection limit but below reporting limit; U = below detection limit.

cfs = cubic feet per second; °C = degree Celsius; µS/cm = microSiemens per centimeter; mV = millivolts; mg/L = milligrams per liter

Underlined text indicates exceedance of acute aquatic life standard; Bold text indicates exceedance of chronic life standard; Asterisks (*) indicate exceedance of human health standard.

Notes on standards:  
a = chronic aquatic life standard, Al = 0.087 mg/L, but this standard is only enforceable when pH = 6.5 – 9.0;  
b = chronic aquatic life standard, Cd = 0.00012 mg/L;  
c = acute aquatic life standard, Cu = 0.04484 mg/L;  
d = acute and chronic aquatic life standards, Zn = 0.046 mg/L;  
e = chronic aquatic life standard, Cd = 0.00018 mg/L;  
g = chronic aquatic life standard, Cd = 0.00016 mg/L;  
h = chronic aquatic life standard, Zn = 0.067 mg/L;  
i = chronic aquatic life standard, Cd = 0.00016 mg/L;  
j = chronic aquatic life standard, Cu = 0.00499 mg/L;  
k = c = acute aquatic life standard, Cu = 0.00756 mg/L;  
chronic, Cu = 0.00534 mg/L.

Data taken from MBMG results in GWIC database: http://mbmgsowicz.mtech.edu/
Sept. 2015 data from DEQ samples (Energy Labs), most are total recoverable analyses, found in Water Quality Technical Report on file at DEQ.
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<th>Reduction Potential</th>
<th>Dissolved Oxygen</th>
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NR = No Reading; J = above detection limit but below reporting limit; U = below detection limit.
cfs = cubic feet per second; °C = degree Celsius, µS/cm = microSiemens per centimeter; mV = millivolts; mg/L = milligrams per liter
Underlined text indicates exceedance of acute aquatic life standard; Bold text indicates exceedance of chronic life standard; Asterisks (*) indicate exceedance of human health standard.
Notes on standards:
a = acute aquatic life standard, Al = 0.750 mg/L, but these standards are only enforceable when pH = 6.5 – 9.0; chronic, Al = 0.087 mg/L; b = acute aquatic life standard, Cd = 0.00052 mg/L; chronic, Cd = 0.000097 mg/L; c = acute aquatic life standard, Cu = 0.00379 mg/L; chronic, Cu = 0.00285 mg/L; d = chronic aquatic life standard, Pb = 0.000545 mg/L; e = acute and chronic aquatic life standards, Zn = 0.046 mg/L; f = chronic aquatic life standard, Cd, Zn = 0.00155 mg/L; g = acute and chronic aquatic life standards, Zn = 0.063 mg/L
Data taken from MBMG results in GWIC database: http://mbmggwick.mtech.edu/
Sept. 2015 data from DEQ samples (Energy Labs), most are dissolved analyses, found in Water Quality Technical Report on file at DEQ.
### Table A.3
Summarized Water Quality Data for Groundwater Sites Below East Fork-Emigrant Creek Confluence

<table>
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<tr>
<th>GWIC ID</th>
<th>Groundwater Site Name</th>
<th>Sample Date</th>
<th>Flow (gpm)</th>
<th>Temp (°C)</th>
<th>pH</th>
<th>Conductivity (µS/cm)</th>
<th>Specific Conductivity</th>
<th>Reduction Potential (mV)</th>
<th>Dissolved Oxygen (mg/L)</th>
<th>Total Dissolved Solids (mg/L)</th>
<th>Hardness (mg/L)</th>
<th>Sulfate (mg/L)</th>
<th>Iron (mg/L)</th>
<th>Aluminum (mg/L)</th>
<th>Arsenic (mg/L)</th>
<th>Cadmium (mg/L)</th>
<th>Copper (mg/L)</th>
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<td>&lt;0.000060 U</td>
<td>&lt;0.00010 U</td>
<td>&lt;0.00149 U</td>
<td>NR</td>
</tr>
<tr>
<td>182638</td>
<td>PRIVATE WELL</td>
<td>9/10/2000</td>
<td>NR</td>
<td>4.5</td>
<td>7.6</td>
<td>153</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
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<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
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</tr>
<tr>
<td>260668</td>
<td>CHICO HOT SPRINGS</td>
<td>4/12/2011</td>
<td>320</td>
<td>47.3</td>
<td>7.52</td>
<td>435.9</td>
<td>369</td>
<td>5.26</td>
<td>269.4</td>
<td>121.3</td>
<td>50.1</td>
<td>&lt;0.005 U</td>
<td>0.003 U</td>
<td>0.00716 U</td>
<td>&lt;0.0002 U</td>
<td>0.00367 U</td>
<td>&lt;0.0002 U</td>
<td>0.192*</td>
<td>0.00375 U</td>
<td>NR</td>
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<tr>
<td>261120</td>
<td>CHICO RESORT COLD SPRING</td>
<td>12/20/2000</td>
<td>15</td>
<td>7.9</td>
<td>8.9</td>
<td>163</td>
<td>NR</td>
<td>NR</td>
<td>106.1</td>
<td>73.2</td>
<td>2.9</td>
<td>&lt;0.005 U</td>
<td>&lt;0.030 U</td>
<td>&lt;0.001 U</td>
<td>&lt;0.002 U</td>
<td>&lt;0.002 U</td>
<td>&lt;0.002 U</td>
<td>&lt;0.002 U</td>
<td>&lt;0.002 U</td>
<td>&lt;0.002 U</td>
</tr>
</tbody>
</table>

NR = No Reading; J = above detection limit but below reporting limit; U = below detection limit.
cfs = cubic feet per second; °C = degree Celsius; µS/cm = microSiemens per centimeter; mV = millivolts; mg/L = milligrams per liter

Underlined text indicates exceedance of acute aquatic life standard; Bold text indicates exceedance of chronic life standard; Asterisks (*) indicate exceedance of human health standard.

Notes on standards:

a = acute aquatic life standard, Cu = 0.00521 mg/L; chronic, Cu = 0.00380 mg/L
b = human health standard, Ni = 0.100 mg/L; acute aquatic life standard, Ni = 0.0614

Data taken from MBMG results in GWIC database: http://mbmggwic.mtech.edu/
Sept. 2015 data from DEQ samples (Energy Labs), most are total recoverable analyses, found in Water Quality Technical Report on file at DEQ.